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Research Report

Ex-post evaluation of the impact of restructuring aid decisions on the viability of aided (non-financial) firms: Final report

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Ex-post evaluation of the impact of restructuring aid decisions on the viability of aided (non financial) firms

Final report

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Ex-post evaluation of the impact of restructuring aid decisions on the viability of aided (non-financial) firms

Final report

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Abstract

Financial distress at the company level plays a signalling role in an economy, indicating that a firm is not making optimal use of its resources. While financial distress and consequent market exit play a key role in ensuring an efficient allocation of resources, they can have negative economic consequences. The European Commission (EC) has allowed state aid to firms in difficulty. This aid can only be given under strict conditions, set out in guidelines on state aid for rescuing and restructuring firms in difficulty. The overall objective of the EU policy is to contribute to successful restructuring of firms and their return to viability.

This study "Ex-post evaluation of the impact of restructuring aid decisions on the viability of aided (non-financial) firms" has the overall objective of evaluating the EC's ex-ante assessment of restructuring plans submitted by the Member States. Particular focus is given to investigating whether support was provided only in the context of a restructuring plan that was likely to return the firms to long-term viability within a reasonable period of time. The evaluation is based on the analysis of 12 evaluation questions – providing first a descriptive assessment followed by detailed analysis of effectiveness and efficiency.

Résumé

La détresse financière au niveau de l'entreprise joue un rôle de signalisation dans une économie, indiquant qu'une entreprise n'utilise pas les ressources de manière optimale. Bien que la détresse financière et la sortie du marché qui en résulte jouent un rôle clé dans l'allocation efficace des ressources, elles peuvent avoir des conséquences économiques négatives. Dans ce contexte, la Commission Européenne (CE) a autorisé des aides d'État à des entreprises en difficulté. Cette aide ne peut être accordée que dans des conditions strictes, énoncées dans les lignes directrices concernant les aides d'État au sauvetage et à la restructuration des entreprises en difficulté. L'objectif global de la politique de l'UE est de contribuer à la réussite de la restructuration des entreprises et leur retour à la viabilité.

Cette étude "Ex-post évaluation de l'impact des décisions d'aide à la restructuration sur la viabilité des aides (non-financières) aux entreprises" a comme objectif principal l'appréciation de l'évaluation ex-post, par la CE, des plans de restructuration soumis par les États membres. On a fait spécialement attention à assurer que le soutien ait été fourni seulement dans le contexte d'un plan de restructuration qui serait susceptible de remettre les entreprises viables à long terme dans un délai raisonnable. L'évaluation est basée sur l'analyse de 12 questions d'évaluation – donnant d'abord une évaluation descriptive suivie d'une analyse détaillée de l'efficacité et de l'efficience

The information and views set out in this study are those of the author(s) and do not necessarily reflect the official opinion of the Commission. The Commission does not guarantee the accuracy of the data included in this study. Neither the Commission nor any person acting on the Commission's behalf may be held responsible for the use which may be made of the information contained therein.

Executive Summary

Financial distress at the company level plays a signalling role in an economy, indicating that a firm is not making optimal use of its resources. If it does not manage to remedy this suboptimal use of resources, the firm will disappear from the market. But while financial distress and market exit play a key role in ensuring an efficient allocation of resources, they may also have negative social and economic consequences.

The European Commission (EC) has, at least since the 1970s, allowed state aid to firms in difficulty on the basis of the EU Treaties. This aid can only be given under strict conditions, set out in guidelines on state aid for rescuing and restructuring firms in difficulty. It requires an agreed and realistic restructuring plan setting out the measures necessary to restore the viability of the firm. The amount of aid allowed is kept to the minimum necessary to implement the plan and appropriate measures are taken to minimize the adverse impact on competition. The overall objective of EU policy for restructuring aid to the non-financial sector is to contribute to successful restructuring of firms, i.e. a return to viability.

To evaluate whether the EC is effective in regard to this overall objective, the Directorate-General for Competition (DG Competition) commissioned the study: “Ex-post evaluation of the impact of restructuring aid decisions on the viability of aided (non-financial) firms”. The consortium formed by WIFO, SPI, Ecorys, ZEW and Idea Consult was asked to provide the study.

The overall objective of the study is to evaluate the EC’s ex-ante assessment of restructuring plans submitted by the Member States. Particular focus is given to investigating whether support was provided only in the context of a restructuring plan that was likely to return the firms to long-term viability within a reasonable period of time.

The study methodology addresses descriptive questions and analyses two standard evaluation criteria recommended for EC evaluations: effectiveness questions and efficiency questions. The analysis under these headings required developing answers to 12 specific evaluation questions which were defined by the EC.

Data collection and analysis was conducted as below:

- *Literature review* – which provided an analysis of the relevant academic publications to develop the basis for the activities included in the study by: confirming that the scope was properly defined, validating the methodology chosen for the different stages of the process, and highlighting the results of previous work.
- *Overview of restructuring aid cases* – which provided a general analysis of the positive (compatible aid) restructuring decisions concerning individual firms in difficulty (in the non-financial sector, excluding the agricultural and the fishery sectors), adopted between the 1 January 2000 and the 31 December 2012. In total, the study covered a final sample of 60 companies.
- *Case studies* – a significant element of the methodology was the development of the case studies. A total of 6 case study companies were analysed, 3 of which had less than 250 employees. The case studies normally involved 8-10 interviews and an analysis of financial data. Cooperation on the part of the case study companies was voluntary. A number of other companies that were contacted for inclusion as a case study refused to cooperate. The remaining 6 companies agreed only under strict confidentiality reassurance to participate in the study, hence all company-specific information has been fully anonymised in this report.
- *Counterfactual analysis* – which aimed at constructing a counterfactual group to enable a reliable comparison of the survival probability between 56 of the aid-receiving firms and (56/168 – depending on the methodology used) most

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similar non-aid-receiving firms by matching techniques. Based on the sample restricted to aid recipients and the matched non-aid recipients the dynamic of survival was analysed by survival models and the development of financial viability was analysed using order logit models.

Strengths and limitations of the data and methods

The main strengths and limitations of the methodology applied in this study are the following:

Strengths:

- Full analysis of restructuring State Aid decisions.
- Combination of several methods and cross-checking the results across definitions, methods and cases.
- Careful qualitative coverage of various dimensions of effectiveness and efficiency, and analysis of developments over time.
- Range of assessment methods and data sources: literature review, case studies, counterfactual analysis, descriptive analysis; secondary data (AMADEUS) and primary data (from restructuring plans and notifications, decision, interviews).
- Number of stakeholders involved (mainly for the case studies).
- Range of techniques applied in the counterfactual analysis.

Limitations:

- Many findings in the case studies were initially based on statements by stakeholders - although they have then been cross-checked and various groups participated in the interviews. Further, financial analysis of the case study companies across several years complements the statements of stakeholders.
- It was not possible to interview all former managers, bank officials, court officials/judges and competitors in all the 6 cases could be interviewed.
- Caution should be used when extrapolating findings to future cases, as all the 60 cases may not be fully relevant to all Member States specific schemes and also inference can depend on macroeconomic factors linked to, for instance, the global financial crisis.

Findings of the evaluation

An overview of the results of the analysis for each of the 12 evaluation questions defined by the EC are provided below, categorized through descriptive questions, effectiveness questions and efficiency questions.

Descriptive Questions:

Evaluation Question 1: How many of the aid recipients are still active on their original market today? If they are not, what happened to them (exited, merged, changed activity, etc.)? Can these developments be related to a typology of key reasons?

- 31 companies are still active on their original market; 14 companies have been acquired by other companies or groups, which have changed their structure of ownership; 8 companies are in state of bankruptcy¹ and 7 companies are bankrupt².
- From the feedback of the interviewees across the 6 case studies, we can infer reasons that have contributed to companies not being active in the market: Unavailability of timely financing/ delayed disbursement of loans; declining profit margins and increasing losses; high labour costs and pressure from labour unions; increasing competition from producers in the emerging economies; contraction in business/ reduction in market size; and the global economic crisis.

Evaluation Question 2: To what extent, and at what point in time, have firms that have benefitted from restructuring aid actually returned to viability, and to what extent have they remained viable?

Viability of the firms can be ascertained from calculating Profit before Taxes (PBT) and Return on Capital Employed (ROCE).

- In regard to PBT:
 - 13 firms that had negative PBT at the time of the decision benefitted from the restructuring aid such that they have positive PBT as measured with latest available data. Of these 13 firms, 62% returned to viability after 1 year, 15% after 2 years, 8% after 3 years and the remaining 15% after 6 years;
 - Overall, 68% of all the firms have improved their performance with regard to PBT.
- In regard to ROCE:
 - 13 firms that had negative ROCE at the time of the decision have positive ROCE as measured from the latest available data. Of these 13 firms, 54% returned to viability after 1 year, 15% after 2 years, 8% after 3 years and the remaining 23% after 6 years;
 - Overall, 61% of all the firms have improved their performance with regard to ROCE.
- Using an alternate measure of viability, the Altman Z score, 26 firms' signalled sufficient financial viability in current year as compared to 17 firms in the decision year.

¹ Companies in state of bankruptcy are active companies in insolvency proceedings. The company will either return to normal operation, or will be reorganized (parts of its activity can be restructured or sold) or if not, then it will be liquidated/dissolved.

² Bankrupt companies are companies that are dissolved and no longer operate in the market.

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Evaluation Question 3: What is the survival probability of aided firms compared to the survival probability without aid?

- Using a combination of propensity score matching and exact matching we identify our control group. On average, we find an absolute 14% to 18% difference in survival probability between restructuring aid receiving firms and the counterfactual group: depending on the chosen definition of survival, 82% to 86% of the aid-recipients but only 62% to 68% from the counterfactual group survived.
- Subsequently we analyse two subsamples separately – aid received earlier than 2005 and aid received earlier than 2008. Employing OLS estimations, we find that the difference in survival probability between aid-recipients and the counterfactual group is significantly higher in the pre-2005 sample. This can both mean that aid is more effective in the long-term, but also that it had a bigger impact on survival during the financial crisis and its aftermath.
- We also measured the viability of a firm in categories of the Altman Z-Score. Using an ordered logit model, we find that aid recipients have a significantly higher probability to improve their financial viability. The difference in the probability of financial recovery between aid recipients and the counterfactual group is highest in the long-term.
- Conducting survival model analyses we find restructuring aid to increase a firm's lifecycle by approximately 8 to 15 years and to decrease the hazard rate by 44% to 56%.
- Restructuring aid receiving firms appeared to be less likely to be acquired since the impact of restructuring aid on survival probability is always highest for definitions of survival which consider acquisitions as a firm's market exit.
- Overall, the counterfactual-based analysis indicates that restructuring aid has achieved its aim, at least in part, of improving viability of the aided companies.

Effectiveness Questions:

The case studies were the main, although not only, source of the analysis for the effectiveness questions.

The results for evaluation question 4 and 6 are provided together.

Evaluation Question 4: Did the aided firm achieve the main financial and operational targets (e.g. net profit, cash flows, return on capital, debt, employment) set in the restructuring plan endorsed by the Commission, within the envisaged timeframe? How much of that was achieved by the restructuring measures and how much by (favourable or unfavourable) developments in the market context? To what extent did the compensatory measures impact the performance of the firm in this respect?

Evaluation Question 6: To which extent was the outcome influenced by the restructuring measures (including compensatory measures to mitigate the distortion of competition and own contribution) laid down in the Commission's decision and effectively implemented by the firm?

- The case studies show that many times the aided company did not fully achieve the main financial and operational targets as set in the restructuring plan.
- Delays in preparation of the restructuring plan at Member State level can negatively affect the outcome, for example rendering targets foreseen in the restructuring plan unrealistic. The final outcome or the ability to attain targets are also affected by the fact that restructuring measures are not fully implemented.

- There is general agreement by the companies and the stakeholders interviewed that the outcome without the aid was likely to have been bankruptcy.
- Different measures take different periods of time to take effect, thus the point at which the impact of the aid is measured is highly relevant.
- In regards to compensatory measures, the case studies examined do not appear to show significant negative impacts for the firms in question.

Evaluation Question 5: Did the key assumptions underlying the financial projections for the firm in the restructuring plan endorsed by the Commission prove realistic? In particular:

- a) Which of the various business scenarios included in the restructuring plan and the EC's decision proved realistic?
- b) To what extent can the restructuring plan laid down in the EC's decision be considered to be based on "realistic assumptions as to the future operating conditions" given the developments following the decision? Did the assumptions and the outcomes diverge and if so, in which direction and magnitude?
- The restructuring plans and underlying assumptions sometimes tend to be too optimistic, for example in relation to the execution of measures (timing), ability to gain new work, market developments and the financial impact of measures. At the same time the actual market conditions were worse than anticipated in the scenarios, related to the impact of the global economic and financial crisis.
 - A clear and significant information asymmetry exists between the company on the one hand, and the granting authorities and the EC on the other, resulting in an "information dependency" (to the company's advantage). This risk is emphasised by different stakeholder interests.
 - Delays in the formal decision procedure or in the actual execution of the decision have a significant impact on the reliability of the scenarios and assumptions.

Evaluation Question 7: Is there any evidence that the aid granted has created a major distortion of competition in the respective sector?

No evidence of major distortion caused by the aid was identified. While some companies show improved performance over competitors, their market share is not sufficient to constitute a major distortion. Further, in some cases, the compensatory measures were considered sufficient to prevent distortions.

Evaluation Question 8: Are there any regularities in the direction and magnitude of the deviation from initially estimated and realised business scenarios and cash flows?

The diversity of the firms in regards to sector, size, employee number, external factors in the market they are operating and uniqueness of the restructuring plan makes it difficult to draw consistent conclusions. In general, the assets restructuring and debt restructuring did not go according to plan for the case study companies. Financial restructuring had varied results.

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- Other organisational restructuring seems to have been realized positively in most of the cases.
- With regard to magnitude of the deviation, mixed results were observed. There were deviations from initially estimated and realized scenarios that can be attributed to the incomplete/ partial implementation of the restructuring plans.

Evaluation Question 9: Are there common features to the restructuring measures that impact the outcome in terms of viability? What conditions on the delivery of restructuring aid seem most effective in ensuring the viability of the aided undertakings?

The applied measures cover multiple elements, including increased efficiency of the (internal) working processes, a restructuring of the financial situation, a better market orientation and a restructuring of the work force. The case studies show that plans and individual measures can 'fail' and be delayed or less successful than expected.

- Although the success of the restructuring plans are dependent on the mix of different measures, the financial restructuring and the strengthening of the efficiency of the (internal) organisation are assessed to be the key measures in order to ensure the future survivability. There should be a balanced mix of measures with predictable outcomes and more desired outcomes (e.g. behavioural change, winning more work) is important. It appears that high dependency on 'soft' measures undermines the objective of ensuring the viability of the aided undertakings.
- The more psychological dimension of the restructuring plans and the underlying measures is important. The attempt to revitalise and restructure the company may result in new ideas and a new positive vibe. At the same time the plan and the state support may give a strong and positive 'signal' to creditors and investors.

Evaluation Question 10: Are there any unexpected impacts regarding viability?

There are several unexpected elements that have been identified that influenced a potential return to viability. These include, among others, the behavioural change that is witnessed for many of the firms studied, the partial implementation of the restructuring plan (that seemed to be sufficient to return to viability for some firms), the lack of interest of financial institutions to provide the required funds even though the governments are prepared to grant the aid and the EC approved, and the timeframe for the Member States to grant the aid (that in some cases was too long).

Efficiency Questions:

Evaluation Question 11: Did the Commission really need and use all the information submitted by the Member States, or are there indications that some administrative requirements/costs could have been avoided without endangering a good decision-making basis of the Commission?

An improvement in terms of the duration of time for a decision to be taken can be observed over the period studied. However, delays in response to requests for clarification have appeared to negatively affect the duration of the process due to:

- Lack of experience/knowledge on the part of either national authorities, regional or local authorities or the companies involved with regard the requirements of the process - resulting in lower quality information and increased requests for clarification. There was also a preferred use of intermediaries rather than direct communication with the company.
- Lack of use of informal written communication or even oral discussion for some questions/ requirements.

It appears that information requirements were not deemed to be excessive or viewed as unnecessary by the majority of stakeholders, although a lack of understanding of the purpose of certain requests was observed.

Evaluation Question 12: Conversely, should the Commission have requested additional information that would have been useful to enable it to assess viability aspects even better?

The information requested appears to have been adequate to assess viability in the majority of the cases examined, with a few specific instances suggesting additional information that could help support the assessment of these aspects.

- Access to specific sectoral knowledge is important to facilitate an efficient process, since it can help determine the need for further information and/ or in assessing the need for additional compensatory measures.
- Access to relevant external documents such as national assessments of the company situation can provide a broader basis for the decision-making process and reduce the risk of using inaccurate assumptions.

Recommendations

The recommendations resulting from the conclusions are as follows (the specific evaluation questions used as the main source of the recommendation are provided in brackets):

- It is difficult to fully match the restructuring plans to the companies' performance. Restructuring plans should have carefully formulated Key Performance Indicators (KPIs) that should be accurately monitored over the restructuring period and beyond. This can help provide crucial insights to explain the effect of the restructuring aid on company performance (Evaluation Question 4 and 6).
- Submitted notifications should possess measures that are SMART (specific, measurable, achievable, relevant and time bound), or those developed under a similar methodology (Evaluation Question 5 and 8).
- In order to ensure that the measures are implemented completely, a sequential mapping of the implementation should be outlined at the time of the decision (Evaluation Question 8).
- Companies receiving the aid should be obliged to submit an activity and target achievement report every 6 months (treated as a deliverable and legally mandated) (Evaluation Question 8).

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- A balanced mix of measures with a focus on tangible outcomes should be considered when formulating the restructuring plan (Evaluation Question 9).
- A clear and detailed description of the required information and a checklist would increase the chances of a return to viability (Evaluation Question 10).
- All immediate stakeholders (EC/ Member State/ company) and secondary stakeholders (e.g. financial institutions/ trade unions) should be on board and cooperative from the beginning. This is especially relevant with regards to the financial institutions such as banks (Evaluation Question 10).
- Direct interactions between EC and the companies should be promoted to assess whether information requested are needed and to help clarify any points of misunderstanding (Evaluation Question 11 and 12).
- Since market forces often affect the ability to achieve the restructuring targets, it can be interesting to require a well-defined fall-back option in case one of the main assumptions is invalidated by external events (Evaluation Question 11 and 12).
- A more concrete restructuring plan template or restructuring plan protocol which complements the Indicative model restructuring plan set out in the R&R 2014 Guidelines should be required to allow the EC in effective and efficient decision making (Evaluation Question 11 and 12).
- Agreement should be reached with the Member State to provide the state aid within a short time span following the decision to grant aid (Evaluation Question 11 and 12).

Overall, it is recommended that firms receiving state aid should be required to participate in any EC-funded evaluation studies. This commitment to cooperate should be made a condition for the aid.

Sommaire exécutif

La détresse financière au niveau de l'entreprise joue un rôle de signalisation dans une économie, indiquant qu'une entreprise n'utilise pas ses ressources de manière optimale. Si elle ne parvient pas à remédier à cette utilisation non optimale des ressources, l'entreprise va disparaître du marché. Mais, tandis que la détresse financière et la sortie du marché jouent un rôle clé, en assurant une allocation efficace des ressources, elles peuvent également avoir des conséquences sociales et économiques négatives.

La Commission Européenne (CE) a, au moins depuis les années 1970, autorisé des aides d'État aux entreprises en difficulté, sur la base des traités de l'UE. Cette aide ne peut être accordée que dans des conditions strictes, énoncées dans les lignes directrices concernant les aides d'État au sauvetage et à la restructuration des entreprises en difficulté. Elle exige un plan de restructuration convenu et réaliste, précisant les mesures nécessaires pour rétablir la viabilité de l'entreprise. Le montant de l'aide autorisée est maintenu au minimum nécessaire pour mettre en œuvre le plan, et des mesures appropriées sont prises pour minimiser les impacts négatifs sur la concurrence. L'objectif global de la politique de l'UE, envers les aides à la restructuration pour le secteur non financier, est de contribuer à la réussite de la restructuration d'entreprises, c'est-à-dire, à un retour à la viabilité.

Pour évaluer si l'EC est efficace à l'égard de cet objectif global, la Direction Générale de la Concurrence (DG Concurrence) a commandé l'étude: " Ex-post évaluation de l'impact des décisions d'aide à la restructuration sur la viabilité des aides (non-financières) aux entreprises ". Le consortium formé par IWIFO, SPI, Ecorys, ZEW et Idea Consult a été invité à fournir l'étude.

L'objectif général de cette étude est l'appréciation, faite par la CE, de l'évaluation ex-post des plans de restructuration soumis par les États membres. L'étude a fait spéciale attention à enquêter si l'appui a été fourni uniquement dans le contexte d'un plan de restructuration qui serait susceptible de retourner la viabilité à long terme aux entreprises, dans un délai raisonnable.

La méthodologie de l'étude aborde des questions descriptives et analyse deux critères d'évaluation normalisés, recommandés pour ces évaluations : les questions d'efficacité et les questions d'efficience. L'analyse sous ces rubriques exige l'élaboration de réponses à 12 questions d'évaluation spécifiques qui ont été définies par la CE.

La collecte et l'analyse des données a été réalisée comme ci-dessous:

- *Revue de littérature* - qui a fourni une analyse des publications scientifiques pertinentes pour développer la base des activités incluses dans l'étude, en confirmant que le champ a été défini correctement, validant la méthodologie choisie pour les différents stades du processus, et en soulignant les résultats de travaux antérieurs.
- *Aperçu des aides la restructuration* - qui a fourni une analyse générale des décisions de restructuration positives (aide compatible) concernant des entreprises en difficulté (dans le secteur non-financier, à l'exclusion des secteurs de l'agriculture et de la pêche), adoptées entre le 1er janvier 2000 et le 31 décembre 2012. Au total, l'étude portait sur un échantillon final de 60 entreprises.
- *Études de cas* - un élément important de la méthodologie a été l'élaboration d'études de cas. Un total de 6 études de cas de sociétés a été analysé, dont 3 avaient moins de 250 employés. Les études de cas impliquaient normalement 8-10 entrevues et une analyse de données financières. La coopération de la part des entreprises à l'étude était volontaire. Un certain nombre d'autres sociétés qui ont été contactées pour l'inclusion comme une étude de cas ont refusé de coopérer. Les 6 autres sociétés ont accepté de participer à l'étude uniquement sous un accord de stricte

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confidentialité, donc, toutes les informations spécifiques de la société ont été rendues entièrement anonymes dans ce rapport.

- *Analyse contrefactuelle* - qui visait à construire un groupe contrefactuel pour permettre une comparaison fiable de la probabilité de survie entre 56 des entreprises bénéficiaires de l'aide et (56/168 - en fonction de la méthodologie utilisée) des entreprises non-bénéficiaires de l'aide, plus similaires, en comparant les techniques. Basé sur l'échantillon restreint de bénéficiaires de l'aide et des non-bénéficiaires de l'aide appariés, la dynamique de la survie a été analysée par les modèles de survie et le développement de viabilité financière a été analysé à l'aide des modèles de régression logistique.

Points forts et contraintes des données et méthodes

Les principaux points forts et contraintes de la méthodologie appliquée dans la présente étude sont les suivants:

Points forts:

- Analyse complète de la restructuration des décisions relatives aux aides d'État.
- Combinaison de plusieurs méthodes et contre-vérification des résultats à travers définitions, méthodes et cas.
- Couverture qualitative minutieuse des diverses dimensions de l'efficacité et l'efficience, et analyse de l'évolution au fil du temps.
- Gamme de sources de données et méthodes d'évaluation : examen de la documentation, études de cas, analyses contrefactuelles, analyse descriptive; données secondaires (Amadeus) et données primaires (de plans de restructuration notifications, décision, entrevues).
- Nombre d'intervenants (principalement pour les études de cas).
- Gamme de techniques appliquées à l'analyse contrefactuelle.

Contraintes:

- De nombreuses constatations dans les études de cas ont été initialement basées sur les déclarations faites par les intervenants - bien qu'elles aient ensuite été contre-vérifiées et que divers groupes aient participé aux entrevues. En plus, l'analyse financière des entreprises à l'étude à travers plusieurs années vient compléter les déclarations de parties prenantes.
- Il n'a pas été possible d'interviewer tous les dirigeants, responsables de la banque, fonctionnaires des tribunaux / juges et concurrents dans tous les 6 cas
- Il faut être prudent lorsqu'on extrapole des résultats à des cas futurs, puisque tous les 60 cas peuvent ne pas être entièrement pertinentes pour les régimes spécifiques de tous États membres et aussi l'inférence peut dépendre de facteurs macroéconomiques liées à , par exemple , la crise financière mondiale.

Constatations de l'évaluation

Un aperçu des résultats de l'analyse pour chacune des 12 questions de l'évaluation définies par la CE est fourni ci-dessous, classé par questions descriptives, questions d'efficacité et questions d'efficience.

Questions descriptives:

Question d'évaluation 1: Combien de bénéficiaires des aides sont toujours actives sur leur marché d'origine aujourd'hui? Si ils ne le sont pas, ce qui leur est arrivé (abandon, fusion, changement d'activité, etc.)? Ces évolutions peuvent être reliées à une typologie des principales raisons?

- 31 entreprises sont encore actives sur leur marché d'origine; 14 sociétés ont été acquises par d'autres sociétés ou groupements, qui ont modifié leur structure de propriété; 8 compagnies sont en état de faillite³ et 7 sociétés sont en faillite⁴.
- À partir des commentaires des personnes interrogées à travers les 6 études de cas, nous pouvons déduire les motifs qui ont contribué à que des sociétés ne soient plus actives dans le marché: indisponibilité de financement en temps opportun/ décaissement tardif des fonds des prêts; diminution des marges de profit et pertes croissantes; coût élevé du travail et pression des syndicats; concurrence accrue des producteurs dans les économies émergentes; contraction des affaires/ réduction de la taille du marché; et la crise économique mondiale.

Question d'évaluation 2: Dans quelle mesure et à quel moment dans le temps, sont les entreprises qui ont bénéficié de l'aide de restructuration effectivement retournées à la viabilité, et dans quelle mesure ont-elles demeuré viables?

La viabilité des entreprises peut être déterminée à partir du calcul des bénéfices avant impôts (PBT) et le rendement du capital investi (RCI).

- En ce qui concerne le PBT:
 - 13 entreprises qui avaient PBT négatif au moment de la décision ont tellement bénéficié de l'aide à la restructuration qu'elles ont un résultat positif tel que mesuré avec PBT, d'après les données disponibles les plus récentes. De ces 13 entreprises, 62% sont retournés à la viabilité après 1 an, 15% après 2 ans, 8% après 3 ans et les derniers 15% après 6 ans;
 - Dans l'ensemble, 68% de toutes les entreprises ont amélioré leur rendement en égard aux PBT.
- En ce qui concerne le rendement du capital engagé (RCI):
 - 13 entreprises qui avaient un rendement du capital engagé négatif au moment de la décision ont un rendement du capital engagé positif, tel que mesuré d'après des données disponibles les plus récentes. De ces 13 entreprises, 54% sont retournés à la viabilité après 1 an, 15% après 2 ans, 8% après 3 ans et les 23% restantes après 6 ans;
 - Dans l'ensemble, 61% de toutes les entreprises ont amélioré leur performance en ce qui concerne le rendement du capital engagé.
- À l'aide d'une autre mesure de viabilité, l'Altman Z SCORE, 26 entreprises ont signalé suffisamment de viabilité financière pendant l'année en cours en comparaison à 17 entreprises dans l'année de décision.

³ Les entreprises en état de faillite sont les entreprises actives dans la procédure d'insolvabilité. La compagnie va, soit revenir au fonctionnement normal, soit être réorganisée (parties de son activité peut être restructurées ou vendues) ou, au cas échéant, liquidée/dissoute.

⁴ Entreprises en faillite sont des entreprises qui sont dissoutes et ne fonctionnent plus dans le marché.

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Question d'évaluation 3: Quelle est la probabilité de survie des entreprises aidées par rapport à la probabilité de survie sans aide?

- En utilisant une combinaison d'appariement par score de propension et la concordance exacte, nous identifions notre groupe de contrôle. En moyenne, nous trouvons une différence absolue de 14 % à 18 % dans la probabilité de survie entre les entreprises qui ont reçu des aides à la restructuration et le groupe contrefactuel: en fonction de la définition choisie de survie, 82% à 86% des bénéficiaires de l'aide ont survécu, contre seulement 62 % à 68 % du groupe contrefactuel.
- Par la suite, nous analysons deux sous-échantillons séparément - aides reçues plus tôt que 2005 et aides reçues plus tôt que 2008. Employant les estimations MCO, nous trouvons que la différence dans la probabilité de survie entre les bénéficiaires d'aide et le groupe contrefactuel est significativement plus élevée dans le échantillon pré-2005. Cela peut signifier que l'aide est plus efficace à long terme, mais également qu'elle avait un impact plus grand sur la survie au cours de la crise financière et ses conséquences.
- Nous avons également mesuré la viabilité d'une entreprise dans les catégories de l'Altman Z-score. À l'aide d'un modèle de régression logistique ordonné, nous trouvons que les bénéficiaires de l'aide ont une probabilité significativement plus élevée d'améliorer leur viabilité financière. La différence dans la probabilité de recouvrement financier entre les bénéficiaires de l'aide et le groupe contrefactuel est plus élevée à long terme.
- Menant des analyses du modèle de survie, nous trouvons que des aides à la restructuration accroissent le cycle de vie d'une entreprise d'environ 8 à 15 ans et baissent le taux de risque en 44 % à 56 %.
- Les entreprises qui reçoivent une aide à la restructuration semblent être moins susceptibles d'être acquises puisque l'impact de l'aide à la restructuration sur la probabilité de survie est toujours plus élevé pour les définitions de survie qui considèrent les acquisitions comme la sortie du marché d' une entreprise.
- Dans l'ensemble, l'analyse fondée sur le contrefactuel indique que l'aide à la restructuration a , au moins en partie, atteint son but d' améliorer la viabilité des entreprises aidées.

Les questions d'efficacité:

Les études de cas ont été la principale, mais pas la seule, source de l'analyse de l'efficacité des questions.

Les résultats des questions d'évaluation 4 et 6 sont fournis ensemble.

Question d'évaluation 4: L'entreprise bénéficiaire a-t-elle pu atteindre les principaux objectifs financiers et opérationnels (p. ex. bénéfice net, flux de trésorerie, rendement du capital, dette, emploi) fixés dans le plan de restructuration approuvé par la Commission, dans les délais prévus? Combien de ce montant a été obtenu par les mesures de restructuration et combien par des développements (favorables ou défavorables) dans le contexte du marché? Jusqu'à quel point les mesures compensatoires ont eu d'incidence sur les performances de l'entreprise à cet égard?

Question d'évaluation 6: Dans quelle mesure était le résultat influencé par les mesures de restructuration (y compris des mesures compensatoires afin d'atténuer les distorsions de concurrence et propre contribution) prévues dans la décision de la Commission et mises en œuvre efficacement par l'entreprise?

- Les études de cas montrent que de nombreuses fois l'entreprise bénéficiaire de l'aide n'a pas pleinement atteint les principaux objectifs financiers et opérationnels, comme défini dans le plan de restructuration.
- Des retards dans l'élaboration du plan de restructuration au niveau de l'État membre peuvent affecter négativement le résultat, par exemple faisant les objectifs prévus dans le plan de restructuration devenir irréalistes. Le résultat final ou l'aptitude à atteindre les cibles sont également affectés par le fait que des mesures de restructuration ne sont pas intégralement mises en œuvre.
- Il y a un accord général parmi les entreprises et les intervenants interrogés que le résultat sans l'aide était susceptible d'avoir été la faillite.
- Différentes mesures prennent différentes périodes de temps avant de prendre effet, donc le point auquel l'impact de l'aide est mesuré est très pertinent.
- En ce qui concerne les mesures compensatoires, les études de cas examinées ne semblent pas montrer d'importantes incidences négatives pour les entreprises en question.

Question d'évaluation 5: Les hypothèses clés qui sous-tendent les projections financières pour l'entreprise dans le plan de restructuration approuvé par la Commission se sont-elles prouvées réalistes? En particulier:

A) Lesquels des divers scénarios d'entreprise inclus dans le plan de restructuration et dans la décision d'EC se sont avérés réalistes?

B) Dans quelle mesure le plan de restructuration prévu dans la décision d'EC peut être considéré fondé sur " des hypothèses réalistes quant aux conditions d'exploitation futures" ,étant donnée l'évolution de la situation à la suite de la décision? Les hypothèses et les résultats ont divergé et si oui, dans quelle direction et avec quelle amplitude?

- Les plans de restructuration et les hypothèses sous-jacentes ont parfois tendance à être trop optimistes, par exemple en ce qui concerne l'exécution des mesures (timing), la capacité d'acquérir de nouveaux travaux, l'évolution du marché et l'impact financier des mesures. En même temps, les conditions réelles du marché étaient pires que prévu dans les scénarios, liées à l'impact de la crise économique et financière mondiale.
- Une asymétrie de l'information claire et significative existe entre l'entreprise d'une part , et les autorités concédantes et la CE sur l'autre , résultant en une "information de dépendance" (à l'avantage de la société). Ce risque est accentué par les différents intérêts des intervenants
- Les retards dans la procédure de décision formelle ou dans l'exécution effective de la décision ont un impact significatif sur la fiabilité des scénarios et des hypothèses.

Question d'évaluation 7: Ya-t-il des preuves indiquant que l'aide octroyée a créé une distorsion majeure de la concurrence dans le secteur considéré?

Aucune preuve de grandes distorsions de concurrence provoquées par les aides n'a été identifiée. Tandis que certaines entreprises présentent un meilleur rendement que leurs concurrents, leur part de marché n'est pas suffisante pour constituer une distorsion majeure. En outre, dans certains cas, les mesures compensatoires étaient jugées suffisantes pour éviter les distorsions.

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Question d'évaluation 8: Y a-t-il des régularités dans la direction et l'ampleur de l'écart par rapport aux estimations initiales, aux scénarios réalisés et aux flux de trésorerie?

Avec la diversité des entreprises, en ce qui concerne le secteur, la taille, nombre d'employés, les facteurs externes dans le marché où ils fonctionnent et l'individualité du plan de restructuration, il est difficile de prendre des conclusions consistantes. En général, la restructuration des actifs et la restructuration de la dette ne se sont pas déroulés selon le plan pour les entreprises en étude de cas. La restructuration financière a eu des résultats variés.

- D'autres restructurations organisationnelles semblent avoir été réalisées de façon positive, dans la plupart des cas.
- En ce qui concerne l'ampleur de la déviation, des résultats variés ont été observés. Il y avait des écarts par rapport aux scénarios initialement estimés et réalisés qui peuvent être attribués à l'état incomplet/ou de mise en œuvre partielle des plans de restructuration.

Question d'évaluation 9: Y a-t-il des caractéristiques communes aux mesures de restructuration qui ont une incidence sur les résultats, en termes de viabilité? Quelles conditions sur la prestation d'une aide à la restructuration semblent les plus efficaces pour assurer la viabilité des entreprises bénéficiaires?

Les mesures appliquées couvrent plusieurs éléments, y compris une efficacité accrue du processus de travail (interne), une restructuration de la situation financière, une meilleure orientation vers le marché et une restructuration de la force de travail. Les études de cas montrent que les plans et mesures individuelles peuvent 'échouer' et être retardés ou avoir moins de succès que prévu.

- Bien que le succès des plans de restructuration dépende du mixage de différentes mesures, la restructuration financière et le renforcement de l'efficacité de l'organisation (interne) sont évalués comme les principales mesures pour assurer la viabilité de l'avenir. Il devrait y avoir une combinaison équilibrée de mesures avec des résultats prévisibles et plus de résultats souhaités (p. ex. un changement comportemental, remportant plus de travail est important). Il semble qu'une haute dépendance de des mesures "douces" compromet l'objectif d'assurer la viabilité des entreprises bénéficiaires.
- La dimension plus psychologique des plans de restructuration et les mesures sous-jacentes est importante. L'effort visant à revitaliser et à restructurer l'entreprise peut entraîner de nouvelles idées et une nouvelle ambiance positive. En même temps, le plan et le soutien de l'État peuvent donner un 'signal' forte et positive pour les créanciers et les investisseurs.

Question d'évaluation 10: Existe-il des impacts inattendus concernant la viabilité?

Il existe plusieurs éléments inattendus et identifiés qui ont influencé un éventuel retour à la viabilité. Cela comprend, entre autres, le changement de comportement qui est témoigné pour bon nombre des sociétés étudiées, la mise en œuvre partielle du plan de restructuration (qui semble, toutefois, être suffisante pour un retour à la viabilité de certaines entreprises), le manque d'intérêt des institutions financières de fournir les fonds nécessaires, même dans le cas où les gouvernements sont disponibles pour accorder l'aide et la CE a approuvé, et le timing pour les États membres d'accorder l'aide qui, dans certains cas, a été trop long.

Les questions d'efficience:

Question d'évaluation 11: La Commission a-t-elle vraiment eu besoin d'utiliser l'ensemble des informations soumises par les États membres, ou y-a-t'il des indications que certaines exigences administratives/coûts auraient pu être évités sans mettre en danger une bonne base de décision de la Commission?

Une amélioration en termes de durée de temps pour que la décision soit prise peut être observée au cours de la période étudiée. Toutefois, les retards dans la réponse aux demandes d'éclaircissement ont semblé avoir une incidence négative sur la durée du processus en raison de:

- Manque d'expérience/de connaissances de la part des autorités nationales, régionales ou locales ou des entreprises concernées en ce qui concerne les exigences du processus - résultant en une baisse de la qualité d'informations et une augmentation des demandes d'éclaircissements. Il y avait aussi une préférence pour l'utilisation des intermédiaires plutôt qu'une communication directe avec l'entreprise.
- Absence d'utilisation de la communication écrite informelle ou même d'une discussion orale pour certaines questions/exigences.

Il semble que les renseignements demandés n'ont pas été jugés excessifs ou perçus comme inutiles par la majorité des intervenants, bien qu'un manque de compréhension de l'objectif de certaines demandes ait été observé.

Question d'évaluation 12: Par contre, devrait la Commission avoir demandé des informations supplémentaires qui lui auraient permis d'évaluer bien mieux la viabilité de quelques aspects?

L'information demandée semble avoir été suffisante pour évaluer la viabilité dans la majorité des cas examinés, avec, toutefois, quelques instances particulières suggérant que quelque information additionnelle pourrait contribuer à l'appui de l'évaluation de ces aspects.

- L'accès à des connaissances sectorielles spécifiques est important pour faciliter un processus efficace, puisqu'il peut aider à déterminer le besoin de plus amples informations et/ou évaluer la nécessité de mesures compensatoires supplémentaires.
- L'accès à des documents externes tels que des évaluations nationales de la situation d'entreprise peut fournir une base plus large pour le processus décisionnel et réduire le risque d'utiliser des hypothèses inexactes.

Recommandations

Les recommandations résultant des conclusions sont comme suit (les questions d'évaluations spécifiques utilisées comme la principale source de la recommandation sont indiquées entre parenthèses):

- Il est difficile de faire correspondre complètement les plans de restructuration à la performance des entreprises. Les plans de restructuration devraient formuler avec soin les indicateurs de rendement clés (IRC) qui devraient être contrôlés avec précision au cours de la période de restructuration et au-delà. Ceci peut aider à fournir des idées essentielles pour expliquer l'effet de l'aide à la restructuration sur les performances de l'entreprise (Question d'évaluation 4 et 6).

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- Les notifications soumises devraient posséder des mesures qui sont SMART (spécifiques, mesurables, réalisables, pertinents et limitées dans le temps), ou celles qui sont développées dans le cadre d'une méthodologie semblable (Question d'évaluation 5 et 8).
- Afin d'assurer que les mesures sont mises en œuvre complètement, un mappage séquentiel de la mise en œuvre devrait être énoncé au moment de la décision (Question d'évaluation 8).
- Les entreprises ayant reçu de l'aide devraient être tenues de soumettre un rapport d'activité et d'atteinte de l'objectif tous les 6 mois (traité comme un produit livrable et légalement mandatée) (Question d'évaluation 8).
- Une combinaison équilibrée de mesures avec un accent sur les résultats tangibles devraient être considérée lors de la formulation du plan de restructuration (Question d'évaluation 9).
- Une description claire et détaillée de l'information requise et une liste de contrôle augmenterait les chances d'un retour à la viabilité (Question d'évaluation 10).
- Tous les intervenants immédiats (EC/ État Membre/ société) et les intervenants secondaires (par exemple les institutions financières/ syndicats) doivent être à bord et coopératifs dès le début. Ceci est particulièrement pertinent en ce qui concerne les institutions financières comme les banques (Question d'évaluation 10).
- Des interactions directes entre EC et les entreprises devraient être encouragées pour évaluer si les informations demandées sont nécessaires et pour aider à clarifier les points d'incompréhension (Question d'évaluation 11 et 12).
- Puisque les forces du marché affectent souvent la capacité d'atteindre les objectifs de restructuration, il peut être intéressant d'exiger un plan bien défini, au cas où l'une des principales hypothèses est invalidée par des événements externes (Question d'évaluation 11 et 12).
- Un modèle de plan de restructuration plus concrète ou plan de restructuration protocole qui complète le plan de restructuration de type indicatif figurant dans la R&R 2014 Lignes directrices devrait être nécessaire pour permettre à la CE une prise de décisions efficace et efficiente (Question d'évaluation 11 et 12).
- Un accord devrait être conclu avec l'État membre à fournir l'aide d'État dans un court laps de temps après la décision d'accorder l'aide (Question d'évaluation 11 et 12).

Dans l'ensemble, il est recommandé que les entreprises bénéficiaires d'aides d'Etat soient tenues de participer à toutes les études d'évaluation financées par la Communauté Européenne. Cet engagement de coopération devrait être une condition de l'aide.

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1. Introduction



1 Introduction

Financial distress at the company level plays a signalling role in an economy, indicating that a firm is not making optimal use of its resources. If it does not manage to remedy this suboptimal use of resources, the firm will disappear from the market. But while financial distress and market exit play a key role in ensuring an efficient allocation of resources, they may also have negative social and economic consequences. Those consequences include: loss of employment in particular areas, loss of technical knowhow and expertise or disruption to services.

In this context, the European Commission (EC) has, at least since the 1970s, allowed state aid to firms in difficulty. However, this aid can only be given under strict conditions (set out in Community guidelines on state aid for rescuing and restructuring firms in difficulty⁵), including to ensure that there is a feasible, coherent and far-reaching restructuring plan to restore the long-term viability of the firm within a reasonable time-frame, whilst the amount of aid given is kept to the minimum necessary to implement the plan and appropriate measures are taken to minimize the adverse impact on competition. To evaluate whether the EC is effective and efficient in regard to the aforementioned objective, the Directorate-General for Competition (DG Competition) commissioned the “Ex-post evaluation of the impact of restructuring aid decisions on the viability of aided (non-financial) firms” to the consortium formed by WIFO, SPI, Ecorys, ZEW and Idea Consult. This document is the Final Report and presents the results, conclusions and recommendations from the evaluation. Beyond this Introduction, this report is divided into the following chapters:

- Chapter 2. Context, objectives and evaluation questions: contains a description of the context of the evaluation, the objectives of the study and the evaluation questions;
- Chapter 3. Overview of the methodology: presents a brief overview of the methodology used in the evaluation and includes an analysis of its strengths and weaknesses;
- Chapter 4. Synopsis of literature review: presents a brief synopsis of the academic publications that relate closely to the topic under evaluation;
- Chapter 5. Evaluation questions – descriptive: presents the answers to the descriptive evaluation questions;
- Chapter 6. Evaluation questions – survival probability of aided firms: presents the answer to the descriptive evaluation question related to counterfactual;
- Chapter 7. Evaluation questions – effectiveness: presents the answers to the effectiveness evaluation questions;
- Chapter 8. Evaluation questions – efficiency: presents the answers to the efficiency evaluation questions;
- Chapter 9. Conclusions and recommendations: includes the main conclusions and recommendations arising from the evaluation.

There are 10 annexes – Annex 1 provides the literature review; Annex 2 includes the key characteristics of the restructuring aid cases; Annex 3 provides more information about the counterfactual analysis; Annex 4 presents the interview guides; and Annexes 5 to 10 (confidential) include the 6 case studies.

⁵ The current rules (“2014 Guidelines”), which entered into force as recently as 1 August 2014, are the fourth iteration, preceded by the “2004 Guidelines”, the “1999 Guidelines” and a first set of Guidelines in 1994.

2. Context, objectives and evaluation questions



2 Context, objectives and evaluation questions

2.1. Context of the evaluation

Rescue and restructuring aid can only be granted to firms in difficulty. According to the 2004 Rescue and Restructuring Guidelines (hereafter referred as 2004 Guidelines), a firm in difficulty means a firm that “... *is unable, whether through its own resources or with the funds it is able to obtain from its owner/shareholders or creditors, to stem losses which, without outside intervention by the public authorities, will almost certainly condemn it to going out of business in the short or medium term.*” In particular, a firm is regarded as being in difficulty in the following circumstances:

- a) *“in the case of a limited liability company, where more than half of its registered capital has disappeared and more than one quarter of that capital has been lost over the preceding 12 months;*
- b) *in the case of a company where at least some members have unlimited liability for the debt of the company, where more than half of its capital as shown in the company accounts has disappeared and more than one quarter of that capital has been lost over the preceding 12 months;*
- c) *whatever the type of company concerned, where it fulfils the criteria under its domestic law for being the subject of collective insolvency proceedings“.*

Also according to the 2004 Guidelines, rescue and restructuring aid may only be regarded as legitimate subject to certain conditions. It may be justified namely by social or regional policy considerations, by the need to take into account the beneficial role played by small and medium-sized enterprises (SMEs) in the economy or, exceptionally, by the desirability of maintaining a competitive market structure when the demise of firms could lead to a monopoly or to a tight oligopolistic situation.

The 2004 Guidelines distinguish between rescue aid and restructuring aid. Rescue aid is designed to allow firms that are facing imminent collapse to stay in business for long enough to prepare a restructuring plan. It must be in the form of liquidity support (loans or guarantees) and has a maximum duration of six months. If further public support is needed after that, it must be in the form of restructuring aid. Restructuring aid aims at supporting a firm's restructuring and its return to long-term viability. It can be granted for a longer period, but must be accompanied by a detailed restructuring plan that meets a number of conditions.

Scope of the evaluation: This evaluation deals with positive (compatible aid) restructuring decisions only; moreover it is focused on individual firms (not aid schemes such as those that exist for SMEs) in the non-financial sector, excluding the agricultural and the fishery sectors, aid granted to firms in the former German Democratic Republic in connection with the reunification of Germany and aid granted to firms in the steel sector in connection with the accession of new Member States.

The overall objective of EU policy for restructuring aid to the non-financial sector is to contribute to successful restructuring of firms where this can be considered legitimate in the light of the justifications explained above. These justifications can only be met by firms that are viable. Moreover, the risks for distortive effects need to be minimized which implies that the amount of aid given is kept to the minimum necessary to implement the plan and appropriate measures are taken to minimize the adverse impact on competition.

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The 2004 Guidelines therefore require the EC to verify the compatibility of restructuring aid according to three principles:

- I. Return to viability: a restructuring plan must be submitted showing that after completing its restructuring, the firm will be able to cover all its costs and to compete in the market on its own merits;
- II. Own contribution: the aid recipient must make a significant contribution to the costs of the restructuring (up to 50% in the case of large companies) from its own resources;
- III. Compensatory measures: the adverse effects of the aid on trading conditions are minimised by divestments of assets, reductions in capacity or market presence and reduction of entry barriers to the markets concerned.

2.2. Objectives and evaluation questions

The overall purpose of this study is to evaluate the EC's ex-ante assessment of restructuring plans submitted by the Member States, in particular in regard to its objective of ensuring support provided in the context of a restructuring plan which is likely to return the firm to long-term viability within a reasonable period of time.

This study purpose will be achieved through addressing descriptive questions and the analysis of two standard evaluation criteria recommended for EC evaluations: effectiveness questions and efficiency questions.⁶

The evaluation questions defined in the Terms of Reference (ToR) are presented below (divided by these 3 headings).

Descriptive

1. How many of the aid recipients are still active on their original market today? If they are not, what happened to them (exited, merged, changed activity, etc.)? Can these developments be related to a typology of key reasons?
2. To what extent, and at what point in time, have firms that have benefitted from restructuring aid actually returned to viability, and to what extent have they remained viable?
3. What is the survival probability of aided firms compared to the survival probability without aid?

⁶ The Terms of Reference explained why three other standard evaluation criteria were not considered as relevant for this particular study:

Internal coherence is already covered implicitly in the analysis of the role of 'compensatory measures' in the context of the policy objective to promote long-term viability.

Relevance of the policy objective of promoting viability of the firm assessed against the needs of stakeholders who want to see their firm survive seems quite clear. Other policy objectives are not within the scope of this evaluation.

EU added value of EU state aid control to prevent subsidy races among Member States is quite clear.

Effectiveness

4. Did the aided firm achieve the main financial and operational targets (e.g. net profit, cash flows, return on capital, debt, employment) set in the restructuring plan endorsed by the Commission, within the envisaged timeframe? How much of that was achieved by the restructuring measures and how much by (favourable or unfavourable) developments in the market context? To what extent did the compensatory measures impact the performance of the firm in this respect?
5. Did the key assumptions underlying the financial projections for the firm in the restructuring plan endorsed by the Commission prove realistic? In particular:
 - a. Which of the various business scenarios included in the restructuring plan and the EC's decision proved realistic?
 - b. To what extent can the restructuring plan laid down in the EC's decision be considered to be based on "realistic assumptions as to the future operating conditions" given the developments following the decision? Did the assumptions and the outcomes diverge and if so, in which direction and magnitude?
6. To which extent was the outcome influenced by the restructuring measures (including compensatory measures to mitigate the distortion of competition and own contribution) laid down in the Commission's decision and effectively implemented by the firm?
7. Is there any evidence that the aid granted has created a major distortion of competition in the respective sector?
8. Are there any regularities in the direction and magnitude of the deviation from initially estimated and realised business scenarios and cash flows?
9. Are there common features to the restructuring measures that impact the outcome in terms of viability? What conditions on the delivery of restructuring aid seem most effective in ensuring the viability of the aided undertakings?
10. Are there any unexpected impacts regarding viability?

Efficiency

11. Did the Commission really need and use all the information submitted by the Member States, or are there indications that some administrative requirements/costs could have been avoided without endangering a good decision-making basis of the Commission?
12. Conversely, should the Commission have requested additional information that would have been useful to enable it to assess viability aspects even better?

3. Overview of the methodology



3 Overview of the methodology

3.1. Methods applied

The methods applied during the evaluation focused on the provision of the Literature review, Overview of restructuring state aid cases, Case studies and Counterfactual analysis. In the following sections a brief description of these methods is presented.

3.1.1 Literature review

The literature review aimed to provide a summary of the academic publications relating to the topic of the evaluation to provide the basis for the activities included in the study by: confirming that its scope has been properly defined; validating the methodology chosen for the different stages of the process; and highlighting the results of previous work.

The review focused mostly on the impact of rescuing and restructuring state aid on the receiving companies. An extensive search and consultation with experts in the field resulted in nine key literature references that focus on this topic. These papers have been reviewed using a template covering the main research questions, the data set used, the definition of firm survival, the research method(s) applied, the main results and the key-takeaways for this evaluation study. The team subsequently clustered the relevant insights, content wise, according to the evaluation questions to be addressed in this study (as far as possible), as well as from a methodological viewpoint.

Chapter 4 presents a synopsis of the literature review and Annex 1 includes full details. The first section of Annex 1 contains a broader literature review on firm exit and on policies that, among other possible objectives, prevent firm exit. We report the main positive and negative impacts as well as the major determinants of firm exit. Subsequently, literature is reviewed on policies preventing firm exit such as bankruptcy protection laws, where we study effects, design and implementation. This has been a useful exercise for setting the scene, understanding this complex process and its consequences and has also provided useful methodological insights. The second section of Annex 1 then continues with a summary of findings from the key references on rescue and restructuring aid, followed by full and detailed forms for each reference.

3.1.2 Overview of restructuring state aid cases

The objective was to provide an overview of the positive (compatible aid) restructuring decisions concerning individual firms in difficulty, adopted between 1 January 2000 and 31 December 2012, with the exclusion of the following categories according to the ToR:

- Aid granted to financial institutions;
- Aid granted to firms active in the agriculture or fisheries sectors;
- Aid granted to firms in the former German Democratic Republic in connection with the reunification of Germany; and
- Aid granted to firms in the steel sector in connection with the accession of new Member States.

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In total, there were 68 restructuring aid cases corresponding to 67 companies (in one company there was a modification of a previously approved restructuring aid). However, from the 67 firms there were a total of 7 cases that did not fit the ToR specifications. Therefore, there were 60 relevant cases from 60 companies of restructuring state aid that fully fitted the needed requisites to stand as a sample in this evaluation.

Of the 60 companies evaluated, almost 40% are located in Poland, with Italy and France representing an additional 21.7%. The remaining EU Member States generated relatively few or no cases. From the total of 17 countries considered in this analysis, 6 countries only had 1 company receiving aid during the ToR timeframe with the same number of companies having 2 benefiting companies. In addition, 5 Member States had 3 or more companies (Figure 1).

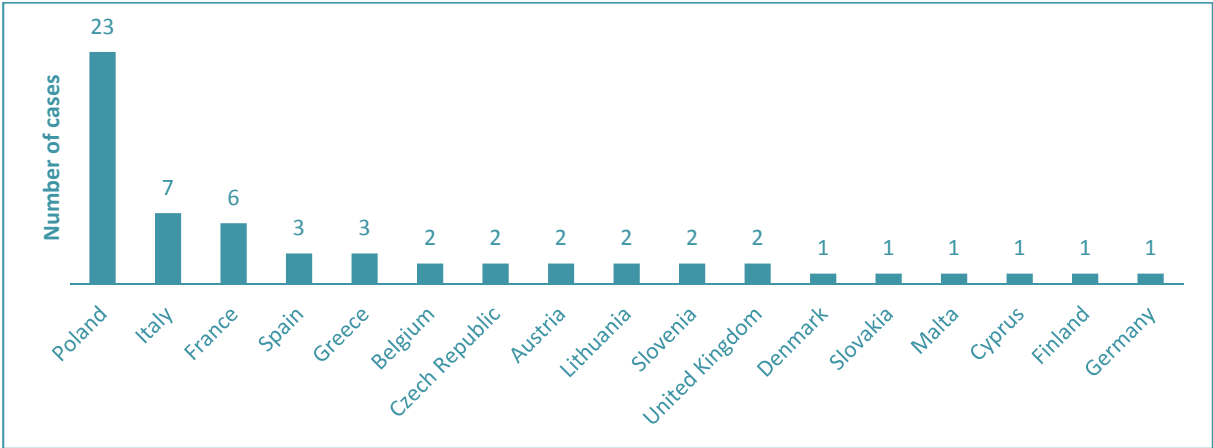


Figure 1. Restructuring aid by country.

The aid distribution by year is an important component of the analysis. In general terms, the number of restructuring aid cases has shown overall growth since 2003, with the last year (2012) representing the highest number of decisions taken by the EC. Nevertheless, there has been some volatility as shown by declining trends from 2005 to 2006 and 2008 to 2010. Over the last three years (2010 to 2012), there was consistent growth from 4 to 13 cases (Figure 2).

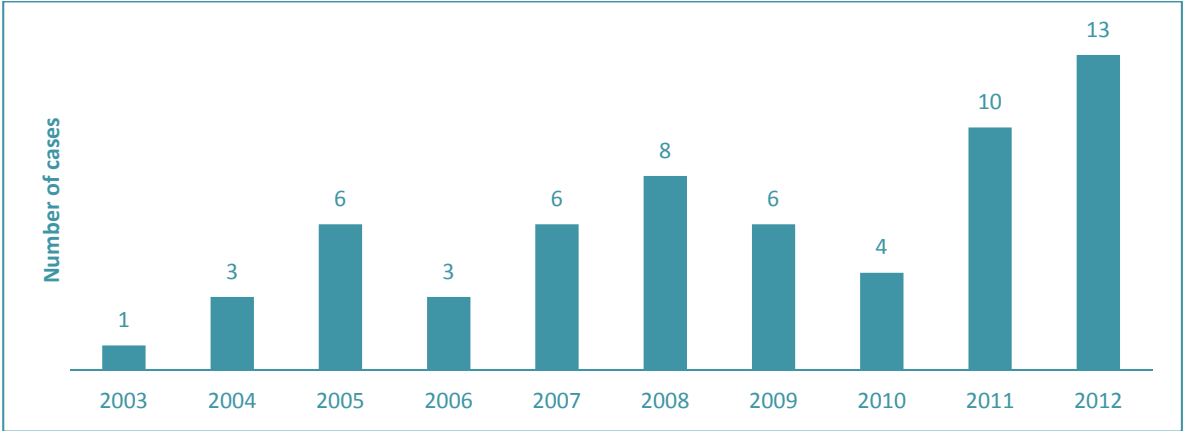


Figure 2. Restructuring aid by year.

A review of company size⁷ shows that 77.9% can be classified as large enterprises. It is important to note that 10 companies are considered large enterprises due to state ownership, in line with Article 3(4) of the Annex to the EC communication on the definition of micro, small and medium-size enterprises⁸. The remaining 22.1% of companies were either medium-sized or small - 15.3% and 6.8% respectively.

Reviewing the company size in terms of number of employees, a more complex situation is identified that indicates 44.1% of the aided companies have less than 250 employees, with 16.9% of the benefiting companies having between 250 and 499 employees. Almost two-thirds of the companies receiving aid have less than 499 employees.

The companies were required to have a solid and feasible restructuring plan to achieve sustainability in order to gain aid. The most common (30% of the companies) duration of the restructuring plans reported in the notification was 5 years, with an additional 25% of the companies stipulating a 4 year restructuring plan. Otherwise, 15% of the companies applied a 3 or 6 year plan, 5% a 7 year plan, and the remaining 10% implemented a 2 year plan (Figure 3).

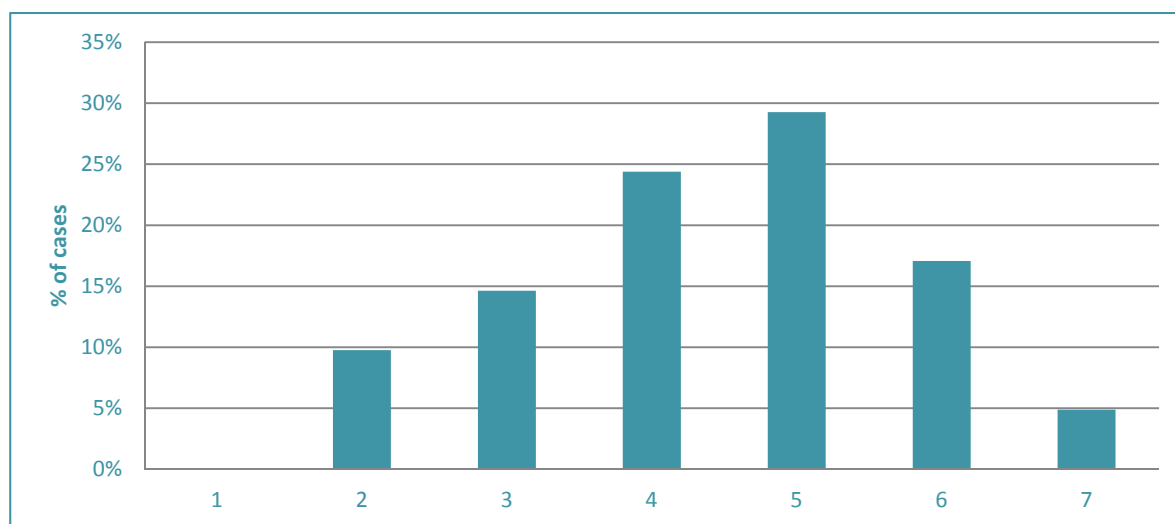


Figure 3. Duration of restructuring plan (number of years).

The amount of state aid per company varies considerably. In 36.7% of the cases, companies benefited from an amount between 0 and EUR 2.5 million; while 30.0% of the cases received an amount between EUR 5 million and EUR 50 million. In addition, 13.3% of the companies gained between EUR 51.0 million and EUR 500 million from the State (Figure 4).

⁷ Size data could not be found for one company, therefore for this analysis 59 companies were considered.

⁸ EC recommendation of 6 May 2003 concerning the definition of micro, small and medium-sized enterprises, OJ 2003/L 124/36.

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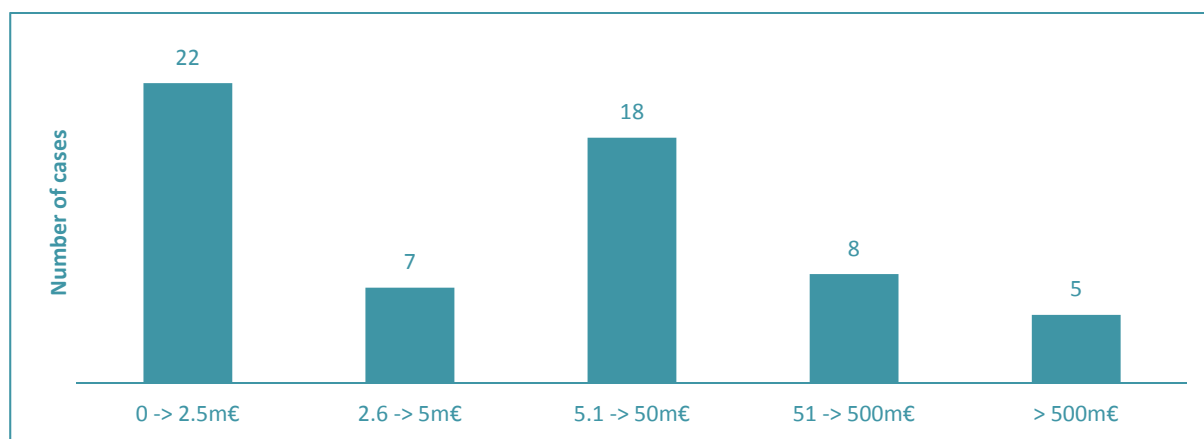


Figure 4. Amount of state aid by interval.

The aid provided to the beneficiary companies took various forms. The aid awarded to the companies was categorised by the following instruments: Debt write-off; Direct Grant; Other forms of equity intervention; Soft loan; Guarantee; Tax deferment; Provision of risk capital; and Interest subsidy. The direct grant was the most commonly used tool in restructuring aid, being used in 40.0% of the cases. Direct grant is followed by soft loans and public guarantees, each being applied in 25.0% of the cases; while debt write-off and other forms of equity intervention were used in 21.7% and 20.0% of the cases respectively.

The main conclusions of the overview are provided together with the answers to the descriptive questions (mainly evaluation questions 1 and 2) in Chapter 5.

3.1.3 Case studies

A significant element of the methodology was the development of the case studies. First, criteria for their selection were defined and a short-list of 15 possible companies was proposed. After comments and suggested updates from the EC, 5 companies were agreed as the case studies to be developed, on the understanding that others from the short-list could be added in the event that any of these five was not able to be developed. Further, the case study template, process and questionnaires were developed and approved by the EC.

During the study a total of nine companies were approached and 6 case studies were developed (the 3 other companies did not agree to participate as a case study). The reason that 6 case studies were developed was because one of the cases initially agreed could not answer all the main evaluation questions.

The main conclusions of the case studies are presented together with the answers to the effectiveness questions in Chapter 6 and the full versions are included in Annexes 5 to 10 (confidential annexes).

It should also be noted that companies only agreed to participate in the case study interviews (and give the contractors access to any written information) if they would get reassurance that their data would be treated as strictly confidential and could only be presented in the public report in anonymous way. This reassurance has been given to the companies to enable the project to be conducted. Therefore, company details and many details of the case study cannot be revealed.

In addition, the cases constituted of interviews carried out in reference to the interview guidelines (Annex 4). The interviewees ranged from company representatives, EC case handlers, Member State case handlers, Industry association

representatives, labour union representatives, representatives of competitor companies and external policy experts thus providing a balanced heterogeneous perspective of the issues.

3.1.4 Counterfactual analysis

The main data source for the empirical analysis is the Bureau van Dijk database AMADEUS. This gives access to an extensive amount of financial and business information of more than 35 million companies across the EU-28. However, not all of these 35 million companies are of relevance for our analysis. In addition, we merge the AMADEUS data with country-level data gathered from Eurostat that are used as controlling factors at the macro-level in our analysis.

The counterfactual analysis aimed at constructing a counterfactual group to enable a reliable comparison of the survival probability between aid-receiving (treatment group) and non-aid-receiving (control group) firms after a potential selection bias is eliminated. The chosen econometric approach was a combination of propensity score matching and direct matching techniques where we identified the three (non-aid-receiving) nearest neighbour firms for each aid-recipient. Based on the sample restricted to restructuring aid-receiving firms and their non-aid-receiving neighbours we proceeded with the analysis by conducting OLS regressions on split samples in order to identify whether the impact of restructuring aid on firm survival differed between the long and short-term.

Subsequently we conducted an ordered logit analysis with the Altman Z-score, a measure of a firm's financial viability, being categorized into groups of financial viability levels. A firm's market exit (bankruptcy) was defined as an additional category in order to consider a potential bias. Such a bias could result if, for instance, the counterfactual group had a higher survival probability because more firms in a bad financial situation (apparently those are most likely to exit the market) dropped out of the dataset. This, in turn, would positively bias the financial viability measure. We then estimated, in steps of several years, whether restructuring aid-receiving firms are able to improve their financial situation relatively to their non-aid-receiving neighbours.

In the next step we applied parametric, semi-parametric and non-parametric survival models in order to consider potential problems arising from right-censoring of the data because some firms exit the market after the end of the observation period as well.

The main conclusions of the counterfactual analysis are presented in Chapter 6 with further details in Annex 3.

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3.2. Strengths and limitations of the methodology

The main strengths and limitations of the methodology applied in this study are the following:

Strengths:

- First time that restructuring State Aid decisions have been analysed in an EC evaluation with such rigor.
- Combination of several methods and double-checking the results across definitions, methods and cases.
- Careful qualitative coverage of various dimensions of effectiveness and efficiency, with analysis of developments over time.
- Several data sources accessed and methods used: literature review, case studies, counterfactual analysis, descriptive analysis; secondary data (AMADEUS) and primary data (from restructuring plans and notifications, decision, interviews).
- Number of stakeholders involved (mainly for the case studies).
- Number of techniques applied in the counterfactual analysis.

Limitations:

- Case studies: Most findings are based on statements by insiders (although they have been carefully double-checked and various groups participated in the interviews). In addition, detailed financial analysis of the company across several years complements the statements of insiders.
- Some companies (three) approached to be a case study did not accept to be a part of the evaluation. This includes two airline companies (the airlines sector had previously been identified as a relevant industry).
- Not all the former managers, bankers, court officials/judges and competitors in all the 6 cases could be interviewed.
- Caution needs to be taken when extrapolating findings to future cases or Member State R&R schemes as not all the analysis from all cases addresses Member State specific schemes, and also such inference can depend on context of the global financial situation.
- Triangulation of findings was not always possible as we were not always able to establish 3 lines of independent information. In such cases the 'checks and balances' were carried out via the use and comparison of the different sources available. First, the answers of various interviewees (e.g. CEO, union member, national authorities, and competitors/business associations) were compared and where inconsistencies arose, we asked for further clarification. Secondly we received existing documentation from several stakeholders (e.g. the company, the EC and the national authorities). This documentation was used to check (oral) statements. As a third source we used (financial) AMADEUS company data in order to assess to overall financial performance of the company and to check specific statements of the stakeholders, e.g. about the financial position of the company and the effectiveness of the aid.

4. Synopsis of literature review



4 Synopsis of literature review

4.1 Introduction

The main aim of the literature review was to provide the basis for the activities included in the study by: confirming that its scope has been properly defined; validating the methodology chosen for the different stages of the process; and highlighting the results of previous work. In this view, the following analyses have been conducted:

- First, a review of the literature on firm exit and on policies that (among other possible objectives) prevent firm exit has been conducted. A summary of the key insights of this review can be found in Annex 1 (section 1), which presents the main positive and negative impacts as well as the major determinants of firm exit as well as the effects, design and implementation of some policies preventing firm exit (such as bankruptcy protection laws).
- Then, the main part of the literature review consists of a review of the literature on the impact of R&R state aid⁹ on the receiving companies. An extensive search and consultation with experts in the field resulted in nine key literature references that focus on this topic¹⁰. These papers have been reviewed using a template covering the main research questions, the data set used, the definition of firm survival, the research method(s) applied, the main results and the key-takeaways for this evaluation study (see Annex 1, section 2). Annex 1 (section 2) also provides a summary of the major insights from these academic publications as well as from the national evaluation reports collected through two distinct channels¹¹.

The following text of this chapter focuses exclusively on the academic literature on R&R state aid and presents a clustering, content wise, of the relevant insights. In contrast to the information in Annex 1, this chapter is largely structured according to the evaluation questions to be addressed in this study (as far as possible) (section 4.2), as well as from a methodological viewpoint (section 4.3).

4.2 Conclusions from the key literature references by evaluation question

In this section we link the insights from the key literature references (see Annex 1 for a more detailed review of each publication) with the 12 evaluation questions stated in the ToR for this study. Because only a few papers really focus on the evaluation of rescue and restructuring-state aid, all of which moreover apply a different perspective compared to the current study, it should be no surprise that these papers provide little information to answer these evaluation questions.

⁹ "Rescue aid and restructuring aid involve different processes, but they are often two parts of a single operation. Rescue aid should make it possible to keep an ailing firm afloat for the time needed to work out a restructuring or liquidation plan. Restructuring aid, on the other hand, should be based on a feasible, coherent and far reaching plan to restore a firm's long-term viability." (Chindooroy e.a., 2007, p. 166). Note that this evaluation study focuses on restructuring aid only.

¹⁰ To our knowledge, this selection includes all the academic publications that provide a horizontal evaluation of the effects of R&R state aid on receiving companies. As indicated in this introduction, the literature review also discusses a broader set of academic publications related to firm exit (impacts and determinants) and related to policies (other than R&R state aid) aimed at preventing firm exit. These results can be found in Annex 2.

¹¹ First, the Member State audit authorities were contacted via email. Then, the ESTAL (European State Aid law quarterly) country correspondents were contacted via email.

For evaluation questions 1 to 4, which we present below, we included the results that could be informative, even if not perfectly matching with the evaluation questions. For the 8 subsequent evaluation questions, the literature survey did not provide insights.

Evaluation Question 1: *How many of the aid recipients are still active on their original market today? If they are not, what happened to them (exited, merged, changed activity, etc.)? Can these developments be related to a typology of key reasons?*

Nulsch (2014) tracks the evolution of the R&R state aid recipient firms in the EU between 2000 and 2010 (analysis of the data of 141 firms). A firm is considered as 'having survived' if the status, name and production site are unchanged or the company has been sold in large parts to a new investor, but at least 50% of employment remains at the former location. It appears that among the 66 firms that received restructuring aid between 2000 and 2010, 80% survived¹². However, no information is provided regarding the activity of the survived firm (original market or not).

Oxera (2009) provides a descriptive analysis of a set of European firms 'in distress' and that did not receive aid. As such, this study provides information regarding 'the typology of key reasons' that can explain firm survival (i.e. will continue to report financial data, in the context of the study). In particular, a firm has a greater probability to survive if:

- It is a large, non-manufacturing firm with non-firm-specific assets and a more modular corporate structure that allows divisions to be sold off to raise cash;
- It has experienced relatively lower losses at the point of distress;
- It has experienced a smaller deterioration in financial performance pre-distress (for a given level of severity of distress);
- It has lower gearing, better access to capital (whether from private investors or capital markets), and a simpler debt structure than its peers;
- It operates in a country or countries with relative flexible labour markets.

The study however does not track the activity of the firms (original market or not) and does not provide further information regarding other developments such as mergers, etc.

Evaluation Question 2: *To what extent, and at what point in time, have firms that have benefitted from restructuring aid actually returned to viability, and to what extent have they remained viable?*

In fact, none of the literature reviewed focuses on the point in time when firms returned to viability. Some articles focus on the moment of exit. According to Nulsch (2014), the 'rescued firms' (rescue or restructuring aid not distinguished) have the highest hazard rates in the first two years after the aid has been paid. In their sample, the hazard rate decreases continuously from year to year. Thus, if firms survive the first two years after they receive state aid, they have good chances to survive in the long run.

¹² The reference date for assessing whether the firms have survived is 30/11/2012.

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According to Chindooroy et al. (2007), the mortality rate¹³ varies considerably according to the year when the companies receive the rescue and/or restructuring state aid. Mortality does seem to be related contemporaneously to the business cycle, with most of the mortality occurring when the economy is very weak, such as in 2003. Moreover, most of the companies that folded did so within 3 years of the start of the aid. This pattern is particularly strong for companies that received rescue state aid, whilst most of the companies that received restructuring state aid and folded did so between 3 and 6 years after aid was awarded.

Evaluation Question 3: *What is the survival probability of aided firms compared to the survival probability without aid?*

The aim of Nulsch (2014) is precisely to compare the survival probability of aided firms with respect to non-aided firms. Nulsch (2014) shows that only 20% of recipient firms that received restructuring aid did not survive, while the failure rate amounted to 65% for the firms that have applied for restructuring aid but did not receive aid. These results must however be analysed with caution given the small size of the samples. Moreover, the assessment of effectiveness is based on comparisons between recipient firms and firms that have applied for restructuring aid, but did not receive aid and is therefore not created through a strict process of statistical matching between recipient firms and non-recipient firms. The author also briefly compared the survival rates between firms that received restructuring aid and firms that received rescue aid. It appears that firms that received restructuring aid have a higher chance to survive than firms that received rescue aid (80% vs 51%).

In Glowicka (2006), the survival status is known for 75 companies: 22 (30%) went bankrupt and 53 (70%) survived. Within the latter category, 23 companies were classified in the group 'new owner'. The chance of survival following restructuring aid seems substantially higher than following rescue aid. Most bankruptcies in absolute terms were in manufacturing and construction. In relative terms, most bankruptcies were in mining, construction and manufacturing. There is a peak in exit about four years after having received aid. If we only focus on restructuring aid, 17.7% of the firms did not return to viability.

According to Chindooroy et al. (2007), almost 50% of the companies having received rescue state aid did not survive while only 20% of the companies having received restructuring aid folded. However, no comparison is made with companies that did not receive aid.

Oxera (2009) provides information regarding the survival probability of firms without aid. In particular, it appears that around 77% of the firms 'in distress' (and that did not benefit from aid) survived during the period 1999-2008.

In general, the literature review demonstrates that providing restructuring aid produces far better chances of survival than providing only rescue aid. Regarding the survival probability of aided firms versus non-aided firms, even if some papers (e.g. Nulsch, 2014) tend to indicate that aided firms have a higher survival probability, the literature does not provide general clear-cut conclusions, supported by a strict process of statistical matching between aided and non-aided firms.

¹³ The mortality rate indicates the share of firms that did not survive. In Chindooroy (2007), the companies are defined to have survived when after the aid was given, (1) they restructured and continued their business activities in large part, or (2) restructured and sold of large part of the business. No further details are provided on the evaluation of a "large part". In case of bankruptcy, a company evidently did not survive. In case of insolvency, from which companies could either end up in bankruptcy or recover, companies were excluded from the survival analysis.

Evaluation Question 4: Did the aided firm achieve the main financial and operational targets (e.g. net profit, cash flows, return on capital, debt, employment) set in the restructuring plan endorsed by the Commission, within the envisaged timeframe? How much of that was achieved by the restructuring measures and how much by (favourable or unfavourable) developments in the market context? To what extent did the compensatory measures impact the performance of the firm in this respect?

None of the reviewed articles links the performance of the state-aid receiving companies with the content of their restructuring plan. But some of the papers address their performance in more general terms and try to separate the impact of the state aid provided by setting up a counterfactual analysis.

Assessing the economic and social effects of rescue and restructuring aid at the company level, London Economics (2004) finds that the overall performance of the companies having received rescue and/or restructuring aid between 1995 and 2003¹⁴ is generally positive both in absolute terms and relative to the performance of the comparator companies. More precisely, the authors find that for the companies that received rescue and/or restructuring aid:

- about 50% increased employment faster than the industry;
- 80% showed an increase in absolute terms and 43% of these companies posted a better increase in turnover than their comparator companies;
- 72% narrowed the profitability-gap with the industry average, though for most of them their profit rate, measured by profits per employee, remains well below that of the industry;
- 76% posted increases in labour productivity and in the case of most of them, to above the industry average;
- Firms that received only rescue aid performed worse than their comparators in terms of employment, turnover and profitability. Conversely, their productivity performance was above the industry average¹⁵.

Analysing the determinants of survival, Chindooroy et al. (2007) find that the probability of success is related more to some key characteristics of the aid-receiving firms (such as their size or age), of the sector to which they belong (such as being active in a growing sector or not) and/or the type of difficulty they encountered (such as poor management) and less to the policy framework of rescue and restructuring state aid. Moreover, none of the main features of the restructuring plans documented in state aid cases mattered for firm survival¹⁶.

¹⁴ The performance of 71 individual companies having received state aid was analysed in the study.

¹⁵ We note that for this analysis, the study included only 2 companies that received rescue aid which may explain the positive productivity performance.

¹⁶ They tested for any impact on survival of the features of the restructuring plans including: duration of restructuring, capacity reductions, personnel reductions, focusing on core business activities, cost-cutting, financial consolidation, selling or closure of plants and assets, new investment, training and upgrading and plant relocation.

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Murn et al. (2010) aim at isolating the effect of aid on firm outcomes in order to evaluate the net effect of aid in Slovenia during the period 1998-2006¹⁷. The outcomes of 487 recipient firms is analysed and compared with the outcomes of non-recipient firms, identified through propensity score matching approach. Among the recipient firms that survived, the results indicate that the granting of the aid had no economically important and statistically significant effect on the recipients:

- Regarding sales, in the period of subsidy allocation and afterwards, most of year-to-year effects of aid (DID) are negative and statistically significant;
- Recipient firms reduce employment more intensively than similar control non-recipient firms in both the years before the aid is received and after (decrease in employment intensifies after the granting of aid);
- In the first two years after aid receipt, the productivity growth in aid receiving firms is indistinguishable from the one in control firms, while in the next two years it becomes significantly lower.

When analysing how much additional sales, employment and value added per employee is created by the granted funds, the authors find that the return of aid is negative (i.e. the additional outcome per EUR of granted aid is negative).

The findings of Murn et al. (2010) differ from those of London Economics (2004). This might be due to two main reasons. First, the set of firms analysed and the applicable state aid rules differ between the two studies. Second, the method applied to compare the outcomes between recipient and non-recipient firms is different.¹⁸

Conclusion

Overall, we must conclude that the existing literature is not very informative for the evaluation questions to be addressed in the context of this study. The literature reviewed is most useful in answering evaluation question 3 on the survival probability of aided firms compared to the survival probability without aid. We need to stretch the findings quite a bit in order to make some of them fit under the three other questions. For evaluation question 2 for example, i.e. when do firms return to viability, the mentioned papers only talk about when mortality peaks? For the 8 subsequent evaluation questions, the literature does not provide any relevant information at all, which can be explained by the fact that these questions are quite specific, focusing for instance on the impact of the restructuring plans, a question that has not been addressed before. We also note that most studies confuse outcomes with causes. If a company is in difficulty, it certainly has low liquidity or high debt. But this is the outcome of its problems/weaknesses, not the cause.

4.3 Conclusions from the key literature references with respect to the methodologies applied

This section presents the key (empirical) methodological insights from the literature. First, we present the empirical models used in the literature (on restructuring aid) to assess the impact of restructuring aid on firm outcomes and in,

¹⁷ It is important to point out that the period covered is partly before Slovenia joined the EU in 2004. So the applicable state aid rules are not the EC state aid rules. The legislative background and, in extenso, the institutional background, are therefore different.

¹⁸ While a propensity score matching approach is used in Murn et al. (2010), London Economics (2004) does not rely on strict statistical tools to select 'comparable firms'. They rely on descriptive criteria (competitors of the aided firms, similar firm descriptions in Bloomberg Professional, similar size in terms of employment and/or turnover).

particular, on firm survival. Then, we explicitly focus on the methods used to identify the ‘control group’ and to compare outcomes between aided and non-aided firms.

Modelling the impact of aid on firms survival

In some of the papers reviewed (see Glowicka, 2006 and Nulsch, 2014)¹⁹, the measure of firm survival and its evolution relies on the analysis of a hazard function. As indicated in Manjón (2008), the hazard function assesses the probability in time t that a firm characterized by a set of covariates exits the market, at an infinitesimally small interval of time after t , conditional on having survived up to time t . This function perfectly characterizes the stochastic behaviour of the variable of interest and can thus be used for making (conditional) inferences. Below, we quote specific estimations of hazard rates in the above cited papers:

- In Glowicka (2006) two estimations of the hazard rates are reported, i.e. a non-parametric and a parametric one;
- In Nulsch (2014), the Kaplan-Meier estimates of the survivor function and the hazard rate are calculated. The author points out a general limitation to such an analysis, which is related to the question of unobserved heterogeneity. Indeed, not all relevant covariates can be included in the specification of the model, as they are simply unobservable (the author cites e.g. the quality of managers, an unobservable firm-specific characteristic that may affect firm survival).

Other authors analyse the impact of aid on firm survival applying probit-models, whether for robustness checks (Glowicka, 2006) or as main method of analysis (Chindooroy et al., 2007 and Oxera, 2009). Studying survival probability by means of probit estimations is widely accepted in the scientific literature. However, we also find some criticism with regard to this approach. Glowicka (2006) explains that these discrete choice models have several drawbacks such as not sufficiently taking into account changes over time as well as categorizing censored observations as forever survivors. Below, we quote specific uses of a probit-model in the above cited papers:

- In Glowicka (2006), after having estimated the hazard rates (in order to take on board information for each point in time), a recursive bivariate probit model is used to further study possible endogeneity of the variable subsidy choice;
- In Chindooroy et al. (2007), the probability of survival is estimated with a probit-model;
- In Oxera (2009), a Heckman selection model is constructed in order to test the empirical relationship between firm characteristics and the market ex ante and the outcomes of distress. The first stage of the Heckman model is a probit regression of survival rates on the explanatory factors, which is estimated through maximum likelihood. Then, a model is estimated on the sample of surviving firms to examine the relationship between factors than can be observed prior to the onset of the distress and the impact on revenue and employment post-distress, controlling for the systematic differences between the characteristics of surviving and non-surviving firms.

¹⁹ Hazard models are also widely used in ex-post evaluations of other types of state aid instruments. For example, Moffat (2015) and Harris and Trainor (2007) both apply a Cox proportional hazard model to estimate the impact of the Scottish Regional Selective Assistance on firm survival.

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The methodology applied in the present study takes into account the strengths and limitations of the methods described above. For robustness checks, the present study relies both on an analysis of the hazard function and on the application of a probit-model. In addition, the analysis conducted also relies on (ordered) multinomial outcome models. Section 6.3 describes more in-depth the chosen techniques as well as several specifications that were applied.

Identifying the control group and comparing outcomes

The techniques used to construct the 'control group' and the methods aimed at assessing the differences between aided firms and the control group in terms of firm survival (or other outcomes) differ from one paper to another:

- In Murn et al. (2010), a propensity score matching approach is conducted. In a first step, firms were matched through proximity in terms of propensity score. Then the differences in outcomes were estimated through Difference-in-Difference (DiD);
- In Nulsch (2014), the control group is composed of 49 firms that applied either for rescue or restructuring aid, but for which the EC denied aid between 2000 and 2010. The differences between the group of aided-firms and the control group are based on an assessment of the statistical significances regarding differences in Kaplan-Meier estimates of the Hazard rates and survivor function;
- Finally, London Economics (2004) does not rely on strict statistical tools to select 'comparable firms'. They rely on descriptive criteria (competitors of the aided firms, similar firm descriptions in Bloomberg Professional, similar size in terms of employment and/or turnover). The differences in outcomes between aided and non-aided firms are made at two points in time. The authors further construct a measure which they call 'differential growth' to analyse how, on average, the basic financial fundamentals of the aid receiving firms have evolved compared to those of similar firms in the same market.

As discussed previously, the empirical counterfactual analysis conducted in the present study relies on the analysis of a (1) hazard function, the application of a (2) probit-model as well of (3) (ordered) multinomial outcome models. In order to ensure causal identification of the treatment effect of aided firms, the identification of the control group is based on a propensity score matching approach. Section 6 describes more in-depth the techniques used in the present study as well as the Side Note 3.1 in Annex 3 provides a brief discussion on why some of the above mentioned alternative econometric approaches (e.g. Difference-in-Difference) do not appear to be feasible for the purpose of the present empirical study and in view of data availability.

5. Evaluation questions – descriptive



5 Evaluation questions – descriptive

5.1 Aided firms still active on their original market

Evaluation Question 1: How many of the aid recipients are still active on their original market today? If they are not, what happened to them (exited, merged, changed activity, etc.)? Can these developments be related to a typology of key reasons?

Findings

- 31 companies are still active in their original market; 14 companies have been acquired by other companies or groups, which has changed their structure of ownership; 8 companies are in state of bankruptcy and 7 companies are bankrupt.
 - From the feedback of the interviewees across the 6 case studies, we can infer reasons that might have contributed to companies not being active in the market: Unavailability of timely financing/ delayed disbursement of loans; declining profit margins and increasing losses; High labour costs and pressure from labour unions; increasing competition from producers in the emerging economies; contraction in business/ reduction in market size; and the global economic crisis.
-

Analysis

In analysing the current status and conditions of the 60 aided companies²⁰, 52% (31 companies) of the companies are still working/ active, and maintain the formal structure pre-decision. An additional 23% (14 companies) of the companies are active, but have been acquired by other companies or groups, which has changed their ownership structure. 13% (8 companies) of the companies are in state of bankruptcy²¹ while the remaining 12% (7²² companies) of the companies are bankrupt²³.

²⁰ Please refer to Annex 2 for detailed descriptive key characteristics of the restructuring aid cases.

²¹ Companies in state of bankruptcy are active companies in insolvency proceedings. The company will either return to normal operation, or will be reorganized (parts of its activity can be restructured or sold) or if not, then it will be liquidated/dissolved.

²² According to the latest AMADEUS data, one of the company has an official status of bankrupt since 16-06-2015.

²³ Bankrupt companies are companies that are dissolved and no longer operate in the market.

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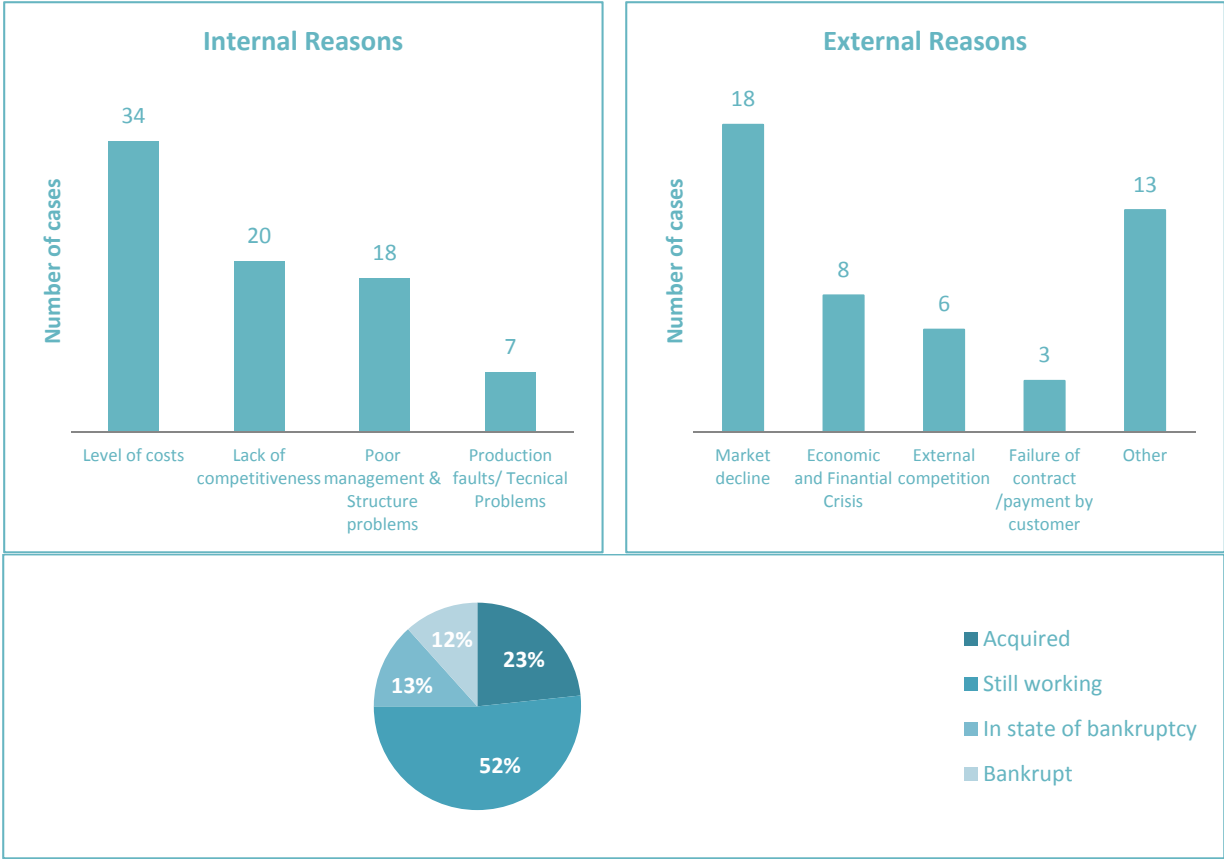


Figure 5. State of the restructured firms.

The companies themselves identified a range of reasons for their business difficulties in the notifications to the national authorities and the EC, which were classified into nine categories: Market decline; Level of costs; Lack of competitiveness; Poor management and problems associated with structure, human resources and strategy; Failure of contract /payment by customer; Economic and financial crisis; Production faults / incidents / technical problems; External competition; and Others. There is some overlap between these definitions and hence Figure 5 segregates the reasons into two distinct components – Internal and External.

Among the internal reasons²⁴, levels of costs (pertaining to labour cost/ raw material costs) accounted for the main reason for 34 out of the 60 companies. 20 companies cited their lack of competitiveness, 18 companies pointed to poor management and structure problems while 7 identified production faults/technical problems as the reason for their business difficulty.

Similarly, among the external reasons, 18 companies blamed market decline, 8 companies identified economic and financial crisis, 6 companies pointed to external competition, 3 recognized failures of contract/ payment by a customer(s) and 13 companies cited other reasons for their business difficulty.

²⁴ Companies have cited multiple reasons for business difficulty and hence the total for internal reason/ external reasons exceeds 60.

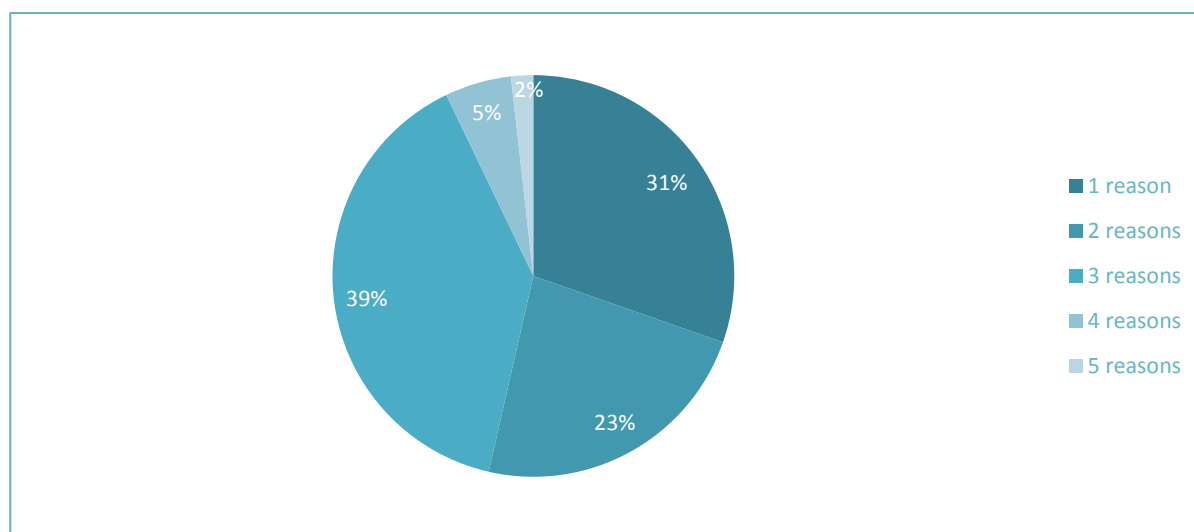


Figure 6. Number of reasons for business difficulty.

Figure 6 can give interesting insights into a company's situation. Companies that have identified 1 reason (31%) and 2 reasons (23%) for their difficulties are likely to address these issues with all their resources and have a better probability of fixing them. When the reasons identified increases, the limited resources and attention of the firms get less focused and the impact of the measures employed in countering these issues might not be as effective. 46% of the companies (39%+5%+2%) have cited 3 or more reasons for their business difficulties. One interpretation that we can make looking at the figure may be that having multiple reasons for business difficulty may result in mishandling the resources by focusing on unsuitable/inappropriate measures for reviving firm viability. This might also have a correlation with the number of firms that are still active (52%) or were acquired/bankrupt (48%). For example, we found that 73% of the firms that went bankrupt eventually had reported 3 or more reasons for business difficulty during the notification, while this figure was only 15% among the acquired firms and 53% among the active (and not acquired) firms. Thus, we can see that the proportion of the firms with three or more reasons for difficulty was highest among those that went bankrupt, adding weight to this argument.

From the feedback of the interviewees across the 6 cases, we can deduce the following possible explanations²⁵ that might have contributed to companies not being active in the market²⁶ even though state aid was granted.

a. Unavailability of timely financing/ delayed disbursement of loans

The companies receiving the restructuring aid have blamed the unavailability of timely financing for their inability to counter their business difficulty. For instance, in one case, the delay in disbursement of loans by the banks did not allow the firm to implement the measures essential to return to viability on time.

²⁵ Since, not all the 60 companies' representatives were contacted, the reasons for not being active in the market needs to be inferred/extracted from the feedback received from the interviewees of the 6 cases.

²⁶ The reasons inferred here does not include the exact same reasons that the companies themselves identified in the notifications to the national authorities and the EC because of what was being experienced during the restructuring plan implementation.

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When there were significant delays in financing, the situation worsened and the measures that would have proven beneficial at a certain time were already inviable by the time they received the loans.

b. Declining profit margins and increasing losses

The reason that the restructuring aid did not contribute significantly to some of the aided companies could be attributed to declining profit margins and increasing losses. Squeezed margins could have been contributed to by the increased costs of production as well as price wars resulting from other competitors willing to sell their product at a cheaper price. Sustained cash flow deficits caused inability to pay liabilities on their due date, thus prompting them to look for buyers, search for alternate revival strategy and finally if left with no option then to file for bankruptcy.

c. High labour costs and pressure from labour unions

In Europe, labour costs are very high compared to the emerging economies with which some of the companies in difficulty were competing. Some companies could not implement their labour related restructuring amidst pressure from labour unions preventing them from cutting down on costs and thus affecting their return to viability.

d. Increasing competition from producers in emerging economies

Emerging countries, such as China and India, who thrive upon cheap labour and raw material costs have caused disruption to the way the market operates for certain companies in difficulties. European companies although generally superior in quality, often have difficulties in competing due to their inability to match the prices offered by companies from emerging economies.

e. Contraction in business/ reduction in market size

A growing market eases the difficulties of competition, a stable market tends to cause companies to be careful and take less risks, while a falling market makes creates increased difficulties for companies to compete. The market that most of these companies operate in has changed a lot in the last decade. For example, markets are increasingly globalised and there is a need for companies to keep up with the latest trends in technological evolution or to comply with stricter standards. Failure to keep pace with market trends can send companies into difficulties.

f. The Global Economic Crisis

The global economic crisis of 2008 has had a profound effect on the ability of firms in difficulty to return to viability. This period was difficult even for firms with a healthy financial situation, let alone for those already in difficulty.

5.2 Viability of aided firms

Evaluation Question 2: To what extent, and at what point in time, have firms that have benefitted from restructuring aid actually returned to viability, and to what extent have they remained viable?

Findings

- In line with the 2004 Guidelines, viability of the firms can be ascertained from calculating Profit before Taxes (PBT) and Return on Capital Employed (ROCE).
- In regards to PBT:
 - 13 firms that had negative PBT at the time of the decision benefitted from the restructuring aid such that they have positive PBT as measured from the latest available data.
 - Of these 13 firms, 62% returned to viability after 1 year, 15% after 2 years, 8% after 3 years and the remaining 15% after 6 years.
 - Looking at the percentage of change in PBT, 68% of all the firms have improved their performance. This measure indicates that the majority of the firms improved their performance although they might not have become viable in the absolute sense.
- In regards to ROCE:
 - 13 firms that had negative ROCE at the time of the decision benefitted from the restructuring aid such that they have positive ROCE as measured from the latest available data.
 - Of these 13 firms, 54% returned to viability after 1 year, 15% after 2 years, 8% after 3 years and the remaining 23% after 6 years.
 - Looking at the percentage of change in ROCE, 61% of all the firms have improved their performance. This measure indicates that the majority of the firms improved their performance although they might not have become viable in the absolute sense.
- In order to provide an alternate measure of viability we looked into the Altman Z score. With reference to the Altman Z score, 26 firms were signalling sufficient financial viability in current year as compared to 17 firms in the decision year.

Analysis

According to the 2004 Guidelines, the definition of viability is that a firm “must be able to cover all its costs including depreciation and financial charges. The expected return on capital must be enough to enable the restructured firm to compete in the marketplace on its own merit.”

Basing the analysis upon these two premises of viability, the firms that have received restructuring aid are analysed. We separately analyse the viability of the firms according to profit before taxes and according to return on capital employed (ROCE) for a clear understanding of the status.

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Profit before Taxes (PBT)

PBT is a profitability measure that looks at a company's revenue after deducting all expenses including interest expenses and operating expenses, but leaves out the payment of tax. This measure is consistent with the 2004 Guidelines as Profit before taxes covers the costs of depreciation as well as financial charges. It is also referred to as "earnings before tax".

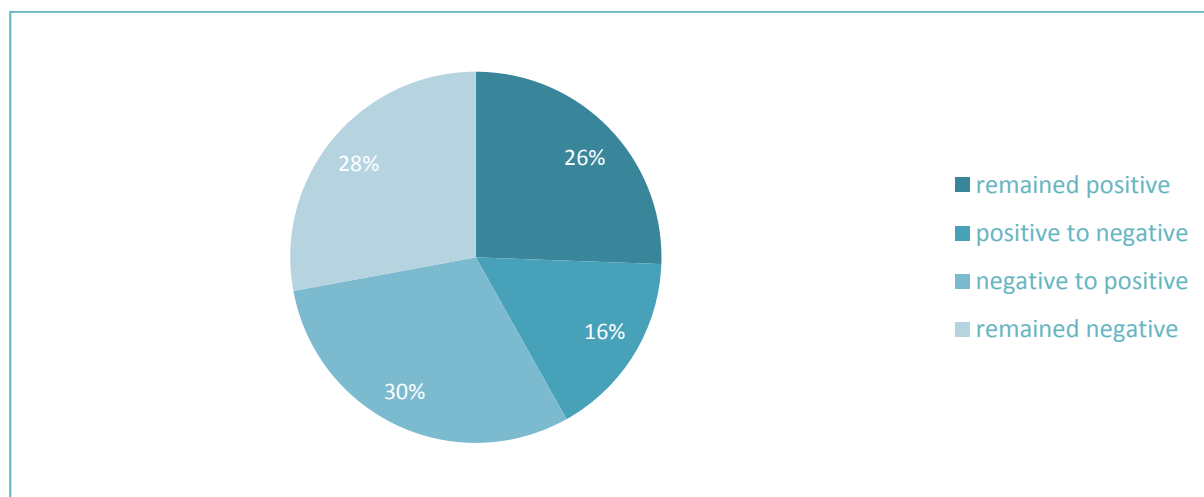


Figure 7. Viability status on the basis of PBT.

The above pie chart allows us to look at the viability status of the restructuring aid recipients²⁷ from the perspective of PBT. For this analysis, we have taken into consideration multiple time frames - Decision year and present (latest date with the data available). Looking at the profit before taxes, 26% of the companies already had positive profit before taxes at the time of the decision²⁸ and they continued to have positive PBT according to the last available data. Hence, no concrete contribution to viability could be deduced for these firms on the basis of this PBT comparison.

16% of the firms which had a positive PBT at the time of the decision, now have negative one according to the last available data. From the feedback received from the interviewees across the 6 cases we can infer that this might have been caused because of the inappropriateness of the restructuring plan, delay in granting of aid, partial/ non implementation of the restructuring measures and/or other external reasons. Likewise, 28% of the firms who had a negative PBT at the time of the decision still have a negative one according to the latest available data. This indicates that the aid might not have aided the firms at all or might have benefitted only to an extent that did not contribute sufficiently²⁹ to turn the negative PBT to be positive.

²⁷ The pie chart considers 43 companies for which PBT data is publicly available from AMADEUS (used for uniformity of standards across analysis).

²⁸ We acknowledge the fact that, there are many considerations apart from profit before taxes or ROCE that might have contributed to the grant of the aid. While a company can have profit at the end of the year in which the decision was taken, it does not mean that it was profitable in the period under assessment, i.e. in the years preceding the notification. In addition, if a decision is taken – say – in June and aid is disbursed in September, then profit at the end of the year would already account for the aid received.

²⁹ It should be noted that there could be several factors apart from restructuring aid itself which might contribute to the profit before tax.

However, 30% (13 firms) of the firms that had negative PBT at the time of the decision now have positive one. It could be that the restructuring plan allowed them to leverage the most out of the aid that they received. Hypothesis: Such success could be aligned with careful planning/ formulation of the restructuring plan, timely implementation and cautious monitoring, however further investigation³⁰ would be required to establish this, since a number of external factors are also relevant.

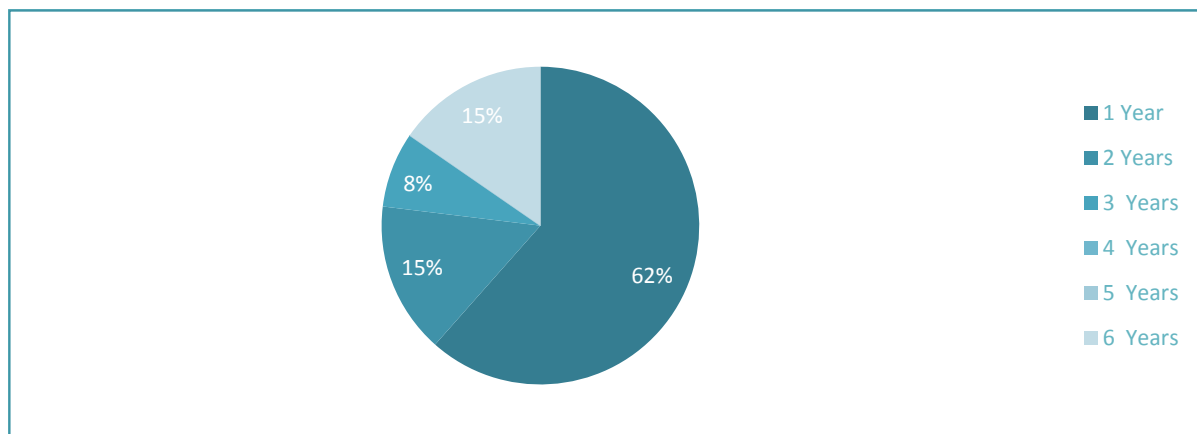


Figure 8. Years to viability on the basis of PBT.

Figure 8 allows us to understand the duration taken by the 30% of the firms that have benefitted from restructuring aid to become viable. This gives an idea of the time³¹ that the firms took to return to viability from the decision date. 62% of the firms which had a negative PBT at the time of the decision returned to viability 1 year after the decision. This might suggest that viability issues can be quickly addressed, provided that the difficulties are recognised and the resources are channelized carefully on the major identified causes. Likewise 15% of the firms took 2 years and 8% of the firms took 3 years. The remaining 15% of the firms took 6 years to come to viability. This might stem from the fact that a major overhaul had to be made in order to generate a significant impact on the PBT or that other external factors were at work that slowed the return to viability. However, caution should be used in drawing conclusions on the influence of the restructuring plan, since the extent of the difficulties (which might be reflected in differing levels of negative PBT), varies. This is an aspect that Figure 9³² addresses.

³⁰ As all the 30% of the firms were not considered as case study, detailed information on what might have contributed to the success is difficult to access without further detailed exploration.

³¹ It is not appropriate to graphically represent specific years because the decisions have been taken in different years for different firms.

³² The small bracket sign used in the pie chart legend refers to negative sign.

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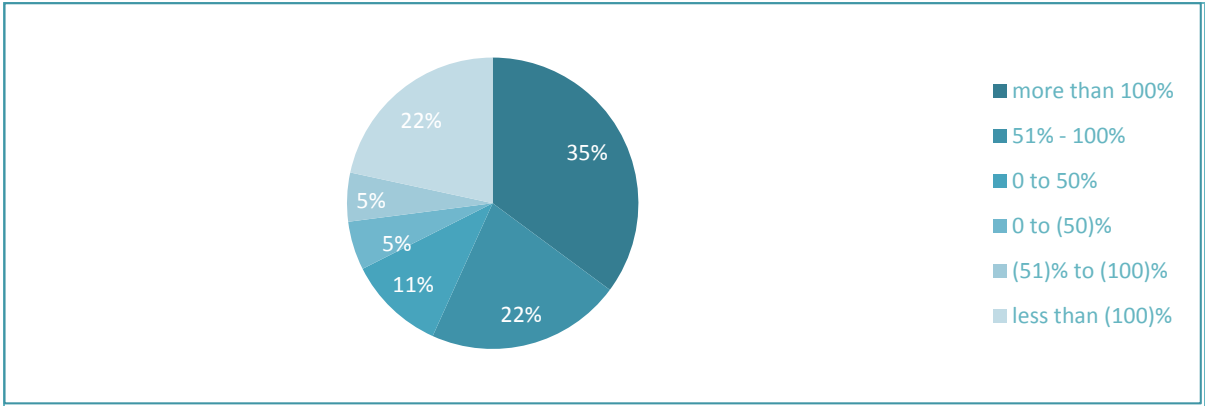


Figure 9. Percentage change in PBT.

Figure 9 allows us to look at the % change in PBT at the decision year compared to the point when the company became viable (in terms of PBT) or if the company did not become viable then the year for which the latest data is available (this allows for complex restructuring plans with longer time to come into effect, ample opportunities to contribute to the financial well-being of the company)³³. This chart is not restricted to the 30% of firms that had positive PBT at present, but compares the 60 firms receiving the restructuring aid considered in this study. Also, it must be noted that a firm with negative PBT at the time of the decision can have positive change in PBT, but the PBT may continue to be negative.

This could be a crucial indicator of the contribution of the restructuring aid on the PBT of the firm (although other factors can also influence the PBT). 68% of the firms have in reality improved their performance if we look at the % change. This is a better measure as compared to basing the impact of restructuring aid on an absolute positive or negative value. 35% have had a positive variation in PBT by 100% or more, 22% between 51%-100% and 11% between 0 to 50%. On the other hand, 32% of the firms did not see a positive change in PBT, which suggests that for some reason they were not able to leverage the most out of the restructuring aid. This percentage might include firms that had positive PBT at the time of the decision and remained positive according to the latest available data (absolute PBT might have decreased in a quantity not enough to change the sign of the PBT).

Hence, this measure identifies that a majority of the firms improved their performance although they might not have become viable in the absolute sense.

Return on Capital Employed (ROCE³⁴)

ROCE is a financial ratio that measures a company's profitability and the efficiency with which its capital is employed. For a company, the ROCE trend over the years is an important indicator of performance. In general, investors tend to favour companies with stable and rising ROCE numbers over companies where ROCE is volatile and bounces around from one year to the next. A higher ROCE indicates more efficient use of capital and is enhanced value creation for shareholder³⁵.

³³ For companies which were in a viable state at decision year, the comparison is done against the latest available data.

³⁴ $ROCE \text{ (using net income)} = \frac{(\text{Net Income} + \text{Interest Paid})}{(\text{Shareholders funds} + \text{Non current liabilities})} * 100$

³⁵ ROCE should be higher than the company's capital cost; otherwise it indicates that the company is not employing its capital effectively. In our analysis we will look at ROCE alone as reliable data for the company's cost of capital is not available.

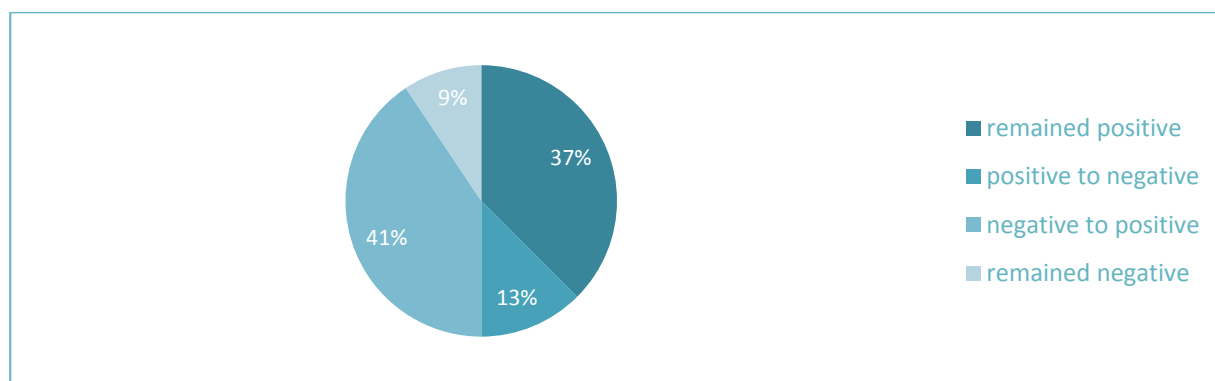


Figure 10. Viability status on the basis of ROCE.

Figure 10 allows us to look at the viability status of the restructuring aid recipient firms³⁶ from the perspective of its ROCE. For this analysis, we have taken into consideration multiple time frames - Decision year and the present (latest date with the data available). Looking at the ROCE, 37% of the companies already had a positive ROCE at the time of the decision³⁷ and they continued to have positive ROCE according to the last available data. Hence, no concrete contribution to viability could be deduced for these firms on the basis of this ROCE comparison.

There were 13% of the firms which had a positive ROCE³⁸ at the time of the decision but went on to have negative ROCE according to the latest available data. From the feedback received from the interviewees across the 6 cases we can infer that this might have been caused because of the inappropriateness of the restructuring plan, delay in granting of aid, partial/ non implementation of the restructuring measures and other external measures. Likewise, 9% of the firms who had a negative ROCE at the time of the decision continued to have a negative ROCE according to the latest available data. This indicates that the aid might not have aided the firms at all or might have benefitted only to an extent that did not contribute enough³⁹ to make the negative ROCE turn into positive.

41% of the firms (13 firms) that had negative ROCE at the time of the decision, now have a positive one. It could be that the restructuring plan allowed them to leverage the most out of the aid that they received. Such success could be aligned with careful planning/ formulation of the restructuring plan, timely implementation and cautious monitoring, however further investigation⁴⁰ would be required to establish this, since a number of external factors are also at work. However,

³⁶ The pie chart considers 32 companies for which PBT data is publicly available from AMADEUS (AMADEUS data is used for uniformity of standards across analysis).

³⁷ We acknowledge the fact that, there are many considerations apart from profit before taxes or ROCE that might have contributed to the grant of the aid. While a company can have positive ROCE at the end of the year in which the decision was taken, it does not mean that it was profitable in the period under assessment, i.e. in the years preceding the notification. In addition, if a decision is taken – say – in June and aid is disbursed in September, then ROCE at the end of the year would already account for the aid received.

³⁸ 42% of firms had positive PBT and 50% had positive ROCE at the time when the decision was taken. The reason for different percentage of firms with positive PBT as compared to positive ROCE is due to different number of total cases for which the data was available (PBT and ROCE are taken from AMADEUS). There were 6 companies for which data for PBT was not available while there were 17 companies for which ROCE was not available. The percentages are calculated deducting the respective number of companies thus making the percentages differ.

³⁹ It should be noted that there could be several factors apart from restructuring aid itself which might contribute to the profit before tax.

⁴⁰ As all the 41% of the firms were not considered as cases, detailed information on what might have contributed to the success is difficult to access without further detailed exploration.

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caution should be used in drawing conclusions on the influence of the restructuring plan, as the extent of the difficulties (which might be reflected in differing levels of negative ROCE), varies.

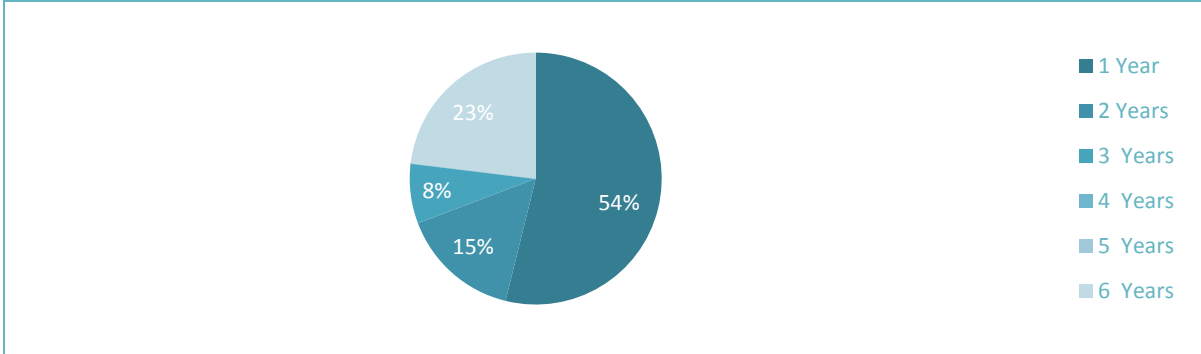


Figure 11. Years to viability on the basis of ROCE.

Figure 11 focuses on the duration taken by the 41% of the firms that have benefitted from restructuring aid to become viable. This gives an idea of the point in time⁴¹ that the firms took to return to viability since the decision date. 54% of the firms which had a negative ROCE at the time of the decision return to viability 1 year after the decision. This might suggest that viability issues can be quickly addressed, provided that the difficulties are recognised and the resources are channelized carefully on the major identified causes. Likewise 15% of the firms took 2 years and 8% of the firms took 3 years. The remaining 23% of the firms took 6 years to come to viability. This might stem from the fact that a major overhaul had to be made in order to generate a significant impact on ROCE or that other external factors were at work that slowed the return to viability. However, caution should be used in drawing conclusions on the influence of the restructuring plan, since the extent of the difficulties (which might be reflected in differing levels of negative ROCE), varies. This is an aspect that Figure 12⁴² addresses.

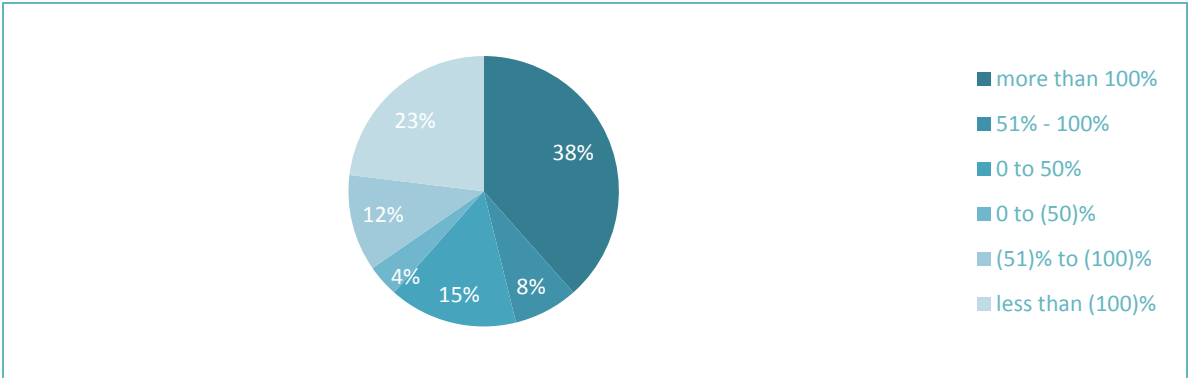


Figure 12. Percentage change in ROCE.

Figure 12 allows us to look at the % change in ROCE between the decision year and the point when the company became viable or if the company did not become viable then the latest year for which data is available (this allows for complex restructuring plans with longer time to come into effect, ample opportunities to contribute to the financial well-being of

⁴¹ It is not appropriate to graphically represent specific years as points in time because the decisions are taken on different years for different firms.

⁴² The small bracket sign used in the pie chart legend refers to negative sign.

the company)⁴³. This chart is not restricted to the 41% of firms that had a positive ROCE according to the latest available data, but compares the 60 firms receiving the restructuring aid considered in this study. Also, it should be noted that a firm with negative ROCE at the time of the decision can have positive change in ROCE, but the ROCE may continue to be negative⁴⁴. This could be a crucial indicator of the contribution of the restructuring aid on the ROCE of the firm. 61% of the firms have in reality improved their performance if we look at the % change. This is a better measure as compared to basing the impact of restructuring aid on absolute positive or negative value. 38% have had a positive variation in ROCE by 100% or more, 8% between 51%-100% and 15% between 0 to 50%. On the other hand, there were 39% of the firms that did not see a positive change in ROCE, which suggests that for some reason they were not able to leverage the most out of the restructuring aid. This percentage might include firms that had positive ROCE at the time of the decision and remained positive according to the latest available data (absolute ROCE might have decreased in a quantity not enough to change the sign of the ROCE). Hence, this measure points identifies that a majority of the firms improved their performance, although they might not have become viable in the absolute sense.

Altman Z score

In order to provide an alternate measure of viability⁴⁵ we looked into the Altman Z score which is used to predict the probability that a firm will go into bankruptcy within two years. The Altman Z scores distinguishes public and private firm and uses different score parameters⁴⁶ to gauge insufficient or sufficient financial viability. Figure 13 summarises the Altman Z score findings. Altman Z scores for 17 out of 56⁴⁷ firms signalled financial viability at the decision year. This increased to 26 for the current year⁴⁸, emphasizing that a number of companies have improved performance.

⁴³ For companies which were in a viable state at decision year, the comparison is done against the latest available data.

⁴⁴ A more detailed analysis of absolute values are done in case to case basis in the confidential annex, not available in this version.

⁴⁵ Calculating Altman Z score is also useful to ensure consistency across different sections of the report as well as the confidential annex where Altman Z scores have been calculated as well.

⁴⁶ For private firms, a score below 1.23 is categorized as insufficient financial viability while for public firms, a score below 1.81 is categorized as insufficient financial viability. Above these respective scores for the private and public firms have been categorized as sufficient financial viability (Altman Z score categorizes anything above these scores further into 2 categories - Normal financial viability and High financial viability).

⁴⁷ Reliable data for 4 firms could not be ascertained.

⁴⁸ Current year refers to the year for which latest data is available.

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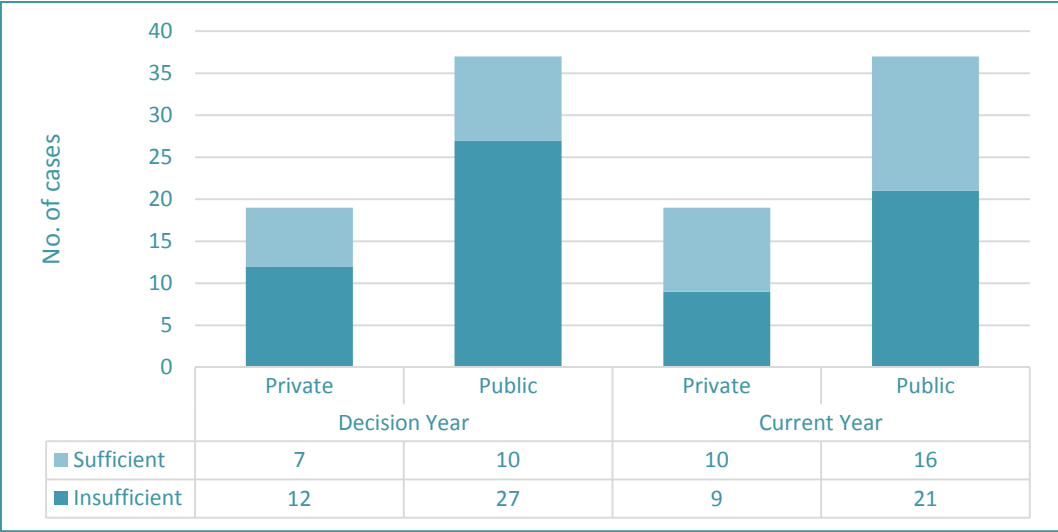


Figure 13: Financial Viability based on Altman Z score

6. Evaluation question – survival probability of aided firms



6 Evaluation question – survival probability of aided firms

Evaluation Question 3: What is the survival probability of aided firms compared to the survival probability without aid?

Findings for the specific 56 historic cases from 2000 to 2012/2014:

- Using a combination of propensity score matching and exact matching we identify our control group. On average, we find an absolute 14% to 18% difference in survival probability between restructuring aid receiving firms and the counterfactual group: depending on the chosen definition of survival, 82% to 86% of the aid-recipients but only 62% to 68% from the counterfactual group survived (Table 3) ;
- Subsequently we analyse two subsamples separately – aid received earlier than 2005 and aid received earlier than 2008. Employing OLS estimations, we find that the difference in survival probability between aid-recipients and the counterfactual group is significantly higher in the pre-2005 sample. This can both mean that aid is more effective in the long-term, but also that it had a bigger impact on survival during the financial crisis and its aftermath (Table 5 and Table 6)
- We also measured the viability of a firm in categories of the Altman Z-Score. Using an ordered logit model, we find that aid recipients have a significantly higher probability to improve their financial viability. The difference in the probability of financial recovery between aid recipients and the counterfactual group is highest in the long-term (Table 8 to Table 11)
- Conducting survival model analyses we find restructuring aid to increase a firm's lifecycle by approximately 8 to 15 years and to decrease the hazard rate by 44% to 56% (Table 12, Table 13 and Table 14)
- Last but not least, restructuring aid receiving firms appeared to be less likely to get acquired since the impact of restructuring aid on survival probability is always highest for definitions of survival which consider acquisitions as a firm's market exit (e.g. the difference in survival probability between aid receiving firms and the counterfactual in column (a) in Table 4 is lower for Def.(.)a definitions of survival than for the respective Def.(.)b definitions.)

Analysis

Methodological considerations

Treatment evaluation refers to the assessment of the impact of certain (policy) interventions on the (economic) outcome variables of interest ("analysis of effectiveness"). The main interest is on the causal effect of the treatment on the outcome which can be directly inferred if treatment is assigned randomly to individuals in an appropriately designed random experiment. After such an experiment is performed, causal inference is simply based on the comparison of the average outcomes of treated and untreated units. However, most policy evaluations in social sciences are based on observational data. Observational data are mostly not related to a random assignment mechanism implying that treatments are not under control, but observed, but related to unobserved factors. Hence, the treatment assignment and potential outcome variables will most likely be correlated ("selection bias").

The potential outcome model framework aims to address this problem by asking what the potential outcome of an average untreated individual would be if this individual were to receive the treatment. For obvious reasons, one can never observe the potential outcome of those who received treatment under the counterfactual state of receiving no treatment (“controls”) and vice versa (Cameron and Trivedi 2005, pp. 861-862). Hence, the researcher is also confronted with a substantial problem of missing data, which is also referred to as the “fundamental problem of causal inference” (Holland 1986). Meaningful comparisons between outcomes of treated (state aid received) and untreated (no state aid received) units (firms) and hence the estimation of the causal effect of treatment thus requires additional assumptions.

Research in statistics and econometrics in the past decades yielded different estimation strategies based on different identifying assumptions (Morgan & Winship 2007, pp. 30-31): First, one strategy is to condition on variables involving procedures such as matching, regression discontinuity design (RDD) or various forms of regression analysis including e.g. the difference-in-difference (DiD) estimator. Most notably, these procedures require that conditional on observable control variables (“covariates”), the outcomes are independent of the treatment variable (“conditional independence assumption”, CIA). If valid, CIA implies that there is no selection bias due to omitted variables, because the set of covariates removes endogeneity in terms of correlation between treatment variable and the error term (Cameron and Trivedi 2005, p. 863). Second, the researcher might aim to find exogenous variation of “instrumental variables” (IV) in order to isolate covariation in treatment and outcome variables. Hence, the main identifying assumption in IV estimation is that the instrument exerts a substantial impact on the treatment variable but there is no direct effect on the outcome variable.

In this study we have chosen an empirical approach which is **mainly based on matching techniques** in order to ensure causal identification of the treatment effect of aided firms. The matching is first employed on the whole population of firms and serves to find un-aided firms which act as control group. After the matching we apply several econometric techniques such as (ordered) multinomial outcome models and survival models on the sample of aid receiving firms and the constructed counterfactual group. (A brief discussion on why the above mentioned alternative econometric approaches do not appear to be feasible for the purpose of the present empirical study and in view of the data availability is provided in Side Note 3.1 in Annex 3.)

The structure of the empirical section is as follows. First, section 6.1 contains a description of the data and the construction of the variables used in the econometric analysis. A detailed outline of the applied econometric techniques and the corresponding findings follows in section 6.2. Section 6.3 briefly summarizes our main findings.

6.1 Data

Our main data source for the empirical analysis is the Bureau van Dijk database AMADEUS. AMADEUS gives access to an extensive amount of financial and business information of more than 35 million companies across the EU-28. However, not all of these 35 million companies are of relevance for our analysis.

We explain how we select an appropriate subsample of firms on which we build our econometric analysis. We use the information provided by AMADEUS to construct the dependent variables – a financial viability measure and variables that represent the operating status of firms – as well as to obtain the key explanatory and other independent variables of our study. Both types of variables will be discussed in sections 6.1.2 and 6.1.3, respectively. In addition, we merge the AMADEUS data with country-level data gathered from Eurostat that are used as controlling macro-level factors in our analysis. These variables will also be discussed in section 6.1.3. Lastly, the EC’s decisions of the restructuring state aid cases also include valuable information for the goal of our study.

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In addition to providing information on the name of the aid receiving firm, the aid instrument and the decision date, these reports enable us to determine the year when restructuring assistance was given by Member States.⁴⁹

6.1.1 Data basis for the matching procedure

By using the name of the aid receiving firms, we are able to identify 63 out of 67 firms in AMADEUS. The firms we could not find in AMADEUS are Interline Spa (Italy), PKS Wadowice S.A., PKS Stastow Sp. and PKS Sws (all Poland). For the remaining firms we obtain financial and business information from AMADEUS for the years between 2000 and 2013.

The pool of possible matching partners forms, together with the observations for the aid receiving firms, the sample for our propensity score matching. It includes firms that (a) have its company headquarters within the EU-28 and (b) operate in a similar industry (measured by the first two numbers of the NACE Code) as the aid receiving firms. (c) Additionally, we restrict the sample to firms that have no missing values for some of the key balance sheet figures in the year 2000 or 2005 in AMADEUS. The idea behind this restriction is that we assume a correlation of missing values between years, for instance if for a firm the relevant data for our study are available in 2005 we expect that there will be also a better data availability in other years compared to a firm that already has missing data in 2005. By choosing these two years, we guarantee that our sample consists also of firms that were already established in the time period between 2000 and 2005. Applying this filter to the AMADEUS database, we can identify 159'787 companies, for which we also obtain financial and business information for the time period of interest.

6.1.2 Dependent variables

Our outcome variables that we are interested in are firm survival or market exit, respectively. As there exists no unique definition of these outcomes, we use different dependent variables for our study. The first set of dependent variables is based on the operating status of the company, while the second set of variables is a measure of financial viability.

First, based on the information given by AMADEUS, we generate a dummy variable that indicates a firm's operating status in the final year of our analysis, i.e. 2014. Firms are considered as being alive (i.e., dummy is equal to one) if AMADEUS reports that a firm is either "active" or was "acquired" (Definition 1a). However, according to this definition, firms that are in insolvency proceedings and firms that have been finally **dissolved** are treated equally in our data. This may be a too narrow definition of a firm being active since firms can possibly recover after going through insolvency proceedings. Hence, we generate a dummy variable that considers additionally a firm as being alive (dummy equal to 1) if AMADEUS reports that this firm is either "in liquidation" or "bankrupt", (but dummy 0 if AMADEUS report no data any more or if it reports "finally dissolved") (Definition 2a). We also want to distinguish between active firms that were target of a successful take-over bid and firms that remained legally independent. For this reason, we introduce additional classifications of firm survival, based on the two definitions above, where we *exclude acquired firms* from the definition of firm survival.

⁴⁹ The start year we determine as the year of the beginning of the implementation by the member state. It is more likely that this is the date when restructuring measures can unfold their impact on the respective firms, rather than the year in which the aid was approved by either the Commission or the Member State. The uncertainty of whether the aid will be approved could lead to expectation building, potentially affecting the outcome variable. However, because we only match firms in similar situations in the year the aid recipients received the aid we assume these ex ante anticipation effects to be negligible.

Therefore, Definition 1b considers firms as being alive (dummy equals 1) only if AMADEUS reports that a firm is “active” (and neither “acquired” nor “in liquidation” nor “bankrupt” nor “finally dissolved”) and Definition 2b considers firms as being alive (dummy equals 1) if AMADEUS reports that a firm is “active”, “in liquidation” or “bankrupt” (but dummy equals zero if firm has been acquired or has been finally dissolved). Table 1 provides an overview of the different definitions of survival.⁵⁰

Table 1: Definition of survival (dummy equals 1)

	Def. 1a	Def. 2a	Def. 1b	Def. 2b
Active	X	X	X	X
In Liquidation/ Insolvency Procedure/ Bankruptcy/Default of Payment/ Dormant	-	X	-	X
Merger or Takeover	X	X	-	-
Dissolved	-	-	-	-

Note: Crosses indicate a status is included in the respective survival definition.

Second, to assess a firm’s financial viability we utilize the concept of Altman (1968, 2002). Altman proposes a multivariate procedure to predict a firm’s probability of going bankrupt within two years. This probability can be separated into three categories: Low, mid-level and high. In this study, we consider firms with a high probability of going bankrupt as firms with insufficient financial viability, firms with a mid-level probability of going bankrupt as firms with normal financial viability, and firms with a low probability of going bankrupt as firms with high financial viability. Even though Altman’s method to predict bankruptcy is sometimes criticized due to its simplicity (as ratio analysis in general) and also because it does not consider the general market environment (e.g. local bankruptcy laws), it can still be seen as a reliable tool to assess a firm’s financial stress condition (Grice and Ingram, 2001). Recent research furthermore suggests the efficacy of the Altman Z-score in predicting financial distress to be high with bankruptcy filings being accurately predicted in 94% of the time and financial distress in over 90% of the time (Hayes et. al, 2010). Furthermore the Z-Score still enjoys great popularity in finance literature and is still implemented in some of today’s commercial rating models and is still widely used by practitioners throughout the world (e.g. Agarwal 2013, Altman, 2013, Bemann, 2005). Indeed, from the application of the Z-score it is easy to map the correspondence between the credit ratings assigned by Standard & Poor’s and the score as shown by Altman and Hotchkiss (2006).

According to Altman, the probability of going bankrupt can be determined by z-scores. The calculation of z-scores depends on the legal form of the company. For *publicly listed firms*, z-scores (Z) are calculated by the following equation:

$$(1) \quad Z = 1.2 * X_1 + 1.4 * X_2 + 3.3 * X_3 + 0.999 * X_4 + 0.6 * X_5$$

X_1 represents the ratio of working capital to total assets, X_2 is the ratio of retained earnings to total assets, X_3 is defined as the ratio of earnings before interest and taxes (EBIT) to total assets, X_4 represents the ratio of total revenue to total assets and X_5 is the ratio of the market value of equity to total liabilities.

⁵⁰ Note that specific terms like “Bankruptcy” refer to the AMADEUS definitions in this section which we do not define as a firm’s market exit in all definitions of firm survival. Thus, it should not be confused with “Bankruptcy” definitions from other chapters.

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With respect to *private companies*, z-scores are given by the following equation:

$$(2) \quad Z = 0.717 * X_1 + 0.847 * X_2 + 3.107 * X_3 + 0.998 * X_4 + 0.42 * X_6$$

X_6 is the ratio of the book value of equity to total liabilities. Hence, the differences between equation (1) and (2) are the weights attached to the five balance sheet ratios as well as the different kinds of ratios of equity to total liabilities. While the market value of equity is taken into account for publicly listed firms, the book value is taken into account for private firms.

We use the information provided by AMADEUS to determine the legal form of the firms in our sample and to calculate z-scores according to equation 1 and 2, respectively. In doing so, we obtain the following balance sheet figures from AMADEUS:

- 1.) Total revenue, 2.) EBIT, 3.) Non-current assets, 4.) Current assets, 5.) Non-current liabilities, 6.) Current liabilities, 7.) Book value of equity and 8.) Other equity

Total assets are calculated as the sum of 3.) and 4.), total liabilities as the sum of 5.) and 6.), and working capital as the difference of 3.) and 6.). Information regarding retained earnings and the market value of equity are not provided by AMADEUS. However, since retained earnings are part of the balance sheet figure “Other equity”, we use 8.) as a proxy for retained earnings. In addition, we use the book value of equity for both groups of firms, publicly listed and private.⁵¹ Finally, we assign firms to the above mentioned categories in accordance to Altman (1968). Table 2 shows the critical values of this categorization process as defined by Altman.

Table 2. Categorization of a firm’s financial viability according to Altman z-scores.

Altman z-score category		Publicly listed firms	Private firms
1	Insufficient financial viability	Z<1.81	Z<1.23
2	Normal financial viability	1.81<Z<2.99	1.23<Z<2.9
3	High financial viability	Z>2.99	Z>2.9

6.1.3 Independent variables

In addition to the above mentioned variables 1.), 5.) and 6.), we use the following financial and business information as independent variables in our empirical examination, which we also obtain from AMADEUS:

- 9.) Net earnings (profits), 10.) Liquidity ratio, 11.) Solvency ratio, 12.) Employment level, 13.) Year established, 14.) Firm size, 15.) NACE-Code, and 16.) Country

The liquidity ratio is the ratio of quickly marketable assets (e.g. cash) to non-current liabilities. Hence, the financial viability should be positively linked to a higher liquidity ratio. The solvency ratio is defined as the ratio of the sum of net earnings and depreciation to total liabilities. As with liquidity ratios, high solvency ratios imply a higher financial viability. Firm size is categorized by AMADEUS into four types: Small, medium, large and very large. The NACE Code, which indicates a firm’s main area of activity, can be obtained in a four digit number.

⁵¹ Interchanging book and market values within the formula should not be a major issue. Indeed one of the main reasons why for instance the Z’’-Score (2002) – a variant of the original Altman’s Z-score – uses book values rather than market values is that whether they could even find continuous equity prices for some of our sample companies. (Altman and Hotchkiss (2006), S.274).

Additional country-level data is drawn from Eurostat. In particular, we obtain the following three variables:

17.) Average unemployment rate of the last three years, 18.) Ratio of subsidies to governmental expenditures, and 19.) GDP per capita

These variables are measures which might affect the propensity of a national government to provide the aid to firms. E.g., when the economy is in a bad state (low GDP growth, high unemployment), political pressure to grant an aid might be higher. Governments which generally subsidize their firms more might generally be more prone to grant an aid. However, the interpretation of these variables should not be too extensive as they only serve as controls.

We face challenges in terms of data availability with respect to the dependent and independent variables since AMADEUS does not consistently report this information throughout the time period of interest (year 2000 to year 2014). For some firms, there are gaps in data with respect to specific years or variables. It is also the case that, in a given year, one or more variables are missing. Additionally, all three cases are true for more than one firm in our sample.

Due to the large number of possible matching partners, we are less concerned about data availability of non-state aid receiving firms. However, we would like to avoid missing values with respect to the independent and dependent variables of aid receiving firms, in order to keep as many aid receiving firms as possible in our analysis. In particular, the values of variables for the years before state aid was granted are of relevance for finding appropriate matching partners for aid receiving firms. Hence, we had to perform a small number of data manipulations with respect to the variables used in the matching procedure to avoid severe reductions of the subsample of aid receiving firms. A full documentation of the changes made can be found in Table 3.1 in Annex 3.

6.2 Estimation strategy

The construction of counterfactuals for treated firms that received restructuring state aid will be conducted by matching methods. Optimally, one would use data from randomized/natural experiment available for identifying causal effects. Matching is an alternative for constructing the unobserved counterfactual outcomes and aims to re-establish experimental conditions. Matching is a non-parametric estimation method and thus one of its main advantages is that it does not rely on a particular specification of functional forms as is the case in ordinary regression methods. Regression-based estimators of treatment effects would be more efficient only if treatment effects are homogenous or the correct functional form is known a priori, but this is rarely the case.

Matching rests on the following identifying assumptions: i) the selection into the treatment group is only driven by observable variables ("selection on observables") and ii) based on the selection on covariates, selection into treatment is random (Conditional Independence Assumption). Matching requires iii) a large enough sample size to ensure that there is an overlap ("common support") as regards the observables in both groups, treated and untreated units, as well as sufficient information on covariates that affect both the treatment decision and the outcome.

In our case, (i) and (ii) this means that we observe all relevant factors why one firm receives an aid and another does not. The analysis can be confounded e.g. when aided firms have systematically better political connections and we do not account for this. Then, the measured treatment effect not only captures the effect of the aid, but also of this unobserved firm characteristic. In practice, this concern might not be particularly relevant as it alleges favouritism to a relevant extent. Conversely, iii) is violated e.g. if all existing big firms receive an aid. Then, there is no common support for firm size.

FINAL REPORT**A technical side note: Illustration of the key identifying assumptions**

The outcome variable of the treated and untreated firm is denoted as y_1 and y_0 , respectively. \mathbf{X} represents a set of observable covariates, D represents treatment where $D = 1$ represents the status of firms that received restructuring state aid and $D = 0$ represents the group of controls of untreated firms. Finally, \perp denotes independence. CIA (Conditional Independence Assumption) then states that conditional on selection on \mathbf{X} (i), the distribution of the potential outcomes is the same across different levels of the treatment (ii), i.e. (Cameron and Trivedi 2005, p. 863).

$$(1) \quad y_0, y_1 \perp D \mid \mathbf{X}$$

Equation 1 implies that all (pre-treatment) covariates that influence treatment assignment and potential outcomes simultaneously have to be observed in \mathbf{X} meaning that there are no omitted confounding covariates.

The other main matching assumption, referred to as “overlap” or “common support” (iii), states that (Cameron and Trivedi 2005, p. 864)

$$(2) \quad 0 < \Pr[D = 1 \mid \mathbf{X}] < 1$$

Equation 2 implies that there is overlap in both groups as for each treated firm there is another matched control with a similar \mathbf{X} . In other words, some randomness is needed to guarantee that firms with similar \mathbf{X} can be observed in treatment and control groups. This would be not the case if firms always ($\Pr[\cdot] = 1$) or never ($\Pr[\cdot] = 0$) receive treatment (Caliendo and Kopeing 2008, p.38).

In the equation below treatment assignment is denoted as $p(\mathbf{x})$ (Cameron and Trivedi 2005, p. 864)

$$(3) \quad p(\mathbf{x}) = \Pr[D = 1 \mid \mathbf{X} = \mathbf{x}]$$

where \mathbf{X} represents a set of observable covariates, D represents treatment (where $D = 1$ represents the status of firms that received restructuring state aid and $D = 0$ represents the group of controls of untreated firms). The propensity score in equation 3 can be easily estimated by a binary choice model such as probit with data on D and \mathbf{X} . The selection of covariates is derived from basic economic principles and previous related studies (e.g. London Economics 2004; Oxera 2009). Generally, covariates that simultaneously influence the treatment and the outcome of interest should be considered (Sianesi 2004). Furthermore, only covariates that are unaffected by the treatment should be included to avoid endogeneity. To ensure this our covariates are measured 1 or 2 years before treatment which is the start date of the restructuring measure. Thus, $(\Pr[D = 1 \mid \mathbf{X}])$ is the probability of receiving aid conditional on the chosen covariates \mathbf{X} .

When treatment assignment depends on a vector of discrete and continuous covariates, the concept of propensity score matching becomes particularly useful. Whereas exact matching methods (which require identical values for each variable for treatment and control group) suffer from the curse of dimensionality problem (lack of common support), less restrictive matching methods, such as propensity score matching (PSM), reduce this problem by defining a distance metric based on the covariates. Functions of relevant observed covariates are referred to as balancing scores. One type of balancing score is the propensity score which measures the conditional probability of treatment assignment. For a more technical discussion, see the box.

In order to predict the probability of receiving state aid we estimate a probit model with the following list of covariates based on the description in section 6.1:

- Firm level financials: *ln* Profit; *ln* Fixed Liabilities; *ln* Current Liabilities; Revenue per Employee; Altman Z-score category as defined in Altman (1962); Liquidity ratio; Solvency ratio; dummy “Public firm” indicating whether firm is listed on the stock exchange.⁵²
- Firm level structural characteristics: *ln* Employment; *ln* Age; firm size dummies (“Medium Firm”; “Large Firm”; “Very Large Firm”).
- Industry level: Industry dummies based on 1-digit NACE industry codes.
- Country level: Dummies for the country where the firm is headquartered.
- Macro level: Unemployment level of last 3 years; Share of subsidies from governmental expenditures; GDP per capita.

Firm level financials include size measures (in logs) as well as financial key ratios, productivity and ownership measures. Firm performance in terms of the financial key ratios and productivity approximates financial viability. One would expect that the higher a firm’s financial viability is the lower is the likelihood that it will receive restructuring state aid. A firm’s liquidity and solvency ratio directly captures a company’s risk of default and hence the probability to receive state aid. Similarly, whether a firm is listed on the stock exchange as well as the financial structure in terms of liabilities in general reflects the firm’s ability to access capital markets. The way firms have access to capital markets might be crucial for survival of firms in financial distress and hence also exerts a potential impact on receiving state aid.

Firm level structural characteristics provide different measures of firm size that influence the economic and political consequences of firm bankruptcy and hence the likelihood of receiving state aid. Firm characteristics such as firm size and the age of a company will also likely influence the adjustment process of firms in financial distress and hence firm survival.

Industry level dummies capture any industry specific heterogeneity such as differences in industry growth rates or industry specific risks. Similarly, country level dummies capture any institutional and macroeconomic effects that are peculiar to individual EU Member States and which are not covered by the other macro level controls. The latter control for different income levels, national labour market conditions as well as the proneness of national governments to provide public subsidies in general. It appears that this group of controls also exerts a potential impact on both, the likelihood to receive state aid as well as firm survival.

Table 3.3 in Annex 3 reports the results of the probit regression.⁵³ First, our probit regression produced a reasonably high model fit (McFadden Pseudo-R² ~ 0.39) which speaks for a high predictive power of the included covariates.⁵⁴ Furthermore, due to the high number of Polish bus operators among restructuring aid recipients we performed the probit regression both with (regr. no. (1)) and without (regr. no. (2)) Polish bus operators (NACE Code 4939) in order to ensure the robustness of our empirical analysis.⁵⁵ As a consequence, the number of total observations is lower (1138875 instead of

⁵² *ln* stands for the logarithmic value of the respective variable. We also use categories of the Altman Z-score in order to smooth the band width of its values which is helpful to satisfy the common support criterion.

⁵³ STATA 13 is used to estimate all the regressions.

⁵⁴ A brief discussion on McFadden’s Pseudo R² is provided by Wooldridge (2002), p. 465.

⁵⁵ Please note that at this stage of the matching procedure, every treated firm only enters the sample only once at the time of being treated. For aid recipients it would be wrong to consider the years after aid was received as if they would not be treated this year. For these firms it is (almost) impossible to receive aid again (along with the fact that they already receive aid) Also we cannot treat these firms as aid receiving firms because they are most likely already in a better financial situation due to the aid which would bias the results. Years prior to the start of the restructuring aid

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1138879) in regr. (2). The total number of observations used in the probit estimation also contains 57 firms comprising the treatment group in regr. (1) and 53 treated firms in regr. (2). When comparing regr. (1) and (2) one infers that estimation results remain virtually unchanged.⁵⁶

6.2.1 Matching algorithm

PSM determines the basis for identifying the counterfactuals and all subsequent regression methods. Based on the results of the probit regression and PSM we can identify the group of counterfactual firms for the firms that received state aid (“treated” firms). First of all, it must be noted that it is unlikely that individual treated and untreated firms exhibit the same propensity score. Within PSM there are a number of feasible methods to estimate the treatment effect conditional on the propensity score (Caliendo and Kopeinig 2008). We first construct different counterfactual groups starting with the nearest neighbour (NB = 1) approach and then extend the counterfactual group to a total number of 3 neighbours (NB =3). Defining two counterfactual groups allows us to examine whether the estimations are robust towards different specifications of neighbours.⁵⁷ We apply nearest neighbour matching with replacement. This means that an observation of the control group can be matched with more than one of the treated observations.

In selecting the nearest neighbours we furthermore conditioned on the following discrete matching arguments where the data set contains many observations at each distinct value of the matching arguments: 2-digit NACE industry codes, firm size (small as reference category, medium, large and very large firms), a binary variable that indicates whether a firm is publicly listed, and the year which represents the start date of the restructuring measure. This ensures that the nearest neighbour belongs to the same industry category, has the same legal form, the same size and that the counterfactual outcome is observed in the same year the treated firm received state aid. By additionally imposing a direct (or covariate) matching method on these variables we aim to avoid “bad” matches where, e.g., a treated observation is matched to a completely different industry. By imposing this procedure we were able to keep the total number of 57 (53) firms that received state aid. All steps conducted for the matching procedure are summarized in the matching protocol in Table 3.2 in Annex 3.

6.2.2 Assessing the matching quality

As argued before, a necessary condition for the validity of the matching procedure refers to the common support requirement. In our case we deleted observations whose propensity score is smaller than the minimum and larger than the maximum of the other group (Caliendo and Kopeinig 2008, p. 45).⁵⁸ This basic criterion avoids incomparable matches and discards 1 observation from the unrestricted treatment group and 2 observations for the restricted treatment group which precludes the 4 restructuring state aid cases of Polish bus operators. This ultimately results in a total number of 56 (51) treated firms for the subsequent treatment evaluation analysis.

measures should also not be considered as years in which these firms did not receive aid because the aid was potentially already approved or the decision-making process is an advanced stadium but the implementation has not started yet.

⁵⁶ Though 63 of the aid receiving companies were listed in AMADEUS some had insufficient data even after interpolation and therefore could not be used in the empirical analysis.

⁵⁷ Constructing alternative control groups with different neighbour specification makes also sense in view of the trade-off involved as regards the number of neighbours: One-to-one matching minimizes bias at the cost of a larger variance, whereas matching based on several neighbours reduces the variance but increases the bias (Caliendo and Kopeinig 2008, p. 45).

⁵⁸ Note that if the focus is only on estimating ATT we can weaken the overlap assumption in (4) as one only needs to assume $\Pr[D = 1 | \mathbf{X}] < 1$ (Caliendo and Kopeinig 2008, p. 36). For estimating ATT it is sufficient to guarantee the existence of potential matches in the control group.

Further assessments of the quality of the matching procedure refer to the performance measures of the probit model. The Pseudo R2 measures the explanatory power of the covariates which should be substantially lower after the matching procedure (Sianesi 2004). Indeed, comparing the Pseudo R2 in Table 3.3a (Pseudo-R2 ~ 0.39) with the respective value of the probit regression after matching based on the sample of treated units and counterfactuals (Pseudo-R2 ~ 0.15 for NB = 1 and Pseudo-R2 ~ 0.16 for NB = 3),⁵⁹ indicates that the systematic differences between both groups decreased substantially after controlling for covariates. Similarly, one can compare likelihood ratio tests on the joint significance of all covariates in the probit model before and after matching (Caliendo and Kopeinig 2008, p. 49). As required, the null hypothesis (“all covariates are jointly insignificant”) is rejected before ($p = 0.00$), but not after matching ($p = 0.83$ for NB = 1 and $p = 0.28$ for NB = 3).

Finally, we apply ordinary two-sample t -tests to check the balancing properties of our matching procedure. The tests examine whether the mean values of the included covariates differ statistically significant for treated and untreated groups before and after matching (H_0 : “means are equal for both groups”). For obvious reasons, matching is designed to ensure that for units with a similar propensity score the assignment to treatment is random and independent of the covariates ($D \perp \mathbf{X} \mid p(\mathbf{x})$). This would closely re-establish the conditions of a controlled randomized experiment. If this is satisfied then firms with the same propensity score must have same distribution of covariates independently of the treatment status. This balancing condition is testable by testing differences in means for each covariate.

The last column of Table 3.4 in Annex 3 reports the result of the mean tests applied to the full sample, i.e., before matching is conducted. As expected, almost all means of the covariates are significantly different between treated firms ($N = 57$) and untreated firms ($N = 1\,138\,822$).⁶⁰

In contrast, the last two columns of Table 3 report the mean test applied to the sample generated by the matching (for nearest and three neighbour matching). Only for one of all covariates (log of firm age), there is a (weakly) significant difference between the selected control group and aid receiving firms (as indicated by one star in both columns). Therefore, and in line with the above tests, we are confident that our matching procedure was successful in identifying valid counterfactuals for the group of treated (state aid receiving) firms.

⁵⁹ Underlying probit regressions are reported in Table 3.3b in the Annex.

⁶⁰ The 1 138 822 observations received a propensity score because a propensity score was computed for every firm in the data set for every year in which AMADEUS provided sufficient data for the respective firm.

FINAL REPORT**Table 3. Mean difference tests after matching**

Variables	Aid receiving firms N = 56		Selected control group (1 NB) N = 56		Selected control group (3 NB) N = 168		t-tests on mean differences	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	1 NB	3 NB
<i>Financial Figures</i>								
<i>ln Profit</i>	-3.69	7.27	-2.50	8.11	-3.20	7.26	-	-
<i>ln Fixed liabilities</i>	7.60	4.12	7.24	4.89	7.61	4.22	-	-
<i>ln Current liabilities</i>	9.95	2.71	10.12	2.82	9.90	2.46	-	-
Revenue per employee	153.89	218.74	184.85	187.04	211.72	275.24	-	-
Altman Z-Score category	1.36	0.59	1.39	0.65	1.49	0.71	-	-
Public firm	0.66	0.48	0.66	0.48	0.66	0.47	-	-
Liquidity ratio	0.68	0.65	0.62	0.41	0.90	2.57	-	-
Solvency ratio	9.53	36.39	15.19	30.41	14.26	28.24	-	-
<i>Firm Characteristics</i>								
<i>ln Employment</i>	6.09	1.77	5.92	2.32	5.75	2.00	-	-
<i>ln Age</i>	3.05	1.14	2.67	0.91	2.88	0.93	*	-
Medium firm	0.30	0.46	0.30	0.46	0.30	0.46	-	-
Large firm	0.29	0.46	0.29	0.46	0.29	0.45	-	-
Very large firm	0.34	0.48	0.34	0.48	0.34	0.47	-	-
<i>Macro level Information</i>								
Unemployment level last 3 years	9.64	4.25	9.78	4.02	9.40	3.34	-	-
Share of subs. from gov. exp. (%)	62.67	11.22	63.97	8.29	64.48	8.65	-	-
GDP per capita	2.16	2.50	2.01	2.37	1.64	2.59	-	-
<i>Outcome</i>								
Status 2014 Def. 1a (1=act.)	0.82	0.39	0.68	0.47	0.67	0.47	*	**
Status 2014 Def. 2a (1=act.)	0.88	0.33	0.73	0.45	0.73	0.44	*	**
Status 2014 Def. 1b (1=act.)	0.80	0.40	0.63	0.49	0.62	0.49	**	***
Status 2014 Def. 2b (1=act.)	0.86	0.35	0.68	0.47	0.68	0.47	**	***

Note: *** (**, *) indicate a significance level of 1% (5%, 10%). H_0 : equal means for both groups. As the nearest neighbour matching procedure is performed with replacement, we also impose Lechner's variance approximation (Lechner 2001).

6.2.3 Econometric results of the treatment evaluation

The outcome variable is the variable of our interest in determining the treatment effect. According to the data description in section 6.1.2 we analyse four different outcome variables. The outcome variable (firm survival) is equal to 1 if AMADEUS reports that the status of a firm in 2014 is "active" or "acquired" (Def. 1a), "active", "acquired", "in liquidation" or "bankruptcy" (Def. 2a), "active" (Def. 1b) or "active", "in liquidation" or "bankruptcy" (Def. 2b). Hence, in Def. 2a only firms are defined as having exited the market if their status is "dissolved". The justification for this definition of outcome is that full recovery is possible for firms with status "in liquidation" or "bankruptcy" and such firms can even receive state aid under certain conditions. Furthermore, the outcome definitions Def.(.)a differ from their Def.(.)b counterparts in the sense that they consider acquired firms as having exited the market. Here, the reason is that it depends on the aim of granting restructuring aid whether an acquisition of a restructured firm is evaluated as a success of the measure or not. It is important to note that the analysis is based on data from AMADEUS while remaining parts of the report also contain additional insider information on the aid receiving firms. Because we were not able to gain such insider information on the counterfactual firms we also refrain from the usage of this insider information we have for aid recipients to avoid biased results. Hence, the figures on the number of surviving aid recipients differs from other parts of the report.

When measuring treatment effects, two effects must be distinguished. The broadest possible average causal effect is the average treatment effect (ATE) which averages across all firms. The average treatment effect is defined for any (sub)population as

$$(3) \quad \text{ATE} = E[y_1 - y_0]$$

The second main treatment parameter is the average treatment effect on the treated (ATT) which is defined analogously as (Cameron and Trivedi 2005, p. 866)

$$(4) \quad \text{ATT} = E[y_1 - y_0 | D = 1]$$

In both cases the mean average outcome of the untreated group, y_0 , defines the relevant counterfactual for the outcome of the treated group, y_1 . Matching estimators impute the missing counterfactuals using the outcome of the nearest neighbours.

The ATE represents an estimator that can be applied to a sample drawn from a larger population where each individual observation is considered in estimating (3). However, in most policy contexts the ATE is not the parameter of interest, but rather the particular interest is on the ATT for whom the policy treatment was designed. In deciding whether a policy was effective, the focus must be on those firms who received the treatment but not on the average effect of all firms (Heckman et al. 1997). In our case the ATT is also the core parameter of interest, since we aim to evaluate the impact of restructuring state aid on the group of treated firms. Apart from this kind of impact assessment, we do not intend to extrapolate our results to a broader population of e.g. non-EU countries or future state aid cases. Instead, the focus is on the evaluation of the unbiased effects of treatment (“internal validity”) for the group of (56/51) firms that received state aid and that contributed to the estimation of the ATT as defined in equation (4).⁶¹

Results of the estimations and interpretation:

The lower part of Table 3 reports the **outcome values** for aid receiving firms (column 2) and different control groups with 1 (column 3) and 3 (column 4) nearest neighbour(s). One can infer that treatment in terms of receiving state aid exerted a significantly positive impact which is robust to the choice of definition of the outcome variable (Def. 1a, Def. 1b, Def. 2a and Def. 2b) suggesting that restructuring aid measures significantly increase survival probability and reduce the probability of a firm’s market exit, respectively.

For instance, the absolute difference in survival probability is $0.82 - 0.68 = 0.14$ if we compare the outcome according to Def. 1a of the treated firms with the counterfactual group with 1 nearest neighbour⁶². This means that whilst 82% of aided firms were active in the year 2014, only 68% of the matched non-aided firm were active, implying a difference of 14 percentage points with respect to firms’ operating status. As noted above the difference of 14%, however, is the absolute difference meaning that from 100 firms 14 firms survive due to restructuring aid which would have otherwise exited the market. In relative terms the interpretation is that the average survival probability increases by 21% when a firm receives restructuring aid ($0.14/0.68$)⁶³. An alternative interpretation looks at the probability of a failure which is 1 minus survival probability. Thus, aid recipients will exit the market with a probability of 18% and non-aid receiving firms with 32% probability. In other words, receiving restructuring aid decreases the average risk of a failure by 44% (1-

⁶¹ Also, estimating the ATT only requires imposing the assumption $y_0 \perp D | \mathbf{X}$ which is weaker than the assumption in (3) that is required for identifying the ATE (Cameron and Trivedi 2005, p. 864).

⁶² Table 3 shows 82% of aided firms as being alive in 2014. Table 3 includes firms that have been defined under 1a, incorporating both “active” and “acquired firms”. A similar definition used in Evaluation Question 1 shows a total of 45 out of 60 firms being alive (31 active and 14 acquired). This is consistent, given the reduction in number of firms considered in Table 3 to 56 firms due to data restrictions, with Table 3.

⁶³ Table 3 indicates that the absolute difference in survival probability is $0.82 - 0.68 = 0.14$. This implies a difference of 14 percentage points with respect to firms’ operating status - meaning that from 100 firms 14 firms survive due to restructuring aid which would have otherwise exited the market. Actual survival rates of the firms on basis of the Altman Z score calculated in evaluation question 2 shows that out of 60 firms, 9 firms (26 – 17) become viable at current year (26 firms signalling sufficient financial viability in current year as compared to 17 firms in the decision year). This is equal to 15% of the firms, similar to the 14% prediction from the counterfactual analysis.

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0.18/0.32) or, alternatively expressed, a non-aid receiving firm from the counterfactual group has 78% (0.14/0.18) higher relative risk of a failure than an aid recipient.

The differences in average outcome variables of the treated firms is statistically significant according to two-sided *t*-tests (column 5) throughout all definitions and for both, the counterfactual groups with 1 and with 3 nearest neighbours while there was no significant difference before in the full sample (Table 3.4). Comparing the results for the different outcome definitions we find the highest difference for Def.1b and Def.2b, the outcome definitions which consider acquisitions as market exits. In other words, aid receiving firms are less frequently acquired compared to non-aid receiving firms (as this different categorization causes the higher difference). Table 4 below exemplary provides the respective calculations for 1 NB.

Table 4: Differences in survival probability and failure risk

	<i>a</i>	<i>b</i>	$c=a/b$	$d=1-b$	$e=a/d$
	Absolute difference	Survival probability for non-aid recipients	Aid increases survival probability about:	Failure risk for non-aid recipients	Aid reduces the risk of a failure about:
Def. 1a	14%	68%	21%	32%	44%
Def. 2a	15%	73%	21%	27%	55%
Def. 1b	17%	63%	27%	37%	46%
Def. 2b	18%	68%	26%	32%	56%

Potential long-term effects

We now aim at analysing potential long-term effects of restructuring state aid. According to the R&R guidelines restructuring aid is “based on a feasible, coherent and far-reaching plan to restore a firm's long-term viability” (EC 2004, section 2.2. para 17). Since some firms received treatment during the later phase of our period of analysis, i.e. from 2009 to 2011, it appears unlikely that corresponding treatment effects have already been realized to the full extent until the last period of analysis, i.e. 2014. We therefore further investigate whether the treatment effect varies over time. Table 5 and Table 6 report results from standard OLS regressions of a dummy variable indicating firm survival (Def. 1a, 1b, 2a and 2b) on a constant and a dummy variable representing treatment assignment (1=state-aid received) for different subsamples.⁶⁴ While the regression is conducted on a sample consisting of firms that received restructuring aid and their nearest neighbour (NB = 1) in Table 5 we include three nearest neighbours (NB = 3) in the regressions in Table 6. In both Tables we report treatment effects of firms that received treatment i) before 2005⁶⁵ and ii) before 2008. Obviously, the number of observations on treated and counterfactual firms is higher in case ii) in Table 5 and Table 6. Furthermore, we report treatment effects for both definitions of our outcome variable in regressions (1) to (8).

⁶⁴ This approach is equivalent to the comparison of means in Table 3. The constant term represents the average outcome for the selected control group and the sum of the constant and the estimated parameter for the binary covariate measures the average outcome for aid receiving firms. The difference of both, the estimated parameter for the binary covariate, is the ATT.

⁶⁵ Before 2005 = largely before the 2004 R&R Guidelines entered into force and were applied.

Firms that received aid before 2005 have a higher survival probability than non-aided firms. When including all firms that received aid before 2008 (regression 2, 4, 6 and 8), the ATT is smaller in magnitude and its statistical significance decreases. Furthermore, the average survival probability for a non-aid receiving firm in the counterfactual group – indicated by the intercept term – is also lower in the pre-2005 cases compared to pre-2008 cases. A pre-2005 aid recipient would have survived with 35% to 55% probability without the aid while a pre-2008 recipient would have had an average survival probability between 53% and 68% without the aid. A qualitatively comparable pattern is observed for both counterfactual groups.

This finding should not be misinterpreted since we also observe the pre-2005 firms for a longer period when they are at risk. However, this still provides some information because we do not observe a similar pattern for the aid-recipients where there is almost no difference in overall survival probability between pre-2005 and pre-2008 aid recipients. Let us for instance consider Def.1: On average a pre-2004 aid recipient survives until 2014 with 80% (0.45+0.35) probability while a pre-2008 recipient does not really differ in the survival probability (0.61+0.18=0.79). Thus, while the firm's in the counterfactual group have significantly lower survival probabilities in the long-term the difference is less obvious for the aid recipients. However, due to the importance of this finding it should be noted that we cannot exclude alternative reasons than long-term effects as described in the candidate list below:

1. The aid might have rather unfolded its impact in the long-term.
2. An alternative interpretation could also be that restructuring aid measures made a bigger difference in survival probability during the financial crisis and its aftermath.
3. Under the pre-2004 guidelines, aid amounts and/or criteria may have been more generous which could have boosted survival probabilities for those having received aid before 2004, so that their long-term performance appears now higher in the statistic than the long-term performance of those which received aid after 2004
4. Competitive pressure in general has increased over the last 10-15 years (due to market liberalisation, globalisation, enlargement, etc.), so that non-aided firms find it nowadays more difficult to survive than non-aided firms that got into difficulties before 2004.
5. The 2004 enlargement have affected unobservable firm characteristics in a way that non-aided firms now have more difficulties to survive (e.g. now we have cases from Eastern Europe where managers may have less long experience in company restructuring).

Table 5: OLS regression of treatment effect for different interval length over time (NB = 1)

	Status Def. 1a		Status Def. 2a		Status Def. 1b		Status Def. 2b	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Aid before 2005	0.35** (0.14)		0.30** (0.14)		0.40*** (0.15)		0.35** (0.15)	
Aid before 2008		0.18* (0.10)		0.16 (0.10)		0.24** (0.11)		0.21** (0.10)
Intercept (E(y D =0))	0.45*** (0.11)	0.61*** (0.08)	0.55*** (0.11)	0.68*** (0.08)	0.35*** (0.11)	0.53*** (0.08)	0.45*** (0.11)	0.61*** (0.08)
#Obs.	40	76	40	76	40	76	40	76

Bootstrapped standard errors in parentheses (1000 reps.). Asterisk represent significance at * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

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	Status Def. 1a		Status Def. 1b		Status Def. 2a		Status Def. 2b	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Aid before 2005	0.30*** (0.11)		0.35*** (0.12)		0.27** (0.11)		0.32*** (0.11)	
Aid before 2008		0.16** (0.08)		0.20** (0.08)		0.16** (0.08)		0.20*** (0.08)
Intercept (E(y D =0))	0.50*** (0.07)	0.63*** (0.05)	0.40*** (0.065)	0.56*** (0.05)	0.58*** (0.07)	0.68*** (0.04)	0.48*** (0.06)	0.61*** (0.04)
#Obs.	80	152	80	152	80	152	80	152

Bootstrapped standard errors in parentheses (1000 reps.). Asterisk represent significance at * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

6.2.4 Multinomial outcome analysis (based on Z-Scores)

We now additionally consider the development of aid receiving and non-aid receiving firms' financial situation over time. Whereas the outcome variable corresponded to the binary categorization in Def. 1a, 1b, 2a, 2b, this section employs a multinomial categorization of the dependent variable based on the Altman-z score as described in section 6.1.2. Although the Altman Z-score is a continuous variable (which can be negative and take the value 0), we construct the ordinal scale from Z-Score categories as described in the data section suggested by Altman (1968, 2002) in order to enable a reasonable consideration of market exit within this framework. The discrete categorization reflects that most agents influencing the probability of survival base their decisions on rule of thumb, such as certain thresholds. For instance, if the Altman Z-Score is at 1 this is merely the same information as it would be at 0.9: there is insufficient financial viability. We start this section with a descriptive overview of the Altman z-score differences between aid-receiving and non-aid receiving firms over time and the general data availability required for the computation of z-scores followed by the estimation of ordered logistic regression models.

Descriptive information on Altman Z-Scores

Table 7 below for Def. 1a and three nearest neighbours as well as Tables 3.5 to 3.7 in Annex 3 for the remaining options provide an overview of data availability of the dependent variables in the post treatment period and give initial insights into the trend of the financial viability of aid receiving firms in comparison to their matched non-aid receiving counterparts. In case of a firm's bankruptcy and acquisition, respectively, we consider its market exit to take place one year after the last annual financial report is available in AMADEUS. Because this procedure is conducted for both, aid receiving and non-aid receiving firms, this will not bias our results.

Table 7: Mean value of Altman z-scores per year, Def. 1a, NB=3.

Time Cat	Year	\bar{Z}_N	\bar{Z}_A	P-Value	Number of firms from N					Number of firms from A				
					in \bar{Z}_N	died	acqu.	miss	total	in \bar{Z}_A	died	merger	miss	total
1	0	1.49	1.36	0.1544	168	0	0	0	168	56	0	0	0	56
	1	1.52	1.36	0.1254	154	11	0	3	168	50	0	0	6	56
2	2	1.59	1.47	0.2561	143	18	1	6	168	49	1	0	6	56
	3	1.62	1.48	0.2682	116	25	2	16	159	42	3	0	8	53
3	4	1.68	1.47	0.1395	94	27	3	5	129	36	4	0	3	43
	5	1.65	1.63	0.8836	77	27	5	5	114	32	3	0	3	38
4	6	1.51	1.63	0.5580	51	30	5	7	93	24	2	0	5	31
	7	1.67	1.70	0.8774	39	27	6	6	78	20	4	0	2	26
4	8	1.75	1.58	0.5692	20	26	5	9	60	12	2	0	6	20
	9	1.83	2.14	0.4721	12	24	5	7	48	7	3	0	6	16
	10	2.20	2.38	0.6550	5	23	5	6	39	8	2	0	3	13

In Table 7, the column *Year* shows the number of years that have elapsed since restructuring aid was granted to an aid receiving firm or, in case of a non-aid receiving firm, to the matched partner in the treatment group. The columns \bar{Z}_N and \bar{Z}_A show the mean value of the Altman z-score category of the non-aid receiving (N) and aid receiving (A) firms respectively. *P-values* refer to a two tailed t-test with assumed unequal variances, where the null hypothesis states that $\bar{Z}_N = \bar{Z}_A$. Separated by treatment status (i.e., non-aid receiving (N) and aid receiving (A)), the subsequent columns display the number of firms that (i) are included in the calculation of the mean value of the Altman z-scores (in \bar{Z} and in \bar{Z}_A), (ii) have the status "not active" (*died*), (iii) was acquired (*acqu.*), (iv) have the status "active" and was not acquired but do not have enough financial variables to calculate a z-score (*miss*) and (v) are in the sample (*complete*).⁶⁶

As Table 7 reveals, data availability of z-scores depends largely on the considered time horizon. We have a higher number of observations for the first years after restructuring aid was granted, which decreases in later years. This has implications for the following time-dependent multinomial outcome analysis of the effect of restructuring aid on the financial viability of firms, which requires a high degree of data availability for the different time periods. Therefore, to increase the number of observations in each time period, we cluster the observations of our sample into four time dependent categories, as shown in the column *Time Cat*. It is important to note that in these tables we did not drop observations for the years after a firm has exited the market or was acquired. Hence, the number of firms in the sample decreases over time solely due to *right censoring*, i.e. the year 2014 was reached. The reason is that we can still use the information that a firm has exited the market in one period in the next period and we do not lose information for these firms. However, while the start year of granting aid varies over time in the sample the final year of our analysis is fixed to 2013 which implies that we observe less firms over a longer time period. Additionally, this is also the reason why the number of firms with status "not active" is not monotonically increasing.

⁶⁶ Mean values of Altman z-scores can only be calculated for firms that are active, not acquired and provide all relevant financial variables to calculate a z-score. Therefore, columns (i) to (iv) add up to (v).

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For instance, a firm that received aid in 2008 and has exited the market in 2010 is only listed as "not active" for the years 2 to 5. In year 6 the firm drops out of the sample because 2014 is reached – the end of our observation period – which lowers the number of non-active firms due to so called *right-censoring*. The same is true for the number of firms that were acquired.

Table 7 indicate a positive trend of financial viability for both groups of firms (if a company has survived). However, while \bar{Z}_N is slightly higher than \bar{Z}_A before restructuring aid was granted, the aid receiving firms \bar{Z}_A (those which have survived) get ahead of those of \bar{Z}_N (which have survived) after 5 years on average; then they are always higher but the difference between \bar{Z}_A and \bar{Z}_n never gets significant. However, there is potential reason for this: From the previous estimations we remember that non-aid receiving firms have a statistically significant lower survival probability. Because firms with low financial viability are apparently more likely to exit the market putting the focus only on the Altman Z-score categories per year without considering market exits would positively bias the financial viability measures in favour of the non-aid receiving firms. This can be shown in a simple example: Let us assume we have two aided firms, one with good financial viability, one with a bad financial viability and also two non-aided firms, one with good and one with bad viability. If the aided firm with bad viability survives until time t because of the aid and the non-aided with bad viability dies prior to t only looking at the Altman Z-score categories would indicate that aid-receiving firms are more likely to be in a bad financial situation in after three years. Thus, one has to take a look at both at the same time – surviving rates and Altman Z-Score categories per year – to get the full picture.

Ordered Response Models

Ordered (ordinal) response models such as ordered logistic models have more than two mutually exclusive categories with natural order, e.g. "good", "medium" and "bad" credit rating. These models are estimated via maximum likelihood and relate the probability that a certain category of the dependent variable is realized or "chosen" to an expression of explanatory variables and corresponding coefficients. In the following we classify the dependent variable into 3 distinct outcomes which follow a natural ordering. Therefore, with regard to the before discussed bias we re-classify the outcome variable and construct a separate category for firms that have exited the market. Furthermore, we group Altman categories 2 and 3 ("normal financial viability" and "high financial viability") to one single category "save zone" in order to avoid a lack of observations the longer the period under review. This categorization enables us not only to analyse whether the probability of exiting the market differs between aid receiving and non-aid receiving firms but also whether full recovery is more likely for aid receiving firms or not.

To summarize, the categories determining the outcome variable in the multinomial logit are as follows:

1. Category 1: The firm has exited the market (Def. 1a, Def.1b, Def.2a and Def. 2b, respectively)
2. Category 2: The firm is in the "red zone" which is the Altman-z category "insufficient financial viability". This is also the baseline category.
3. Category 3: the firm is in the "save zone" which encompasses the Altman z-score categories "normal financial viability" and "high financial viability".

With 3 outcome categories the ordered logit model estimates a set of coefficient vectors β_1 , β_2 and β_3 corresponding to the respective outcome category. According to the discussion on non-feasible estimation methods provided by Side Note 3.1 in Annex 3, the interaction terms (as required for the classical difference-in-difference estimator) in discrete choice models can be interpreted neither in terms of sign nor in terms of inference.

However, recall that after conducting the matching procedure there is no significant difference in Altman-Z score categories between treatment and control group before treatment was received.⁶⁷ Accordingly, the ordered logit approach can also be interpreted as a conditional Difference-in-Difference approach as it is sufficient to compare the post-treatment outcomes at distinct points in time. Thus, the estimation results from the ordered logistic models allow for an attractive way to work around the problem of the interaction terms in discrete-choice models by deriving marginal effects from the estimated results. Marginal effects refer to the effect of a unit increase in the explanatory variable on the probability of selecting the respective outcome category expressed in percentage terms. With a dichotomous explanatory variable (restructuring state aid is received or not), the marginal effect of receiving aid is the difference in the adjusted predictions for the two groups of firms, i.e. for treated and non-treated firms. In order to examine the dynamics of firm survival, we estimate the ordered logit model for different time intervals of our analysis period. In other words, for each of our three Altman Z-Score categories – dead, red zone and save zone – and for each time interval we estimate the probability for both groups to be in the respective Altman Z-Score category and subsequently calculate whether the difference in the probability of being in the same category differs statistically significant between aid recipients and the counterfactual group.

Results of the calculations

Table 8 to Table 11 report the ordered logit estimation results for the alternatives definitions of firm survival, i.e. Def. 1a, Def.1b, Def.2a and Def. 2b, respectively. The row “Margins” reflects the difference in the adjusted predictions of both groups of firms while “Av. Pr.” is the average probability for an aid receiving and a non-aid receiving firm, respectively, to be in the respective category.

When looking at the Altman categories 1 (Z-Cat.) in Table 9 (“firm has exited the market”), one infers that the probability of firm bankruptcy gets significantly lower three years after the start of restructuring measures for firms that received state aid. A unit change in the independent variable, i.e. aid received instead of no aid received, decreases the probability of a market exit by 21% in absolute terms (Altman cat. 1) after more than six years of restructuring while the difference is only 10% in absolute terms in the period from three to six years after restructuring (column 2). There was no significant difference observed in the first three years after the start of a restructuring measure. Accordingly, there is evidence of a positive treatment effect in terms of reducing the likelihood of market exit which starts after four years and then increases with the years elapsed since restructuring-aid was granted. This result again suggests restructuring aid measures to rather have a long-term than a short term impact on survival (conditional on a firm’s survival in the first years). Furthermore, the probability of a firm’s full recovery from financial distress – measured in categories of the Altman z-score – is also significantly higher for restructuring aid recipients in the long-term. Again referring to Table 9 we find a 19% higher probability for aid recipients to fully recover and reach the save zone six years after the restructuring aid measures have been implemented compared to counterfactual but only a 13% difference 4 to 6 years after the start year and no significant impact in the first 3 years.⁶⁸

⁶⁷ The reader is referred to the respective *t*-statistic in Table 3.

⁶⁸ The estimation results from the ordered logit estimations are robust to the inclusion of covariates (age of the firm, dummy for public firms, GDP per capita, share of subsidies from government expenditures, three year unemployment rate). They are available upon request. Financial covariates were excluded because these are logically related to the dependent variable, since the Altman z-score is defined on the basis of a linear combination of financial covariates. Due to missing observations we refrain from including the number of employees and due to perfect prediction in some cases firm size is also excluded. As the focus is on firms survival and financial viability and the matching shows no mean difference for these variables this will not bias the findings.

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Table 8. Ordered logit for Def.1a

Year	0			1-3			4-6			>6		
Z-Cat.	1	2	3	1	2	3	1	2	3	1	2	3
Av. Pr. No Aid	-	0.63 (0.04)	0.37 (0.04)	0.14 (0.03)	0.50 (0.04)	0.35 (0.03)	0.25 (0.04)	0.42 (0.04)	0.32 (0.04)	0.46 (0.06)	0.25 (0.05)	0.29 (0.06)
Av. Pr. Aid	-	0.70 (0.06)	0.30 (0.07)	0.13 (0.03)	0.48 (0.04)	0.39 (0.05)	0.18 (0.04)	0.40 (0.04)	0.42 (0.05)	0.30 (0.07)	0.25 (0.05)	0.45 (0.09)
Margin		0.07 (0.07)	-0.07 (0.08)	-0.02 (0.03)	-0.02 (0.03)	0.04 (0.06)	-0.07 (0.05)	-0.03 (0.02)	0.10* (0.06)	-0.16* (0.09)	0.00 (0.01)	0.16* (0.10)
N		224	224	221	221	221	163	163	163	92	92	92

Table 9. Ordered logit for Def.1b

Year	0			1-3			4-6			>6		
Z-Cat.	1	2	3	1	2	3	1	2	3	1	2	3
Av. Pr. No Aid	-	0.63 (0.04)	0.37 (0.04)	0.16 (0.03)	0.50 (0.04)	0.34 (0.04)	0.29 (0.04)	0.42 (0.04)	0.30 (0.04)	0.52 (0.06)	0.22 (0.04)	0.26 (0.05)
Av. Pr. Aid	-	0.70 (0.06)	0.30 (0.07)	0.13 (0.03)	0.48 (0.04)	0.39 (0.05)	0.18 (0.04)	0.39 (0.04)	0.43 (0.06)	0.31 (0.07)	0.23 (0.05)	0.46 (0.08)
Margin		0.07 (0.07)	-0.07 (0.07)	-0.03 (0.03)	-0.02 (0.03)	0.05 (0.06)	-0.10** (0.05)	-0.03 (0.02)	0.13* (0.07)	-0.21** (0.09)	0.01 (0.02)	0.19** (0.09)
N		224	224	221	221	221	166	166	166	98	98	98

Table 10. Ordered logit for Def.2a

Year	0			1-3			4-6			>6		
Z-Cat.	1	2	3	1	2	3	1	2	3	1	2	3
Av. Pr. No Aid	-	0.63 (0.04)	0.37 (0.03)	0.12 (0.03)	0.53 (0.03)	0.35 (0.04)	0.23 (0.04)	0.44 (0.05)	0.33 (0.04)	0.40 (0.07)	0.29 (0.05)	0.31 (0.06)
Av. Pr. Aid	-	0.70 (0.07)	0.30 (0.07)	0.10 (0.02)	0.50 (0.04)	0.40 (0.06)	0.15 (0.03)	0.40 (0.05)	0.45 (0.06)	0.26 (0.07)	0.28 (0.05)	0.46 (0.10)
Margin		0.07 (0.07)	-0.07 (0.07)	-0.02 (0.03)	-0.03 (0.04)	0.05 (0.06)	-0.08* (0.04)	-0.04 (0.03)	0.12* (0.07)	-0.14* (0.08)	-0.01 (0.02)	0.15* (0.08)
N		224	224	221	221	221	158	158	158	88	88	88

Table 11. Ordered logit for Def.2b

Year	0			1-3			4-6			>6		
Z-Cat.	1	2	3	1	2	3	1	2	3	1	2	3
Av. Pr. No Aid	-	0.63 (0.04)	0.37 (0.04)	0.13 (0.03)	0.53 (0.03)	0.34 (0.03)	0.27 (0.04)	0.43 (0.04)	0.30 (0.04)	0.47 (0.06)	0.26 (0.05)	0.28 (0.06)
Av. Pr. Aid	-	0.70 (0.06)	0.30 (0.07)	0.11 (0.02)	0.50 (0.05)	0.40 (0.05)	0.16 (0.04)	0.39 (0.05)	0.45 (0.07)	0.28 (0.07)	0.26 (0.05)	0.47 (0.07)
Margin		0.07 (0.07)	-0.07 (0.08)	-0.03 (0.03)	-0.03 (0.03)	0.06 (0.07)	-0.11** (0.05)	-0.05* (0.03)	0.15** (0.07)	-0.19** (0.10)	0.00 (0.02)	0.19** (0.09)
N		224	224	221	221	221	161	161	161	94	94	94

Bootstrapped standard errors in parentheses (1000 repetitions). Asterisk represent significance at $p < 0.1$, $** p < 0.05$, $*** p < 0.01$. "Z-Cat" represents the categories (Z-Cat=1) market exit, (Z-Cat=2) red zone according to Altman z-score category "firm with insufficient financial viability" (3) save zone encompassing the Altman-z-score categories "normal financial viability" and "high financial viability". "Year" is the corresponding time period elapsed after the beginning of the restructuring measures. "Av. Pro. Aid" and "Av. Pr. No Aid", respectively, are the average probabilities of aid recipients and non-aid recipients to be in the corresponding category. Estimations applied on the dataset including the 3 nearest neighbours.

Although we have evaluated the impact of receiving restructuring aid at several distinct points in time, i.e. with a different number of years elapsed since aid was received, we did not model the involved dynamics explicitly so far. The estimation approaches in section 6.2.5 ("survival analysis") allow examining the dynamics of firm survival.

6.2.5 Survival analysis

Survival analysis (also referred to as time to event analysis or more generally duration analysis) can give a different perspective on our subject of study. These methods represent a common tool not only in economics but in variety of research disciplines, e.g. in pharmaceutical statistics to assess the efficacy of a new therapy in a clinical trial or in engineering to study the lifetime of machine components. Generally, the focus is on observing the time to the occurrence of an event. In our application, this is the survival – or death – of firms. There are two main concepts in this survival analysis. The first is the survivor function which is used to determine the probability of an individual to survive beyond a certain point in time. The second concept is the hazard rate or hazard function which is the probability that an individual will experience an event such as market exit at time t while that individual is at risk for having an event, i.e. the firm is still operating in $t-1$.

From a conceptual econometric perspective survival analysis enables to consider the phenomenon of *right censoring*. The point of survival analysis is to follow subjects over time and observe at which point in time they experience the event of interest. However, in practice the researcher can only observe time until some point. Right-censoring means that some individuals do not experience the event until the end of the observation (Allison 2010, pp. 413-416). In our case, firms are said to be right-censored if they do not exit the market until the last year that we observe, i.e. 2014, but potentially will do so afterwards. Without the consideration of right-censoring standard errors might be large and estimates potentially biased. To capture timing and right-censoring survival models employ two-variable outcomes where a time variable measures the last event-free observation if right-censored) or the time at event and the censoring variable measures if an individual experienced an event at a certain point in time or not.

The very aim of survival analysis is to estimate and compare survival functions and hazard rates, respectively, of different groups (i.e. treated firms vs. control firms in our data set). Using survival analysis in this section, we aim at answering the question how a restructuring aid affects overall survival time of firms.

Methodological considerations

Survival analysis can be either conducted non-parametrically, parametrically or semi-parametrically; all approaches have their advantages and drawbacks. We start our analysis with non-parametric methods, proceed with parametric survival models and complete this section with semi-parametric models. Due to the large amount of estimations we focus on the more restrictive outcome Definitions Def.1a and Def.2a.⁶⁹

Non-parametric analysis

Non-parametric survival analysis methods are the most straightforward way to describe the survival in a sample. They enable a simultaneous consideration of right-censoring and provide an intuitive graphical presentation. These methods do not require parametric and functional assumptions, however, have the downside that they are mainly descriptive and do not allow controlling for covariates. We employ the two most popular non-parametric methods by 1) Kaplan-Meier (1958) and 2) Nelson-Aalen (1972). The Kaplan Meier statistic is an estimator for estimating survival functions. It constitutes a simple way of estimating the empirical probability of surviving until a certain point in time and can be interpreted as a non-parametric maximum likelihood estimator (NPML). It can be used to obtain univariate descriptive statistics for survival data, including the median survival time, and compare the survival experience for two or more groups of subjects.

⁶⁹ However, the results are fully robust to alternative outcomes Def. 1b and Def.2b and are available upon request.

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An alternative approach is provided by the Nelson-Aalen estimator which estimates the cumulative hazard rates: the cumulative number of expected events after a certain time has passed (Greene 2003, pp. 798-799). Formally, the hazard function is a function of probability (risk) of an event to occur within a time interval $[t, t+i]$ given the observation under risk has already survived until t . The Nelson-Aalen estimator is given by

$$(5) \quad H(t) = \sum_{t_i \leq t} \frac{d_i}{n_i}$$

where d_i represents the number of events at time t_i and n_i the number of firms still alive or observable (uncensored) at time t_i . Using the same notation the Kaplan-Meier estimator is given by

$$(6) \quad S(t) = \prod_{t_i \leq t} \frac{n_i - d_i}{n_i}$$

These estimators are an extension to the general survivor function for uncensored data which basically is the proportion of individuals alive at t .⁷⁰

Figure 14 provides the graphical results of both estimation methods for Def.1a.⁷¹ Figure 14 reports the Kaplan-Meier survivor function and the Nelson-Aalen cumulative hazard estimates for 1 and 3 nearest neighbours. Both are step functions with discontinuities at the observed bankruptcy. They are horizontal between the observed bankruptcy events.⁷² From the Kaplan-Meier survival estimates we infer that the probability of firm survival decreases as we approach the end of the observation period for both groups. Again, in accordance to our findings from previous sections, the survival probability is lower for the counterfactual group ($Aid = 0$), and the difference between both groups gets more pronounced the more years pass since the treatment in terms of state aid was imposed. Apparently, this result is also reflected in the Nelson-Aalen estimates for the cumulative hazard rates. Accordingly, the conditional probability of going bankrupt increases the more years pass but at a higher level for the counterfactual firms that did not receive state aid ($aid = 0$). Again, the treatment effect gets more pronounced the longer the time distance to the treatment is. For instance, from Table 3.8 we infer that after 9 years of receiving treatment the conditional probability to go bankrupt in the next instant is 0.46 and 0.19 for non-aided firms and aided firms, respectively. This indicates that a longer period of time is required, so that state aid measures can become effective which corresponds very well with our earlier results.

As regards the statistical significance between aid receiving and non-aid receiving firms, the Wilcoxon-Breslow-Gehan test for equality of survivor functions is applied finding the difference being significant at least at the 5% level.⁷³

⁷⁰ These extensions can be justified heuristically by the intuition that if a firm survives until t it has survived already until t_1 . The individual must then survive from t_1 until t_2 conditional on that it has already survived until t_1 and so on. Hence the K-M estimator follows from multiplying these conditional survival probabilities.

⁷¹ The corresponding figure for Def.2a is Figure A3.1 in the Appendix. Figures for Def.1b and 2b are not reported but look very similar and exhibit an even higher spread.

⁷² The underlying data for calculating the estimators in equations (5) and (6) are provided in Table 3.8 to Table 3.11 in Annex 3.

⁷³ Test results are reported in the Table 3.12 in Annex 3. A description of the test as well as an introduction into survival analysis in general is provided by Kalbfleisch and Prentice (2002).

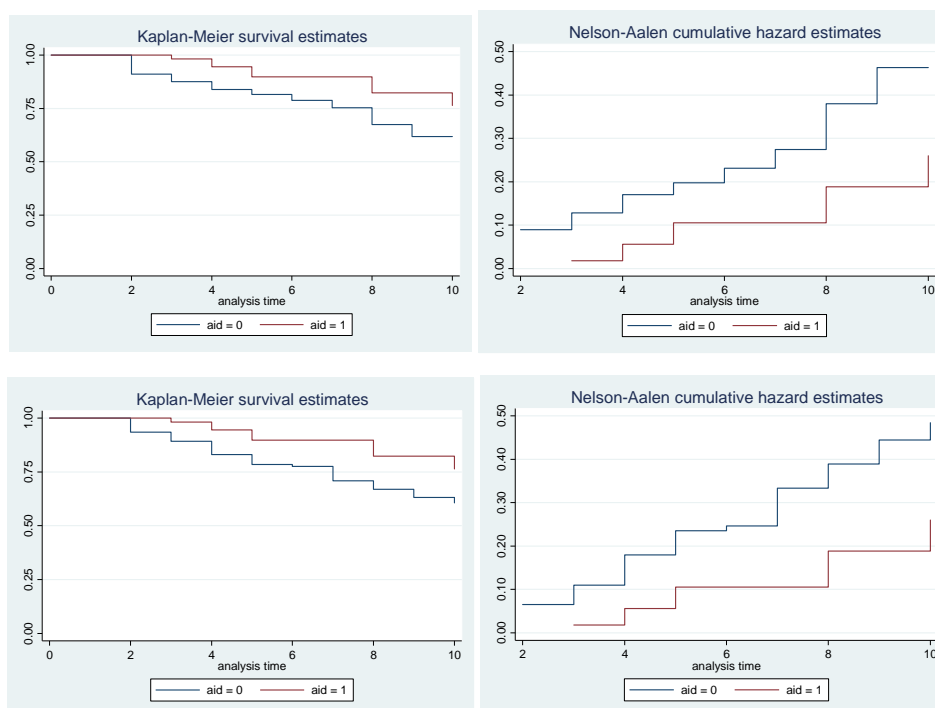


Figure 14. Kaplan-Meier and Nelson-Aalen estimates (Def.1a). Upper panel for NB =1, lower panel NB=3.

Parametric analysis

We proceed with the estimation of a fully *parametric survival model*. As already explained, parametric survival models enable us to control for co-factors with potential impact on survival probability. More importantly, they also allow to estimate the baseline hazard from which we can predict the average survival time of a firm with certain characteristics. Having chosen the appropriate model, parametric survival models deliver the highest efficiency compared to the prior non-parametric and the subsequent semi-parametric methods. As a drawback, the accuracy of parametric survival models depends on the distributional assumptions of the survival functions, e.g. Exponential, Weibull, Gompertz, Log-Logistic or Log-Normal distributions. Parametric survival methods are implemented in a regression framework and estimated by maximum likelihood. Regression analysis steps involve i) identification of the distribution that best fits the underlying data and ii) identification of relevant covariates.

With respect to the first step – finding the optimal distribution – we run parametric regressions with several distributions and compute the corresponding *Information Criteria*. The model with the lowest Information Criteria test statistic provides the best model fit: In our case the Akaike Information Criterion and the Bayesian Information Criterion test statistics are lowest for the log-normal model while the exponential model fits the data worst.⁷⁴ This finding is independent of the definition of outcome and the inclusion of covariates. Thus, in the second step, the parametric regressions are conducted using a log-normal model with the log-normal survivor function $S(t) = 1 - \Phi\left(\frac{\log(t) - \mu}{\sigma}\right)$.⁷⁵ In this model, the error term is normally distributed and the specification of a (log)linear model similar to a standard linear model.

⁷⁴ The corresponding table is provided in Table 3.14 in Annex 3

⁷⁵ Variable μ is the scale parameter.

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Besides the treatment variable *Aid* we also let the distribution depend on additional covariates such as macro-level information as well as firm age, dummy for public firm and firm size (dummies for Medium Firm, Large Firm and Very Large Firm with Small Firms being the reference category). Thus, we can also investigate which factors may have an impact on survival probability and length, respectively. However, excluding those does not substantially change the results with respect to the *Aid* variable since due to the matching procedure both groups do not differ with regard to the control variables. We do not include financial variables since they likely partially absorb the impact of aid on survival due to correlation.

Table 12. Parametric survival function based on log-normal distribution (NB 3)

	(1) Def. 1a	(2) Def. 2a	(3) Def. 1b	(4) Def. 2b
Aid	1.68 ^{***} (0.33)	2.07 ^{**} (0.74)	1.70 ^{***} (0.33)	2.08 ^{***} (0.53)
Public Firm	1.29 [*] (0.20)	1.31 (0.28)	1.29 [*] (0.19)	1.30 (0.24)
Age	1.00 (0.00)	1.00 (0.00)	1.00 (0.00)	1.00 (0.00)
Medium Firm	1.10 (0.37)	1.08 (0.59)	1.09 (0.29)	1.07 (0.56)
Large Firm	0.95 (0.32)	1.00 (0.56)	0.95 (0.26)	1.00 (0.53)
Very Large Firm	1.57 (0.53)	1.43 (0.80)	1.50 (0.42)	1.37 (0.72)
Share of subsidies from gov. expenditures (%)	1.00 (0.01)	1.00 (0.01)	1.00 (0.01)	1.00 (0.01)
GDP per Capita	1.03 (0.03)	1.05 [*] (0.03)	1.03 (0.03)	1.05 [*] (0.03)
Unempl. level last 3 years	1.04 [*] (0.03)	1.05 (0.03)	1.04 [*] (0.02)	1.04 (0.03)
Intercept	4.52 ^{**} (3.04)	5.40 ^{**} (4.41)	4.58 ^{**} (3.00)	5.47 ^{**} (4.35)
ln_sig	-0.19 ^{**} (0.83)	-0.06 ^{**} (0.09)	-0.22 ^{***} (0.08)	-0.09 (0.09)
sigma	0.83 (0.07)	0.95 (0.07)	0.80 (0.81)	-0.92 (0.08)
N	1438	1464	1406	1432

Note: Standard errors in parentheses. Asterisk represent significance at * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Coefficients are parametrized in accelerated failure time metric (AFT) and reported as Time Ratios (Exponentiated Coefficients).

The corresponding results are reported in Table 12. It is important to note that parametric survival models with a log-normal distribution are parametrized in accelerated failure time metric (AFT), i.e. the coefficients measure to what extent the treatment accelerates or decelerates the speed with which firms traverse the survival curve assuming that a firm's lifetime is generally limited. In Table 12 we report the exponentiated coefficients from our estimates to make them interpretable as time ratios. This means they measure the comparison of rates at which firms traverse the survival curve. Thus, a time ratio of 1.68 for *Aid* as estimated in Def. 1a can be interpreted as follows: restructuring aid prolongs survival time by 68% (68% (1-1.68=-0.68)) compared to the control group and approximately doubles survival time for Def.2a (107% lifetime expansion), respectively. For the models which consider acquisitions as market exit we also find that public firms have a significantly longer survival time than private firms. The graphical illustration of the survival functions from Table 12 is made available in the Figure 3.2 in Annex 3.

As mentioned above parametric survival models have the advantage that the intercept term is also explicitly estimated and defines the baseline survival time – the survival time when all covariates are set to zero. For instance the constant

term of 4.52 for Def.1a can be interpreted as mean survival time measured in years if all other covariates are zero (which is in practice not the case). The constant together with the other coefficients allows predicting the average time-to-failure for aid-recipients and non-aid receiving firms (while the control variables are fixed at their means).⁷⁶.

Table 13: Average survival time

	Def. 1a	Def. 2a	Def. 1b	Def. 2b
Predicted average survival duration for aid=0 in years	11.59	14.12	11.09	13.43
Predicted average survival duration for aid=1 in years	19.53	29.20	18.86	27.96
Difference in average survival duration in years	7.93 ^{''}	15.09 ^{''}	7.78 ^{''}	14.53 ^{''}

Table 13 reveals that the average time-to-failure (or survival time) is roughly between 11 and 14 years for the non-aid counterfactual. For the aid recipients, it is twice as high with average times-to-failure between 20 and 29 years, depending on specification of our survival variable.

Semi-Parametric analysis

Last but not least we complete the duration model section with the estimation of semi-parametric “Cox proportional hazard” models. Cox models (Cox, 1972) are termed semi-parametric since they leave the baseline hazard function $\propto (t) = \log_e(h_0(t))$ unspecified meaning that they do not impose restrictions on the shape of the baseline hazard and therefore allow the baseline hazard to be as flexible as possible, however, at the cost of not explicitly estimating the baseline hazard. Thus, this class of models does not allow making any predictions on survival time. The covariates, however, enter the model parametrically.

$$(7) \quad \log(h_t) = \log(h_0(t)) + \beta_1 x_{i1} + \dots + \beta_k x_{ik}$$

or equivalently

$$(8) \quad h_i(t) = h_0(t) \cdot \exp(\beta_1 x_{i1} + \dots + \beta_k x_{ik})$$

There is no constant term in the linear predictor $\eta_i = \beta_1 x_{i1} + \dots + \beta_k x_{ik}$ since the constant is absorbed in the baseline hazard $h_0(t)$ which gives the hazard (or the occurrence) of an event in t if all other predictors are equal to zero. Thus, the Cox models enable us to produce covariate-adjusted hazard ratios without imposing any assumption on the baseline hazard which yields generally more robust estimates. In terms of interpretation it is important to note that in contrast to the ATF metric from the log-normal parametric survival model the coefficients in the Cox model are Hazard Ratios (HR), i.e. the ratio of two hazards rates and may have nothing to do with prolongation of survival. Recall that a hazard rate is the probability that an individual will experience an event such as market exit at time t while that individual is at risk for having an event, i.e. the firm is still operating in $t-1$. The HR is the ratio of the probability of an event (in our case market exit) in the treatment group (aid recipients) to the control group (matched non-aid receiving firms) at any duration. Thus, the hazard ratio does not depend on the time survived in the proportional hazard model. The Cox model is a proportional hazard model which means it assumes that the hazard is a constant proportion over time e.g. for groups A and B it is $HR = \frac{h(A)_t}{h(B)_t} = \text{constant}$ or in other words the hazard functions should be parallel. Hence, a key assumption for proportional hazard rate estimations is the proportionality condition. If the condition holds the parameters can be estimated without consideration of the hazard function.

⁷⁶ Note: Information on mean values of the corresponding variables are reported in Table 3.

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In our case the proportional hazard assumption cannot be rejected as indicated by the test statistics in Table 14. The table also reports the results for a Cox model with covariates, applied to the dataset with three neighbour matching and all four definitions of survival. We include a dummy for *Public Firm*, dummies for firm size (*Medium* to *Very Large*), a firm's *Age* as well as macro-level variables *Unemployment level last 3 years*, *Share of subs. from gov. exp. (%)* and *GDP per capita*. We report hazard ratios (exponential coefficients) rather than the actual coefficients in Table 14 since their interpretation is more straightforward. We find that restructuring aid significantly reduces the hazard regardless of the outcome definition: the hazard rate for those firms who received aid is only between 32% and 42% of the hazard rate for those firms that had not received the aid or alternatively expressed restructuring aid reduces the hazard rate around 58% to 68% – other things equal – which is little higher than our initial findings from the matching where we found restructuring aid to reduce the risk of a failure by 44% to 56%. In contrast to the findings from the parametric survival models do not find that a public firm has a statistically significant lower risk of a failure now, however, the coefficient for Very Large Firm is significant for Def. 1a and Def. 1b indicating that these firms also have a lower failure risk if *Bankruptcy* and *In Insolvency Procedure* are not considered as market exit.

Table 14. Cox regressions with covariates (NB 3)

	(1) Def. 1a	(2) Def. 2a	(3) Def. 1b	(4) Def. 2b
Aid	0.416** (0.160)	0.326*** (0.155)	0.398*** (0.153)	0.315*** (0.150)
Public Firm	0.710 (0.220)	0.687 (0.241)	0.712 (0.219)	0.691 (0.241)
Age	0.997 (0.005)	0.997 (0.006)	0.996 (0.006)	0.996 (0.006)
Medium Firm	0.647 (0.312)	0.696 (0.370)	0.658 (0.317)	0.700 (0.372)
Large Firm	0.850 (0.415)	0.714 (0.395)	0.846 (0.412)	0.710 (0.392)
Very Large Firm	0.366* (0.188)	0.495 (0.276)	0.388* (0.198)	0.526 (0.291)
Share of subsidies from gov. expenditures (%)	1.002 (0.017)	1.002 (0.018)	1.002 (0.017)	1.003 (0.018)
GDP per Capita	0.934 (0.041)	0.918* (0.044)	0.936 (0.042)	0.919* (0.044)
Unempl. level last 3 years	0.934 (0.044)	0.954 (0.049)	0.934 (0.044)	0.954 (0.049)
Test of propor. hazard assum. $p > \chi^2$ for all cov.	✓	✓	✓	✓
LR χ^2	20.54	16.53	20.66	16.86
$p > \chi^2$	0.01	0.06	0.01	0.05
# subjects	224	224	224	224
# observations	1436	1462	1404	1430

Bootstrapped standard errors in parentheses (1000 repetitions). Asterisk represent significance at * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Coefficients are exponentiated and to be interpreted as hazard ratios.

6.3 Brief summary of findings in empirical section

In the empirical study we have engaged in estimating a variety of econometric models in order to compare survival characteristics of aid receiving firms with those of a non-aid receiving counterfactual group which was constructed through a matching procedure. The comparison of survival probability after the matching estimated that 80% to 86% of the aid recipients have survived until the end of the observation period 2014 while the probability was 14% to 18% lower (in absolute terms) for firms in the counterfactual group, depending on the definition of survival. Expressed in relative terms, restructuring aid increased the survival probability roughly between 21% and 27% or – put differently – decreased the risk of a failure by 44% to 56%. Based on the firms chosen through the matching procedure we have subsequently estimated OLS regressions for different observation periods, i.e. firms that have received aid earlier than 2005 and firms that have received aid earlier than 2008. We found the impact of restructuring aid to be higher for the pre-2005 cases. This allows for (at least) two interpretations: aid rather unfolded its impact in the long-term than in the short-term and/or aid made a bigger difference in survival probability during the financial crisis and its aftermath.

In the next step we estimated multinomial outcome models in order to identify the impact of restructuring aid on financial recovery. The outcome was measured through categories of the Altman Z-score. We found aid-recipients not only had higher survival probabilities but were more likely to improve their financial viability and reach the “save zone” compared to non-aid receiving firms. Furthermore, we found higher effects because of the aid in the long-term (starting at year 3): the difference between aid-receiving and non-aid receiving firms in terms of survival probability as well as in terms of recovery from financial distress between aided and non-aided firms was larger at later points in time.

Finally, we estimated a set of survival models. In the parametric survival model we found that restructuring aid increased a firm's lifecycle by approximately 8 to 15 years. In the semi-parametric models we estimated a decrease of the hazard rate by 58% to 68% from receiving restructuring aid. Last but not least, restructuring aid receiving firms appeared to be less likely to be acquired since the impact of restructuring aid on survival probability is always highest for definitions of survival which consider acquisitions as a firm's market exit.

Summarized, our findings can be interpreted as empirical evidence that there is evidence that restructuring aid was very effective instrument to prevent a firm from exiting the market. Furthermore, it appears that the instrument unfolded its impact even more in the long-term.

7. Evaluation questions – effectiveness



7 Evaluation questions – effectiveness

7.1 Achievement of the main financial and operational targets set in the restructuring plan & influence of the restructuring measures on the outcome

Evaluation Question 4: Did the aided firm achieve the main financial and operational targets (e.g. net profit, cash flows, return on capital, debt, employment) set in the restructuring plan endorsed by the Commission, within the envisaged timeframe? How much of that was achieved by the restructuring measures and how much by (favourable or unfavourable) developments in the market context? To what extent did the compensatory measures impact the performance of the firm in this respect?

Evaluation Question 6: To which extent was the outcome influenced by the restructuring measures (including compensatory measures to mitigate the distortion of competition and own contribution) laid down in the Commission's decision and effectively implemented by the firm?

Findings

- The case studies show that many times the aided company did not fully achieve the main financial and operational targets.
 - Delays in preparation of the restructuring plan at Member State level can negatively affect the outcome, for example, rendering targets foreseen in the restructuring plan unrealistic (found in 2 of the 6 cases).
 - The final outcome or the ability to attain targets are affected by the fact that restructuring measures were sometimes not fully implemented. The partial implementation could be attributed to various reasons, including delayed financing by the banks rendering the measures to become obsolete, too much optimism regarding the desired outcome of the measure in the restructuring plan, and realization of some measures to be not urgent/ of immediate significance for viability while implementing the restructuring plan.
 - There is general agreement by the companies and the stakeholders interviewed that the outcome without aid was likely to have been bankruptcy and also that restructuring measures implemented had a positive influence on company performance.
 - There are significant other aspects that influence company performance, apart from the aid itself, making it difficult to disentangle the effect of these from the effect of the aid. Thorough financial analysis did allow us to ascertain what readily recognisable measures impacted on. However, lack of proper definition of market and thus reliable market/industry data (e.g. market growth rate, market shares etc.) makes it difficult to identify the effect of the restructuring measures.
 - Different measures take different periods of time to take effect, thus the point at which the impact of the aid is measured is highly relevant.
 - In regards to compensatory measures, the case studies examined do not appear to show significant negative impacts for the firms in question.
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Analysis

The analysis is first discussed on a case by case basis. After, the most important points are summarized, stressing similarities or differences across the cases.

Case study 1

At the end of the restructuring period (end 2007/2008), the company was alive and had improved its financial situation (in particular its debt reimbursement). However, while production targets were achieved, operating targets were not reached and the values of most financial ratios were still worrying. Despite this fragile recovery, the restructuring plan did allow the firm to take some necessary measures for further development. However, right after the end of the restructuring period, the company viability was again threatened due to two external events. Nevertheless, the company managed to survive and since 2013, the company performance has improved due to the acquisition of two important contracts.

It is however difficult to disentangle the direct effects of the restructuring aid on the company's results given several external and internal elements, such as its dependency on one or two contracts whose acquisition depends strongly on commercial aspects and the large influence of geo-political developments in the market in question. Also, since the market in which the company is active is very volatile, a long period is required to see the benefits of any structural improvements. Finally, some measures of the restructuring plan were not fully implemented. The annualisation of the working time could not be implemented due to negotiations failing within the company which was not confirmed by the labour union. A manager indicated that the negotiation failing was not the reason for not implementing the measure: the company never believed in such a measure (as contracts last 2-3 years) but the national authority wanted this measure to be included in the restructuring plan. Not all the measures related specifically to product activities were implemented. First, it was deemed not to be necessary to implement fully the marketing plan given the demand of the product was high enough (2007-2008). Then the product's market crashed during the crisis (400 units of product produced annually before the crisis against 12 during the crisis, according to a manager) and it was deemed not to be relevant anymore to further implement the measures towards product diversification. Finally, other measures (some specific investments) were postponed or not implemented because they were deemed as not necessary/urgent anymore given the activity level.

In spite of the above, the statements of the stakeholders interviewed and the analysis tend to indicate that the company would have died a slow death without the aid, with the two external events leading to its bankruptcy. Further, the aid was considered to have had a number of key positive impacts including: financial restructuring, the positive psychological impetus for the shareholder, its impulse towards a strategy of constantly developing products answering client needs, its development towards diversified production, equipment modernisation, continuation of R&D developments and improvements in the working process (monitoring, decrease in indirect employment).

While the opinion of some of those involved in the restructuring of the company was that the compensatory measures were not necessary due to the company's small size, it appears the measures did not negatively impact the firm. For instance, the activity of the firm was not high enough to expand the size of its production site. However, in relation to this, there was a suggestion that greater sectoral analysis/ knowledge could have helped more accurately define the measures required. The existing "mechanical" clear-cut criteria (definition of firm in difficulty, required own contribution, etc.) ease the expectations: regarding this case, the shareholder already initiated the restructuring plan before the final decision. The "clear-cut" criteria of the guidelines might have helped to build expectations related to the granting of the aid and the requirement regarding the own financial contribution to the restructuring plan was deemed to be necessary and a good practice.

Case study 2

Although the company survived beyond the restructuring period, during the process of completing this study, it was noted that the company had now defaulted on its bank loan and the Ministry had started procedures to repay the loan and reclaim the funds – thus forcing the company into a state of bankruptcy. According to the interviews conducted around 50%-60% of the restructuring measures were implemented including: reorganisation of the production lay-out (almost completed); closure of a number of production lines (again partially completed); production of new articles (some progress); and reduction of stock (more time would be needed). Since implementation of the measures was only partial, and each measure takes time to be reflected, it can be expected that targets were not reached. The reason for this partial implementation of restructuring measures was attributed by the company representatives, to some extent on delay in receiving the financial aid, slow advancement of work and dependence on completion of other restructuring measures (as in case of reduction of stocks).

Thus, the aid, did not achieve the desired aim to return the firm to viability.

Some key case characteristics make it difficult to disentangle the effective direct effects of the restructuring aid on the company's results. First, the process of granting the aid lasted 3 years and restructuring measures have been implemented before the aid was received. Thus, there is not therefore a clear-cut "start" date for the restructuring activities. In addition, the delays in granting the aid have severely impacted the firm, markedly reducing its turnover. Finally, the external influences of the global financial crisis witnessed around the initial period of restructuring must also have affected the firm as they did other companies at that time.

Although the company believes that the aid did have some effect, it is clear that important issues associated with the implementation of the aid have severely diminished this impact and eventually have contributed to its failure. Firstly, the payment of the aid was delayed by three years, arriving only in 2012, at the end of the restructuring period. Thus when financing was received, it was already too late to implement the restructuring plan fully. Even in this situation the guarantees were not extended. No compensatory measures were included in the restructuring plan due to its small size and share of the market. The impact of requirement for own contribution could not be reliably derived. However, we can deduce that, from the very nature of the business (being 99.997% owned by one shareholder), the burden on the owner with an own contribution requirement was high on a single individual (as opposed to when the ownership is amongst a group of people or for public organisation). This would also mean that he would have had to be absolutely confident of the positive impact of the restructuring measures while requesting for the restructuring aid (thus increasing the commitment to make the restructuring plan successful).

Case study 3

It is considered that the state aid received allowed the company to survive, improve its financial indicators, and increase its income. This positive result allowed the company to be sufficiently attractive for privatisation. The company also highlighted that the EC's approval to obtain aid for rescue and restructuring had a positive psychological effect as, in the eyes of the banks and the new customers, the company regained credibility. For example, following the decision one bank provided a loan and lease and a new customer started to place orders (now the company's third largest client). Of the total cost of the restructuring plan the company was supposed to bear 61%. The own contribution was aimed to be covered through sales of the company's assets (land, buildings and machinery); sales of shares in a company; and the remaining would be obtained in a form of financial leasing. However, upon execution, in total, the own contribution by the end of 2012 amounted to 70% of the restructuring costs. Since the own contribution was also a part of the restructuring measure (in the form of sales of company assets and shares), this enforced that the restructuring measures were being implemented to extract the desired amount of targeted own contribution. The impact of own contribution emphasised and reinforced the need to achieve the target. As a compensatory measure the company stopped the production of two specific types of products. The company is not planning to restart the production of these product types in the future, as the profitability of the current product portfolio is satisfactory (which is confirmed in the financial analysis). Given the restored viability of the company this compensatory measure did not have a significant

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Case study 4

The impact of the aid measures cannot be assessed for this company since the state aid was not received (due to voluntary liquidation prior to receipt), nor was the restructuring plan implemented.

Case study 5

The company has so far managed to survive and from 2013 its financial results appear to be improving, although it is yet to achieve healthy financial results. All stakeholders are in agreement that the receipt of aid prevented the company's bankruptcy. However, the financial analysis does not indicate the likelihood of bankruptcy, although the financial ratios do show a mixed picture, throughout the period 2004-2013, the company continued to be in normal state of financial viability as assessed through the Altman Z score.

According to the interviewees, the reputation of the company has substantially improved in recent years. In regard to achieving targets, only the employment restructuring was a complete success. The objectives associated with this aspect have even been achieved ahead of schedule. However, when it comes to other areas of restructuring, their success is uncertain. The majority of the planned actions were introduced only partially. Financial results have improved by less than expected. The company was not able to sell most of the lands that were held for sale. It should be noted, however, that much has been done to regulate the legal status of the land. Taking this into account, it can be assumed that with the improvement of the market situation, asset restructuring should improve. It is also difficult to assess the investments, since they were postponed and many of them have not been implemented due to insufficient funds. One positive aspect is the fact that currently the company's management is planning new investment program. With regard to compensatory measures, they consisted mostly in stopping some areas of production. Given that those closed areas were on the verge of profitability (although they had a growth potential), compensatory measures are not deemed as severe. In this context, it is assumed that these compensatory measures did not have a significant impact on the viability of the company.

The company was supposed to bear around 75% of the total cost of the restructuring plan, which turns out to be a relatively large proportion of own contribution. This might have ensured that the company representatives effectively believed in the capacity of the restructuring plan to restore long term viability and ensured enough efforts in the implementation of the restructuring plan.

All stakeholders agree that restructuring has been and is still needed and that it is difficult to separate the impact of restructuring aid from the influence of other factors.

Case study 6

The company has survived thus far and currently performs better than before the aid. However, it is important to note that since the restructuring plan has not been fully implemented, and the majority of it only materialised in 2013-2014, it is still early to fully assess its impact. Nevertheless, progress has been made so far in achieving production, profitability, debt restructuring and management modernisation targets. Importantly, the policy goal of maintaining employment in a region severely hit by deindustrialisation can be considered as met, since staff have increased over the period of implementation. However, the results have not fully followed the expectations of the restructuring plan. Part of this target non-materialisation can be attributed to the delay in the implementation of the plan, which worsened the operational position. Additionally, the global market context changed, negatively affecting the company between the planned (2010) and the actual (2013) payment of the restructuring aid.

In regard to the extent to which the aid influences the outcome, it is however difficult to disentangle the direct effects of the restructuring aid on the company's results given several external and internal elements, such as its strong dependency on one or two global market trends, also some actions were already implemented before the final decision. Financial analysis suggests that the likelihood of the company going bankrupt if it did not receive the aid was high with stakeholders concurring in this opinion. Further, it is evident that the restructuring measures have had some positive effects on company performance with the return to profitability in 2013 attributed to the alleviation of the firm's debt and the modernisation of its organisational structure. However, the family ownership and their determination to keep the firm in operation is also believed to have contributed significantly to the survival of the firm.

In this specific case a reduced own contribution was accepted due to the fact that the company was located in an assisted area for regional aid. The execution of the own contribution proved to be complicated due to a delay in the real estate sale, but was solved by a capital increase from the owners. The latter underlines the involvement of the owners with the overall performance of the company. The own contribution did not influence the overall viability of the company.

With regard to compensatory measures, the compensation measure restricting sales did not have a substantial impact on the company's viability, since sales did not reach the threshold limits applied. The impact relating to the restriction on applying for other state subsidies is less easy to assess. It could as well be the case that the firm would have further modernised its production capacity had it had the possibility to apply for relevant state subsidies, but this is a hypothetical situation.

From the examination of the six case studies in question, it is possible to draw observations that provide further insight into important factors influencing the role of the restructuring measures and their outcome.

In relation to reaching the targets set out in the restructuring plans, it was evident that time was an important factor in respect to a number of the cases examined. In particular, we see that the longer the duration of negotiations to formulate the restructuring plan, most often, the worse the situation of the company at the time of receiving aid. This can occur to the extent that the targets foreseen in the restructuring plan can become unrealistic, even to the point of affecting the eventual outcome of the restructuring process.

Another factor that may have influenced the reaching of targets in the restructuring plan was that in a number of cases, restructuring measures were only partially implemented. This seems to have been linked to the perceived relevance⁷⁷ of certain measures by the company during the period of restructuring.

Given that improvement in viability should derive mainly from internal measures contained in the restructuring plan (as opposed to external factors such as market forces) it would be interesting to examine the extent to which this is true.

⁷⁷ As mentioned in case 1, a manager of the company indicated that the reason for not implementing one of the measures was that the company never believed in such a measure but the national authority wanted this measure to be included in the restructuring plan.

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However, for all cases, it would be fair to say that there are significant other aspects that influence company performance, apart from the aid itself such as restructuring measures that have been implemented before the aid was received, identification of the measures to tackle the problem itself and significance of such measures, resistance/acceptance or workforce/labour unions etc.), making it difficult to disentangle the effect of these from the effect of the aid. Thorough financial analysis did allow us to ascertain what readily recognisable measures impacted on. However, since these measures were spread over a period of time and there could be other market forces that might have had an impact on the company performance, what amount of contribution was caused by what measure is difficult to pin point. Also, lack of proper definition of market and thus reliable market/industry data (e.g. market growth rate, market shares etc.) did not allow the identification of the effect of the restructuring measures.

On the one side, external factors could even threaten the company's survival in spite of the implementation of restructuring measures (e.g. market forces). Apart from external factors, the internal factors that have had a negative influence on the success of the restructuring plan are delay in receiving aid diluting the impact of the measures or causing measures to become totally obsolete, too much optimism regarding the desired outcome of the measure and realization of some measures to be not urgent/ of immediate significance for viability and lack of monitoring of the outcomes of the restructuring measures by the EC/ national authorities etc. On the other side, internal factors could equally provide significant positive impetus that could not be derived from the measures alone (e.g. commitment of owners / shareholders to firm survival).

Another aspect that was also evident across the cases studied was that different measures take different periods of time to take effect and so the point at which the impact of the aid on the company is measured can influence the answer to this question. Also, for several cases, the start of the restructuring period was not the point at which the aid was received, as a number of actions were implemented prior to this.

Nevertheless it is evident that for all cases (both from opinions gathered, existing documentation and financial analysis) that the outcome without aid was likely to have been bankruptcy (with the exception of the financial analysis for case 5). Thus, the aid plays a determining role in the outcome, although it is far from being the only factor. Also, in cases where the restructuring was at least partially implemented, the restructuring measures implemented were generally considered to have had a positive influence on company performance, even if not to the desired extent or outcome.

Finally in regard to compensatory measures, while the case studies examined do not appear to show significant negative impacts for the firms in question, there were some concerns raised among stakeholders questioned. It was mentioned that access to specialised sectoral analysis might help to more accurately define compensatory measures and ensure that when the potential to distort competition is limited, they do not imply a negative effect on the company.

7.2 Assumptions underlying the financial projections in the restructuring plan

Evaluation Question 5: Did the key assumptions underlying the financial projections for the firm in the restructuring plan endorsed by the Commission prove realistic? In particular:

- a) Which of the various business scenarios included in the restructuring plan and the EC's decision proved realistic?
- b) To what extent can the restructuring plan laid down in the EC's decision be considered to be based on "realistic assumptions as to the future operating conditions" given the developments following the decision? Did the assumptions and the outcomes diverge and if so, in which direction and magnitude?

Findings

- The restructuring plans and underlying assumptions sometimes tend to be too optimistic, for example in relation to the execution of measures (timing), ability to gain new work, market developments and the financial impact of measures. At the same time the actual market conditions were worse than anticipated in the scenarios, related to the impact of the global economic and financial crisis.
- A clear and significant information asymmetry exists between the company on the one hand, and the granting authorities and the EC on the other, resulting in an "information dependency" (to the company's advantage). This risk is emphasised by different stakeholder interests.
- Delays in the formal decision procedure or in the actual execution of the decision have a significant impact on the reliability of the scenarios and assumptions.

The analysis is first discussed on a case by case basis. After, the most important points are summarized, stressing similarities or differences across the cases.

Case study 1

In the first case study a mixed view exists on whether the financial projections turned out to be realistic. On the one hand, the restructuring plan for this company turned out to be quite realistic in terms of production targets. This might be explained by the rather low level of uncertainty of the scenario developed in the plan. In fact there was only one scenario which was based on nearly acquired contracts. On the other hand, the scenario targets related to productivity, operating income and financial health were not achieved. This was mainly related to delays in the production, smaller margins than expected and worsened market circumstances (war in Northern Africa and sharp decrease in global demand due to the economic crisis). With hindsight knowledge we assess that the financial projections could have been more realistic and of a better quality. More attention could have been paid to the relevancy (and financial impact) of some of the foreseen measures, which turned out to be unrealistic (e.g. on the working time annualisation). Besides this, the specific market characteristics (pressure on the margins due to unstandardized products, important brand effects, and volatility) could have been taken into account in more detail in order to understand the impact of the measures and improve the quality of the financial projections.

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Case study 2

In this case a revised restructuring plan was assessed by the EC, which also included significant changes in the (global) market circumstances. Nevertheless it became clear that the restructuring plan, financial projections and the underlying assumptions were not very realistic. Several of the foreseen measures were not possible to implement. As the state guarantee was not directly accepted by the banks (due to a lack of confidence), this resulted in delays in the financing and essential delays in the implementation of the restructuring plan. A more thorough ex-ante assessment of the restructuring plan (at company or ministry level) could have prevented this delay by anticipating these problems.

Case study 3

In the third case study, the company achieved the restructuring targets more or less in line with the original restructuring plan, although some discrepancies still exist regarding the assets and debt restructuring objectives. Looking back, the restructuring plan and the underlying assumptions seemed to be quite realistic and in line with the expectations. Two specific observations can be made. First, not all restructuring activities proved necessary for regaining viability due to a changing market (e.g. some planned investments were reduced in size). Second, the assumptions about the restructuring of assets were too optimistic, as the real estate market was not as good as expected. Some such pitfalls could have been avoided by better ex-ante assessment (company or national level), but the developments on the real estate market were especially difficult to predict.

Case study 4

The company analysed in the fourth case study was in a very difficult situation when they started the process of developing a restructuring plan and asked the national authorities for support. The request for restructuring aid and the implementation of the industrial plan was seen as the only option (besides liquidation). As the company went bankrupt just after the final EC decision, it is not possible to assess whether the (three) scenarios were realistic. Nevertheless, it became clear from this case that the restructuring plan was in fact (i) very weak and (ii) already outdated when the EC took its final decision. Regarding the weakness, it is clear that the plan was based on several (high risk) assumptions which were to a large extent outside the control of the company. These risks were not all explicitly mentioned in the plan, although they were already flagged before in a financial audit report and by the assessment body of the national authorities. Pertaining to the accuracy of the plan, we see that during the decisional procedure the situation of the company worsened (the main client terminated some important contracts), which undermined the successful realisation of the plan, but was not included in the final EC decision. The fact that the restructuring aid was the last hope of the company may have provided an incentive not to provide all information to the national authorities and/or the EC (on time).

Case study 5

In the fifth case study, whether the restructuring plan and the financial projections proved to be realistic is quite nuanced. Some parts of the plan were implemented in line with the original idea, while other parts are delayed or only implemented partially. Regarding the overall quality of the plan and underlying assumptions, we assess that they were not always realistic and adequate. The fast sale of property for example (in order to generate significant revenues) was not realistic. Further, the estimation of the restructuring costs turned out to be incomplete and not accurate, while at the same time some measures remained quite 'vague' in terms of impact.

Case study 6

In the sixth case study, the company anticipated, compared to some of the other cases, quite early on their worsening performance and profitability and developed a restructuring plan and amended it several times. Some of the amendments were needed to ensure that the result of the formal investigation procedure met the guideline requirements.

The restructuring plan which was presented to the EC included 3 financial scenarios (intermediate, best-case and worst-case) which would restore the long-term viability of the company. With current hindsight knowledge it becomes clear that none of the scenarios turned out to be realistic, including the worst-case scenario. There are 2 main explanations for this observation. First of all, the restructuring plan could not have foreseen the intensity and full consequences of the (worsening) debt crisis in Southern Europe, which also worsened the business environment. Second, there was a delay in the implementation of the restructuring plan (mainly related to the delay of the authorities to release the aid after the EC decision) which resulted in a rapidly outdated plan and worsened the sale potential of the firm's real estate. The delay exposed the company (and the plan) even longer to the rapidly changing market context due to the national and global financial crisis.

Based on these findings from the case studies, some more general observations can be made.

Too much optimism – From the assessed cases it becomes clear that the restructuring plans and underlying assumptions sometimes tended to be too optimistic. For three of the cases (case 3, 5 and 6) they anticipated a fast sale of property (land, assets), which was not always realistic due to the (changing) market circumstances. At the same time the future market development and the company's ability to increase its sales is sometimes overestimated (case 1, 4 and 6), while the same is applicable for the expected financial impact of specific measures (case 4 and 5). Also the expected behaviour of essential 'partners' in the restructuring plan (such as the banks in case 2) is sometimes unrealistic. We assess that this (valid or invalid) optimism is a fundamental part of problem that restructuring aid tries to solve: often the restructuring aid is one of the last solutions for a company to survive. In combination with the existence of information asymmetry and different interests, this creates incentives to present a (too) optimistic view on the future viability of a company.

At the same time we observe that for most of the cases the actual market conditions were worse than anticipated in the scenarios, which is related to the strong magnitude of the economic and financial crisis (especially in the south of the EU where some of these companies are based). It seems fair to conclude that these external factors had a significant influence on the reliability of the scenarios and assumptions (especially case 6, but also case 1 and case 4).

Existence of information asymmetry – An important observation is that a clear and significant information asymmetry exists between the company on the one hand and the granting authorities and the EC on the other hand. For the decision to grant the restructuring aid the granting authorities (and to a lesser extent also the EC) are dependent on the information which the companies provide (e.g. forecasted sales and profit data, specific market circumstances, and expected market trends). This information asymmetry is applicable for the actual content of the restructuring plan, but especially for the 'timing' of the information. The market and business conditions for these companies can change very rapidly, which undermines the feasibility of the restructuring plans and the business scenarios and (in the end) also the quality of the final EC decision. In one of the assessed cases (case 4) the business condition worsened very seriously, while this was not directly communicated and not taken into account in the EC decision.

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Existence of different interests – Related to the previous point is the fact that the cases (as can be expected) confirm that different interests exist and may conflict. For most of the assessed cases the interests of the company and granting authority were more or less equal (trying to avoid bankruptcy and lay-offs, etc.). It is not always certain that these interests also match with the objectives and more formal criteria of the R&R guidelines. This places the EC to some extent in a 'dependent' position, for example in relation to the information it receives (content and timing, see previous point).

Timing – From the cases it became clear that delays in the formal decision procedure (case 4) or in the actual execution of the decision (case 6) have a significant impact on the reliability of the scenarios and assumptions. Given the existing difficult financial circumstances any delay may undermine the feasibility of the restructuring plan and the used assumptions, e.g. suppliers or creditors lose their confidence (case 6), contracts may be cancelled by clients (case 4).

7.3 Distortion of competition in the sector

Evaluation Question 7: Is there any evidence that the aid granted has created a major distortion of competition in the respective sector?

Findings

- No evidence of major distortion caused by the aid was identified. While some companies show improved performance over competitors, their market share is not sufficient to constitute a major distortion (except for case 1); further in some cases (1 and 5), the compensatory measures were considered sufficient to prevent distortions.

Analysis

The analysis is first discussed on a case by case basis. After, the most important points are summarized, stressing similarities or differences across the cases.

It is important to state that the distortion of competition may arise in different dimensions and may have different angles. At the same time it is clear that 'distortion of competition' also has a legal context and meaning, especially in relation to article 107-109 of the Treaty on the Functioning of the European Union (TFEU). Within the scope of the case studies we were not able to carry out a detailed analysis whether or not the aid created a major distortion of competition. In order to answer this research questions we aimed to talk to competitors and/or industry representatives and collect their experiences and insights. In addition we assessed whether competitors raised complaints and assessed whether the market position (market share) of the aided company significantly changed. Although these different elements do not provide a definitive answer whether or not distortion of competition appeared, it gives useful insights about the (potential) distortion of competition.

Case study 1

With regard to the impact of aid on competition, all interviewees agree that the aid has not induced (formal/ informal) complaints among the competitors and had a limited impact on the competition. The company has no direct national competitors, and the aid was not aimed at further strengthening the company in its main market, but rather focused on diversification to another market. Moreover, the company's main market might already be considered to be distorted, in particular by geo-political factors.

Also, the company was considered to be an almost insignificant player in the new market, which was to be the focus of diversification measures, such that limiting production capacity was considered sufficient to ensure little impact on competition.

While the competitors agreed that aid had limited impact on competition in this specific case, the competitors had concerns about the aid instrument in general and its impact on the industry as a whole. When considering the instrument in general (not this specific case), competitors stated that while such state support may create short-term benefits to the company that receives the support, it might induce greater damage and long-term negative impact to companies in other Member States. This is particularly due to the following specificities of the industry: high capital and human investments required, long construction periods, the cyclical nature of the industry. This implies that aid to a specific company might induce negative impact that may last longer than in another type of industry (due to potential losses in new orders but also know-how and skills).

Case study 2

The very small size of the company (40 employees) and market share (0.03%) lead those involved with the granting of the state aid to consider that compensatory measures were not even relevant. Further, those questioned in the context of this case study, offered no indication that any distortion of the market had taken place.

Case study 3

The overall impression is that the public aid received by the company did not cause any market distortions. The interviewed stakeholders did not know of any complaints. According to the national authorities the restructuring aid did not induce market distortions as firstly, the aid amount was relatively small and secondly the company was not a large market player. One of the competitors approached claimed that had not heard anything about the granting of the state aid⁷⁸.

Case study 4

The impact of the aid measures cannot be assessed for this company since the state aid was not received (due to voluntary liquidation prior to receipt), nor was the restructuring plan implemented.

⁷⁸ The competitor in reference here reported that they sold their products through distributors and they usually would hear from them information about things happening on the market if it was of an adversity. Hence it can be inferred that the competitor did not have any apparent concern on the possible distortion being caused by the state aid being granted to the company.

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Case study 5

With regard to market distortion, the overall impression is that the public aid received did not cause any market distortions. The interviewed stakeholders did not hear any complaints. It is worth noting that even the industry body representing the sector did not indicate objections to the restructuring aid. The company was not a big market player. Also at EU level, it was considered that the aid was not too risky given that company would focus on the national market and the compensatory measures were deemed to be sufficient and efficient in avoiding market distortion.

Case study 6

With regard to market distortion, the formal investigation period yielded no objection or comment raising concerns on the market distortion. Industry bodies representing the local and national competitors saw no distortion in the market due to this restructuring plan. All parties further regarded the plan as fair and supported a swifter implementation by the authorities. The fact that the company had not benefitted from other kinds of state aid in the past as well as the company's profile as a family run business and its social responsibility activities made this support even more concrete. Given the company's small share in the EU market (less than 0.3%), any distortion of the market is likely to have been very marginal.

Finally it is important to mention that market stakeholders are of the opinion that a similar sector specific scheme should have been applied for the entire industry to prevent the large number of company bankruptcies that occurred.

From the case studies examined, no evidence of major distortion caused by the aid have been identified. While some companies show improved performance over competitors, their market share is not sufficient to constitute a major distortion.

There are, however, sector specific issues at stake, which might need to be considered more in regard to the issuing of such aid. For example, if negative impacts may last longer than in another type of industry, compensatory measures need to take this into account. Also, if many companies are in difficulty in a particular sector, a scheme could be made available to provide sector specific support, rather than just benefiting one specific company.

7.4 Regularities in the direction and magnitude of the deviation

Evaluation Question 8: Are there any regularities in the direction and magnitude of the deviation from initially estimated and realised business scenarios and cash flows?

Findings

- It should be noted that the diversity of the firms in regards to sector, size, employee number, external factors in the market they are operating and uniqueness of the restructuring plan does not allow major regularities to be drawn.
- Regarding magnitude, mixed results have been observed and hence no pattern could be identified.
- In general assets restructuring (asset sales and land sales) and debt restructuring did not go according to the plans.
- Financial restructuring had mixed results with several measures such as turnover, financial income and charges, profit before taxes, net profit and ROE being analysed. There were no coherent or consistent themes that could be ascertained and hence no strong conclusion can be identified.
- Other organisational restructuring seems to have been realized positively in most of the cases.
- Major deviations between initially estimated and realized scenarios can be attributed to the incomplete/partial implementation of the restructuring plan.
- Also, symmetries could be seen in the perception reached during the implementation of the plan by multiple firms that several measures included in the restructuring plan were actually unimportant for its return to viability.
- Likewise, delays in actual receipt of the aid making the targeted scenarios and cash flows obsolete could also be deduced.

Analysis

The analysis is first discussed on a case by case basis. After, the most important points are summarized, stressing similarities or differences across the cases.

Case Study 1

The company had a wide array of measures included in the restructuring plan. Regarding employment, according to the company manager and report of the local authority, this target was reached.

According to the country manager, the expected targets regarding the number of productive hours were overall successfully reached. The expected activity diversification was also mainly achieved during the first three years according to a report of the local authority (this was not the case for the years after this).

The expected increase in the productivity did not occur, due to the overestimated foreseen effects of a proposed but actually irrelevant measure as well as due to unspecified problems with contracts realisation (delays, etc.).

The expected operating results were also not reached. The operating income was much smaller than foreseen.

Some measures included in the restructuring plan were already implemented before the final decision (e.g. employment reduction and IT system modernization) and some others were postponed or not implemented. Once the aid was granted, it turns out that the full implementation of the restructuring plan was not possible due several reasons: According to a report of the local authority based on

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company statements, the annualisation of the working time could not be implemented due to failing negotiations within the company. Not all the measures related specifically to diversification activities were implemented. First, it was considered to be unnecessary to fully implement the marketing plan given the demand was high enough initially. Then the market literally crashed during the crisis and it was considered not to be relevant anymore to further implement the measures towards this diversification. Other measures were postponed or not implemented because they were to be not necessary/urgent anymore given the activity level. It is important to note that the assessment of some developments is based on oral statements only, except when specified. It must therefore be analysed with caution.

Case Study 2

For the company, all four measures foreseen in the restructuring plan were not fully implemented. This result was mainly related to the delays in the funding process, which also contributed to delaying the implementation of the plan. As a result, it is believed that between 50%-60% of the foreseen measures were only implemented. Reorganisation of the production lay-out was almost finished. Regarding the closure of production lines, there were still some machines that could have been decommissioned compared to what was planned and thus this could not be considered complete. Production of new complete articles was fully programmed and was advancing slowly, but has not yet materialized. Lastly, reduction of stocks was expected to have been easily implemented if other measures of the restructuring plan were implemented as well (which wasn't the case) and thus, this measure needs additional time to be fully materialized.

However, to better understand the success in the implementation of the restructuring plan, a number of the company's targeted and actual financial figures are considered. These include: total production value, total financial income and charges, profits (before taxes), profit (loss) for the year and return on equity.

Looking at production value, while the company registered a production value of EUR 3.44 million in line with expectations initially, the results in the following years began to decrease. In fact, and at the end of the restructuring period, there was a EUR 2.4 million difference between what the company expected and actually achieved.

For total financial income and charges, the company performed significantly well in this indicator, demonstrating an improvement of 60% for the whole restructuring period and an average of 20% a year.

Looking into the company's profits before taxes (PBT), while the company did improve during the restructuring period, the profits did not meet expectations. For profits (losses), the company performed slightly below their expected targets, despite managing a profit in three of the five years.

Lastly, for return on equity (ROE⁷⁹), there was a decreasing tendency, but this was still better than the planned target.

Case Study 3

The restructuring aid allowed the company to pay back the rescue aid. The financial goals of the restructuring plan were achieved at the level of the realistic scenario. Employment figures were also slightly above those estimated.

The activities within the organisational, operational and environmental protection restructuring were largely completed. Export sales through an agent decreased to the benefit of export sales for the company on its own. This was caused by securing new clients and development of sales within the large business group. Similarly, other major operational restructuring such as water losses were also reduced.

The actions of the restructuring plan were completed within the timeframe of the plan except for restructuring of assets and debt. The

⁷⁹ Since ROE instead of ROCE was estimated in the restructuring plan, hence we use the same indicator to make comparison between the target and the actual result.

activities within assets and debt restructuring were not fully achieved. The planned income from the sale of real estate was not met, as a lower value was achieved. This was caused by a limited demand on the real estate market (partially caused by the 2008 economic and financial crisis). The sale of idle machinery also raised less income than expected. Investments for modernization and addition to the existing machinery were planned, but the entire amount was not used/spent. In debt restructuring, repayment of liabilities was below that planned, which was partly due to the reduced income raised from the sale of the real estate.

These discrepancies were also caused by the fact that not all restructuring activities proved necessary for regaining viability. An analysis of the market forced a change in some of the initial decisions regarding the planned investments. For example, instead of buying certain machines less were bought as demand for specific type of product decreased. In total the restructuring costs were less than planned. The own contribution represented 70% of the total costs of restructuring as compared to initially planned 60.4% in the restructuring plan and hence should be considered as good sign of commitment on the owners/ company's management part.

Case Study 4

The impact of the aid measures cannot be assessed for this company since the state aid was not received (due to voluntary liquidation prior to receipt), nor was the restructuring plan implemented. Thus business scenarios and cash flows were thus not realized.

Case Study 5

The restructuring plan was based on the following four restructuring measures: (i) financial restructuring, (ii) assets restructuring, (iii) employment restructuring and (iv) an implementation of an investment programme. We look at the planned against the actual results achieved.

As regards to the financial restructuring, the repayment of the rescue aid was achieved. However the sales increase foreseen did not materialise. Profitability was also not achieved as planned.

The company intended to carry out restructuring of its assets. The company planned to sell fixed assets and to rent out a part of its immovable property. However this plan failed. The main reasons for the failure of asset restructuring were: too optimistic terms of sale established in the restructuring plan, stagnation on the real estate market associated with the economic crisis and lack of full regulation of the legal status of the properties. Also, there was no current spatial development plan, according to which part of land belonging to the company could change its function and become residential land.

The company has managed to fully implement the employment restructuring. Thus, employment restructuring could be considered a success. However, it should be noted that for some time the company employed people through an external employment agency. Although it was cost effective, it could also reflect the inability to meet the requirements of the plan in terms of downsizing at that time (As noted in an audit report, some employees joined voluntarily the redundancy programs in the period 2009-2011 and were compensated). Currently, the company's employment is fully in line with what was foreseen in the plan.

The company did not implement all its investment plans. The basic reason for the incomplete execution of the investment plans was the lack of funds due to problems with the sale of the properties. This resulted in postponement of investment projects. What is more, over time, some of the postponed plans turned out to be no longer profitable. A lack of timely implementation of development and replacement investments could have negatively affected the financial indicators achieved by the company.

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Case Study 6

The most important objective of the restructuring plan for this company was the restructuring of the firm's debts. These debts were considered to be an important barrier to the company's viability. If considering the level of outstanding debt as an indicator to measure the success of this action, the impact of the delay in the implementation of the restructuring aid becomes apparent. The debts rose during this delay leaving a gap that the reduced firm's operational profits left the firm with additional debt in comparison to the target value.

Also, the company was expected to achieve an increase in sales after the application of the restructuring plan. Only a small increase was achieved. However, the reduced starting point, as well as the global market context change (exchange rates, petrol and raw material prices) and the national market context might have influenced the outcome of the realisation of these short-term estimates.

Regarding the expected increase in profitability, the company presented positive operational profits (EBIT) as was expected in the estimation. However, these figures include also the effect of the restructuring grant and the real estate sale. If these revenues are excluded the firm presents operational losses. These results fall behind the expected targets in the first two years of the implementation of the restructuring plan. However signs (although slow) of improvement in profitability can be seen despite the reduced turnover.

Finally, an additional target was the modernisation of the firm's management, sales and marketing structure with an emphasis on increasing the share of certain products in the product mix. This target is difficult to assess in full. Nonetheless, the actions relevant to the modernisation of the management structure seem to have been completed and the share of the particular products in the product mix had already grown significantly.

Based on the findings from the case studies, some more general observations can be made.

There are several components that companies have included in their restructuring plan. These components have been categorized into measures. In general, assets restructuring was not a success because the terms of sale established in the restructuring plan were too optimistic and they did not take into account the stagnation of the real estate market associated with the economic crisis. Debt restructuring did not go according to plan either. Considering the level of outstanding debt as an indicator to measure the success, the impact of the delay in the implementation of the restructuring aid was apparent. Financial restructuring showed varied results for the several measures (such as turnover, financial income and charges, profit before taxes, net profit and ROE) being analysed. There were no coherent or consistent pattern that could be ascertained and hence no strong conclusion can be identified. On the other hand organisation restructuring seemed to have been realized positively in most of the cases. Employment, operational and environmental protection restructuring generally met their targeted outcomes. It should be noted that the diversity of the firms in regards to sector, size, employee number, external factors in the market they are operating and uniqueness of the restructuring plan does not allow major regularities to be drawn. Regarding magnitude, mixed results have been observed and hence no regularities could be pointed out.

However, there were several explanations that were common to explain the deviation from initially estimated and realized scenarios. These reasons for not achieving the desired results were attributed to the incomplete/partial implementation of the restructuring plan or to the effect of factors not considered well in the plan. Also, during implementation of the restructuring plans, multiple companies realised that several measures included in the restructuring plan were actually unimportant for the return to viability. Lastly, as included in this report several times, delays in actual receipt of the aid /making financing unavailable at crucial times meant that the targeted scenarios and cash flow became obsolete.

7.5 Common features to the restructuring measures

Evaluation Question 9: Are there common features to the restructuring measures that impact the outcome in terms of viability? What conditions on the delivery of restructuring aid seem most effective in ensuring the viability of the aided undertakings?

Findings

- The applied measures cover multiple elements, like for example increased efficiency of the (internal) working processes, a restructuring of the financial situation, a better market orientation and a restructuring of the work force. The case studies show that plans and individual measures can 'fail' and be delayed or less successful than expected.
- Although the success of the restructurings plans are dependent on the mix of different measures, the financial restructuring and the strengthening of the efficiency of the (internal) organisation are assessed to be the key measures in order to ensure the future survivability. The cases show that a balanced mix of measures with predictable outcomes and more desired outcomes (e.g. behavioural change and winning more work) is important. It appears that high dependency on 'soft' measures undermines the objective of ensuring the viability of the aided undertakings.
- The more psychological dimension of the restructuring plans and the underlying measures is very important. The attempt to revitalise and restructure the company may result in new ideas and a new positive vibe. At the same time the plan and the state support may give a strong and positive 'signal' to creditors and investors.

Analysis

The analysis is first discussed on a case by case basis. After, the most important points are summarized, stressing similarities or differences across the cases.

Case study 1

The company intended to improve its viability via a rather wide range of measures, mainly related to improvements in the internal process (trainings, reduction in activity and workforce, increase in productivity, investments to upgrade the equipment), market expansion (diversification of production) and financial restructuring (increase in equity, debt reimbursements). It is difficult to disentangle all the effects and the impact of specific measures: (i) some restructuring measures were implemented before the aid was received, (ii) most of the foreseen measures were aimed at improving the long term structural productivity / competitiveness, (iii) some measures were not fully implemented (e.g. in relation to the work force, product diversification and equipment modernization), and (iv) the acquisition of more contract work was highly uncertain due to the level of competition. The analysis showed that the financial restructuring and the strengthening of internal working processes were very important, but that at the same time there is also a more psychological dimension related (new positive vibe, positive signals, and new strategies).

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Case study 2

This company foresaw interventions in four different areas - reorganisation of the productive lay-out (differentiation of production), the closure of several production lines, production of new complete articles and the reduction of stocks. As the company went bankrupt the restructuring measures did at the end not contribute to the long term viability of the firm. Nevertheless, the analysis shows that only 50%-60% of the foreseen measures were implemented (mainly the reorganisation of the productive lay-out). The poor results mainly relate to the lack of completeness of the plan. Combined with the delays in granting the aid and the poor overall market condition the measures were not suited to revitalise the company.

Case study 3

The restructuring plan included actions aiming primarily at restructuring the debt of the company, but also at restructuring its marketing, finances, organisation and assets. The majority of the plan (costs) was covered the sale of company assets and leasing credit. The restructuring measures were carried out and the activities allowed progress in achieving production, profitability, and debt restructuring and modernisation targets. One of the key successes of the plan was that the aid attracted a strategic investor, which took over a part of the envisaged (state) investments. At the same time the aid created trust among commercial banks (new loans) and potential new customers. Beside the improved company performance, these more psychological aspects turned out to be very important.

Case study 4

The restructuring plan covered two main measures: (i) reorganisation/reshaping of the company and (ii) development/modernisation of the company. The measures mainly aimed to reduce the cost of the company structure, but also raise awareness of market opportunities, better availability of resources and investments in new production lines. None of the measures was implemented. The company went bankrupt and the "failure" of the plan is mainly related to the high risk assumptions on which the plan was based and on the timing of the request as it was sent to the authorities when the company was in a critical situation.

Case study 5

The restructuring plan was based on the assumption that the company should make a large transformation in terms of the business model. According to the restructuring plan the company intended to restructure in four areas: (i) financial restructuring, (ii) assets restructuring, (iii) employment restructuring and (iv) implementation of the investment program. In other words, the restructuring was mainly focused on downsizing, sale of assets, investment activities and organisational changes within the company. Although the overall implementation of the plan was quite successful, the planned sale of assets was substantially delayed and less positive than anticipated. The sales were too optimistic in terms of planning and financial reward, while also the administrative process was regarded as a cause of delays (absence of a spatial development plan, uncertainty about the legal status of the property).

Case study 6

The restructuring plan included actions aimed primarily at restructuring of the company's debt, but also at increasing profitability and modernising its management, marketing and sales departments. It is difficult to disentangle the direct effects of the measures given several external and internal elements, such as the strong dependency on global market trends. Progress was made in achieving production, profitability, debt restructuring and management modernisation targets, but not fully in line with the expectations of the restructuring plan. The company especially benefitted from the direct grant: the financial performance of the company improved immediately and significantly due to the payment of the actual grant.

Based on these findings from the case studies, some more general observations can be made.

Mixed success - As could be expected, most of the restructuring plans had a rather broad scope and the measures were focused on the improvements of multiple elements, such as increased efficiency of the (internal) working processes, a restructuring of the financial situation, a revision of the ownership of assets, new investments, a better market orientation and a restructuring of the work force. For some of the cases the overall set of measures was quite successful, as for case 1, case 3 and case 5. At the same time the analysis shows that the plans were not always successful: in case 4 the implementation of the plan was too late, in case 2 the plan failed due to a lack of completeness. The cases also show that 'individual' measures can 'fail', be delayed or less successful as expected, as for example the sale of assets (case 5), the closure of several production lines (case 2), the product diversification and equipment modernization (case 1) and the timely provision of the aid itself (case 2 and 6). Related to this is the observation across the case that 'delays' in both the upfront procedure (developing the restructuring plan, notification procedure, etc.) and the post decision procedure (e.g. implementation of measures, payment of the aid) have a negative influence on the viability of the company. This is explicitly illustrated in case 4 (company went bankrupt just after the EC decision) and case 6 (the delay in the payment of the state aid pushed the company towards the edge).

Key measures - Although the success of the restructuring plans are dependent on the mix of different measures, the financial restructuring and the strengthening of the efficiency of the (internal) organisation are assessed to be the key measures in order to ensure the future survivability. The *financial restructuring* may relate to different sub-measures, as for example the sale of property and assets, the restructuring of the outstanding debts (new payment arrangements, new contract conditions, etc.) and the involvement of external investors, creditors or owners. The main objective of this financial restructuring is to reach a new financial perspective for the company and minimise the costs and risks for the involved stakeholders (given the fact that a bankruptcy is often near). In this respect, a specific observation can be made in relation to the type of granted aid and the impact it had on the position of the firm. In one specific case (case 6) the company received the support partially as a direct grant to repay outstanding loans, although the national authorities delayed the payment. This direct grant had an immediate effect on the restructuring of the firm's debt and 'solved' one of the most urgent threats for its future viability. Also the *strengthening of the efficiency* may relate to multiple sub-measures, like for example modernisation of the production process, reduction of stocks and a more efficient use of the work force. The main objective for this is to improve the efficiency (improved balance between costs and benefits) and as a result the profitability. Nevertheless, the cases show that a focus on these key measures is not a guarantee for success (case 2 and 4).

The role of measures with uncertain outcomes - The cases show that there is an important role for measures with a rather uncertain outcome or result, often related to renewed success in the market. While the outcome of some measures are rather predictable (sale of assets, debt restructuring), some other are not. Examples of these 'soft measures' are the

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development of new products (case 1, case 2, case 5), the improved acquisition of work on existing markets (case 1, case 4, case 6) and the higher awareness of market opportunities (case 4). The nature of these measures reflect that there exists uncertainty about the outcomes and determines to a large extent the success of the restructuring plan. The companies in case 1, 5 and 6 were at the end successful in winning work again. For case 2 and 4 these ambitions turned out to be unrealistic. Based on these observations we conclude that exists a clear risk that a restructuring plan is too dependent on measures with a rather uncertain outcome. Of course these 'soft measures' are an important part of the overall plan, but a too high dependency on these measures may undermine the objective of ensuring the viability of the aided undertakings.

Psychological dimension - The importance of the more psychological dimension of the restructuring plans and the underlying measures can be underlined. The attempt to revitalise and restructure the company may result in new ideas and a new positive vibe. Both for case 1 and case 5 the reflections around the development of the restructuring plan and after that also the implementation, created new incentives and a forward looking atmosphere, which also had a positive impact on the behavioural change which was needed in the companies (especially in case 1). Also the (urgent) need to restructure the company forces the management to reformulate their mission and strategy and rethink the strengths and weaknesses of the company, which can result in a 'new start' for the company and its employees. Related to this is the importance of the 'signal' the granted aid gives (or not). When public authorities are (still) willing to support a company, also private or semi-public organisations may take this as a positive sign. Case 1 illustrates that the support of the national government convinced (private) creditors and investors to keep the company alive. The opposite happened in case 4, although this is less obvious. In this case creditors and clients lost confidence in the company, which was to some extent related to the ongoing granting and notification procedure.

7.6 Unexpected impacts regarding viability

Evaluation Question 10: Are there any unexpected impacts regarding viability?

Findings

- There are several unexpected elements that have been identified and that influenced a potential return to viability. These include, among others, the behavioural change that is witnessed for many of the firms studied, the partial implementation of the restructuring plan (that seemed to be sufficient to return to viability for some firms), the lack of interest of financial institutions to provide the required funds even though the governments are prepared to grant the aid and the EC approved, and the timeframe for the Member States to grant the aid (that in some cases was too long).

Analysis

Whereas some cases more or less developed in line with expectations, others encountered several unexpected events and impacts. The unexpected effects with regard to viability as well as other surprising events are first discussed on a case by case basis. After, the most important points are summarized, stressing similarities or differences across the cases.

Case study 1

The company had a very long and difficult recovery, influenced by many external events. It is still alive and performance in recent years is promising. Three points especially merit mentioning in light of unexpected effects with regard to return to viability.

To begin, we notice a substantial behavioural change in management and strategy. Although this was not explicitly mentioned in the restructuring plan, it has been vital for the survival of the company. Actively studying the market and searching for opportunities has resulted in more diversification and a more flexible attitude. This, in turn, has helped to transform the company back into a viable business.

In addition, external factors can be extremely important for the success of the restructuring plan and its ensuing return to viability. No matter how well developed the restructuring plan, unexpected external events can have serious consequences. Business development with new and more risky markets has proven to be dangerous and cannot be the sole focus. An embargo also stresses the major influence of world politics.

Lastly, timing is most important in the delicate situation of a company in difficulty. The major reason for a lengthy procedure can, in this case, be found in the provision of incomplete information to the EC. Several requests for information delay the decision and subsequently the implementation of the restructuring plan.

Case study 2

For the second case, we also report 3 unexpected characteristics that influenced a potential return to viability.

To start, receiving the aid in a timely manner is critical for a successful return to viability. While the company survived in the years following the aid, it recently went into state of bankruptcy. The main reasons can be found in a complicated restructuring process and several external impacts. The former is largely the result of delayed aid. Communication with financial institutions was especially difficult and deferred the granting of the aid, impacting on the progress of the implementation of the restructuring plan.

Moreover, and linked to the former point, the restructuring plan was only partially implemented. Whereas partial implementation seemed to be sufficient to return to viability for other cases, it clearly was not sufficient in this one. The partial implementation can principally be attributed to the delayed aid.

Finally, unclear assignment of responsibilities and accountability within the firm resulting in inadequate monitoring also impacted on the implementation of the restructuring process and thus hindered a full return to viability.

Case study 3

The third case revealed two unexpected and interesting themes relating to viability.

Primarily, the restructuring plan consisted of five main parts. Whereas three of them were largely implemented, two of them were not. Asset and debt restructuring were far from completed. Nevertheless, partial implementation of the restructuring plan seemed sufficient to return to viability. Intriguingly, another case study showed that a similar misjudgement with regard to asset sales was made two years earlier in a restructuring plan for a company in the same Member State.

Further, the restructuring aid was scheduled in two separate instalments. The first part, however, seemed to have a very strong signalling effect, restoring trust among clients, suppliers, banks and investors. Surprisingly, this was so strong that the second instalment was not needed as a private (foreign) investor provided substantial capital.

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Case study 4

After the second case, the most unexpected elements were encountered while studying the fourth case. Again, 3 of these elements are especially worth comment.

Firstly, the restructuring plan was dependent on receiving sufficient access to liquidity. Whereas it is normal that banks are reluctant to provide additional loans to companies in difficulty, it can also be expected (and it is usually likewise observed) that financial institutions are more willing to provide a loan after a positive state aid decision. In this case, however, financial institutions were not willing to provide the required funds even though the government was prepared to grant the aid and the EC approved. A possible explanation can be found in bad stakeholder management. As it appears, many of the stakeholders were not included in the development of the restructuring process. If this would have been the case, the difficulties relating to access to finance would have surfaced earlier in the process.

Secondly, the compensatory measures seemed to introduce a certain amount of risk. These measures focused on a reduction of capacity as well as some sort of territorial restraint. The latter focused on Germany, France and Spain. Somehow, the company thus ventured into different geographical markets, also upcoming economies and politically less stable markets. These contracts obviously entail a larger amount of risk for the already troubled company. An EU trade embargo subsequently damaged further the outlook for a return to viability.

Finally, the timeframe of the decision is not considered to be extremely lengthy, certainly not when looking at the complexity of the file and the incomplete information provided. However, a decision making process of about 1 year proved to be too long for the restructuring plan to still be feasible and for the company to be able to return to viability. The entire process should probably have started earlier to enable a positive outcome.

Case study 5

For the fifth case study, we identify 2 unexpected effects with regard to viability.

Firstly, the case elucidates that very partial implementation of the restructuring plan can already trigger a return to viability. The company survived after receiving restructuring aid and is still active today. Its performance has largely improved and the reputation of a reliable company is well established. This restructuring process, although not fully implemented, can thus be evaluated as successful. The return to viability and the results achieved are rather unexpected when looking at the very partial implementation of the restructuring plan. As only employment restructuring was fully implemented, a big part of the plan was not. Hence, the extent of the positive results could be judged somewhat surprising compared to this incomplete restructuring. A similar effect was found, be it less pronounced, for the third case study.

Secondly, it seems that the restructuring aid itself did not constitute a sufficient signal for an expeditious privatization. However, the improved image after the restructuring period should now provide a boost to the privatization process. It seems that the restructuring aid thus contributed in this respect as well, although maybe a bit later than one might expect.

Case study 6

Concerning the sixth case study, 3 specific features are worth discussing.

First, about 95% of the restructuring plan has been implemented and the company is performing substantially better than before the aid. The performance is slightly below the targets set out in the plan. Intriguingly, the company has increased employment, a trend that is rarely spotted in rescue and restructuring cases. The process of debt restructuring is key to explaining this increase. Initially, a high financial burden did not leave sufficient means to employ all the human resources that were needed. After the debt restructuring process,

the additional financial breathing space allowed for the employment of additional staff.

Next, as the company has a very low market share, compensatory measures were very limited. Nevertheless stakeholders considered them to be unnecessary. This is rather surprising as this type of measures and especially the argumentation on why they are necessary can be very well explained, but maybe was not broadly communicated.

Finally, it took two and a half years post EC decision for the authorities to grant the aid. This period is surprisingly long and one could argue that, in such as case, a re-investigation would need to take place. Circumstances could have widely changed, impacting on the probability of success of the restructuring plan.

After having discussed the unexpected impact on viability and other unforeseen events for each case, it is possible to draw attention to similarities and differences across all cases.

All survival case studies document that the restructuring aid has been essential for the return to viability of the companies in difficulty. One of the most interesting and unpredicted outcomes is certainly the behavioural change that is witnessed for most of the companies studied. More actively studying the market and trying to diversify production when needed can be essential for survival. This type of behavioural change was often documented although it was never explicitly mentioned in the restructuring plans.

Being flexible is all the more important as the case studies nicely illustrate that outside factors can be unpredictable and astonishingly determining in the success or failure of a restructuring process. A fall in demand, an economic crisis or a completely vanishing demand as a result of an embargo can negatively impact sales and hinder a return to viability. An optimal restructuring plan takes into account multiple scenarios and corresponding plans. Rigidity can in these cases be fatal.

Despite an efficient procedure by the EC, most cases seem to suffer from a more or less lengthy procedure. The case studies have documented several reasons, i.e. provision of incomplete information to the EC, difficult negotiation with financial institutions and the government delaying the aid. A speedy process is however crucial to maintain realistic chances of return to viability for the distressed company.

The latter is all the more important as the signalling effect of the aid seems to differ across cases. Following a positive restructuring aid decision, we have observed increased trust and interest of financial institutions and investors. However, one case surprisingly documents that this is not always true. It was surprising that, even with support of the government, additional funding could not be found. Unfortunately, this only came to light very late in the process.

Related to the previous point, we would expect that there is a stronger learning effect within Member States. An authority that has notified multiple restructuring cases could be expected to be aware of what constitutes required information and put an effort in immediately complying. This learning effect does also not always seem present when it comes to realistically designing a restructuring plan. Two of our cases in the same Member State make a similar mistake with regard to asset restructuring and the sale of real estate and land.

Although everyone is aware that there are multiple state aid instruments, such as a loan guarantee, loan and grant, we also found that Member States indeed use these different tools in restructuring cases. As one of the interviewed stakeholders clearly mentioned that recent observations showed that repayment might enhance efficiency, the choice between a grant and a loan could for instance impact the chances of a return to viability. Finally, most stakeholders of all case studies evaluate compensatory measures as being unnecessary.

8. Evaluation questions – efficiency



8 Evaluation questions - efficiency

8.1 Administrative requirements/costs

Evaluation Question 11: Did the Commission really need and use all the information submitted by the Member States, or are there indications that some administrative requirements/costs could have been avoided without endangering a good decision-making basis of the Commission?

Findings

- A general increase in efficiency in terms of the duration of time for a decision to be taken can be observed over the period studied.
 - Delays in response to requests for clarification have negatively affected the duration of the process due to:
 - Lack of experience /knowledge on the part of either national authorities, regional or local authorities or the companies involved, regarding the requirements of the process (resulting in lower quality information and increased requests for clarification).
 - Preferred use of intermediaries (like national and local authorities) rather than direct communication with the company.
 - Lack of use of less formal written communication or even oral discussion on questions/ requirements.
 - The existence of guidelines was cited as a particularly positive contribution towards the efficiency of the information provision process.
 - Information requirements were not deemed to be excessive or viewed as unnecessary by the majority of stakeholders, however a lack of understanding of the purpose of certain requests was observed.
 - It is not clear how the reports monitoring the implementation of the restructuring plan are being used, since measures were not always fully implemented or targets attained and, at the same time little follow-up on such occurrences was detected.
-

Analysis

The response to this question will first be discussed in terms of the procedure leading to the granting of the aid and then consider issues associated with the information used during the implementation of the aid. For each of these aspects, it will consider the overall set companies and then make some observations based on the efficiency of the procedures that took place in the six case studies completed during this study.

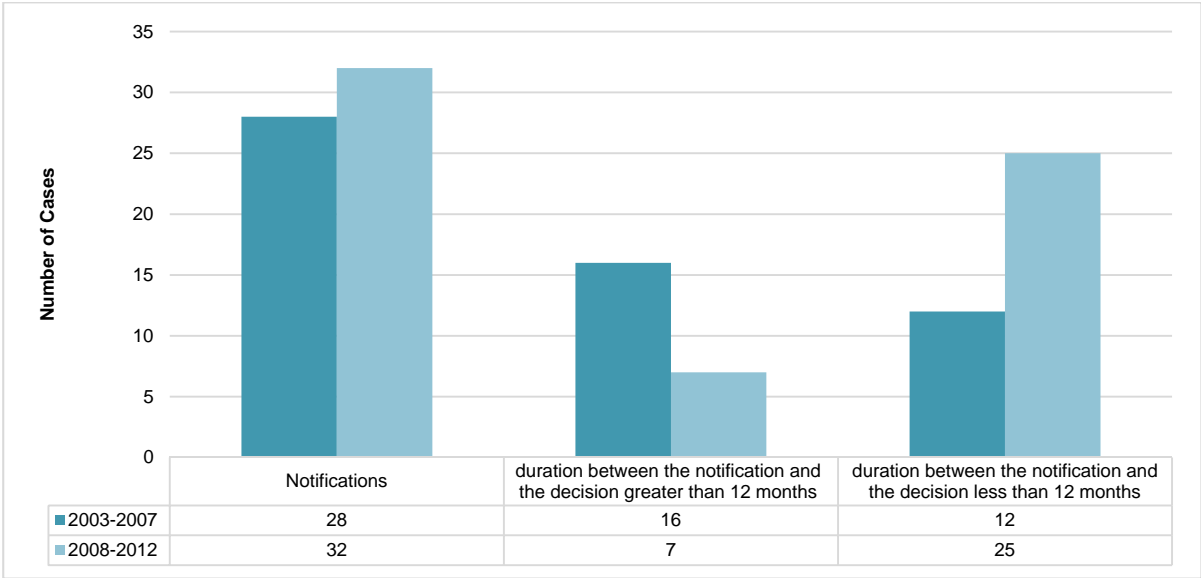
Procedure leading to the granting of the aid

Decisions in the context of state aid for restructuring need to be based on clear evidence that aid pursues an objective of common interest. Thus, the EC requires Member States to submit a restructuring plan to assess whether the aid falls within the guidelines including:

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- A description of the circumstances that led to the company's difficulties including the company's weaknesses;
- An explanation of how the proposed restructuring measures will remedy the beneficiary's underlying problems;
- Information on the business model of the beneficiary, including the beneficiary's organisational structure, funding, corporate governance and other relevant aspects;
- Information regarding the future prospects for supply and demand on the relevant product market, with scenarios reflecting best-case, worst-case and intermediate assumptions.

The complexity of the cases of restructuring aid that fall within the scope of this study varies widely. Thus, it might be expected that the time required for the EC to analyse the information provided and complete any information gaps would vary somewhat. Indeed, a wide variation for the time between the date of notification and the decision regarding the aid can be observed across the years studied. At the extremes there are cases in which the negotiation extends beyond a year or others for which it takes a matter of a few weeks.



One way to see whether any increase in efficiency can be observed across the period in question could be to divide the data set of companies into two periods with roughly equal numbers. For example, we could analyse the period 2003-2007 (for which there were 28 notifications) and 2008-2012 (for which there were 32 notifications), and assume that the mix of complex and less complex cases might also be roughly equal. In doing this we find that the duration between the notification and the decision was greater than 12 months for 16 out of the 28 cases notified in the five year period 2003-2007 (57%), but in the four year period 2008-2012, this was true for only seven out of the 32 cases (22%). Thus, a general increase in efficiency in terms of the duration of time for a decision to be taken can be observed over the period studied. One interpretation might be attributed to the increased sense of urgency prompted by the global financial crisis and the possible repercussions of delay in decision making in such troubled financial scenarios. On the other hand, this could also be due to learning effects from applying the "new" 2004 guidelines better.

The time period required for the decision to be taken regarding restructuring aid is very important, since it can affect the outcome of the restructuring plan. For example, the case studies examined showed that the situation of a company tends to get worse over the period of negotiation of the restructuring measures. Such companies are often on the brink of bankruptcy with ever increasing debts and the situation of the company can be very different by the time the aid is received and the restructuring begins to be implemented from that reported in the version of the restructuring plan submitted to the EC. Also, the longer the period of negotiation the more likely that the assumptions on which the plan is based also become invalid, whether regarding the situation of the company or those relating to external factors such as market forces. This can lead to a situation in which the targets associated with the restructuring measures are not attained within the timeframe set and thus that the return to viability is delayed or even that the assumptions on which the plan is based have changed so significantly that it is no longer possible to return the company to viability.

One of the factors that appears to negatively affect the duration of the decision process, is delays in response to requests for clarification. In this respect the case studies examined show that there would appear to be a number of factors that contribute to delays.

Firstly, lack of experience regarding the requirements of the process can mean that more time is required to understand what is being requested. In particular this was observed for certain national authorities in which the use of this kind of instrument has not previously been used, with regional or local authorities and with some of the companies involved.

Secondly the exclusive use of intermediaries rather than direct communication with the company was also observed to generate communication difficulties that caused delays. It needs to be acknowledged that the process initiation should be done by national authorities but the follow up on less elaborate issues can be done more efficiently if communicated directly with companies. For example, one case referred that communication via a national authority increased the likelihood of distortions in the process. As highlighted in some cases, direct communication with the company improved the efficiency.

Finally while a written-only procedure is deemed as legally binding and also to ensure common understanding of the agreements, the use of less formal written communication or even oral discussion for some intermediary questions/requirements was considered to promote a more efficient communication process.

In regard to the quality/ appropriateness of the information received, while in some cases only minor clarifications were required, we see that for other cases the information provided is lacking or not well organized. In one case, despite the small size of the aid request and apparent simplicity of the case, 3 requests for information were sent by the EC after the notification, mainly because the overall quality of the information provided was not good (lack of information, missing/ wrong information). This was attributed to the fact that the regional/ local authorities were not well aware or prepared for such cases and also that the company had difficulty in answering some specific requirements due to a lack of "in-house" knowledge. Similarly, for another case we see that the restructuring plan was made of 13 separated documents with another 30 documents containing additional information. Due to this multitude of documents the EC assessment was quite complicated: one structured document containing all the information organised properly would have been more linear to evaluate as it would have ensured greater consistency of the information presented, making it easier to understand and systematise.

In regard to the type of information required, on the other hand, the existence of guidelines was considered by the interviewees as a particularly positive contribution towards the efficiency of the information provision process. They were considered to offer a framework that clearly set out what is possible and what information is required. However, at the same time others still found difficulties in determining what information to include due to the specificity of such cases.

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In regard to the amount of information requested, for the most part, information requirements were not deemed to be excessive or viewed as unnecessary by the majority of stakeholders questioned. However, certain stakeholders did not understand the need for particular information (e.g. citing too many requests for updates in the company's financial situation, or burdensome counterfactual analysis).

Procedure during the implementation of the aid

The guidelines indicate that the EC should receive regular detailed reports communicated by the Member State concerned for the purpose of monitoring the correct implementation of the restructuring plan. However, from the case studies implemented, it is not clear how this information is being used. For example several cases in which restructuring measures were only partially implemented were detected. Also in a number of cases the targets associated with certain measures were not achieved. If no action or follow-up is taken when measures are not fully complied with, the purpose of providing such information is questionable.

8.2 Additional information to assess viability

Evaluation Question 12: Conversely, should the Commission have requested additional information that would have been useful to enable it to assess viability aspects even better?

Findings

- The information requested appears to have been adequate to assess viability in the majority of the cases examined with a few specific instances suggesting additional information that could help support the assessment of these aspects.
- Access to specific sectoral knowledge is important to facilitate an efficient process since it can help determine the need for further information and/ or in assessing the need for additional compensatory measures.
- Access to relevant external documents such as national assessments of the company situation can provide a broader basis for the decision-making process and reduce the risk of using inaccurate assumptions.
- The time taken for the Member State to provide the state aid has an important influence on the return to viability.

Analysis

The response to this question is derived from observations based on the efficiency of the procedures that took place in the six case studies completed during this study. For the most part, the stakeholders interviewed in the context of the case studies considered that the information requested was adequate. However, although it would appear that it was possible to assess viability correctly in most of the cases examined, there were a few suggestions about additional information that could have proved useful in certain instances. These are now described.

In respect to additional information that could support the decision process, more economic analysis, such as relevant market tests, as well as more sectoral specific knowledge was suggested as important to enhance the efficiency of the procedure since sectoral analysis can help determine the need to request certain information and/ or to request additional compensatory measures.

It should be noted that this was for a case being decided upon in 2004, and thus is possibly less pertinent to the current reality since there the access to such information has markedly improved in recent years because of an overall improvement in digital information storage and retrieval.

Also, in another case the decision lacked⁸⁰ some important elements that were mentioned in formal documents, available from the moment of the notification (e.g. assessment carried out by the national authority, financial audit of the company). While it is not realistic to assume that the EC could carry out an in-depth assessment for each case, limiting the decision of the authorisation to the documents provided in the notification can represent a significant risk. For example, if the EC had access at least to the assessment carried out by the national authority, it would have had an additional basis to evaluate the assumptions of the restructuring plan. In other words it would have obtained a broader view on the situation providing it with a more solid foundation to formulate its decision.

Further, the major influence of external market forces has been observed in the context of a number of the case studies examined in this study, which have affected the return to viability. When such a situation is considered to be highly likely, it has been suggested that requesting the preparation of a fall-back option might a way to mitigate against the situation when one of the main assumptions is invalidated by external events.

Finally, in respect to information on which the EC could act to support implementation and return to viability, it was noted through the case studies that the time for the Member State to provide the state aid has an important influence on the return to viability. In one case, the state aid was received a substantial time after the decision. This compromised the implementation of the restructuring and hence the return to viability, to the extent that all the measures could not be implemented and the firm finally became bankrupt a few years after the end of the restructuring period.

⁸⁰ The EC did not have access to the documents and the national authority did not carry out an exhaustive assessment either, in this case.

9. Conclusions and recommendations



9 Conclusions and recommendations

In this study, we focused on the survival of companies having received restructuring state aid. In general terms, the number of restructuring aid cases has grown since 2003, with the last year (2012) representing the highest number of decisions taken by the EC. Nevertheless, there has been some volatility with declining trends from 2005 to 2006 and 2008 to 2010.

Large companies accounted for more than three quarters of the restructuring cases. It is important to note that some of the companies with less than 250 employees are considered as "large" enterprises due to state ownership, in line with Article 3(4) of the Annex to the EC communication on the definition of micro, small and medium-size enterprises.

Companies being awarded restructuring aid identified a range of reasons for their business difficulties, with the most common being high level of costs, lack of competitiveness, poor management and problems associated with structure, and market decline.

The most common (30% of the companies) duration of the restructuring plans reported in the notification was 5 years, with an additional 25% of the companies stipulating a 4 year restructuring plan. Otherwise, 15% of the companies applied a 3 or 6 year plan, 5% a 7 year plan, and the remaining 10% implemented a 2 year plan. The most common instruments identified as levers to recovery and viability being personnel reduction, focus or change on core business, cost cutting and new investment in equipment or products.

The amount of state aid per company varied considerably. Almost half of the companies benefited from an amount between 0 and EUR 5 million; 30% of the cases received an amount between EUR 5 million and EUR 50 million; 13% of the companies gained between EUR 51 million and EUR 500 million; and 8% obtained more than EUR 500 million.

The direct grant was the most commonly used tool in restructuring aid, followed by soft loans, public guarantees, debt write-off and other forms of equity intervention.

Descriptive Questions

Evaluation Question 1 and 2

Evaluation Question 1: How many of the aid recipients are still active on their original market today? If they are not, what happened to them (exited, merged, changed activity, etc.)? Can these developments be related to a typology of key reasons?

Evaluation Question 2: To what extent, and at what point in time, have firms that have benefitted from restructuring aid actually returned to viability, and to what extent have they remained viable?

Conclusion:

In analysing the current status and conditions of the aided companies, 52% (31 companies) of the companies are still working/active, and maintain the formal structure pre-decision. An additional 23% (14 companies) of the companies are active, but have been acquired by other companies or groups, which has changed their ownership structure. 13% (8

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companies) of the companies are in state of bankruptcy⁸¹ while the remaining 12% (7 companies) of the companies are bankrupt⁸².

From the feedback of the interviewees across the 6 case studies, we can infer reasons that might have contributed to companies not being active in the market: Unavailability of timely financing/ delayed disbursement of loans; declining profit margins and increasing losses; high labour costs and pressure from labour unions; increasing competition from producers in the emerging economies; contraction in business/ reduction in market size; and the global economic crisis.

According to the 2004 Guidelines, the definition of viability is that a firm “must be able to cover all its costs including depreciation and financial charges. The expected return on capital must be enough to enable the restructured firm to compete in the marketplace on its own merit.” To ascertain the status regarding viability, we look into Profit before taxes (PBT) and Return on capital employed (ROCE). Out of the aided companies, 13 firms that had negative PBT and ROCE at the time of the decision benefitted from the restructuring aid such that they have positive PBT and positive ROCE respectively as measured from the latest available data. According to PBT, of the 13 firms, 62% returned to viability after 1 year, 15% after 2 years, 8% after 3 years and the remaining 15% after 6 years. According to ROCE, of the 13 firms, 54% returned to viability after 1 year, 15% after 2 years, 8% after 3 years and the remaining 23% after 6 years.

Looking at the percentage of change in PBT, 68% of all the firms have improved their performance – similarly, the percentage of change in ROCE indicates that 61% of all the firms have improved their performance. This indicates that the majority of the firms improved their performance although they might not have become viable in the absolute sense.

As an alternate measure of viability we used the Altman Z score which is used to predict the probability that a firm will go into bankruptcy within two years. According to the Altman Z score, 26 firms were signalling sufficient financial viability in the current year as compared to 17 firms in the decision year.

Recommendation:

There is no recommendation directly sourced from the descriptive analysis of Evaluations Questions 1 and 2.

Evaluation Question 3

Evaluation Question 3: What is the survival probability of aided firms compared to the survival probability without aid?

Conclusion:

In the empirical study we have engaged in estimating a variety of econometric models in order to compare survival characteristics of aid receiving firms with those of a non-aid receiving counterfactual group which was constructed through a matching procedure. The comparison of survival probability after the matching suggested that 80% to 86% of the aid recipients have survived until the end of the observation period 2014 while the probability was 14% to 18% lower (in absolute terms) for firms in the counterfactual group, depending on the definition of survival. In relative terms restructuring aid increases survival probability approximately between 21% and 27% or decreases the risk of a failure by 44% to 56%. Based on the firms chosen through the matching we subsequently estimated OLS regressions for subsets of

⁸¹ Companies in state of bankruptcy are active companies in insolvency proceedings. The company will either return to normal operation, or will be reorganized (parts of its activity can be restructured or sold) or if not, then it will be liquidated/dissolved.

⁸² Bankrupt companies are companies that are dissolved and no longer operate in the market.

the observation period, i.e. firms that have received aid earlier than 2005 and firms that have received aid earlier than 2008 and found the impact of restructuring aid to be higher for the pre-2005 cases which allows (at least) two interpretations: aid rather unfolds its impact in the long term than in the short-term and/or aid made a bigger difference in survival probability during the financial crisis and its aftermath.

In the next step we have estimated multinomial outcome models in order to identify the impact of restructuring aid on financial recovery and found aid-recipients to not only have higher survival probabilities but are also more likely to improve their financial viability – measured through categories of the Altman Z-score – and reach the “save zone” compared to a non-aid receiving firm. Furthermore, we find higher effects in the long-term for both, the difference between aid-receiving and non-aid receiving firms in terms of survival probability as well as in terms of recovery from financial distress. Finally, we have estimated survival models of different types and found restructuring aid to increase a firm’s lifecycle by approximately 8 to 15 years in the parametric survival model and to decrease the hazard rate by 44% to 56%.

We also find that restructuring aid receiving firms are also less likely to become the subject of an acquisition process. Summarized, there is evidence that restructuring aid is an effective instrument to prevent a firm from exiting the market but appears to unfold its impact even more in the long-term.

Overall, the counterfactual-based analysis indicates that restructuring aid has achieved its aim, at least in part, of improving viability of the aided companies.

Recommendation:

There is no recommendation directly sourced from the counterfactual-based analysis of Evaluation Question 3.

Effectiveness Questions

Evaluation Question 4 and 6

Evaluation Question 4: Did the aided firm achieve the main financial and operational targets (e.g. net profit, cash flows, return on capital, debt, employment) set in the restructuring plan endorsed by the Commission, within the envisaged timeframe? How much of that was achieved by the restructuring measures and how much by (favourable or unfavourable) developments in the market context? To what extent did the compensatory measures impact the performance of the firm in this respect?

Evaluation Question 6: To which extent was the outcome influenced by the restructuring measures (including compensatory measures to mitigate the distortion of competition and own contribution) laid down in the Commission's decision and effectively implemented by the firm?

Conclusion:

The case studies show that in many cases the aided firm did not fully achieve the main financial and operational targets as set in the restructuring plan. Delays in preparation of the restructuring plan before it is provided to the EC can negatively affect the outcome, for example, rendering targets foreseen in the restructuring plan unrealistic (found in 2 of the 6 cases). The final outcome or the ability to attain targets may also be affected by the fact that restructuring measures were sometimes not fully implemented. The partial implementation can be attributed to various reasons including delayed financing by the banks rendering the measures to be obsolete, too much optimism regarding the desired

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outcome of the measure in the restructuring plan and realization of some measures regarded to be of not urgent or immediate significance for viability while implementing the restructuring plan.

There is general agreement by the companies and the stakeholders interviewed that the outcome without aid was likely to have been bankruptcy and also that restructuring measures implemented had a positive influence on company performance despite the negative market circumstances since 2008. There are significant other aspects that influence company performance, apart from the aid itself, making it difficult to disentangle the effect of these from the effect of the aid. Thorough financial analysis has allowed us to ascertain how the company has performed. However, since the restructuring measures were spread over a period of time and there were other market forces that might have had an impact on the company performance, the amount of contribution caused by each measure is not possible to accurately identify. Different measures take different periods of time to take effect, thus the point at which the impact of the aid is measured is highly relevant. In regards to compensatory measures, the case studies examined do not appear to show significant negative impacts for the firms.

Recommendation:

It is difficult to fully match the restructuring plans to the companies' performance. Restructuring plans should have carefully formulated Key Performance Indicators (KPIs) that should be accurately monitored over the restructuring period and beyond. This can help provide crucial insights to explain the effect of the restructuring aid on company performance.

Evaluation Question 5

Evaluation Question 5: Did the key assumptions underlying the financial projections for the firm in the restructuring plan endorsed by the Commission prove realistic? In particular:

- a) Which of the various business scenarios included in the restructuring plan and the EC's decision proved realistic?
- b) To what extent can the restructuring plan laid down in the EC's decision be considered to be based on "realistic assumptions as to the future operating conditions" given the developments following the decision? Did the assumptions and the outcomes diverge and if so, in which direction and magnitude?

Conclusion:

From the analysed case studies it is clear that the restructuring plans and underlying assumptions sometimes seemed to be too optimistic, for example in relation to the execution of measures (timing), ability to gain new work, market developments and the financial impact of measures. The 2008 economic crisis also worsened the actual market conditions, resulting in business scenarios in the restructuring plans becoming unrealistic and also leading to divergent outcomes compared to the original plan. The different stakeholder interests and existing information asymmetry underline this risk of unrealistic scenario building. At the same time it is important to note that delays in the formal decision procedure or in the actual execution of the decision had an impact on the reliability of the scenarios and assumptions.

Recommendation:

In relation to the sometimes too optimistic restructuring plans and related assumptions it is important to ensure two things. First, in order to increase the overall quality, the submitted plans should, for the main measures (e.g. property sale), clearly indicate the underlying key assumptions in relation to for example timing, the used interest rates, financial benefit and behaviour of involved external parties. In case a major assumption of the restructuring plan is or cannot be

implemented a fall-back option (to substitute the scenario developed which did not take sufficiently into account uncertainties) should be included in the restructuring plan.

Second, both the national and European authorities should continue to ensure critical review of the submitted plans' business scenarios.

Evaluation Question 7

Evaluation Question 7: Is there any evidence that the aid granted has created a major distortion of competition in the respective sector

Conclusion:

No evidence of major distortion caused by the aid has been identified. While some companies show improved performance over competitors, their market share is not sufficient to constitute a major distortion (except for case 1); also in some cases (1 and 5), the compensatory measures were considered sufficient to prevent distortions.

Recommendation:

There are sector specific issues at stake, which can need to be considered more in regard to the issuing of such aid. If many companies are in difficulty across a sector, a scheme could be made available to provide cross sector support (only to be done in rare circumstances though), rather than just benefiting one specific company.

Evaluation Question 8

Evaluation Question 8: Are there any regularities in the direction and magnitude of the deviation from initially estimated and realised business scenarios and cash flows?

Conclusion:

The diversity of the firms in regards to sector, size, employee numbers, external factors in the relevant market and the uniqueness of the restructuring plans does not allow significant conclusions to be drawn. However, in general, assets restructuring was not a success, as the terms of sale established in the restructuring plan were too optimistic and they did not take into account the stagnation of the real estate market associated with the economic crisis. Debt restructuring did also not provide the planned results. Considering the level of outstanding debt as an indicator to measure the success, the impact of the delay in the implementation of the restructuring aid was apparent. Financial restructuring showed varied results for the several measures (such as turnover, financial income and charges, profit before taxes, net profit and ROE) being analysed. There were no coherent or consistent pattern that could be ascertained and hence no strong conclusion can be identified for such financial restructuring.

On the other hand organisation restructuring seemed to have been realized positively in most of the cases. Employment, operational and environmental protection restructuring generally met their targeted outcomes.

There were several common explanations for the deviation from initially estimated and realized scenarios. These reasons for not achieving the desired results were attributed to the incomplete/ partial implementation of the restructuring plan or to the effect of factors not considered well in the plan. Also, during implementation of the restructuring plans, some companies (self) identified that several measures included in the restructuring plan were not important for a return to

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viability. Lastly, delays in actual receipt of the aid/ available financing at crucial times meant that the targeted scenarios and cash flow became obsolete.

Recommendation:

First, as a prerequisite to ensuring submission of good notifications/applications by companies and public authorities of the Member States, the notifications should possess measures that are SMART (specific, measurable, achievable, relevant and time bound), or those developed under a similar methodology. This also corresponds to the recommendation made from Evaluation Question 5. This recommendation complements the Indicative model restructuring plan⁸³ as set out in the Annex II to the R&R 2014 Guidelines.

Second, in order to ensure that the measures are implemented completely, a sequential mapping of the implementation should be outlined at the time of the decision. Here, the company can define what measures need to be completed before starting another. If measures complement each other, this should also be mapped accordingly. The main purpose of this would be to ease monitoring of the outcome.

Third, companies receiving the aid should be obliged to submit an activity and target achievement report (treated as a deliverable and legally mandated) every 6 months. Monitoring should then be done by the national authority and the EC. Any deviation should be identified and necessary actions should be required to be taken. This recommendation complements the Article 132 under section 8 (Reporting and Monitoring) of the R&R 2014 Guidelines⁸⁴ as well.

Evaluation Question 9

Evaluation Question 9: Are there common features to the restructuring measures that impact the outcome in terms of viability? What conditions on the delivery of restructuring aid seem most effective in ensuring the viability of the aided undertakings?

Conclusion:

Regarding the common features to the restructuring measures that impact the outcome in terms of viability, we conclude that the financial restructuring and the strengthening of the efficiency of the (internal) organisation are assessed to be the key measures in order to ensure the future survivability. There should be a balanced mix of measures with relatively predictable outcomes (e.g. sale of property) and more desired outcomes (e.g. behavioural change, winning more work). A too high dependency on 'soft' measures may undermine the objective of ensuring the viability of the aided undertakings. The psychological dimension should not be underestimated. The actual attempt to revitalise and restructure the company may result in new ideas and a new positive vibe. At the same time the plan and the state support may give a strong and positive 'signal' to creditors and investors.

⁸³ This model sets out an indicative table of contents for a restructuring plan, to assist Member States and the Commission in preparing and reviewing restructuring plans as efficiently as possible. The information set out in it is without prejudice to the more detailed requirements set out in the guidelines concerning the content of a restructuring plan and the other matters to be demonstrated by the Member State concerned.

⁸⁴ When adopting a decision under these guidelines the Commission may impose additional reporting obligations regarding the aid granted in order to be able to check whether the decision approving the aid measure has been respected. In certain cases, the Commission may require the appointment of a monitoring trustee, a divestment trustee or both, to ensure compliance with any conditions and obligations linked to the approval of the aid.

Recommendation:

For the benefit of the aided company, a balanced mix of measures with a focus on tangible outcomes in addition to soft measures should be considered when formulating the restructuring plan.

Evaluation Question 10

Evaluation Question 10: Are there any unexpected impacts regarding viability?

Conclusion:

There are several unexpected elements that have been identified and that influenced a potential return to viability. These include, among others, the behavioural change that is witnessed for many of the firms studied, the partial implementation of the restructuring plan (that seemed to be sufficient to return to viability for some firms), the lack of interest of financial institutions to provide the required funds even though the governments are prepared to grant the aid and the EC approved, and the timeframe for the Member States⁸⁵ to grant the aid (that in some cases was too long).

Recommendation:

First, a clear and detailed description of the required information and a checklist would accelerate the process and hence increase the chances of a return to viability.

Second, we stress the importance of having all immediate stakeholders (EC/ Member State/ company) and secondary stakeholders (e.g. financial institutions/ trade unions) on board and cooperative from the beginning. This is especially relevant with regards to the financial institutions such as banks. All sound stakeholder management is a necessity to avoid misunderstanding and crucial delays. Methods to ensure the interest of financial institutions to provide the required funds should be devised.

Efficiency Questions**Evaluation Question 11 and 12**

Evaluation Question 11: Did the Commission really need and use all the information submitted by the Member States, or are there indications that some administrative requirements/costs could have been avoided without endangering a good decision-making basis of the Commission?

Evaluation Question 12: Conversely, should the Commission have requested additional information that would have been useful to enable it to assess viability aspects even better

Conclusion:

A general increase in efficiency in terms of the duration of time for a decision to be taken can be observed over the period studied. However, delays in response to requests for clarification have negatively affected the duration of the process. These delays seem to have been caused by lack of experience/knowledge on the part of either national authorities, regional or local authorities or the companies involved, regarding the requirements of the process (resulting in lower

⁸⁵ Recommendation pertaining to time frame for the member states also corresponds to (and is elaborated in) recommendation for evaluation questions 11 and 12.

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quality information and increased requests for clarification). Further, use of intermediaries rather than direct communication with the company at times have hindered in addressing issues on a timely manner.

The existence of guidelines was cited as a particularly positive contribution towards the efficiency of the information provision process. Information requirements were not deemed to be excessive or viewed as unnecessary by the majority of stakeholders, however a lack of understanding of the purpose of certain requests was observed. It is not clear how the reports monitoring the implementation of the restructuring plan are being used, since measures were not always fully implemented or targets attained and, at the same time little substantial follow-up on such occurrences was detected.

Recommendation:

In order to avoid delays and ensure efficiency there are a number of recommendations that could help to streamline the process whilst maintaining, or even improving, decision quality.

First, direct interactions between EC and the companies should be promoted to assess whether information requested is needed and to clarify any points of misunderstanding.

Second, currently the format and structure of the restructuring plan differ from one case to another. This can slow down the reviewing process of the EC case handlers in the sense that for every dossier on top of its uniqueness in terms of situation and content (information provided, descriptions used, analyses presented) additional other elements are present, making it hard to find common ground for comparison and judgement. We thus recommend to implement a more concrete restructuring plan template or restructuring plan protocol than what was being used/observed. This recommendation complements the Indicative model restructuring plan set out in the R&R 2014 Guidelines as discussed in recommendation for evaluation question 8. This could clearly highlight the selection criteria and the analysis required that allows the EC to take its decision. The company and national authority will then have to provide the information within this template to help standardise the process from a case to another and therefore speed up the process at national level. This template could be presented to the Member States' authorities in a workshop, with attendance of the national authorities and EC case handlers and also acting as a platform to share best practices.

On the other hand, the information requested by the EC appears to have been adequate to assess viability in the majority of the cases examined. A further two additional information recommendations are as follows.

First, the EC should ensure that significant sectoral knowledge is accessible, in order to facilitate an efficient process since it can help determine the need for further information and/ or in assessing the need for additional compensatory measures⁸⁶. Also, access to relevant external documents such as national assessments of the company situation can provide a broader basis for the decision-making process and reduce the risk of using inaccurate assumptions. Since market forces often affect the ability to achieve the restructuring targets, it might be interesting to require a well-defined fall-back option in case one of the main assumptions is invalidated by external events.

Second, the time for the Member State to provide the state aid appears to have an influence on the return to viability. Agreement should be reached with the Member State to provide the state aid within a short time span following the decision to grant aid (the restructuring process should also have sufficient information to be certain that other necessary

⁸⁶ Also corresponds to the recommendation for evaluation question number 4 and 6.

financing is in place). This agreement should be monitored by the EC through information provided by the Member State. Given the fact that the authorisation for a restructuring state aid takes at least a few months, it would be relevant for the EC to be constantly updated on the economic and financial situation of the company in difficulty and on the external events affecting the situation. For this reason, and in order to improve the procedure, it would be of a great importance for the EC to have up-to-date feedback from the national authority and the company itself. In case of unexpected default of the company before the approval/granting decision is taken, alteration of the amount of aid to be provided should be considered to allow viability to be restored in the same timeframe as being considered sufficient initially.

Further, and perhaps more generally, it is recommended that firms receiving state aid must be obligated to participate in any EC-funded evaluation studies (commitment to cooperate should be made an important condition for the aid).

It can be argued that some of the recommendations above increase the information burden on all parties. However, we feel that the instrument should not be developed towards a lighter decision process (in the sense “less analysis conducted”) at the expense of the quality of the decision taken. Overall, the instrument is not an “open” horizontal/structural support to companies that does not always lend itself to a high degree of standardization. We feel the instrument is (and should remain) a tool that is used in some specific cases. In this view, the granting of the aid for a given company must be justified on the ground of sound and careful analyses and standards.

Annexes

Annexes list

Annex 1. Literature review (Public)

Annex 2. Key characteristics of the restructuring state aid cases (Public)

Annex 3. Counterfactual analysis (Public)

Annex 4. Interview guides (Public)

Annex 5-10. Case study 1-6 are confidential and omitted here

Annex 1. Literature review (Public)



Context – Policies aimed at preventing firm exit

This section aims at briefly analysing the context in which R&R state aid takes place by presenting key insights of the literature regarding the positive and negative impacts of firm exit and its key determinants. This sections also discusses briefly the effectiveness (design and implementation) of policies preventing firms exit, excluding R&R state aid.

Impact and determinants of firm exit

In this section, we briefly present the key positive and negative impacts of a firm's exit on the economy in order to identify some of the potential rationales as well as adverse effects of policies aimed at preventing this exit. Subsequently, we discuss the key factors impacting firm exit, which is relevant information when assessing the effective impact of aid on a firm's survival probability.

With regard to the impact of firm exit, broad literature (e.g. Griliches and Regev, 1995; Foster et al., 2001 and Bartelsman et al., 2009)⁸⁷ highlights the significant positive effects of firm entry and exit on productivity and output growth. Firm exit eases the reallocation of resources from declining to expanding businesses. Using a large sample from the UK manufacturing industry from 1980 until 1992, Disney et al (2003b) show that around half of labour productivity growth can be attributed to the process of external restructuring⁸⁸. This share increases to over 80% when looking at total factor productivity. The authors claim that entry and exit play a vital role as often weak performing companies or plants have to leave the market and are replaced by more efficiently performing ones, hence boosting overall productivity levels. This relationship between restructuring and productivity seems to hold as well for other areas. Using a dataset of about 1.5 million retail establishments, Foster et al (2006) document substantially lower productivity levels for exiting firms than for incumbents and entering ones. In addition, entrants seem to encounter higher productivity growth than incumbents. Brixy (2014) further states that the process of creative destruction (renewal of the stock of firms) is vital for a competitive and innovative economy as it, among other positive effects, contributes to fighting 'structural inertia' that hinders the advancement of new ideas on long-established organisations (Brixy, 2014).

Cincera and Galgau (2005) analyse the impact of entry and exit on different key macroeconomic variables (employment, output, productivity). Among other results, the authors highlight the positive role of entry and exit in enhancing productivity. For example, the authors find, for the period 1997-2003, a positive and significant relationship between current firm entry and labour productivity growth as well as between twice lagged firm exit rate and labour productivity growth. The authors find however a robust negative relationship between the once lagged firm exit rate and output growth. While the results hold in average, a closer inspection by sector shows that the significance and even the sense of the relationship between entry and exit respectively and the different macroeconomic variables differ among sectors. While the authors highlight the general expected positive results of deregulation policies (through a subsequent increase in firm entry and exit), it appears that in some specific sectors (traditional manufacturing sectors), deregulation policies have no significant effect on entry, but do have a positive and significant effect on firm exit. This hampers expected

⁸⁷ Quoted by Martin and Scarpetta (2011).

⁸⁸ With external restructuring, they mean entry, exit and changing market shares.

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positive effects of deregulations policies and could worsen the situation in these sectors. In this view, the authors state that complementary measures that accompany deregulations policies should be put in place in some specific industries.⁸⁹

Exit can thus have obvious negative effects as well, most of them with a rather social nature. Firm exit might imply net losses in employment (when there are frictions on the labour market or modifications in the economic structure of a region: i.e. decrease in labour intensity, etc.) and might threaten a local economy as whole. In addition, EC (2014)⁹⁰ and Doing business (2012)⁹¹ state that premature liquidation of (sustainable) firms decreases the recovery rates for creditors and might have negative effects on funding of viable businesses. In this view, Doing business (2012) highlights the importance of (good) policies (insolvency regime) that help avoid premature liquidation of sustainable businesses in order for them to continue operating and for the creditors to recover their investments (which in turn decrease liquidation rates and increase funding of viable businesses). Finally, firm exit might have negative competitive effects in some specific oligopolistic industries. For example Hüscherlath and Müller (2012) have studied the competitive effects of five liquidations and six mergers in the domestic U.S. airline industry between 1995 and 2010. The authors demonstrate that route exits due to liquidation lead to substantially larger and permanent price increases than merger-related exits.

It is clear that restructuring can play a crucial role in the overall performance of an industry and that firm exit can have positive as well as negative effects. The entry-exit process is influenced by a number of factors. Especially interesting for assessing the impact of restructuring aid, are the determinants of firm survival or exit. A thorough knowledge of the contributing aspects ensures that our estimations will account for all relevant control variables. Manjon and Arauzo (2008) provide an extensive overview of the industrial organisation literature on **factors impacting firm survival**. Though it is difficult to believe a priori that all the relevant covariates are included in the specification of the models and that these covariates explain all variation in the dependent variable. Thus, the assumption that firm-survival variation is fully given by a set of observed variables seems strong (Lancaster 1990). The goodwill of the firm and the quality of managers are examples of unobserved firm-specific characteristics that may impinge on survival and should consequently be accounted for in the specifications.

Mangon and Arauzo (2008) make a basic distinction between internal and external factors:

- Internal factors are for example age, (start-up) size, investment in R&D activities, ownership status (plants created de novo vs plants created by existing firms; multi-plant firms vs single plant firms), the legal structure of the firm (limited or unlimited liability; sole proprietorships vs partnerships vs non-public companies and joint-stock companies), financial strength and structure;
- External factors can refer to the industry (sector, technology, capital-labour ratio, entry rates, scale economies) as well as to the dynamics of industries (product life cycle, demand volatility, growth of the industry, industry innovation rate and type, etc.), the geographical space (e.g. agglomeration economies, rural vs urban areas, etc.) and the business cycle (with upswings vs downswings etc.).

In addition, this line of literature might also provide useful methodological insights. As indicated in Manjon and Arauzo (2008), most of the authors (e.g. Disney et al., 2003a) estimate the impact of a number of variables on firm exit by

⁸⁹ The authors do not however specify precisely the types of "complementary policies" needed.

⁹⁰ EC (2014), COMMISSION RECOMMENDATION of 12.3.2014 on a new approach to business failure and insolvency on a new approach to business failure and insolvency. C(2014) 1500 final

⁹¹ Doing business (2012), Annual report – Chapter 2: Resolving insolvency (formerly closing a business).

means of Cox proportional hazards. Other authors (e.g. Cefis and Marsili, 2005) combine this method with other methods such as Weibull, complementary log-log or generalized gamma. Finally, the remaining authors estimate the impact of variables by means of another method: Log-logistic (Mahmood, 2000) or piece-wise constant hazard (Mata and Portugal, 2002).

Policies aimed at preventing firm exit – Effects, design and implementation

As presented in the previous section, firm exit might have both positive (productivity) and negative impacts (employment, debtors, etc.). Given the negative effects presented above, and other political reasons, such as support to economies in transitions⁹², several types of policies including rescue and restructuring aid aimed at preventing firm exit have been developed. It is important to point out that, given the nature of the main negative impacts of firm exit⁹³ other policies (such as measures related to the functioning of the labour market or to the incentives for investment in particular regions) might be needed to structurally solve these negative impacts. These potential ‘complementary’ policies are not under the scope of this evaluation study.

In this section, we present key recommendations from the literature regarding the effects, design and implementation of some of the policies aimed at preventing firm exit. Please note that R&R state aid policies are discussed in the chapter 3 of the report and in the following section more in detail.

In addition to the expected and well documented negative impact (on for example productivity⁹⁴ and distortion of competition), the literature has highlighted potential additional adverse effects of policies preventing firm exit. Bertsch et al. (2015) have analysed the effects on tacit coordination of a government instrument aimed at systematically bailing out firms in the presence of negative idiosyncratic shocks. The authors have developed an infinite-horizon model (repeated game setting) and demonstrate that systematic bailouts facilitate (tacit) coordination. Indeed, the expected future profits from coordination increase (since firms are guaranteed to be in business in future periods) and the guaranteed presence of competitors in the next periods makes the (expected) punishment phase harsher than in an environment where competitors may exit the market due to an exogenous shock (which would leave the deviant firm unpunished).

Besley and Seabright (1999) have analysed EC decisions with respect to state aid and provide several recommendations for an improved instrument design. Regarding state aid aimed at preventing firm exit, they highlight the importance of comparing the social cost of granting aid with the social cost of the counterfactual instead of focusing on the private cost, as is often done (particularly at national level). In order to assess the social cost of a counterfactual scenario (no aid), Besley and Seabright (1999) recall that it is important to bear in mind that, in the absence of aid, a firm’s decision would not be necessarily efficient from the point of view of the market. Firms may indeed exit an industry either too early (because senior creditors force bankruptcy without taking into account the interests of other stakeholders in the firm, including workers) or too late (because they fail to internalize the beneficial externality created for other firms by their reduction of output).

⁹² As indicated by Haucap and Schwalbe (2011) restructuring aid can be economically justified as an economic policy instrument of sectoral, structural policy. In this context, adjustment aid is granted to companies with the aim to simplify the process of adjustment to the prevailing economic conditions.

⁹³ Reduction of employment and negative impact on regional economic development.

⁹⁴ See the previous section for a brief review of the literature (e.g. Dysney et al. (2003), Foster et al. (2006), etc.) that highlights the positive effect of firm exit on productivity growth.

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An EC recommendation of 2014⁹⁵ also puts forward a number of key minimum standards for developing a framework that enables the efficient restructuring of viable enterprises in financial difficulty and giving honest entrepreneurs a second chance. In particular, the EC highlights the need to develop a preventive restructuring framework where negotiations on the restructuring plan are facilitated (appointment of a mediator, stay of individual enforcement actions and suspensions of insolvency proceedings) as well as the importance of a well-developed restructuring plan (providing minimum standards on the contents, the adoption by creditors, confirmation by the court, the rights of creditors and the effects of a restructuring plan).

Doing business (2012) also provides recommendations for policy design aimed at preventing firm exit and illustrates the advantages that might arise from the introduction of changes in the bankruptcy regime in selected countries (e.g. new bankruptcy law in 1997 in Belgium that helped to decrease the share of bankruptcies among SME's). The report moreover specifically presents key features of a 'good' insolvency regime by presenting several best practices for such laws. We quote some of them:

- Establishing time limits for proceedings;
- Promoting specialised courts;
- Establishing effective reorganisation proceedings;
- Protecting secured creditors;
- Increasing transparency.

Before analysing the literature related to R&R state aid and given that restructuring aid as well as bankruptcy protection procedures aim to prevent exit, it seems interesting to also study literature on the effectiveness of bankruptcy protection laws such as the US's Chapter 11. This might provide useful insights in terms of methodology as well as influential variables, impacting chances of survival, which should be taken into account in our analysis. The extant literature on this topic documents diverse variations on the bankruptcy system between countries and hence differences in effectiveness. This paragraph will focus on the multiple methodologies that are used to estimate the impact on survival as well as the variables included.

Bandopadhyaya (1994) studies the duration of a firm's stay under Chapter 11 protection. He uses a hazard function and Weibull duration model. Three types of variables are included, i.e. firm-specific, industry-specific and economy wide ones. Only a firm's interest burden and the extent to which industry capacity is used, seem to have a significant influence on the hazard rate. Shumway (2001) stresses the importance of variables such as market share and stock returns. Studying post-bankruptcy performance, Hotchkiss (1995) finds that management also has a substantial impact on performance. The latter is measured, amongst others, as having a negative operating income (or not) and needing a second 'workout' (or not). Logit regression are used and control for total assets, industry specific effects and whether or not the CEO changed. The study finds that not changing the CEO has a significant and negative influence on performance. More recently, Bogan and Sandler (2012) also look at the effect of a change of management and even document by means of probit regressions that this is the most important determinant for a successful recovery. Wong et al. (2007) find that market value before entering Chapter 11 as well as credit spread matter in terms of shareholder value following Chapter

⁹⁵ EC (2014), COMMISSION RECOMMENDATION of 12.3.2014 on a new approach to business failure and insolvency on a new approach to business failure and insolvency. C(2014) 1500 final

11. However, based on a proportional hazard model (Cox), they also document that the accounting parameters lose significance.

Next to possible company and industry variables the way of handling the return to viability could vary in terms of efficiency. Thorburn (2000) clearly shows that sale via auction is fast and low cost while at the same time delivers equal chances of survival as a restructuring process. Chang and Schoar (2006 and 2013) document judge specific differences in Chapter 11 procedures. It seems that the outcome of the request to restructure depends on the preferences (pro-debtor or pro-creditor) of the judge. Hence, the paper continues with an estimation of the survival rate using a fixed effects model taking these judge specific preferences into account (assuming that part of the explanatory variables result of a non-random process). Controlling also for sales, employment and industry specific effects they document subsequent differences in the survival rate of companies. Drawing a parallel, this would mean that fixed effects might be appropriate with regard to the EC official who is in charge of the restructuring case (case-handler).

Concluding this brief overview of the effectiveness of bankruptcy protection systems we learn that diverse techniques are used such as hazard rate estimation and logit regression. In addition, the variables included also differ depending on the techniques used and the availability of data. Most tests include firm specific as well as industry specific variables. In addition to these, the change of management and the nature of the designed path back to viability seem to be of substantial importance for success.

Regarding bankruptcy procedures in Europe, OECD (2012) illustrates empirically that, by increasing the costs associated with firm exit, more stringent bankruptcy legislation may result in valuable resources being trapped in inefficient firms, thereby reducing 'allocative efficiency'⁹⁶. However, tighter bankruptcy laws imply a stronger guarantee for creditors, which may improve the supply of credit, thereby implying a theoretically ambiguous impact of bankruptcy laws on 'allocative efficiency'.

⁹⁶ A measure of the extent to which the more productive firms in an industry have higher market shares

Summary of the key literature references on R&R state aid

In this Chapter we provide an overview of the key references in relation to the impact of R&R state aid, starting with those papers and studies which come closest to the objectives of this evaluation study.

On the effectiveness of R&R state aid

Chindooroy et al. (2007) is an evaluation of the effectiveness of restructuring aid. In terms of focus, it should be noted though that this paper considered both rescue and restructuring aid and that the applicable guidelines were those of 1999.

Particularly relevant is the computation of the mortality and survival rates among rescue and restructuring aid-receiving companies and their exploration of the determinants of survival of aid-receiving companies, including the various aid package characteristics and the types of the difficulties faced by the aid receiving firms. They use a dataset with a sample covering 77 rescue and restructuring aid cases with 71 individual companies involved that have been approved by the Commission over the period 1995–2003.

They estimate that, in 2003, almost 50% of the companies having received rescue state aid did not survive while only 20% of the companies having received restructuring aid folded. Mortality seems to be related contemporaneously to the business cycle, with most of the mortality occurring when the economy is very weak like in 2003. The study also explored the determinants of survival of aid-receiving companies, both company characteristics and aid characteristics, applying a Probit-model. Their overall conclusion is that the probability of success is related to some key characteristics of aid-receiving firms, of the sector to which they belong and/or the type of difficulty they encountered and less to the policy framework of rescue and restructuring state aid. The latter conclusion is based on a tentative econometric assessment of whether the main features of the restructuring plans⁹⁷ documented in state aid cases mattered for company survival which turned out not to be the case.

We note that the authors did not include matching firms in their sample. This implies that the state aid parameters measure to what extent a higher chance of survival is associated to receiving a larger amount of state aid and/or having other instruments in the aid package as opposed to capturing whether granting or not rescue and restructuring state aid had a significant impact on company survival.

Chindooroy et al. (2007) builds on a report by London Economics for DG Enterprise in 2004. In addition to the research questions discussed in Chindooroy et al (2007), the **London Economics (2004)** report also reviewed the economic and social effects of rescue and restructuring at the (1) company level as well as at the (2) sectoral level.

The first research question is addressed by tracking the performance of all the aid-receiving companies from the time they received aid relative to the performance of their competitors. The analysis relies on the entire population of state aid-receiving companies, but is relatively limited because the aid beneficiaries are only judged with reference to their

⁹⁷ They tested for any impact on survival of the features of the restructuring plans including: duration of restructuring, capacity reductions, personnel reductions, focusing on core business activities, cost-cutting, financial consolidation, selling or closure of plants and assets, new investment, training and upgrading and plant relocation.

employment and turnover dynamics and return to productivity and profitability. We note moreover that the analysis is restricted to only those companies who were beneficiaries of positive state aid decisions between 1995 and 1999 *and that were still in business in 2002*. In the next stage, the study therefore analyses in greater detail firm performance after the receipt of state aid, by drawing up four case studies of aid-receiving companies. However for reasons of confidentiality, the case studies are not retained in the public version of the report.

In order to isolate the effects of restructuring and rescue aid, the study applies a counterfactual approach, not by means of an econometric estimation, but by simple descriptive statistics comparing the performance of the aid receiving companies with their comparators. The comparator firm performance is summarised by constructing weighted averages of the underlying variables. The study finds that the overall performance of the companies having received rescue and/or restructuring aid is generally positive both in absolute terms and relative to the performance of the comparator companies⁹⁸. More precisely, the authors find that for the companies that received restructuring state-aid:

- about 50% increased employment faster than the industry;
- 80% showed an increase in absolute terms and 43% of these companies posted a better increase in turnover than their comparator companies;
- 72% narrowed the profitability-gap with the industry average, though for most of them their profit rate, measured by profits per employee, remains well below that of the industry;
- 76% posted increases in labour productivity and in the case of most of them, to above the industry average;
- Firms that received rescue aid performed worse than their comparators in terms of employment, turnover and profitability. Conversely, their productivity performance was above the industry average.⁹⁹

To review the economic and social effects of rescue and restructuring at the industry level – the second research question – the study looks at the distribution of sales by region for each of the relevant aid-receiving companies, and subsequently investigates how their market share within the EU has changed over time. Five sectors are analysed and for each of these sectors, they focus on one aid-receiving company. Using Bloomberg-listed companies in the same field of activity as the aid-receiving companies as a proxy for the sector, they also investigate other aspects of the aid-receiving company performances (for example profits, employment levels and income to sales ratios). Thus again a counterfactual analysis was applied. The five cases show very different pictures in terms of impact on the sector in which they operate. For example, three companies show robust growth in EU-market share up to a level in 2002 which was actually higher than in the mid-nineties. But the authors mention explicitly that the sample of companies reviewed in greater detail is too small to draw any firm conclusions that would be applicable to the whole population of state aid-receiving companies. Nevertheless, again according to the authors, the results suggest that, perhaps, in a number of cases the recovery of a state aid company appears to occur at the expense of EU competitors.

Nulsch (2014) aims at answering the question whether state aid paid to rescue and restructure companies is indeed used effectively and whether the initial aim – firm survival – has been reached. The study further analyses the firms'

⁹⁸ The comparisons of the performances is made at two points in time: just immediately before receiving State aid (initial time) and in the most recent year for which financial and employment data are generally available (final time). For reasons of data availability the author restrict the 'initial' time to the moment of receiving the first instalment of State aid and the 'final' time to 2002.

⁹⁹ We note that for this analysis, the study included only 2 companies that received rescue aid which may explain their positive productivity performance as opposed to their negative performance in terms of employment, turnover and profitability, which is counter-intuitive.

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external and internal characteristics that influence firm survival. The aim of this paper is therefore particularly close to some of the objectives of the current evaluation study. However, rescue and restructuring state aid are not distinguished in the main analysis.

The analysis is based on a data set comprising 190 firms in difficulties from the EU Member States. The dataset is composed of two subsamples:

- 141 firms that received R&R aid which has been notified and approved by the EC between 2000 and 2010 in one of the EU Member States;
- 49 firms that applied either for rescue or restructuring aid but for which the Commission denied aid between 2000 and 2010. This set of firms acts as the 'control group' for the empirical analysis. It is important to point out that this group is not created through a strict process of statistical matching between recipient firms and non-recipient firms. Therefore, the characteristics of the firms may differ widely from one group to another and may explain the differences in survival rates.

In order to evaluate the effect of internal and external firms' characteristics on the survival rates, the authors calculated the Kaplan-Meier estimates of the survivor function and the hazard rates of the recipient and non-recipient firms.¹⁰⁰ In the study, a firm is considered as having survived if the status, name and production site are unchanged or the company has been sold in large parts to a new investor but at least 50% of employment remains at the former location.¹⁰¹ In order to test for the firm characteristics that might influence the possibility to survive, the Kaplan-Meier estimates are also compared for each group of firms sharing common external or internal characteristics.

The results of the study indicate that:

- Firms that received R&R aid seem to have a higher probability to survive than firms that have been notified for aid but where the Commission denied the payment of aid;
- Firms that received restructuring aid have a higher chance to survive than firms that received rescue aid;
- Firms located in Central and Eastern European Countries or in East-Germany have a higher probability to survive than firms located in Western Europe;
- Smaller firms tend to have a higher chance of survival than larger firms;
- Older firms tend to have a higher chance of survival than younger firms.

Ela Glowicka has studied bailouts in the EU extensively (see e.g. Glowicka, 2005 and Glowicka, 2006), also paying attention to the effectiveness of R&R aid in her empirical research. Glowicka (2005) builds a model with two asymmetric firms (Cournot duopoly). Each one is located in a separate country, but they share a common market. On the one hand, a successful R&R aid is obviously beneficial for the firm that survives, but not for consumers. On the other hand, a bailout that did not succeed in preventing exit can still be beneficial as it might, in the case of an 'entry-deterrence' equilibrium, oblige the other firm to cut its costs more than would otherwise be the case (and it thereby improves efficiency). Hence,

¹⁰⁰ In their setting, the survivor function is defined as the firms' probability of surviving beyond a certain point of time while the hazard rates are defined as the probability that a market exit occurs in a given interval, under the condition of having survived until the beginning of that interval.

¹⁰¹ The reference date for assessing whether the firms have survived or not is the 30/11/12.

even failed R&R measures might still be beneficial for the consumer. In addition, the results point out that small countries clearly have a higher preference for using R&R aid than bigger countries.

Noteworthy empirical results can be found in Glowicka (2006). The paper studies the 86 R&R decisions made by the Commission from 1995 until 2003. These 86 cases represent 79 companies and 10 Member States, with a concentration of cases between 1996 and 1998. The focus of the research is on finding the determinants of bailout decisions as well as to study the effectiveness of the measures. After detailed descriptives, a hazard function is estimated twice to evaluate the effectiveness of the bailouts. If the aid measures were successful, the hazard rate is expected to be low. The non-parametric estimation of the hazard rate however clearly shows that, for most cases, the aid only delayed exit. Overall, the rate increases until 4 years after the aid and then decreases. This means that many firms exit 4 years after having received a bailout.¹⁰² The parametric estimation leads to mostly similar results and provides additional information on the difference between rescue and restructuring operations. The change in hazard rate, peaking after four years seems to be substantially more pronounced for rescue than for restructuring measures. Last, results of a recursive bivariate probit point to the endogenous character of the choice whether to subsidise or not. Treating this variable as exogenous is thought to underestimate its impact.

On the efficiency of R&R state aid

Bolsa, Ferruz and Nicolaidis (2014) examine recent cases of corporate restructuring partly funded with public money. These authors focus on the efficiency of restructuring aid, i.e. whether the benefits from protecting jobs exceed the costs of job losses. This research question builds on their assumption that the aim of restructuring state aid is to avoid the adverse consequences of firm failure, which are unemployment and loss of output. Because their focus is on the efficiency of restructuring state aid, the empirical approach applied is less relevant for this evaluation study which focuses more on the effectiveness. But their extensive description of the set of cases is useful as a source of inspiration for our own description of the cases.

Applying a rather intuitive approach, the authors define the theoretical conditions which need to be fulfilled in order for R&R aid to be socially optimal. However, when testing these conditions empirically, the lack of data for many of the variables requires a further simplification of the model which boils down to the condition that the costs of intervention must be smaller than the expected benefits in terms of the value of the jobs which are saved.

The authors gathered data on employment of 67 firms that received restructuring state aid¹⁰³ and estimated the amount of aid per job saved, which they compared with the average gross salary in Europe. Their data show that the average cost of saving a job, EUR 49,293, was 1.7 times larger than the average annual salary, EUR 29,400. Therefore, if one considers the annual salary (i.e. the output that would be lost during unemployment lasting a year) as the relevant benchmark, then the conclusion is that too much state aid was granted (definitely if one takes into account that not all jobs will be saved, that workers may find another job within one year and that competition distortion effects have not been taken into account). Further refinements on a smaller set of cases take company size as well as country differences into account. But irrespective of how the data are analysed, the authors claim that their findings cast serious doubt on the efficiency of

¹⁰² Around 70% of the exits identified in the non-parametric estimation occurred during the first 4 years after having received a bailout while around 25% of the exits occurred precisely in the 4th year after having received a bailout.

¹⁰³ Only 'one-time' aid cases were included. Cases related to the financial sector (banks, insurance companies, etc.) were excluded.

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R&R aid. There appears to be no consistent policy of targeting aid to the number and value of jobs saved. In fact, the picture that emerges is one of granting rather random amounts of aid.

Another paper which focuses on the efficiency of R&R state aid, though from a completely different perspective, is the one by **Schweiger (2011)**. This paper investigates the impact of R&R state aid on static and dynamic efficiency, but focuses on Slovenian manufacturing. The focus on static and dynamic efficiency builds on the idea that the success of an economy depends largely on how successful it is in allocating inputs and outputs across businesses efficiently with minimum disruption and frictions. Market institutions that impact this allocation, like for example R&R state aid, potentially account for productivity differences across companies and ultimately countries.

Schweiger combines aid data with firm-level accounting data, using non-experimental¹⁰⁴ treatment effects estimators that assume selection on observables (linear regression models) and estimators that explicitly allow for selection on unobservables (instrumental variables models). The outcome variable is either the micro covariance (a firm level measure of allocative efficiency), or the growth of market share or the growth of productivity. The estimations include AID as a dummy variable for whether the firm received R&R state aid or not. It should be noted that the period covered is before Slovenia joined the EU. So the applicable state aid rules are not the EC state aid rules.¹⁰⁵ Moreover, no distinction is made between rescue and restructuring aid.

Her empirical analysis reveals that state aid hindered the efficient static allocation of resources. None of the firms that received aid exited, while the predicted probability of exit is 2.5 per cent for firm-years without aid and 3.6 per cent for firm-years with aid.¹⁰⁶ This result indicates that according to their economic fundamentals these firms were more likely candidates for exit, but they did not exit, suggesting that aid delayed exit and kept inefficient firms alive (as it was proven that aid had no significant effect on TFP). In addition, the growth rate of market share was higher for aid-receiving firms, which suggests that aid had a distortive effect on the market structure, because it allowed less efficient firms to grow faster than more efficient firms and thus shifted the burden of structural adjustment onto firms that managed without aid. Aid had no significant effect on TFP growth. Overall, the author concludes that aid for rescue and restructuring of firms appears to have been distortive.

Murn et al. (2010) also focus on R&R aid in Slovenia. The authors provide an analysis of the efficiency of rescue and restructuring state aid to Slovenian firms in difficulty. More specifically, the authors analyse the causal effects (net effects) of state aid for rescuing and restructuring on changes in firms' sales, employment and productivity by comparing the recipients of state aid funds to non-recipients. It is important to point out that the period covered is before Slovenia joined the EU. So the applicable state aid rules are not the EC state aid rules. The legislative background and, in extenso, the institutional background, are therefore different.

The set of recipient firms analysed is composed of the 487 firms that received rescue or restructuring aid during the period 1998-2006. In order to compare the outcomes of recipient firms with outcomes of similar non-recipient firms, the

¹⁰⁴ According to the author, experimental evaluation is in general the preferred method to estimate treatment effects; however, given that firms are not assigned randomly to a group that receives aid and a control group that does not receive aid, experimental data are not available.

¹⁰⁵ In comparison to current EU guidelines, the Slovenian state aid rules did not legally require formal evidences of potential survivability of the candidates nor an in-depth restructuring plan.

¹⁰⁶ Due to the fact that none of the aid-receiving firms exited during 1998-2003, the author could not estimate the impact of state aid on exit decisions directly. However, she estimated the probability of exit using a probit model of exit on a sample of firm-years without aid and then used the estimated coefficients to calculate the predicted probability of exit for firm-years with aid based on their fundamentals. The gap between this implied probability and the actual (zero) incidence of exit among firms receiving aid reveals something about the impact of aid on exit.

authors use the propensity score matching approach. This allows for an approximation of the unobserved hypothetical outcome (outcome when no aid is received). In a first step, the propensity to obtain state aid is calculated for each firm (both aided and non-recipient firms) using a random effects logit panel. In a second step, each firm that received aid has been matched with a similar non-recipient firm or a group of non-recipient firms (max. 6 firms that did not receive aid on the whole period considered). The matching is based on the relative proximity in terms of propensity score. Then, differences in differences are calculated between recipient firms and their 'control group'.

The results indicate that, among the firms that survived, aid proved to be inefficient in promoting growth in sales, in increasing productivity and in creating or maintaining employment. When analysing how much additional sales, employment and value added per employee is created by the granted funds, it appears that the return of aid is negative (i.e. the additional outcome per EUR of granted aid is negative).

While the objectives and the framework (Slovenian R&R policy) of the paper are not strictly comparable to ours, the paper brings interesting insights with regard to the methods of identification of the control group and the treatment of the differences between recipient firms and their control group.

On the impact of financial difficulty and distress on firms' output and employment

Oxera (2009) investigates the impact of financial difficulty and distress on firms' output and employment, as well as their potential broader consequences at the industry and regional level. The study does not aim at analysing the impact of state aid on recipients. In this view, there is therefore no comparison on the financial distress and outcomes (in terms of output, employment and general activity) between firms that have received aid and firms that have not.

The study first identifies the factors that determine the outcomes of the distress. The study also specifically investigates the relationship between firm characteristics prior to distress and survival rates which indicate the likelihood that firm-level employment and output will not fall to zero. In this study, a firm is considered to have 'survived' if it continues reporting financial data until the last year of the period under consideration (three years after the onset of distress). However, some of the firms that cease reporting may have been acquired and have continued operations under a different legal entity. These firms might be expected to continue operating activities and preserve at least some level of output and employment under a different legal entity. These firms are however considered in the study as 'non-survived'.¹⁰⁷

The analysis of the factors that determine the outcomes, concludes with the formulation of questions and hypotheses to be tested. In order to test and further investigate these hypotheses, the study adopts a three-tier approach:

1. The first tier consists of a statistical analysis carried out on 1.370 European firms, considered on the basis of several selection criteria, as 'in distress' in the period 1999-2008. An econometric analysis is conducted to identify the factors that influence whether the firm survives, the implications of distress for output, and the implications of distress for employment;

¹⁰⁷ Authors reckon that it is critical to take account of the impact of mergers and acquisitions on outcomes of distress. Where possible, this has been examined for particular firms in the case studies' analysis. However, it is not always practical to examine the impact of mergers and acquisitions on a case-by-case basis.

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2. In a second tier, a more focused analysis is carried out on selected case studies, which is particularly informative for analysing the process and outcomes of distress, as well as providing information about factors that might be relevant in specific aid cases;
3. The third tier is a review of existing research on the causes and outcomes of distress in order to achieve a well-informed understanding of the available information and insights about the consequences of financial distress.

Finally, the results of the analysis were cross-checked through targeted interviews with market practitioners (in particular, insolvency practitioners and bankruptcy lawyers).

The study provides empirical results related to the evolution of key factors before and after the onset of distress: an increase in employment and revenue and a decline in the firm's financial position can be pointed out prior to distress while a decrease in employment and an increase in revenue may be observed after the onset of distress.

The study shows that the average survival rate of firms three years after the onset of distress is around 77%. The study also provides information regarding the likelihood of firms to survive, according to firms' characteristics: e.g. a firm has greater probability to survive if it is a large, non-manufacturing firm, etc.¹⁰⁸ This contradicts the findings in Nulsch (2014), who found that smaller firms have a greater probability to survive. This contradiction might be due to the different sets of firms taken into account in the two papers, i.e. aided firms in Nulsch (2014) versus non-aided firms in distress in Oxera (2009).

In practice, the findings of this study can be used to inform the EC on the expected outcome of the counterfactual by providing insights regarding what might be the outcome of a firm in distress that does not receive aid, given that firm's characteristics. For example, the application of the framework proposed in the study might help the EC to identify cases where it is necessary to ask the Member State to provide further evidence to demonstrate why there would be a significant effect in case the aid is not provided.

In the context of the current evaluation, this study could provide key information regarding the identification and the treatment of the sample of the 'counterfactual' firms. In particular, the variables/factors used to identify firms in distress may be relevant for identifying the 'match' for each recipient firm (with the requirement that the value of the factors of distress are comparable between the recipient firm and its matches at the time the firm receives aid). Moreover, in addition to 'firm survival', we could also analyse the impact of aid on the 'distress' of firms by comparing 'distress' of the firms that receive aid with the distress of the 'control group'.

On R&R state aid for the financial sector

The evaluation of R&R state aid for the financial sector is not within the scope of the current study, though studies by Bruce Lyons provide interesting insights. Lyons and Zhu (2013) analyse four case studies on state aid to banks during the financial crisis. They report on the differences between the financial sector and other industries as well as on the

¹⁰⁸ In particular, a firm has greater probability to survive if: it is a large, non-manufacturing firm with non-firm-specific assets and a more modular corporate structure that allows divisions to be sold off to raise cash; it has experienced limited losses at the point of distress; it has experienced a smaller deterioration in financial performance pre-distress (for given level of severity of distress); it has lower gearing, better access to capital (whether from private investors or capital markets), and a simpler debt structure than its peers; it operates in a country or countries with relative flexible labour markets.

importance of acknowledging the dissimilar character of a systemic versus a non-systemic bank. When studying the diverse cases Northern Rock, WestLB, Fortis Bank and Lloyds-HBOS, multiple concerns are documented.

First, basic principles, for example 'one time, last time', were violated. Second, a distinction should be introduced between the compensatory measures for systemic versus non-systemic banks. As explained in Lyons (2009), in the banking system failures can be very contagious and they have direct implications for other companies and industries. Therefore, bailouts can be justified. However, there is a clear distinction between major and smaller banks. Lyons and Zhu (2013) report that a counterfactual scenario was missing from the investigations and would have been of added value. Following the analysis of the counterfactual, only systemic banks should be treated differently from firms in other industries. This obviously has implications for the required compensations demanded. Next, additional problems are raised with regard to these compensatory measures. They seem to miss a clear pattern and not sufficient attention was given to the competitive effects of mergers. The crisis should not prevent a sound analysis under merger control. Furthermore, the issue of moral hazard should be better taken into account. The paper warns for the dangers of too much 'politics' and suggests that the focus should lie on restoring balanced competition for future cases.

On the existence and insights of potential (non-academic) evaluations of restructuring aid at national level

Finally, an extensive search for the existence of the potential evaluation of the R&R aid instrument within Member states was conducted through various distinct channels¹⁰⁹. While formal answers were not received for every country¹¹⁰, it seems that very few evaluations specifically focused on R&R state aid appear to exist.

However, national evaluations of the restructuring state aid instruments were identified in Poland. The evaluated instruments are specific to the Polish case (economy in transition) but these evaluations illustrate some of the key adverse effects as well as potential positive impacts of the R&R state aid in general. In these studies, the outcomes of recipient firms are not statistically compared to those of non-recipient firms. In this view, the methodology used in the present study widely differs from the methodology used in those studies.

Rutkiewicz (2014)¹¹¹ evaluates the impact of restructuring state aid to hard coal mining industry in Poland from 1990-2010. According to the author, the aid contributed only to a small extent to an increase in competitiveness. Indeed, the aid was mostly directed to mines on the verge of bankruptcy (writing off debts, etc.), which had the adverse effect of decreasing incentive to achieve better results and slowing down the development of healthy mines. No empirical analysis was however provided to support its statement.

Ziółkowska (2012)¹¹² analyses the restructuring aid to state owned transport companies and focuses particularly on the case of the "PKS – Staszow" company. According to the author, the aid was effective. More specifically, thanks to the

¹⁰⁹ First, the member states' audit authorities were contacted via email. Then, the ESTAL (European State Aid law Quarterly) country correspondents were contacted via email.

¹¹⁰ It was confirmed that no evaluation existed to the knowledge of the following institutions: Supreme Audit Office Czech Republic, Luxembourgish Court of Auditors, Audit office of Cyprus, Denmark, Finland, France, Belgium and Sweden.

¹¹¹ Rutkiewicz K (2014). Pomoc publiczna na restrukturyzację górnictwa węgla kamiennego w świetle Polityki konkurencji Unii Europejskiej w latach 2002-2010 (State aid for restructuring of the coal mining industry in the light of the European Union's competition policy in the period 2002-2010).

¹¹² Ziółkowska K (2012). Restrukturyzacja przedsiębiorstw państwowych z wykorzystaniem pomocy publicznej na przykładzie PKS w Staszowie (Restructuring Program for State-Owned Transport Companies With the Deployment of Public Aid - the Example of "PKS - Staszow" Company)

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granting of the aid, the company regained its creditworthiness, lowered real estate tax through selling unprofitable real estate, increased productivity through employment restructuring, bought new buses and modernized its gas station.

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London Economics (2004), "Ex-post evaluation of the Impact of Rescue and Restructuring Aid on the International Competitiveness of the Sector(s) Affected by Such Aid", Report prepared for the European Commission, June 2004 ¹¹³ .	
Summary of the research question	<p>In addition to the research questions like discussed in Chindooroy e.a. (2007), this report which was prepared for DG Enterprise and Industry Review also addresses the following research questions:</p> <ol style="list-style-type: none"> 1. To review the economic and social effects of rescue and restructuring at the company level by assessing the growth, profitability and productivity performance of aid-receiving companies from the time they received their first award of state aid. The purpose of this exercise is to understand in which way, if any, the aid has helped the company to survive a difficult time. 2. To review the economic and social effects of rescue and restructuring at the sectoral level by assessing the likely impacts on the competitors of the beneficiaries of state aid. The study analyses how the European-based competitors of the aid receiving firms have fared in terms of market share, gross fixed assets, employment and profitability and aims to establish whether there is any systematic evidence to suggest that the aid-receiving companies have gained an advantage over their European-based rivals.
Data set	<p>For the first research question, the analysis is restricted to only those companies who were beneficiaries of positive state aid decisions between 1995 and 1999 and that in 2002 were still in business. For the comparators and aid-receiving Bloomberg Professional (BB) listed companies, the information was obtained from Bloomberg. A range of data sources was employed to obtain this information for the non-BB-listed companies, including the state aid case reports, LexisNexis database, company web pages and other internet sites.</p> <p>For the second research question, five sectors are analysed: sporting goods, consumer electronics, chemicals, turning and milling machines, and firearms. For each of these sectors, they focus on one aid-receiving company. The key source for sectoral data was Europroms (available from Eurostat's New Cronos database). Financial data (sales by geographic region and total/gross fixed assets) on the aid-receiving companies was primarily sourced from the companies' annual reports, and other financial statements. The secondary source for company data was Bloomberg Professional.</p>
Firm survival	Same definition as in Chindooroy e.a. (2007)
Research method applied	<p>The first research question is answered in two stages. First, they track the performance of all the aid-receiving companies from the time they received aid relative to the performance of their competitors. This exercise gives a broad overview of the "average" performance of firms after they receive state aid. It relies on the entire population of state aid-receiving companies, but is relatively limited because the aid-receiving companies are only judged with reference to some key aspects of their performance, e.g. employment and turnover dynamics and return to productivity and profitability. In the next stage, the study analyse in greater detail firm performance after the receipt of state aid, by drawing up four case studies of aid-receiving companies. However for reasons of confidentiality, the case studies are not retained in the public version of the report.</p>

¹¹³ This sheet only presents the additional research questions and the way they have been answered as compared to the ones addressed in the Chindooroy ea (2007) paper which builds on the London Economics (2005) evaluation study.

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	<p>In order to isolate the effects of restructuring and rescue aid, the study applies a counterfactual approach. They discuss the Difference-in-Difference (DiD) method but decide to apply a simpler method because of methodological concerns and issues of data-availability. The methodological concerns mainly relate to finding the proper set of competitors and the fact that the aid varies in terms of amount and conditions amongst the aid-receiving companies which therefore cannot be strictly compared with one another. The following four steps describe the methodology actually applied:</p> <ol style="list-style-type: none"> 1. Identification of suitable comparators of aid-receiving companies. 2. Definition of performance indicators for aid-receiving companies and their comparators. The authors use employment, turnover, profitability and labour productivity as indicators of performance. The comparator firms' performance is summarised by constructing weighted averages of the underlying variables 3. Measurement of performance for each aid-receiving company and its comparators, immediately before receiving state aid and in the most recent year for which data was generally available. 4. Comparison of the progress made by each aid-receiving company against that of comparators over the same time period. <p>The relevant comparators were selected applying the following procedure:</p> <ul style="list-style-type: none"> • An initial list of comparators was constructed with companies classified in the same industry subgroup as the BB-listed firm and from the geographic market most relevant to aid-receiving company. To this list, other companies were added if they were defined as a competitor in the state aid case reports, or by the alternative sources • Subsequently, firms without sufficient data were filtered out to form a basic list of comparators. • Thirdly, to ensure that the companies present in the basic list were suitable comparators, the firms' descriptions in Bloomberg Professional were compared to the activities of the aid-receiving firm. • Finally, the list was further refined by selecting similarly sized companies, as indicated by the level employment and/or turnover. Dissimilar firms were eliminated. <p>Having established the comparator groups, the authors compare employment, turnover, profitability and labour productivity of companies that received state aid against those that did not. This comparison is made at two points in time, just immediately before receiving state aid (initial time) and in the most recent year for which financial and employment data are generally available (final time). The authors also construct a measure which they call "differential growth" to analyse how, on average, the basic financial fundamentals of the aid receiving firms have evolved compared to those of similar firms in the same market.</p> <p>For the second research question, the authors look at the distribution of sales by region for each of the relevant aid-receiving companies, and follow this up with an investigation into how their market share of sales within the EU has changed over time. When relevant, the authors also investigate the relationship between sales outside of the EU by each of the companies, with extra-EU exports for the corresponding sector. Furthermore, they use Bloomberg-listed companies in the same field of activity as the aid-receiving companies as a proxy for the sector to investigate other aspects of the aid-receiving companies' performances (like for example profits, employment levels and income to sales ratios). So again a counterfactual analysis was applied. However, compared to the group of companies selected as comparators to address the first research questions, the focus is now on the performance of companies in the same sector (regardless of size), but of European origin. Therefore, they excluded from the sample any companies that originated from outside of the EU, but included companies that were too small</p>
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	or too large to be considered comparators to address the first research question.
Summary of the main results	<p>With respect to the first research question, the study finds that the overall performance of the companies having received rescue and/or restructuring aid is generally positive both in absolute terms and relative to the performance of the comparator companies. More precisely, the authors find that:</p> <ul style="list-style-type: none"> • With regards to employment, about 50% of the state aid-receiving companies increased employment faster than the industry; • With regards to turnover, 80% of the state aid-receiving companies showed an increase in absolute terms and 43% of these companies posted a better increase in turnover than their comparator companies. • Regarding to profitability, as measured by profits per employee, 72% of state aid-receiving companies narrowed their gap with industry average, though for most of them their profit rate remains well below that of the industry; • With reference to labour productivity, 76% of the aid-receiving firms posted increases in productivity and in the case of most of them, to above the industry average; and • Firms that received rescue aid performed worse than their comparators in terms of employment, turnover and profitability. Conversely, their productivity performance was above the industry average. <p>The five cases reviewed to address the second research question, show very different pictures in terms of impact on the sector in which they operate. For example, three companies show robust growth in EU-market share up to a level in 2002 which was actually higher than in the mid-nineties. But the authors mention explicitly that the sample of companies reviewed in greater details is too small to draw any firm conclusions that would be applicable to the whole population of state aid-receiving companies. Nevertheless, again according to the authors, the results suggest that, perhaps, in a number of cases the recovery of a state aid company appears to occur at the expense of EU competitors. But much more detailed case studies would be required to disentangle the specific effects of the recovery of the state aid receiving companies on their competitors from factors idiosyncratic to the competitors such as aging or inferior product range, insufficient R&D in new processes and products, etc.</p>
Key takeaways for the evaluation	<ul style="list-style-type: none"> • While for addressing the impact of state aid on the survival probability, Chindooroy e.a. (2007), building on this study of London Economics, did not use an approach including a counterfactual analysis, the London Economics study does so for the other research questions addressed in this study. However, the counterfactual analysis is not applied by means of an econometric estimation, but by simple descriptive statistics comparing the performance of the aid receiving companies with their comparators. • These comparators are selected using a number of criteria (sector, geographic location and size mainly), but without paying attention to the fact whether the comparators have similar financial difficulties to start with. • In the overall conclusion of the study, the authors stress the need to clearly identify, at the time the state aid is approved, the sector and the competitors of the state aid-receiving company, and to track sectoral and company developments on an on-going basis. Without such a Dbase, the basic data difficulties that they faced in undertaking their analysis of the potential sectoral impacts of rescue and restructuring state aid will remain, and will continue to seriously hamper any future evaluations, it is stated. The question therefore arises whether for the current evaluation, the necessary data will be available for a sufficiently long period and number of sectors.

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Glowicka, E. (2006), "Effectiveness of Bailouts in the EU", GESY Discussion Paper No 176, available online: http://epub.ub.uni-muenchen.de/13375/1/176.pdf (last consulted 21. January 2015).	
Summary of the research question	This paper studies the effectiveness of bailouts in the European Union. Effectiveness is defined as the ability to keep the firm alive. In this context, the paper looks at restructuring as well as rescue aid. The main research question is further defined into three parts. The first part looks at the impact of aid on survival/the risk of bankruptcy. Second, Glowicka studies the differences between restructuring and rescue aid in this respect. The third subquestion studies the nature of the aid variable (being exogenous versus endogenous). The literature review covers mostly bankruptcy predictions and survival analysis.
Data set	The dataset consists of 79 firms (86 aid decisions) and covers a period from 1995 until 2003. This represents the period of use of that version of the R&R guidelines. Cases from 10 different EU Member States are included. Each decision forms one observation. Information is retrieved from the decision texts from the European Commission, the London economics report (2004), AMADEAUS and newspapers. This leads to an unbalanced panel data set. There appears to be a clear concentration of cases from 1996 to 1998.
Firm survival	Bankruptcy is defined as: "... ceasing operations. If a firm becomes insolvent, sells most of their assets, reduces employment dramatically and stays active in the market, it is also counted as bankrupt." What happened to the firm in terms of survival is known only for 75 firms.
Research method applied	A first step is to estimate the hazard rate (linking the probability of bankruptcy to the time passed since bailout). A hazard rate estimation is chosen above a discrete choice model as the latter could lead to biased results with cross-sectional data. Two estimations are reported, i.e. a non-parametric and a parametric one. The hazard function is subsequently presented in a graph. A recursive bivariate probit model is used to further study possible endogeneity of the variable subsidy choice.
Summary of the main results	<ul style="list-style-type: none"> • The non-parametric estimation reports a clear decrease in the hazard rate at first, followed by an increase later on. This means that the aid delayed exit. • The parametric tests report a higher chance of survival after having received restructuring aid than in the case of rescue aid. The difference is about 10%. It appears that firms within categories such as transport, electricity and financial services have a higher chance of survival. Here, the difference is about 4% (construction taken as a reference point). The reported hazard function points to delayed exit, as was the case with the non-parametric test. • Looking at the choice between rescue and restructuring aid, the variables time and state-owned seem to be decisive, rather than other determinants such as industry. Overall, there seems to be a peak of bankruptcies about 4 years after the aid has been granted. • The bivariate probit results indicate endogeneity issues. Thus the aid choice should be taken into account as endogenous when analysing the probability of exit. Otherwise, the influence of aid will be underestimated.
Key takeaways for the evaluation	<ul style="list-style-type: none"> • Hazard rates could be a useful tool to study the effectiveness of restructuring aid. The idea would then be to study whether or not the aid has an influence on the hazard rate. • There is evidence indicating that subsidy choice is an endogenous variable which should be taken into account.

Chindooroy, R., P. Muller and G. Notaro (2007), "Company survival following rescue and restructuring state aid", European Journal of Law and Economics 24, p. 165–186	
Summary of the research question	<p>This paper builds on the findings from the ex-post evaluation study of rescue and restructuring aid undertaken by London Economics for the European Commission Enterprise Directorate General (London Economics, 2004). In terms of objectives, this ex post evaluation comes closest to the aim of the current study. It is an evaluation of the effectiveness of rescue and restructuring aid. In terms of focus, it should be noted though that the study considered both rescue and restructuring aid and that the applicable guidelines were those of 1999.</p> <p>The study first provides extensive summary statistics on the entire population of rescue and restructuring state aid cases that have been approved by the Commission over the period 1995–2003.</p> <p>Second, the authors compute mortality and survival rates among rescue and restructuring aid-receiving companies.</p> <p>Third, they explore the determinants of survival of aid-receiving companies, including the various aid package characteristics (type of aid, the financial instrument used to provide the aid and the amount of state aid) and the types of the difficulties faced by the aid receiving firms.</p>
Data set	<p>The population of rescue and restructuring state aid cases considered in the study includes all the rescue and restructuring state aid cases that were approved by the European Commission over the period 1995–2003, 86 in total. Nine cases were excluded from our analysis because the period of aid reimbursement (for rescue aid cases) or the implementation of the restructuring plan had not yet come to an end by 2003. The remaining 77 rescue and restructuring state aid cases cover 71 aid-receiving companies as a number of companies benefited from multiple awards of such aid.</p> <p>For these companies, 2 sorts of information were collected:</p> <ul style="list-style-type: none"> • company characteristics: national and regional location of the company, sectors of business activities, main competitors; year of foundation; year difficulties started, the causes and duration of the business difficulties; the company status in 2003; and employment, turnover and profit of the company at the time of the aid first being given and in 2003 (if applicable). • aid characteristics: type of aid (rescue or restructuring); value of the aid, start year and duration of disbursement; focus of aid towards specific location or product within company; financial instruments used to provide the state aid; and the anticipated use of the aid (purely financial support or structural changes); (if applicable): start and duration of restructuring process and, where available, details of measures undertaken with a quantification of the restructuring measures (for example, reduction in number of employees). <p>In addition to relying on the information provided in the rescue and restructuring state aid case documentation, a variety of additional sources was used. For listed companies, the information service Bloomberg Professional 2000 provided most of the information. In the case of unlisted companies, the authors relied on a wide range of information sources such as the various company information databanks available in LexisNexis, company annual reports, company web sites, press articles, official bankruptcy registers, etc. The sectoral data that were used were obtained from the OECD STAN dataset.</p> <p>To evaluate the current legal status of the companies, a variety of sources were consulted, such as the websites of the aid-receiving companies, LexisNexis and the archives of the Financial Times (at FT.com) and general searches over the Internet.</p>

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	<p>The regression sample consists of 63 observations, i.e. all state aid approvals over the period 1995–2003 for which all the necessary information to estimate the model was available.</p>
<p>Firm survival</p>	<p>For their descriptive statistics, the authors distinguish between 6 different current legal status categories: ceased (but some leaving a trace), new owner, privatized, renamed, unchanged and unknown.</p> <p>For the empirical analysis, a binary success – failure variable is constructed. Companies are defined to have survived when after the aid was given, (1) they restructured and continued their business activities in large part, or (2) restructured and sold of large part of the business. No further details are provided on the evaluation of a “large part”.</p> <p>In case of bankruptcy, a company evidently did not survive. In case of insolvency, from which companies could either end up in bankruptcy or recover, companies were excluded from the survival analysis.</p>
<p>Research method applied</p>	<p>The authors apply a Probit-model to evaluate the chances for survival with a set of variables potentially affecting firm survival like they are used in other studies (size, age, public or private ownership, sector growth) as well as variables that are related to the state aid provided. The later include the condition of the company at the time of the aid, the amount of liquidity (grants, capital injections, loans) given as aid to the company and a series of dummy variables indicating whether the aid package included other aid instruments like for example guarantees, whether the aid was given recently and the kind of difficulty at the time of the state aid case like mentioned in the decision.</p> <p>The authors do not include matching firms in their sample (see below). This implies that the state aid parameters measure to what extent a higher chance of survival is associated to receiving a larger amount of state aid and/or having other instruments in the aid package as opposed to capturing whether granting or not rescue and restructuring state aid had a significant impact on company survival.</p>
<p>Summary of the main results</p>	<ul style="list-style-type: none"> • Almost 50% of the companies having received rescue state aid did not survive while only 20% of the companies having received restructuring aid folded. • The mortality rate varies considerably according to the year when the companies received the rescue and/or restructuring state aid. Mortality does seem to be related contemporaneously to the business cycle, with most of the mortality occurring when the economy is very weak. Moreover, most of the companies that folded did so within 3 years of the start of the aid. This pattern is particularly strong for companies that received rescue state aid, whilst most of the companies that received restructuring state aid and folded did so between 3 and 6 years after aid was awarded. • Analysing the determinants of survival, the authors find that the probability of success is related more to some key characteristics of aid-receiving firms, of the sector to which they belong and/or the type of difficulty they encountered and less to the policy framework of rescue and restructuring state aid. Moreover, none of the main features of the restructuring plans documented in state aid cases mattered for firm survival¹¹⁴.

¹¹⁴ They tested for any impact on survival of the features of the restructuring plans including: duration of restructuring, capacity reductions, personnel reductions, focusing on core business activities, cost-cutting, financial consolidation, selling or closure of plants and assets, new investment, training and upgrading and plant relocation.

Key takeaways for the evaluation	<ul style="list-style-type: none">• While the study focuses on effectiveness in terms of the impact of restructuring and rescue aid on firm survival, it does so applying a methodology that does not allow to draw strong conclusions since the sample does not include companies that did not receive state aid. The authors do not apply a counterfactual analysis because, like they mention themselves, <i>“a proper counterfactual for the case at study requires that the matching firms should also be in a condition of difficulty, which is generally not observable. In addition, the condition of difficulty should be fairly specific and comparable to that of aided firms.”</i> As such, the authors specify the conditions that need to be fulfilled when selecting matching firms for the counterfactual analysis that is planned in this study.• The extensive description of the key characteristics of cases in sections 3 is useful as a source of inspiration for our own description of the cases, though we should mention that their sample includes both rescue and restructuring aid, as well as cases in the financial sector. These key characteristics are:<ul style="list-style-type: none">○ geographical distribution (by country and whether in assisted area or not)○ sectoral distribution○ size of the companies○ type of business problems encountered by the companies○ the financial instruments used• The definition of firm survival used is binary, though includes companies that have discontinued or sold a small part of their activities. But it is not clear which cut-off has been applied.
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Oxera (2009), "Should aid be granted to firms in difficulty? A study on counterfactual scenarios to restructuring aid", Prepared for the European Commission, Competition Reports, December, 2009.	
Summary of the research question	<p>The key objective of this study is to inform the European Commission about what might happen to a firm seeking approval for restructuring aid in the absence of such aid.¹¹⁵ The study therefore investigates the impact of financial difficulty and distress on firms' output and employment, as well as their potential broader consequences at the industry and regional level.</p> <p>The study does not aim at analysing the impact of state aid on recipients. In this view, there is therefore no comparison on the financial distress and outcomes (in terms of output, employment and general activity) between firms that have received aid and firms that have not.</p>
Data set	<p>The final sample that is used for the firm-level empirical analysis consists of 1.370 firms that can be considered as 'in distress' in the period 1999-2008 after application of the selection criteria¹¹⁶. Firms that have received or have applied for rescue and restructuring aid in the above mentioned period are excluded from the sample. The primary information source for the analysis of firm-level outcomes is the ORBIS database provided by Bureau Van Dijk.</p>
Firm survival	<p>The authors confirm that from a conceptual perspective, there are a number of potential benchmarks for determining whether a particular firm has survived or not (such as the appointment of a liquidator, physical discontinuation of productive activity, removal from the national companies register, final sale of assets). The authors do not identify any of these benchmarks as a conceptually or practically superior definition of non-survival¹¹⁷.</p> <p>Therefore, for their empirical analysis, the following definition is used: a firm is considered to have 'survived' if it continues reporting financial data until the last year of the period under consideration (three years after the onset of distress). By definition, these firms will not have been liquidated, and will have continued operations under the same legal entity. However, some of the firms that cease reporting may have been acquired and have continued operations under a different legal entity. These firms might be expected to continue operating activities and preserve at least some level of output and employment under a different legal entity. These firms are however considered in the study as having 'non-survived'.</p> <p>Authors reckon that it is critical to take account of the impact of mergers and acquisitions on outcomes of distress. Where possible, this has been examined for particular firms in the case studies analysis. However, it is not always practical to examine the impact of mergers and acquisitions on a case-by-case basis. This is because it is not always possible to disentangle the output and employment of the acquired firm/assets from the output and employment of the acquiring firm. In addition, employees and assets may be transferred to other firms via a number of mechanisms¹¹⁸. Such transfers may be difficult to observe and their net impact may be difficult to quantify robustly.</p>

¹¹⁵ This is referred to as the 'counterfactual scenario' to state aid being received.

¹¹⁶ These criteria comprise the European Commission's criteria for designation as a 'firm in difficulty' (i.e. in the context of the study: a firm must have lost 50% of its capital over a particular period of which 25% must have been lost in the final year of this period and must have incurred negative net income in the year of distress) and additional criteria in order to ensure that the selection process is as robust as possible.

¹¹⁷ Moreover the data collected from ORBIS do not provide a definitive indicator of the legal status of a firm. It is therefore not possible to distinguish between the outcomes described above once a firm has ceased reporting financial data.

¹¹⁸ For example, in the case of Air Libert , employees were hired by a competitor (Air France) following the firm's bankruptcy.

<p>Research method applied</p>	<p>The study begins by describing the key aspects of the process of distress and its implications for outcomes in terms of output and employment. Using economic analysis, the study identifies the factors that determine the outcomes of the distress. The factors considered in the study are related to the firm and sector characteristics, the business and financial performance prior to distress, the size of any shocks, the contemporaneous market conditions and labour market characteristics. This analysis concludes with the formulation of questions and hypotheses to be tested.</p> <p>In the context of this analysis, the authors also specifically study the relationship between firm characteristics prior to distress and survival rates, which indicate the likelihood that firm-level employment and output will not fall to zero.</p> <p>In order to test the relevant hypotheses derived from the analysis, the study adopts a three-tier approach.</p> <ul style="list-style-type: none"> • The first tier (see section 5 of the study) consists of a statistical analysis carried out on the sample of firms in difficulty (see above for more description on the sample). In a first stage, the analysis examines the key trends before, during and after the distress to understand how firms develop after the onset of distress, and how this is related to their business and financial performance before the distress. Then, using econometric analysis, the empirical relationship is explored between firms' characteristics and the market ex ante and the outcomes of distress. More specifically, the following steps are taken to test the different hypothesis (Heckman selection model): <ul style="list-style-type: none"> ○ First, a model is estimated over the whole sample (including both surviving and non-surviving firms) to examine the factors that influence whether a firm survives over either one or three years following the onset of distress. ○ Then, a model is estimated on the sample of surviving firms to examine the relationship between factors that can be observed prior to the onset of the distress and the impact on revenue and employment post-distress, controlling for the systematic differences between the characteristics of surviving and non-surviving firms. • In a second tier, a more focused analysis is carried out on selected case studies (see section 5 and 7), which are particularly informative for analysing the process and outcomes of distress, as well as providing information about factors that might be relevant in specific aid cases. • The third tier is a review of existing research on the causes and outcomes of distress in order to achieve a well-informed understanding of the available information and insights about the consequences of financial distress. <p>The results of the analysis were cross-checked through targeted interviews with market practitioners (in particular, insolvency practitioners and bankruptcy lawyers).</p>
<p>Summary of the main results</p>	<p>Some of the key results of the empirical analysis related to the process of distress are briefly presented below:</p> <ul style="list-style-type: none"> • With regards to firm performance leading to distress, it appears that, for a typical firm in the sample experiencing distress, employment increases significantly, revenues increase slightly and a sharp decline in the firm's financial position may be pointed out prior to distress (eventually due to inappropriate investment decisions). • Regarding firm survival, the average survival rate of firms three years after the onset of distress is around 77%. • Regarding the impact of distress on output and employment, following the onset of

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	<p>distress, surviving firms tend to reduce employment. In contrast, revenues typically recover by the third year following distress after a relatively small decline in the year of distress. Five years after the onset of distress, revenues are around 30% higher than the year prior to distress, while employment is around 3% lower over the same period.</p> <ul style="list-style-type: none"> • Finally, with regards to the impact at the industry and regional level, the empirical analysis has not found any wider effects of distress on output. <p>The study also provides information regarding the likelihood of firms to survive, according to firms’ characteristics. In particular, a particular firm has greater probability to survive if:</p> <ul style="list-style-type: none"> • It is a large, non-manufacturing firm with non-firm-specific assets and a more modular corporate structure that allows divisions to be sold off to raise cash; • It has experienced limited losses at the point of distress; • It has experienced a smaller deterioration in financial performance pre-distress (for a given level of severity of distress); • It has lower gearing, better access to capital (whether from private investors or capital markets), and a simpler debt structure than its peers; • It operates in a country or countries with relative flexible labour markets. <p>In practice, the findings of this study can be used to inform the European Commission on the expected outcome of the counterfactual. For example, the application of the framework proposed in the study might help the European Commission to identify cases where it is necessary to ask the Member State to provide further evidence to demonstrate why there would be a significant effect in case the aid is not provided.</p>
<p>Key takeaways for the evaluation</p>	<ul style="list-style-type: none"> • The study does not provide information regarding the impact of aid on recipients but focusses on the counterfactual scenario only; • The study highlights the difficulties, given data availability, encountered to define ‘firm survival’ in a way that allows to take into account cases where a change in firm’s legal entity name occurs. • The study could provide key information regarding the identification and the treatment of the sample of the ‘counterfactual’ firms. In particular, the variables/factors¹¹⁹ used to identify firms in distress may be relevant for identifying the ‘match’ for each recipient firm (with the requirement that the value of the factors of distress are comparable between the recipient firm and its matches at the time the firm receives aid). • In addition to the impact on ‘firm survival’, we could also analyse the impact of aid on the ‘distress’ of firms by comparing ‘distress’ of the firms that receive aid with the distress of the ‘control group’.

¹¹⁹ See table 8.1 “Information set for the counterfactual”.

Murn, A., Burger, A. and Rojec, M. (2010), "Do state aids for rescuing and restructuring of firms in difficulty serve their purpose? The case of Slovenia", Paper presented at the 11th Bi-annual EACES conference, Tartu (Estonia) 26-28 August 2010.	
Summary of the research question	<p>The aim of this paper is to analyse the efficiency of rescue and restructuring state aid to Slovenian firms in difficulty. More specifically, the authors analyse the causal effects (net effects) of state aid for rescuing and restructuring on changes in firms sales, employment and productivity by comparing the recipients of state aid funds to non-recipients.</p> <p>According to the authors, the paper is the first that allows identifying the additional sales, employment and value added per employee that is created by the granted funds.</p> <p>It is important to point out that the period covered is before Slovenia joined the EU. So the applicable state aid rules are not the European Commission state aid rules. The legislative background and, in extenso, the institutional background, are therefore different.</p>
Data set	<p>The set of recipient firms is composed of the 487 firms that received rescue or restructuring aid during the period 1998-2006. The data come from two major sources: firm level data on state aid for rescuing and restructuring (State Aid Record) and firm's financial data (Financial statements of companies from AJPES data base) for the period 1998-2006.</p> <p>For each recipient, a control group composed of 1 up to 6 other firms is constructed (see below for information on the matching method).</p>
Firm survival	A firm is considered as having survived if the firm was still in the business register in 2006, meaning that the firm still existed as a legal entity.
Research method applied	<p>Authors used the propensity score matching approach. In such approach, state aid recipients are matched with similar control firms that were not granted subsidies. This allows to obtain an approximation for the unobserved hypothetical outcome (outcome when no aid is received).</p> <p>In a first step, the propensity to obtain state aid is calculated for each firm (both aided and non-recipient firms) using panel random effects logit model¹²⁰.</p> <p>In a second step, each firm that received aid has been matched with a similar non-recipient firm or a group of non-recipient firms (max. 6 firms that do not received aid on the whole period considered). The matching is based on the relative proximity¹²¹ in terms of propensity score. In order to avoid biased estimates, a balancing hypothesis test is conducted in order to ensure that the non-causality condition holds (i.e. for a given propensity score, the choice on granting state aid is random and therefore recipient firms and non-recipient firms should be observationally identical).</p> <p>Once the recipient firms are matched with their respective control group, the authors combine propensity score matching with difference-in-difference. For each match, a difference in difference (DID) is calculated by subtracting time difference of the control group outcome variable from the time difference of the recipient firm' outcome variable.</p> <p>The performances of recipient firms and their control matches are tracked both in years before the granting of the aid and after. The differences in outcome are both calculated for each year (year-to-year) and for an entire cumulated period.</p>

¹²⁰ The set of regressors includes the average wage, value added per employee, employment, capital intensity, foreign ownership indicator, outward FDI indicator, time dummies and 2-digit industry dummies.

¹²¹ The method for selecting matching firm is the caliper K-nearest neighbours matching. The matching is performed for each year in the period 1998-2006 separately and only for firms within the same 2-digit industry. Two other methods have also been used: the kernel-based matching on Mahalanobis metric and the previous method combined with a caliper condition.

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<p>Summary of the main results</p>	<p>Among the recipient firms that survived, the results indicate that aid proved to be inefficient in promoting growth in sales, in increasing productivity and in creating or maintaining employment:</p> <ul style="list-style-type: none"> • Regarding sales, in the period of subsidy allocation and afterwards, most of year-to-year effects of aid (DID) are negative and statistically significant; • Recipient firms reduce employment more intensively than similar control non-recipient firms in both the years before the aid is received and after (decrease in employment intensifies after the granting of aid); • In the first two years after aid receipt, the productivity growth in aid receiving firms is indistinguishable from the one in control firms, while in the next two years it becomes significantly lower. <p>When analysing how much additional sales, employment and value added per employee is created by the granted funds, the authors find that the return of aid is negative (i.e. the additional outcome per EUR of granted aid is negative).</p>
<p>Key takeaways for the evaluation</p>	<ul style="list-style-type: none"> • This study analyses the efficiency of state aid. The study does not focus on a comparison of survival rates between recipients and non-recipients as the main analysis focusses on firms that survived. • The definition of firm survival relies only on the existence of the legal entity and does not take into account the possibility for the activity of a given firm to continue under a different legal entity. • No distinction is made between rescue and restructuring aid which seem to be treated equivalently. • The study provides insights with regards to the methods of identification of the control group and the treatment of the differences between recipient firms and their control group.

Schweiger, H. (2011), "The impact of state aid for restructuring on the allocation of resources", European Bank for Reconstruction and Development, Working Paper No. 127	
Summary of the research question	<p>Schweiger (2011) investigates the impact of R&R state aid on static and dynamic efficiency of Slovenian manufacturing. The focus on static and dynamic efficiency builds on the idea that the success of an economy depends largely on how successful it is in allocating inputs and outputs across businesses efficiently with minimum disruption and frictions. This process of allocation consists of two complementary components, cross-sectional (static) allocation and longitudinal (dynamic) allocation of inputs and outputs from less productive to more productive businesses.</p> <p>Market institutions that impact this allocation, like for example R&R state aid, potentially account for productivity differences across countries. State aid in essence provides soft budget constraints to the firms receiving it, and soft budget constraints have an influence on the life-cycle of firms and thus market selection. Aid can postpone the exit of unprofitable firms and thus shift the burden of structural adjustment onto more efficient firms who are managing without it. Hence, aid can have an impact not only on the exit decision of firms, but also on the allocation of inputs and outputs across firms. This in turn affects aggregate productivity growth. Moreover, state aid may affect the recipient firm's competitors not only in the recipient firm's country of origin, but also in other countries.</p>
Data set	<p>The study combines aid data with firm-level accounting data.</p> <p>The data come from six major sources: The Data Analysis Service (PASEF) of the Faculty of Economics at the University of Ljubljana; the Commission for State Aid Control (CSAC) at the Ministry of Finance (MF) of the Republic of Slovenia; the Statistical Office of the Republic of Slovenia (SORS); the Business Register of Slovenia (BRS); the Ministry of the Economy (ME), and the Official Gazette of the Republic of Slovenia On-line.</p> <p>The data on state aid for the rescue and restructuring of firms in difficulty were prepared by CSAC and cover the period from 1998 to 2003. There was a sharp decrease in both the aid allocated and the number of recipients in 2002 as a consequence of new restrictions officially adopted in July 2000 to harmonise Slovenian legislation with the EU restrictions. Slovenia joined the European Union on 1 May, 2004.</p> <p>The study focuses on the manufacturing sectors.</p>
Firm survival	<p>The author follows "standard" conventions in the literature to define continuing, entering and exiting firms on the basis of the availability of their accounting data:</p> <ul style="list-style-type: none"> • Continuing firm: Exists in $t - 1$, t, and $t + 1$ • Entering firm: Exists in t and $t + 1$, but not in $t - 1$ • Exiting firm: Exists in $t - 1$ and t, but not in $t + 1$
Research method applied	<p>According to the author, experimental evaluation is in general the preferred method to estimate treatment effects; however, given that firms are not assigned randomly to a group that receives aid and a control group that does not receive aid, experimental data are not available. So, like the other authors, Schweiger has to use non-experimental evaluation estimators and rely on the information on how firms actually performed after some of them received aid and others did not.</p> <p>Non-experimental treatment effects estimators can be grouped under two categories based on how they handle selection bias. The author uses treatment effects estimators that assume selection on observables (linear regression models) and estimators that explicitly allow for selection on un-observables (instrumental variables models). The identification strategy for the underlying instrumental variables in the models that allow for selection on un-observables</p>

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	<p>involves firm-level variables that affect the likelihood of receiving aid prior to 2002, but not after 2002, when Slovenia sharply scaled back its aid in order to comply with EU regulations.</p> <p>The outcome variable is either the micro covariance (a firm level measure of allocative efficiency), the growth of market share or the growth of productivity. The estimations include AID as a dummy variable for whether the firm received R&R state aid or not.</p>
<p>Summary of the main results</p>	<ul style="list-style-type: none"> • None of the firms that received aid exited, while the predicted probability of exit is 2.5 per cent for firm-years without aid and 3.6 per cent for firm-years with aid. This result indicates that according to their economic fundamentals, these firms were more likely candidates for exit, but they did not exit, suggesting that aid delayed exit and kept inefficient firms alive. • The empirical analysis further reveals that state aid hindered the efficient allocation of resources to more productive businesses • In addition, the growth rate of market share was higher for aid-receiving firms, which suggests that aid had a distortive effect on the market structure, because it allowed less efficient firms to grow faster than more efficient firms and thus shifted the burden of structural adjustment onto firms that managed without aid. • Finally, the results suggest that aid had no significant effect on TFP growth. • Overall, the author concludes that aid for rescue and restructuring of firms appears to have been distortive.
<p>Key takeaways for the evaluation</p>	<ul style="list-style-type: none"> • The focus is on the impact of R&R-aid on the static and dynamic efficiency in Slovenia. So it is more about distortion of competition and the negative consequences thereof on productivity. • The impact on survival is only touched upon as entry and exit are means to reach allocative efficiency. • The period covered is before Slovenia joined the EU. So the applicable state aid rules are not the European Commission state aid rules. The legislative background and, in extenso, the institutional background, are therefore different. • No distinction is made between rescue and restructuring aid which seem to be treated equivalently.

Lyons B. and M. Zhu (2013), "Compensating Competitors or Restoring Competition? EU Regulation of State Aid for Banks During the Financial Crisis", Journal of Industry, Competition and Trade, vol. 13, p. 39-66.	
Summary of the research question	Lyons and Zhu study state aid to restructure banks and in this regard look at differences with state aid policy in other industries. They evaluate the Commission's aid practice for failing banks during the crisis.
Data set	There is a general overview of information concerning all restructuring bank cases during the crisis. Four cases are chosen for in depth analysis. These are chosen to reflect the diversity and extensiveness (different countries, ownership structure, forms of intervention). The four cases are: Northern Rock, WestLB, Fortis Bank, Lloyds-HBOS.
Firm survival	Not specified in a list. However, next to survival or not, the text inspires for the following alternatives/alternative formulations: nationalisation (probably not common for other industries), merger, divestiture (forced or not), slow extended wind-down.
Research method applied	After a thorough analysis of the theory for restructuring firms in general versus restructuring banks and an overview of the Commission's practice to restructuring aid for banks, four case studies are carried out.
Summary of the main results	<ul style="list-style-type: none"> • The case studies lead to several concerns such as the 'one time, last time' principle losing credibility, inconsistencies in behavioural measures, divestitures without much planning upfront and no bank-specific counterfactual. • Advice is given to concentrate on restoring balanced competition for rescue and restructuring state aid control.
Key takeaways for the evaluation	<ul style="list-style-type: none"> • Selection of case studies should reflect the diversity of the sample. • Importance of the counterfactual scenario for a proper evaluation.

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Bolsa Ferruz, M.A. and N. Nicolaidis (2014), "An Economic Assessment of State Aid for Restructuring Firms in Difficulty: Theoretical Considerations, Empirical Analysis and Proposals for Reform", <i>World Competition</i> 37, No 2, p. 207-234.	
Data set	Database covers 114 restructuring aid cases from 2000 till April 2013. Rescue aid cases are not included. The data have been gathered from the case search engine of the European Commission's website devoted to state aid. Only those cases that were related to 'one-time' aid (sixty state aid schemes were excluded for that reason - especially for SMEs). Twenty-three cases that were related to the financial sector (banks, insurance companies, etc.) were also excluded.
Firm survival	not relevant since focus is on efficiency, not of effectiveness
Research method applied	<p>Applying a rather intuitive approach, the authors define the theoretical conditions which need to be fulfilled in order for R&R aid to be socially optimal. First of all, the benefits from intervention, equal to the value of the forgone output in case of bankruptcy, should be larger than the costs of the intervention which equal the costs of the process of intervention and the impact on competitors of the aid recipient who are deprived of the possibility of expanding their output if the state prevents the bankruptcy of their competitor.</p> <p>On top, providing the aid would be justified, it should (1) not exceed the difference between the social value and the social costs and it should (2) not exceed the minimum needed to bring back the recipient firm to viability (which equals the cost of capital minus expected revenue and avoided liabilities).</p> <p>However, when testing these conditions empirically, the lack of data for many of the variables requires a further simplification of the model which boils down to the condition that the costs of intervention must be smaller than the expected benefits in terms of the value of the jobs which are saved.</p> <p>The authors gathered data on employment of 67 firms that received state aid and estimated the amount of aid per job saved, almost €50,000. This amount is compared with the average gross salary in Europe which is equal to € 29,400 (source: Eurostat). More detailed comparisons are made, taking into account sector and country differences (source: ILO).</p>
Summary of the main results	<p>The average cost of saving a job, € 49,293, was 1.7 times larger than the average annual salary, € 29,400. Therefore, the conclusion must be that, at least on average, too much state aid was granted (definitely if one takes into account that not all jobs will be saved, that workers may find another job within one year and that competition distortion effects have not been taken into account).</p> <p>Taking into account sector and country differences, but building on a much smaller set of 28 cases in the manufacturing sector, the authors further conclude that:</p> <ul style="list-style-type: none"> • large and very large absolute amounts of aid result in much higher amounts of aid per worker, which provides an indication that relatively more aid goes to large capital-intensive companies; • the average amount of aid per worker in small firms is much larger than the average amount of aid in medium-sized or large firms, which casts doubt on the efficiency of intervention to save small firms. <p>According to the authors, these findings cast serious doubt on the efficiency of R&R aid. Irrespective of how the data are analysed, there appears to be no consistent policy of targeting aid to the number and value of jobs saved. In fact, the picture that emerges is one of granting rather random amounts of aid (from a policy perspective)</p>

Key takeaways for the evaluation	<p>Since the focus is on the efficiency of restructuring state aid, the empirical approach applied is less relevant for the study which focuses more on the effectiveness.</p> <p>The extensive description of the set of cases in sections 4.3 to 4.10 is useful as a source of inspiration for our own description of the cases, though covers another sample. This description covers the following items:</p> <ul style="list-style-type: none">• the public policy objectives that may justify the R&R aid• the proportion of countries that are located in assisted areas• the number of state aid measures over time• Member States granting state aid• amount and instrument of aid• market share of ailing companies• compensatory measures• own contribution
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Nulsch, N. (2014), "Is subsidizing companies in difficulties an optimal policy? An empirical study on the effectiveness of state aid in the European Union", IWH-Diskussionspapiere, No. 2014, 9	
Summary of the research question	This study aims at answering the question whether state aid paid to rescue and restructuring companies is indeed used effectively and whether the initial aim – firm survival – has been reached. The study further analyses the firms' external and internal characteristics that influence firm survival.
Data set	The analysis is based on a data set comprising 190 firms in difficulties from the EU Member States. The dataset is composed of two subsamples: <ul style="list-style-type: none"> • 141 firms¹²² that received R&R aid which has been notified and approved by the European Commission between 2000 and 2010 in one of the EU Member States. • 49 firms that applied either for rescue or restructuring aid but for which the Commission denied aid between 2000 and 2010. The primary source for information is the European State Aid register which provides several documents (final decisions, letters to Member States, press releases, etc.). Information on the current status of the companies was compiled via company information (company websites, press releases, annual reports) and in particular the AMADEUS database.
Firm survival	In the study, a firm is considered as having survived if one of the following criteria is fulfilled: <ul style="list-style-type: none"> • The status, name and production site are unchanged. • The company has been sold in large parts to a new investor. Yet, even though take-overs and mergers are sometimes treated as firm deaths (Dunne and Hughes 1994) the authors treat them as continuous (like Harhoff et al. 1998) as not the ownership is essential but the preservation of workplaces. Thus, in the study a firm has survived if at least 50% of employment remains at this location (even if the company has been renamed, privatized or nationalized).
Research method applied	The authors first provide a descriptive analysis of the rate of survival of the 190 firms. From this descriptive analysis, several hypotheses are derived regarding the effect of internal (age, geographical location, number of employees, etc.) and external (rescue vs restructuring aid, relevant R&R guidelines) firms' characteristics on survival rates. In order to test these hypotheses, the survivor function is constructed and describes the firms' probability of surviving beyond a certain point of time. They additionally consider hazard rates, which are defined as the firms' probability that a market exit occurs in a given interval of time (from the time where aid is received). The Kaplan-Meier estimates of the survivor function and the hazard rates are calculated for both the group of 'rescued firms' and the firms that did not receive the aid. In order to test for the firm characteristics that might influence the possibility to survive, the Kaplan-Meier estimates are also calculated and compared for each of the following groups: <ul style="list-style-type: none"> • Rescued Firms vs Restructured Firms; • State Owned Firms vs Private Firms;

¹²² This sample does not include the cases where the aid was approved but not being paid, the cases where the Commission found that the subsidy did not constitute aid, the cases where companies, especially banks, received aid based on separate rules adopted in response to the economic crisis and a case where the company received aid twice. Finally one case has been excluded as the exact data of closure could not be found.

	<ul style="list-style-type: none"> • Central and Eastern European Countries of the EU and Eastern Germany vs Western Europe; • New Guidelines = 2004 vs Old Guidelines = 1994, 1999; • Industry Manufacturing vs other industries; • Firms younger than 40 years (i.e. the median value) vs firms older than 40 years old; • Firms with less than 410 employees (i.e. the median value) vs firms with more than 410 employees; • Firms with less than 20,000 Euro aid/employee (i.e. the median value) vs firms with more than 20,000 Euro aid/ employee.
Summary of the main results	<p>The following results can be pointed out:</p> <ul style="list-style-type: none"> • Firms that received R&R aid seem to have a higher probability to survive than firms that have applied for aid but where the Commission denied the payment of aid; • Firms that received restructuring aid have a higher chance to survive than firms that received rescue aid; • Firms located in Central and Eastern European Countries or in East-Germany have a higher probability to survive than firms located in Western Europe; • Smaller firms tend to have a higher chance to survive than larger firms; • Older firms tend to have a higher chance to survive than younger firms.
Key takeaways for the evaluation	<ul style="list-style-type: none"> • No distinction is made between rescue and restructuring aid which seem to be treated equivalently. • The aim of the study is to evaluate the effectiveness of R&R aid. However, the assessment of effectiveness is based on comparisons between recipient firms and a 'control group' of non-recipient firms in 'comparable difficulties'. This control group is not created through a strict process of statistical matching between recipient firms and non-recipient firms. Therefore, the characteristics of the firms may differ widely from a group to another and may explain the differences in survival rates. • The analysis relies on a definition of firm survival that allows for considering the cases where the activity of the firm continued but where the legal entity name of the firm changed. This type of definition allows for a more reliable analysis of the impact of aid on the outcomes of the firm. • The analysis begins with a descriptive analysis that could feed into our own descriptive analysis of the cases.

Annex 2. Key characteristics of the restructuring aid cases (Public)



A fundamental part of the restructuring plans presented by the companies are the key elements identified as levers to recovery and viability. The levers to recovery adopted in the analysis are: Capacity reduction; Personnel reduction; Financial consolidation; Focusing or change on core business; Training, upgrading and organisational improvement; Cost-cutting; New investment (equipment or products); Relocation; Plant / assets sold; Plant / asset closure / liquidation; Production capacity; Closure of one or several subsidiaries; Privatization; and Other.

The most commonly instrument used was personnel reduction, detected in half of the companies' restructuring plans (50.0%). This was followed closely by focus or change on core business (48.3%), cost cutting (45.0%), and new investment in equipment or products (45.0%). The remaining instruments were used in less than 20.0% of the cases examined (**Figure 15**).

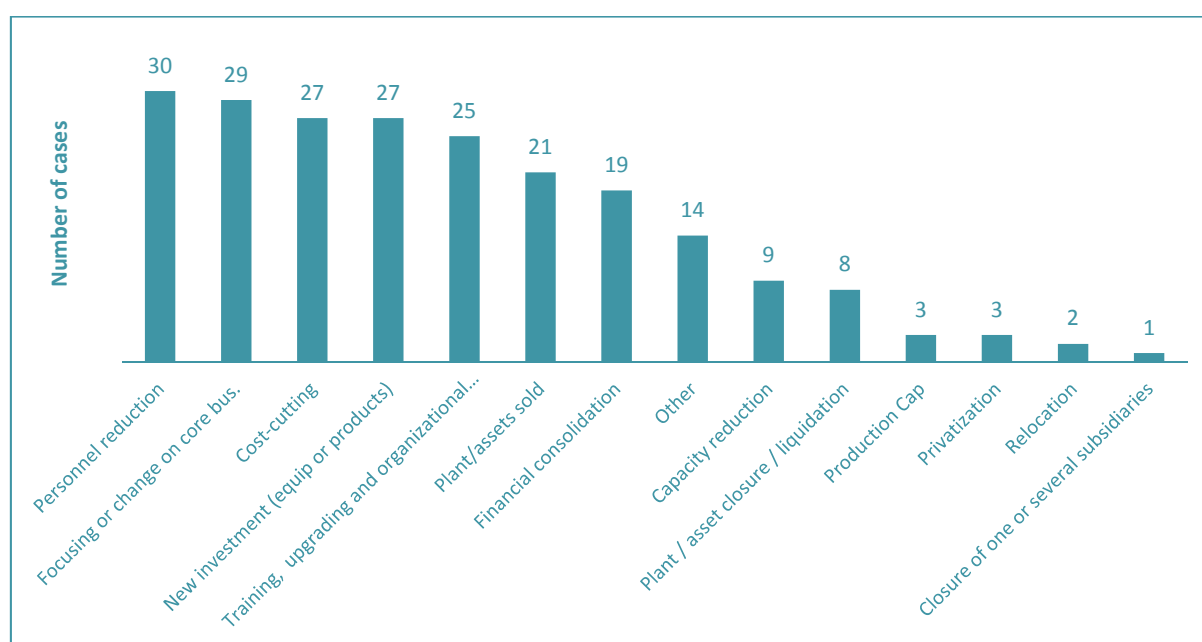


Figure 15. Key elements of the restructuring plan.

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Patterns for bankrupt cases

Geographic pattern

Figure 16 shows the survival status of companies with regard to countries. The companies identified as in a state of bankruptcy / bankrupt are located in 8 countries.

There seems to be no clear geographical pattern. Out of the total 23 cases from Poland, 4 are classified as in a state of bankruptcy / bankrupt. In Italy, 3 of the 7 cases are classified as in state of bankruptcy / bankrupt. In Lithuania, Slovakia and Cyprus, the firms that received aid did not survive. Companies from Greece, Belgium, Czech Republic, Austria, UK, Denmark, Malta, Finland and Germany are all still alive. These represent 25 % of the total cases.

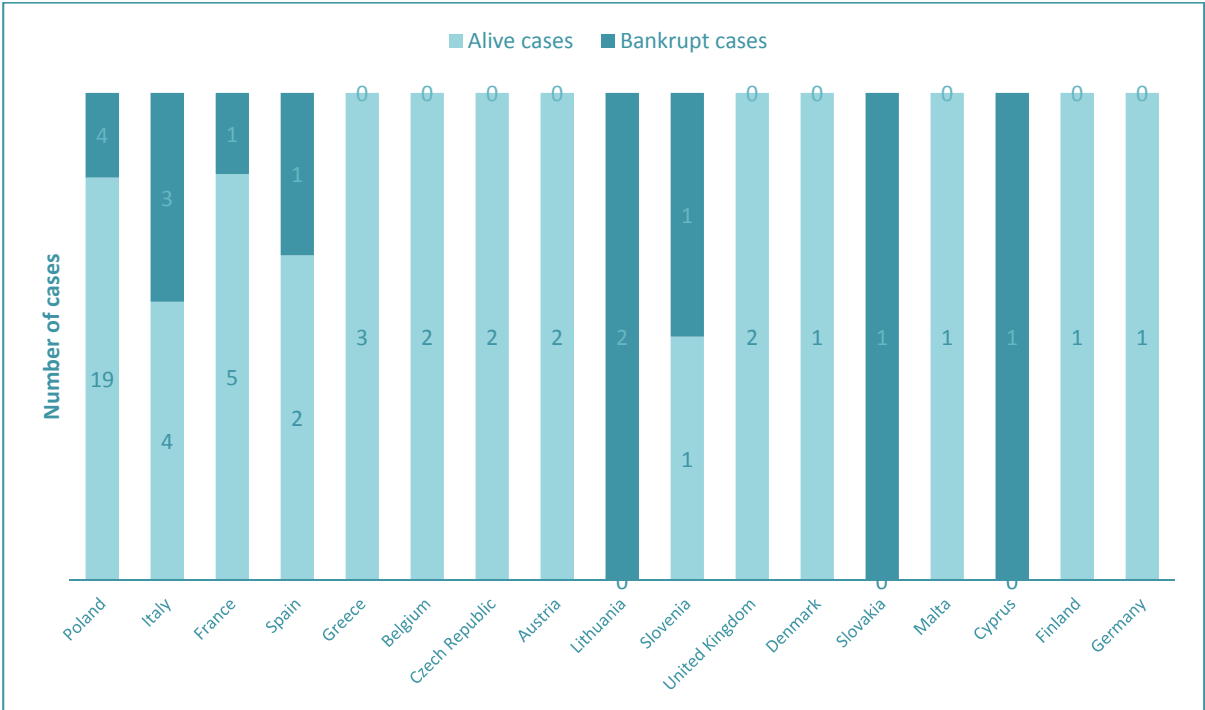


Figure 16. Survival of cases per country.

Size pattern

In general, restructuring aid was provided to large firms (77%). Just over 50% of the companies classified as in a state of bankruptcy / bankrupt are large firms – slightly less than this representation of large companies in the population. The proportion of medium size companies classified as in a state of bankruptcy / bankrupt is slightly higher than the overall proportion of medium size companies in the population (Figure 17).

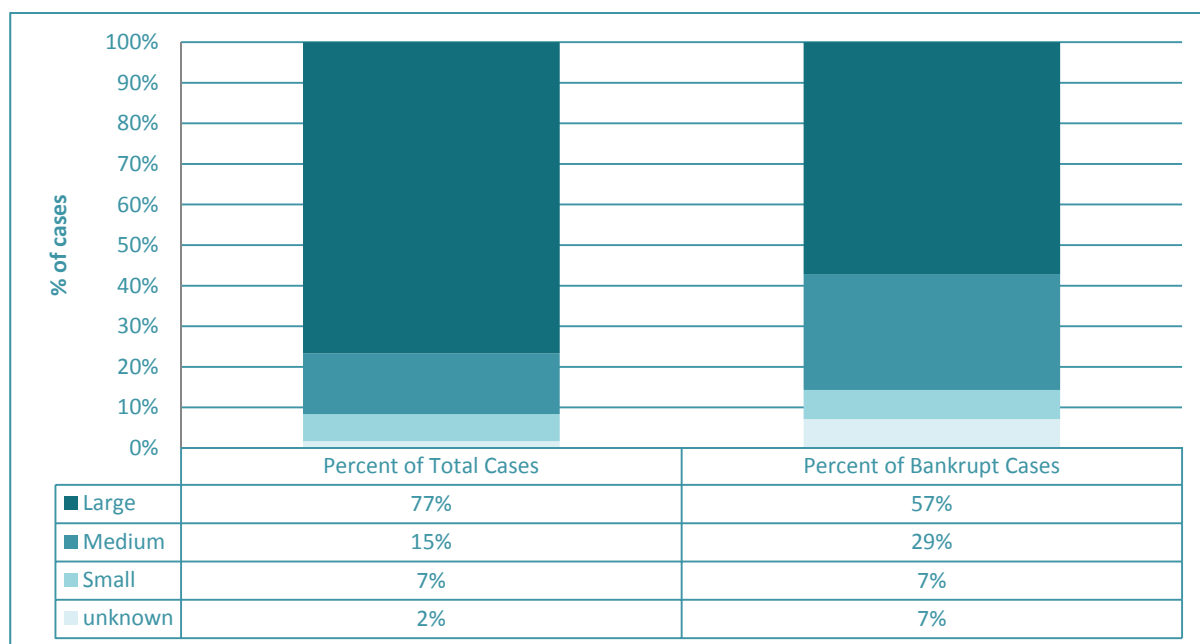


Figure 17. Size pattern.

Sector pattern

Companies classified as in a state of bankruptcy / bankrupt are in 4 of the 10 sectors in which companies that received restructuring aid are located. Out of the 34 manufacturing companies, 8 have resulted in failure (approximate 25% failure rate). The transportation sector has experienced a 36% failure rate (4 bankruptcies out of 11). The mining and quarrying sector included 1 company that received aid but did not survive, as did the wholesale and retail trade sector (although this last sector included a total of 5 companies) (Figure 18).

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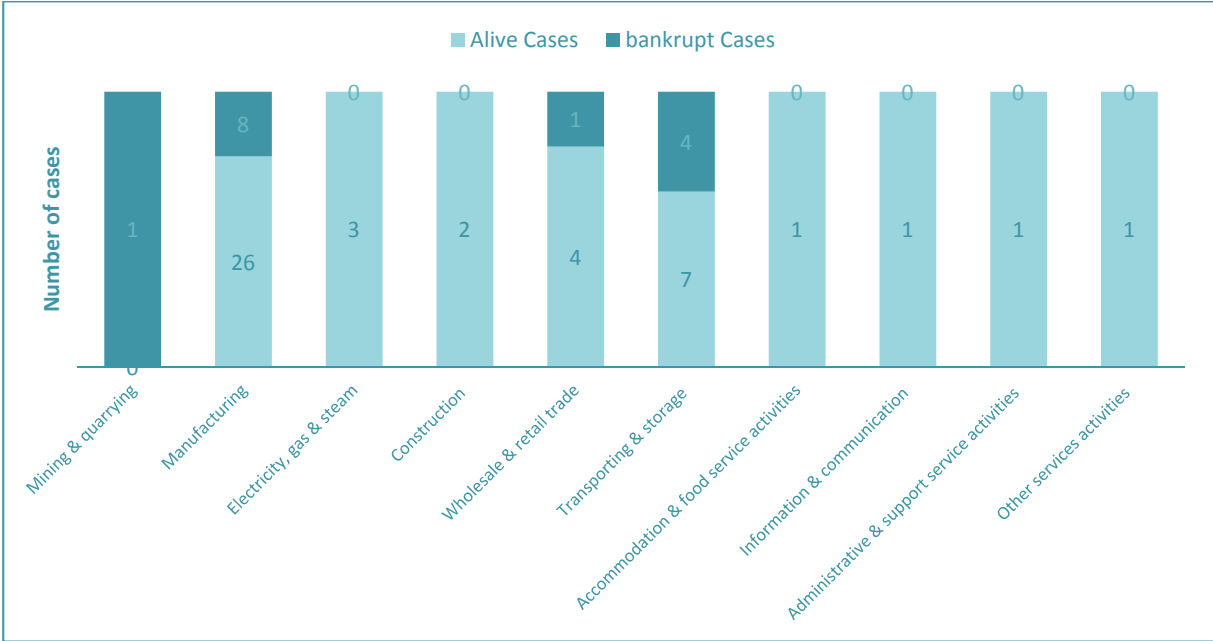


Figure 18. Survival of cases per sector.

Annex 3. Counterfactual analysis (Public)



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Side Note 3.1.: Non-feasible methods

In order to apply an IV estimator one needs valid and strong instruments for endogenous variables. In our estimation context several of the covariates might be potentially endogenous and hence would have to be instrumented using various valid and strong external (exogenous) instrumental variables. Since IV estimates are consistent but not unbiased the sample size must be rather large. In addition, the IV and treatment variable must be strongly correlated and the researcher must be able to explain what drives the exogenous treatment assignment (Angrist and Krueger 2001). The latter appears to be quite difficult, since the instrument must not be correlated with the error term at the same time, i.e. it has no partial correlation with the outcome variable and can thus be excluded from the outcome equation ("exclusion restriction"); hence, the perfect instrument would be an apparent contradiction (Morgan and Winship 1999, p. 683).¹²³ Furthermore, there are many missing observations that are randomly distributed in our data set as regards the relevant observable variable characteristics as well as the relevant period of analysis. This also precludes estimation strategies based on sufficient panel data structure and the usage of so-called internal instruments (e.g. panel-GMM-IV estimators).

An application of RDD, e.g. with firms in difficulty as a threshold variable, is unlikely to yield reliable estimates. The reason is that the definition of firms in difficulty according to the guidelines on state aid for rescuing and restructuring firms (European Commission 2004, "R&R guidelines") is too fuzzy and does not provide a clear cut threshold which would be essential for RDD estimations. RDD would be feasible in general if the decision of granting aid would be solely based on hard criteria or soft criteria if their definition would be clearer. Because such information is not available as regards identification requirements, RDD cannot be considered as an alternative estimator for the purposes of the present study. Finally, our estimation method described in the next sub-section is based on propensity score matching which draws on the same identification strategy as RDD but provides a much more general approach (Winship and Morgan 1999, p. 676).

Finally, (conditional) DiD appears to be a promising alternative candidate estimator at first glance. Combining matching methods with the DiD estimators allows to reduce the bias that is due to selection on time-invariant unobservables. However, DiD based estimates become less reliable with an increasing time lag between the treatment (year when state aid was received) and the before and after measurements (up to several years). Also, a DiD estimator is not appropriate with categorical dependent variables such as discrete choice models as all aid recipients have to be alive at the time the aid is granted by definition. In principle, one could apply an outcome variable (such as the Altman Z-score) or an ordinal scale (Altman Z-Score categories). However, a bias will occur if bankruptcy is not treated appropriately. The reason is that the counterfactual is constructed before the aid is granted. Thus, an aided firm which had the same rating compared to a firm without aid is more likely to survive than the non-aided firm. However, the aided firm is more likely to survive with a rather bad rating while non-treated firms should be *ceteris paribus* more likely to exit the market which would positively impact the average rating of the counterfactuals. Thus, a conditional DiD on that basis will bias the results of survival probability in favour of non-aided firms. This allows consideration of before mentioned bias but require (non-linear) regression techniques for ordinal dependent variables such as ordered logit models. Furthermore, combining DiD models with non-linear estimation techniques removes attractive features of DiD models and hence ultimately does not contribute to the identification of the causal effects (Lechner 2011, pp. 30-32). Moreover, statistical tests about the partial effects of (treatment) variables are not necessarily informative in the context of such models (Greene 2010). However, we provide a similar approach in the empirical analysis (section 5) based on the Altman Z-score as a dependent variable.

¹²³ Also, the main identifying assumption of IV can never be tested directly.

Table 15. Documentation of data manipulations in the group of treated firms.

Name of the firm	Changes made
Cyprus Airlines	Copy employment, liquidity ratio, solvency ratio from 2005 to 2004
Götzke Natursteinwerke	Copy revenue, profit, EBIT from 2004 to 2007 and employment from 2008 to 2007
Air Aland	Copy employment from 2008 to 2010
British Energy	Copy all variables of interest from 2004 to 2003
Macedonian Publishing	Copy all variables of interest from 2008 to 2010
Fluorite	Copy all variables of interest from 2007 to 2006
Air Malta	Copy all variables of interest from 2011 to 2010
Zakład Naprawczy	Copy non-current assets from 2010 to 2011
Fabryka Samochobow	Copy employment from 2003 to 2004
Stocznia Gdansk	Copy employment from 2004 to 2005
Zakłady Miesne	Copy employment from 2010 to 2011
Fabryka Łozysk	Copy employment from 2005 to 2009
Konas	Copy all variables of interest from 2005 to 2004
Bull	Copy solvency ratio from 2003 to 2004
Krakowskie Zakłady	Copy solvency ratio from 2004 to 2007

Table 16. Matching protocol.

Step 1	Specify and estimate the probit model to obtain the estimated propensity scores $\hat{p}(x)$.
Step 2	Restrict the sample to common support: delete all observations of treated firms with propensity scores larger than the maximum and smaller than the minimum of the propensity scores in the control group.
Step 3	Choose one observation from the subsample of treated firms and delete all other observations from that subsample.
Step 4	Restrict the subsample of control firms to firms that have the same size (small, medium, large, very large) and operate in a similar industry (measured by the 2-digit NACE code) as the chosen treated firm. In addition, delete all observations that are not in the same year as the year in which the chosen treated firm received restructuring state aid.
Step 5	Calculate the difference of the propensity scores between the chosen treated firm and the remaining control firms.
Step 6	<i>For NB=1:</i> Select the observation with the minimum distance from the remaining control group. <i>For NB=3:</i> Select the three observations with the minimum distance from the remaining control group.
Step 7	Repeat steps 3-6 for all treated firms.

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Table 17. Probit estimation: probability of receiving restructuring state aid ($D = 1$).

Regr. no.	(1)		(2)	
	Full Sample		Without Polish Bus Operators	
<i>Financial figures</i>				
<i>ln Profit</i>	-0.0295***	(0.0068)	-0.0290***	(0.0069)
<i>ln Fixed Liabilities</i>	-0.0576***	(0.0189)	-0.0475**	(0.0198)
<i>ln Current Liabilities</i>	0.0128	(0.0516)	0.0314	(0.0515)
Revenue per Employee	-0.0002	(0.0002)	-0.0002	(0.0002)
Altman Z-Score category	-0.2368***	(0.0867)	-0.2511***	(0.0916)
Public Firm	0.2324**	(0.1107)	0.2550**	(0.1155)
Liquidity ratio	0.0035	(0.0314)	0.0079	(0.0235)
Solvency ratio	-0.0092***	(0.0016)	-0.0092***	(0.0016)
<i>Firm characteristics</i>				
<i>ln Employment</i>	0.2878***	(0.0554)	0.2533***	(0.0553)
<i>ln Age</i>	-0.0118	(0.0502)	-0.0355	(0.0507)
Medium Firm	0.0805	(0.1715)	0.0084	(0.1732)
Large Firm	-0.0706	(0.1920)	-0.0829	(0.1917)
Very Large Firm	-0.0632	(0.2566)	-0.0974	(0.2581)
<i>Industry information</i>				
NACE Industry Code 0	-0.0303	(0.4859)	-0.0249	(0.4824)
NACE Industry Code 1	-0.9418**	(0.3698)	-0.9177**	(0.3681)
NACE Industry Code 2	-0.8827**	(0.3539)	-0.8684**	(0.3527)
NACE Industry Code 3	-0.7224**	(0.3638)	-0.7128*	(0.3629)
NACE Industry Code 4	-0.8956**	(0.3552)	-1.0081***	(0.3602)
NACE Industry Code 5	-0.7546**	(0.3651)	-0.7542**	(0.3644)
NACE Industry Code 6	-0.5962	(0.5096)	-0.6237	(0.5104)
NACE Industry Code 7	-0.6800*	(0.3717)	-0.6906*	(0.3707)
<i>Country information</i>				
Belgium	-0.9548**	(0.3766)	-0.9893***	(0.3739)
Cyprus	0.1383	(0.7630)	0.1410	(0.7623)
Czech Republic	-1.0654***	(0.4001)	-1.0598***	(0.3982)
Germany	-1.3527***	(0.4437)	-1.3969***	(0.4444)
Denmark	-0.5638	(0.7137)	-0.5923	(0.7150)
Spain	-1.1296***	(0.3799)	-1.2017***	(0.3797)
Finland	-0.8810**	(0.4223)	-0.9195	(0.4224)
France	-1.3984***	(0.3980)	-1.4465***	(0.3967)
UK	-1.5745***	(0.4191)	-1.5881***	(0.4188)
Greece	-0.7936*	(0.4565)	-0.8620*	(0.4559)
Italy	-1.1410***	(0.3401)	-1.2121***	(0.3386)
Malta	0.5994	(0.8888)	0.5226	(0.8843)
Poland	-0.1504	(0.3483)	-0.2564	(0.3512)
Slovenia	0.5666	(0.4799)	0.5368	(0.4784)
Slovakia	-0.8110*	(0.4598)	-0.8920*	(0.4607)
<i>Macro level information</i>				
Unemployment level last 3 years	-0.0503***	(0.0173)	-0.0383**	(0.0175)
Share of subsidies from governmental expenditures (%)	-0.0077	(0.0120)	-0.0081	(0.0120)
GDP per Capita	0.0426**	(0.0201)	0.0434**	(0.0204)
Intercept	-1.5939	(1.0030)	-1.5812	(1.0028)
McFadden R ²	0.386		0.382	
LR χ^2	479.06		433.59	
p > χ^2	0.00		0.00	
#Observations	1132417		1132413	

Standard errors in parentheses. *** (**, *) indicate a significance level of 1% (5%, 10%).

Table 18. Probit estimation: probability of receiving restructuring state aid ($D = 1$) on the matched sample with one and two nearest neighbours.

	(1)		(2)	
	N=1		N=3	
<i>Financial figures</i>				
<i>ln Profit</i>	-0.0204	(0.0212)	-0.0104	(0.0165)
<i>ln Fixed Liabilities</i>	0.0527	(0.0709)	-0.0476	(0.0534)
<i>ln Current Liabilities</i>	0.0212	(0.222)	0.0701	(0.142)
Revenue per Employee	-0.000432	(0.00109)	-0.000168	(0.000682)
Altman Z-Score category	0.0185	(0.385)	-0.300	(0.221)
Public Firm	-0.172	(0.455)	-0.137	(0.321)
Liquidity ratio	0.703**	(0.339)	0.0382	(0.0643)
Solvency ratio	-0.0155**	(0.00661)	-0.0113**	(0.00448)
<i>Firm characteristics</i>				
<i>ln Employment</i>	0.102	(0.208)	0.206	(0.149)
<i>ln Age</i>	0.119	(0.174)	-0.102	(0.127)
Medium Firm	1.064	(1.002)	-0.747	(0.563)
Large Firm	0.909	(1.093)	-0.631	(0.628)
Very Large Firm	0.476	(1.288)	-0.779	(0.788)
<i>Industry information</i>				
NACE Industry Code 0	0.135	(1.800)	-0.187	(1.306)
NACE Industry Code 1	-0.577	(1.316)	-1.327	(1.026)
NACE Industry Code 2	-0.553	(1.204)	-1.202	(0.957)
NACE Industry Code 3	-0.114	(1.190)	-0.608	(0.943)
NACE Industry Code 4	-0.457	(1.246)	-1.161	(0.970)
NACE Industry Code 5	-0.809	(1.191)	-1.186	(0.960)
NACE Industry Code 6	0.135	(1.800)	-0.187	(1.306)
NACE Industry Code 7	-0.577	(1.316)	-1.327	(1.026)
<i>Country information</i>				
Belgium	-4.668	(742.7)	-4.746	(233.6)
Cyprus	0	(.)	0	(.)
Czech Republic	-4.944	(742.7)	-5.812	(233.6)
Germany	0	(.)	-5.387	(233.6)
Denmark	0	(.)	0	(.)
Spain	-5.341	(742.7)	-5.669	(233.6)
Finland	0	(.)	-5.867	(233.6)
France	-6.638	(742.7)	-7.239	(233.6)
UK	-6.539	(742.7)	-7.443	(233.6)
Greece	-5.510	(742.7)	-6.167	(233.6)
Italy	-5.975	(742.7)	-6.594	(233.6)
Malta	0	(.)	0	(.)
Poland	0	(.)	0	(.)
Slovenia	-4.306	(742.7)	-4.815	(233.6)
Slovakia	0	(.)	0	(.)
<i>Macro level information</i>				
Unemployment level last 3 years	-0.0706	(0.0658)	-0.0909	(0.0498)
Share of subsidies from governmental expenditures (%)	-0.0473	(0.113)	-0.0728	(0.0828)
GDP per Capita	-0.00487	(0.0880)	0.0865	(0.0634)
Intercept	6.830	(742.7)	11.64	(233.7)
McFadden R ²	0.17		0.16	
LR x ²	24.42		38.24	
p > x ²	0.83		0.28	
#Observations	105		217	

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Standard errors in parentheses. *** (**, *) indicate a significance level of 1% (5%, 10%). Matched sample was achieved from matching on full sample, thus comparison should be done with column (1) in Table 3.3a.

Table 19. Mean difference tests before matching with unequal variances.

Variables	Aid receiving firms, N=57		Non-aid receiving firms, N=1132360		Results of t-tests on mean difference
	Mean	S.D.	Mean	S.D.	
<i>Financial Figures</i>					
<i>ln Profit</i>	-3.8104	7.2691	2.0825	4.3054	***
<i>ln Fixed liabilities</i>	7.6584	4.1073	5.0288	2.6484	***
<i>ln Current liabilities</i>	9.9896	2.7099	6.8662	1.9918	***
Revenue per employee	155.0788	216.9677	532.5130	21760.7750	***
Altman Z-Score category	1.3509	0.5822	2.0916	0.7455	***
Public firm	0.6667	0.4756	0.2847	0.4513	***
Liquidity ratio	0.6708	0.6469	1.5428	3.2522	***
Solvency ratio	7.9504	37.9917	33.3579	25.0619	***
<i>Firm Characteristics</i>					
<i>ln Employment</i>	6.1066	1.7635	2.6816	1.5603	***
<i>ln Age</i>	3.0551	1.1371	2.6719	0.7853	**
Medium firm	0.2982	0.4616	0.3967	0.4892	-
Large firm	0.2807	0.4533	0.1639	0.3702	*
Very large firm	0.3509	0.4815	0.0429	0.2027	***
<i>Macro level Information</i>					
Unemployment level last 3 years	9.5842	4.2290	10.7737	4.3288	**
Share of subs. from gov. exp. (%)	62.2212	11.6203	66.7845	9.7499	***
GDP per capita	2.1772	2.4827	0.4537	2.4405	***
<i>Outcome</i>					
Status 2014 Def. 1a (1=act.)	0.8246	0.3837	0.8304	0.3753	-
Status 2014 Def. 2a (1=act.)	0.8772	0.3311	0.8555	0.3516	-
Status 2014 Def. 1b (1=act.)	0.8070	0.3981	0.8143	0.3889	-
Status 2014 Def. 2b (1=act.)	0.8596	0.3504	0.8393	0.3672	-

Note: *** (**, *) indicate a significance level of 1% (5%, 10%). H₀: means are equal for both groups.

Table 20. Mean value of Altman z-scores per year, Def. 1, NB=1.

Time	Cat	Year	\bar{Z}_N	\bar{Z}_A	P-Value	Number of firms from N					Number of firms from A				
						in \bar{Z}_N	died	acqu.	miss	total	in \bar{Z}_A	died	acqu.	miss	total
1	0		1.39	1.36	0.7609	56	0	0	0	56	56	0	0	0	56
	1		1.42	1.36	0.6297	50	5	0	1	56	50	0	0	6	56
2	2		1.57	1.47	0.4758	46	7	1	2	56	49	1	0	6	56
	3		1.45	1.48	0.8644	40	7	2	4	53	42	3	0	8	53
3	4		1.48	1.47	0.9450	31	8	2	2	43	36	4	0	3	43
	5		1.46	1.63	0.3910	26	9	2	1	38	32	3	0	3	38
4	6		1.58	1.63	0.8579	19	9	2	1	31	24	2	0	5	31
	7		1.47	1.70	0.3809	15	9	2	0	26	20	4	0	2	26
	8		1.57	1.58	0.9752	7	9	1	3	20	12	2	0	6	20
	9		1.60	2.14	0.3287	5	8	2	1	16	7	3	0	6	16
	10		2.00	2.38	.	1	9	2	1	13	8	2	0	3	13

Table 21. Mean value of Altman z-scores per year, Def. 2, NB=1.

Time					Number of firms from <i>N</i>					Number of firms from <i>A</i>				
Cat	Year	\bar{Z}_N	\bar{Z}_A	P-Value	in \bar{Z}_N	died	acqu.	miss	total	in \bar{Z}_A	died	merger	miss	total
1	0	1.39	1.36	0.7609	56	0	0	0	56	56	0	0	0	56
	1	1.42	1.36	0.6297	50	5	0	1	56	50	0	0	6	56
2	2	1.57	1.47	0.4758	46	6	1	3	56	49	1	0	6	56
	3	1.45	1.48	0.8644	40	6	2	5	53	42	1	0	10	53
3	4	1.48	1.47	0.9450	31	7	2	3	43	36	2	0	5	43
	5	1.46	1.63	0.3910	26	8	2	2	38	32	1	0	5	38
	6	1.58	1.63	0.8579	19	8	2	2	31	24	1	0	6	31
4	7	1.47	1.70	0.3809	15	9	2	0	26	20	3	0	3	26
	8	1.57	1.58	0.9752	7	9	1	3	20	12	1	0	7	20
	9	1.60	2.14	0.3287	5	8	2	1	16	7	2	0	7	16
	10	2.00	2.38	.	1	7	2	3	13	8	2	0	3	13

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Table 22. Mean value of Altman z-scores per year, Def. 2, NB=3.

Time	Cat	Year	\bar{Z}_N	\bar{Z}_A	P-Value	Number of firms from <i>N</i>				Number of firms from <i>A</i>					
						in \bar{Z}_N	died	acq.	miss	total	in \bar{Z}_A	died	merger	miss	total
1	0		1.49	1.36	0.1544	168	0	0	0	168	56	0	0	0	56
	1		1.52	1.36	0.1254	154	11	0	3	168	50	0	0	6	56
2	2		1.59	1.47	0.2561	143	17	1	7	168	49	1	0	6	56
	3		1.62	1.48	0.2682	116	22	2	19	159	42	1	0	10	53
3	4		1.68	1.47	0.1395	94	24	3	8	129	36	2	0	5	43
	5		1.65	1.63	0.8836	77	24	5	8	114	32	1	0	5	38
4	6		1.51	1.63	0.5580	51	27	5	10	93	24	1	0	6	31
	7		1.67	1.70	0.8774	39	24	6	9	78	20	3	0	3	26
4	8		1.75	1.58	0.5692	20	23	5	12	60	12	1	0	7	20
	9		1.83	2.14	0.4721	12	21	5	10	48	7	2	0	7	16
	10		2.20	2.38	0.6550	5	18	5	11	39	8	2	0	3	13

Table 23. Non-Parametric Hazard Function Estimates (NB = 1, Def. 1a).

Year	Beq. Total	Bankruptcy	Net Lost	Surv. Funct.	Std. Error	N-A Cum. Haz.	Std. Error
<i>Non-aid receiving firms</i>							
2	56	5	0	0.91	0.04	0.09	0.04
3	51	2	1	0.88	0.04	0.13	0.05
4	48	2	10	0.84	0.05	0.17	0.06
5	36	1	5	0.82	0.05	0.20	0.06
6	30	1	6	0.79	0.06	0.23	0.07
7	23	1	3	0.75	0.06	0.27	0.08
8	19	2	5	0.67	0.08	0.38	0.11
9	12	1	3	0.62	0.09	0.46	0.14
10	8	0	2	0.62	0.09	0.46	0.14
<i>Aid receiving firms</i>							
2	56	0	0	1	.	0	.
3	56	1	3	0.98	0.02	0.02	0.02
4	52	2	9	0.94	0.03	0.06	0.03
5	41	2	4	0.90	0.04	0.11	0.05
6	35	0	6	0.90	0.04	0.11	0.05
7	29	0	5	0.90	0.04	0.11	0.05
8	24	2	4	0.82	0.06	0.19	0.08
9	18	0	4	0.82	0.06	0.19	0.08
10	14	1	2	0.76	0.08	0.26	0.10

Table 24. Non-Parametric Hazard Function Estimates (NB = 3, Def. 1a).

Year	Req. Total	Bankruptcy	Net Lost	Surv. Funct.	Std. Error	N-A Cum. Haz.	Std. Error
<i>Non-aid receiving firms</i>							
2	168	11	0	0.93	0.02	0.07	0.02
3	157	7	6	0.89	0.02	0.11	0.03
4	144	10	26	0.83	0.03	0.18	0.03
5	108	6	14	0.78	0.03	0.24	0.04
6	88	1	18	0.78	0.03	0.25	0.04
7	69	6	9	0.71	0.04	0.33	0.06
8	54	3	15	0.67	0.04	0.39	0.06
9	36	2	9	0.63	0.05	0.44	0.08
10	25	1	6	0.61	0.05	0.48	0.09
<i>Aid receiving firms</i>							
2	56	0	0	1	.	0	.
3	56	1	3	0.98	0.02	0.02	0.02
4	52	2	9	0.94	0.03	0.06	0.03
5	41	2	4	0.90	0.04	0.11	0.05
6	35	0	6	0.90	0.04	0.11	0.05
7	29	0	5	0.90	0.04	0.11	0.05
8	24	2	4	0.82	0.06	0.19	0.08
9	18	0	4	0.82	0.06	0.19	0.08
10	14	1	2	0.76	0.08	0.26	0.10

Table 25. Non-Parametric Hazard Function Estimates (NB = 1, Def. 2a)

Year	Req. Total	Bankruptcy	Net Lost	Surv. Funct.	Std. Error	N-A Cum. Haz.	Std. Error
<i>Non-aid receiving firms</i>							
2	56	5	0	0.91	0.04	0.09	0.04
3	51	1	1	0.89	0.04	0.11	0.04
4	49	2	10	0.86	0.05	0.15	0.05
5	37	1	5	0.83	0.05	0.18	0.06
6	31	1	6	0.81	0.06	0.21	0.07
7	24	1	4	0.77	0.06	0.25	0.08
8	19	2	5	0.69	0.08	0.36	0.11
9	12	1	3	0.63	0.09	0.44	0.14
10	8	0	2	0.63	0.09	0.44	0.14
<i>Aid receiving firms</i>							
2	56	0	0	1	.	0	.
3	56	1	3	0.98	0.02	0.02	0.02
4	52	0	10	0.98	0.02	0.02	0.02
5	42	1	4	0.96	0.03	0.04	0.03
6	37	0	7	0.96	0.03	0.04	0.03
7	30	0	5	0.96	0.03	0.04	0.03
8	25	2	4	0.88	0.06	0.12	0.06
9	19	0	4	0.88	0.06	0.12	0.06
10	15	1	3	0.82	0.08	0.19	0.09

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Table 26. Non-Parametric Hazard Function Estimates (NB = 3, Def 2a)

Year	Beg. Total	Bankruptcy	Net Lost	Surv. Funct.	Std. Error	N-A Cum. Haz.	Std. Error
<i>Non-aid receiving firms</i>							
2	168	11	0	0.93	0.02	0.07	0.02
3	157	6	6	0.90	0.02	0.10	0.03
4	145	8	28	0.85	0.03	0.16	0.03
5	109	4	14	0.82	0.03	0.20	0.04
6	91	1	18	0.81	0.03	0.21	0.04
7	72	6	10	0.74	0.04	0.29	0.05
8	56	2	15	0.72	0.04	0.33	0.06
9	39	2	9	0.68	0.05	0.38	0.07
10	28	1	6	0.65	0.05	0.41	0.08
<i>Aid receiving firms</i>							
2	56	0	0	1	.	0	.
3	56	1	3	0.98	0.02	0.02	0.02
4	52	0	10	0.98	0.02	0.02	0.02
5	42	1	4	0.96	0.03	0.04	0.03
6	37	0	7	0.96	0.03	0.04	0.03
7	30	0	5	0.96	0.03	0.04	0.03
8	25	2	4	0.88	0.06	0.12	0.06
9	19	0	4	0.88	0.06	0.12	0.06
10	15	1	3	0.82	0.08	0.19	0.09

Table 27. Test for equality of survivor function (Wilcoxon-Breslaw test).

	Definition 1a				Definition 2a			
	1 N		3 N		1 N		3 N	
	Events observ.	Events expect.	Events observ.	Events expect.	Events observ.	Events expect.	Events observ.	Events expect.
Aid=0	17	11.39	49	41.02	14	8.72	41	33.27
Aid=1	9	14.61	9	16.98	6	11.28	6	13.73
Total	26	26	58	58	20	20	47	47
χ^2	4.34		5.76		7.13		8.01	
$p > \chi^2$	0.04		0.02		0.01		0.01	

	Definition 1b				Definition 2b			
	1 N		3 N		1 N		3 N	
	Events observ.	Events expect.	Events observ.	Events expect.	Events observ.	Events expect.	Events observ.	Events expect.
Aid=0	17	10.96	49	41.02	14	8.49	41	32.92
Aid=1	9	15.04	9	16.98	6	11.51	6	14.08
Total	26	26	58	58	20	20	47	47
χ^2	4.67		6.00		7.48		8.27	
$p > \chi^2$	0.03		0.01		0.01		0.00	

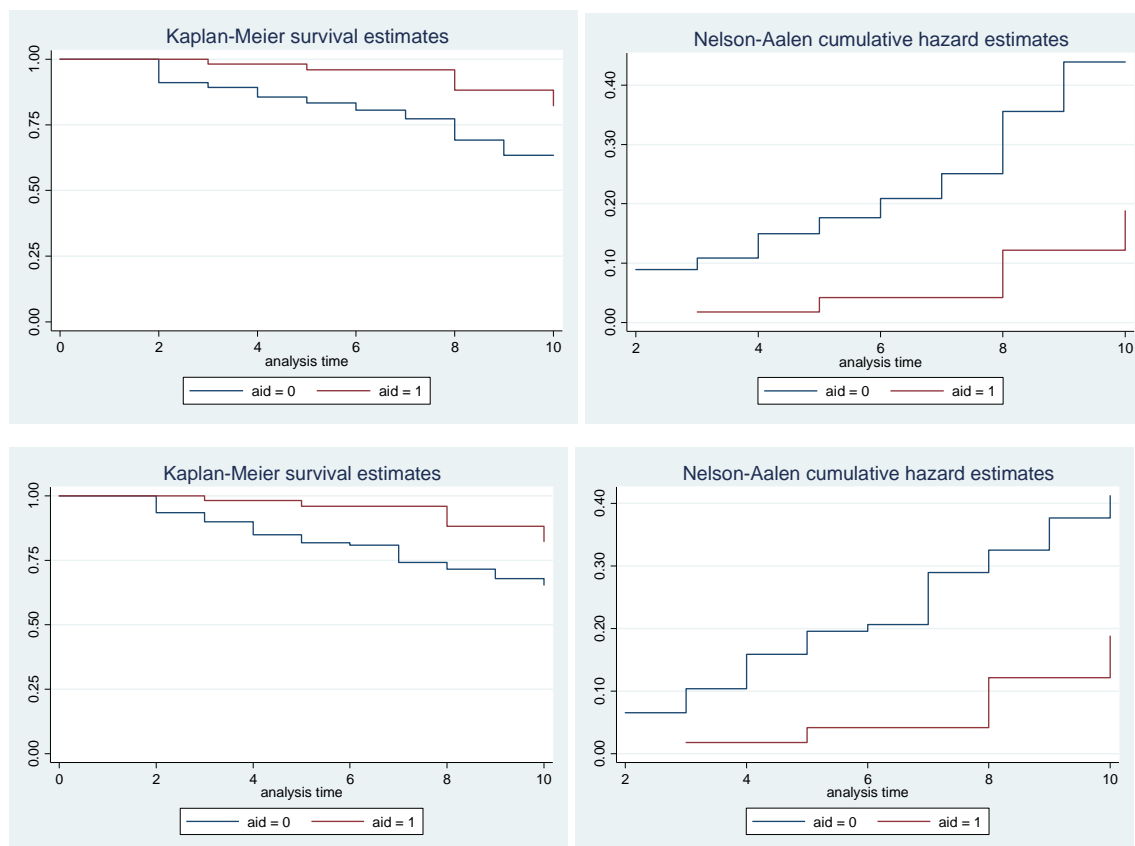


Figure 3.1: Kaplan-Meier and Nelson-Aalen estimates (Def.2a). Upper panel for NB =1, lower panel NB=3

Table 28. Information criteria for parametric models fitted with different distribution.

		Exponential	Log Logistic	Log Normal	Weibull	Gompertz
AIC	Def. 1a	315.21	295.19	290.75	297.13	304.57
	Def. 2a	279.45	266.82	262.54	268.88	274.34
BIC	Def. 1a	325.75	311.01	306.57	312.95	320.39
	Def. 2a	290.03	282.69	278.41	284.75	290.21

		Exponential	Log Logistic	Log Normal	Weibull	Gompertz
AIC	Def. 1a	316.26	294.37	289.84	298.55	305.86
	Def. 2a	280.40	267.23	262.51	270.35	275.56
BIC	Def. 1a	347.89	331.27	326.74	335.45	342.76
	Def. 2a	312.13	304.25	299.53	307.37	312.58

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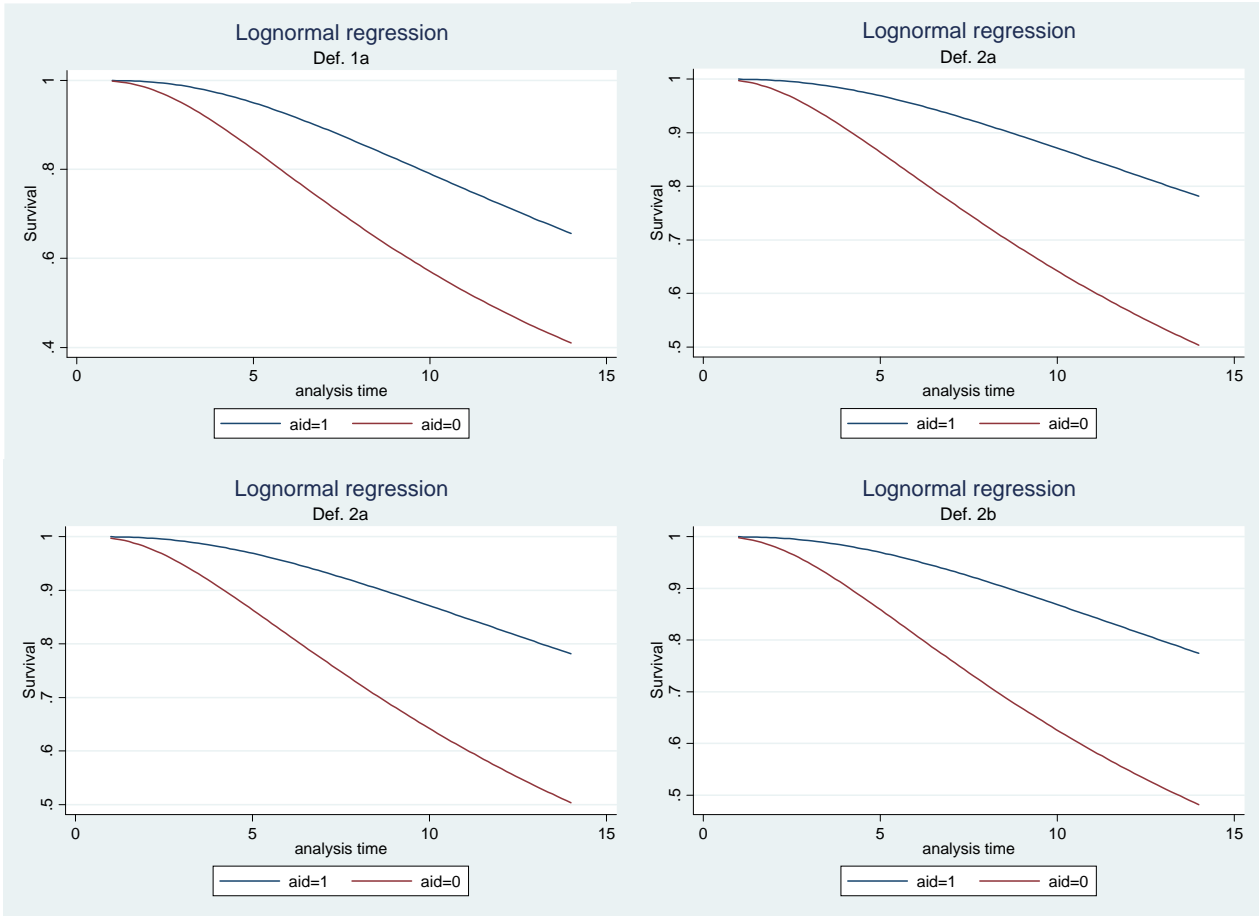


Figure 3.2: Parametric survival curves (NB 3)

Annex 4. Interview guides (Public)



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Introduction to the project team

General remarks about the case study / interviews

- These interview guidelines provide a detailed overview of the questions which are relevant in order to answer the overall research questions (based on the ToR). For different types of stakeholders, different sets of questions were identified.
- Please note that section A-B-C provides the context of the case and (in principle) be largely based on desk study and existing documentation. Of course this needs to be checked with the different stakeholders.
- Section D and E are the “key sections” for the overall assessment of the effectiveness of the aid. For these sections need insights from the different stakeholders, so these are the main priority sections (in case of limited availability of time of the stakeholders)
- Regarding the analysis: try to “double check” information and statements as much as possible in the different interviews.

Remarks about the level of confidentiality:

- Confidentiality is an important issue, as this evaluation relates to sensitive business information. Please make sure that there is a clear understanding about the level of confidentiality, in order to avoid discussion after finalisation of the case study.
- In principle, the following level of confidentiality is offered:
 - Stakeholders have the possibility to classify certain information as ‘confidential’ and not for publication. Of course this will hinder our analysis and we should try to avoid this situation.
 - Based on the interviews and documentation, the case study will be prepared. Some parts of the case study will be fully confidential and will only be read by the staff-members of the DG Competition. In the case study we only refer to ‘types of stakeholders’, no specific people or companies.
 - In the main report only a brief anonymised summary of the case study will be provided.
 - Interview notes will be made by the consortium and send to the interviewee for corrections and validation.

Company – interview guidelines

Section A: Introduction

At the beginning of the interview, we want to make sure that the interviewee is familiar with our project and their position in the process (e.g. regarding the confidentiality).

- Do you have specific questions about this project?
- Can you briefly elaborate on your current role / position within the company?
- Were you involved in the procedure for granting the restructuring aid? Can you elaborate on your involvement?

Section B: A company in difficulty: understanding the situation

In this part, it is important to get a good picture of the difficulties that the company faced before receiving the restructuring aid and to understand the “counterfactual situation” (what if...)

- Can you describe the position of the company before / during the period in which the restructuring aid was granted?
 - Please elaborate on the market conditions, economic context, developments within the firm, specific company strategies, etc.
- What were the main conditions which threatened the viability of the company? (e.g. a cash-flow problem, declining market, bankruptcy of a important client).

Determining the counterfactual

- What could have occurred if the company did not receive the restructuring aid?
- What steps had been undertaken to improve the problematic situation before filing for restructuring aid? Can you elaborate on the results of these steps?

Process towards the restructuring plan:

- Can you elaborate on the national/regional process which led to the granting of the restructuring aid?
- What was the role and position of the national/regional granting authority?
 - Can you elaborate on the ‘political dimension’ the national/regional granting authority was present in (e.g. specific policy objectives)?
- What process was followed together with the national/regional granting authority? How was your organisation involved?
- Can you elaborate on the process with the European Commission which led to the approval of the granted restructuring aid?

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- How did you experience the contacts with the European Commission? What did you experience as positive and what not?

Section C: The received restructuring aid / restructuring plan

At this point, we prefer to move to the details of the restructuring plan itself.

- Can you elaborate on the restructuring plan / received aid?
 - How was this restructuring plan set-up and developed?
 - Can you elaborate on the specific objectives formulated?
 - Can you elaborate on the specific financial analysis carried out?
 - Can you explain the underlying rationale for the restructuring aid? Was there a specific 'design' of the restructuring aid?
 - Can you elaborate on the different scenarios developed?
 - To what extent were the underlying assumptions (for the restructuring plan / scenarios) based on well-founded argumentation / analysis?
- Can you elaborate on the complementary measures required by the European Commission in order to minimise the impact of the aid on competition? Which measures were required?
- Where there specific flaws / barriers in the process?

Section D: Realization and impact of the restructuring aid

The answers in this section are important to determine the impact of the restructuring plan in terms of its viability as well as possible market distortions.

Realization of the restructuring plan/aid

- Can you elaborate on the development of the company since the restructuring aid was received? What is the current position of the company?
 - Can you elaborate on the implementation of the restructuring plan?
 - Can you elaborate on the financial situation (over time)? Can you provide specific information which illustrates the performance of the company over the last couple of years? (e.g. employment, turnover, financial ratio's, profit development, etc.) N.B.: preferably this can be linked to the restructuring plans.
 - To what extent are the financial and operational targets set in the restructuring plan realised? (e.g. net profit, cash flows, return on capital, debt, employment, etc.)?
 - Where there any unexpected outcomes?
- Looking back, how would you judge the 'quality' of the decision and used restructuring plan / scenarios?

- To what extent was the underlying plan / scenario realistic?
- To what extent were the assumptions realistic?
- Looking back, how would you assess the relevancy of the required complementary measures aimed at decreasing the impact on competition?
 - Were these measures necessary according to you?
 - Did these complementary measures [required by the EC] have negative effects on the potential growth/viability of the company?

Impact of the restructuring plan/aid

- Looking back, how would you assess the impact of the restructuring aid? Did the aid contribute to the overall viability of the company?
 - Can you illustrate / prove this “impact” with concrete examples or financial data?
 - What would have happened without the restructuring aid? What was the influence of (unexpected) ‘exogenous conditions’?
 - What conditions influenced the ‘outcomes’ of the restructuring plan?
 - Can you prove / illustrate your judgement about the impact (e.g. specific examples, specific data, etc.)?
- Can you elaborate on the effect of receiving restructuring aid on the R&D activities of the company?
- How do you see the broader ‘market distortions’ due to the granted aid? Did the aid have a negative impact on other market players? Are you aware of specific complaints?

Section E: Overall assessment of the effectiveness of the aid / R&R instrument

The answers in this part shall help us to determine the effectiveness and efficiency of the restructuring plan/aid.

- Looking back, was the support useful and successful? Can you elaborate on that?
- What do you see as the most important element of the aid instrument?
- What was crucial for the success of the restructuring plan/aid?

Closure:

- Are there other elements we need to discuss in the context of this case study?
- Do you have suggestions for other persons / organisations to talk to?
- Do you have specific documentation we might use?

Granting authority – interview guideline

Section A: Introduction

At the beginning of the interview, we want to make sure that the interviewee is familiar with our project and their position in the process (e.g. regarding the confidentiality).

- Do you have specific questions about this project?
- What was your role in the procedure for granting the restructuring aid to [the case study company]?

Section B: A company in difficulty: understanding the situation

In this part, it is important to 1) get a good picture of the difficulties that the [case study company] faced before receiving the restructuring aid; 2) understand what could have happened in the situation that the firm did not receive his restructuring aid (counterfactual situation) and 3) to understand the process of receiving the restructuring aid including the exact steps that were taken on both the national as well as EC level.

- Are you familiar with the situation which led to the granting of the aid? Can you elaborate on this situation?
- Can you elaborate on the counterfactual situation: what would have happened without the granted aid?

Section C: The received restructuring aid / restructuring plan

At this point, the interview shall move to the details of the restructuring plan itself.

- Can you elaborate on the context during which the granting of the restructuring aid took place? (e.g. political dimension)
- Was granting the restructuring aid to [the case study company] linked to any schemes, national priorities or reformation of particular sectors?

Restructuring plan in detail:

- Can you elaborate on the restructuring plan / received aid?
 - How was the restructuring plan set-up and developed?
 - Can you elaborate on the specific objectives formulated?
 - Can you elaborate on the specific financial analysis carried out?
 - Can you explain the underlying rationale for the restructuring aid?
 - Was there a specific 'design' of the restructuring aid?
 - Can you elaborate on the different scenarios developed?
 - To what extent were the underlying assumptions (for the restructuring plan / scenarios) based on well-founded argumentation / analysis?
- Where there specific flaws / barriers in the process?

Working with the EC

- Were the guidelines of the European Commission accessible to work with? Were there any specific barriers or flaws?
- How did you experience the process towards the EC on granting the restructuring aid to [the case study company]?
- Do you have indications that some administrative requirements/costs could have been avoided without endangering a good decision-making basis of the Commission?
- Was there additional information available that would have been useful in order to assess the viability aspects even better?

Section D: Impact of the restructuring aid

The answers in this section are important to determine the impact of the restructuring plan in terms of its viability as well as possible market distortions.

- Looking back, how would you assess the impact of the restructuring aid? Did the aid contribute to the overall viability of the company?
 - Can you illustrate / prove this “impact” with concrete insights?
 - What conditions influenced the ‘outcomes’ of the restructuring plan?
 - Can you prove / illustrate your judgement about the impact (e.g. specific examples, specific data, etc.)?
- What would have happened without the restructuring aid?
- What was the influence of (unexpected) ‘exogenous conditions’?
- How do you see the broader ‘market distortions’ due to the granted aid? Did the aid have a negative impact on other market players? Are you aware of specific complaints?
- Looking back, how would you judge the ‘quality’ of the restructuring plan / scenarios?
 - To what extent was the underlying plan / scenario realistic?
 - To what extent were the assumptions realistic?

Section E: Overall assessment of the effectiveness of the aid / R&R instrument

The answers in this part shall help us to determine the effectiveness and efficiency of the restructuring plan/aid.

- Looking back, was the support useful and successful? Can you elaborate on that?
- What do you see as the most important element of the aid instrument?
- What was crucial for the success of the restructuring plan/aid?

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Closure:

- Are there other elements we need to discuss in the context of this case study?
- Do you have suggestions for other persons / organisations to talk to?
- Do you have specific documentation we might use?

Other market players – interview guidelines

Section A: Introduction

At the beginning of the interview, we want to make sure that the interviewee is familiar with our project and their position in the process (e.g. regarding the confidentiality).

- Do you have specific questions about this project?
- Can you briefly elaborate on your current role / position within the company? What is the relation of the company with the [case study company]? What was the relation before the [case study company] received the restructuring aid?

Section B: Understanding the situation

In this part, it is important to 1) get a good picture of the difficulties that the [case study company] faced before receiving the restructuring aid; and 2) understand what could have happened in the situation that the firm did not receive his restructuring aid (counterfactual situation)

- To what extent are you familiar with the problems that [case study company] was facing? Can you elaborate how you understand the situation?
- Can you describe the situation before / during the period in which the restructuring aid was granted? Please elaborate on the market conditions, economic context, etc.
- Was (and how?) your company involved when the decision-makers were deciding whether to grant the restructuring aid to [the case study company]?
- How did your company deal with the situation that the competitor will receive restructuring aid? Are you aware of specific complaints?

Section C: Impact of the restructuring aid

- How do you judge that granting of the state aid? Was it a fair decision? Can you elaborate on it?
- Did the restructuring aid have a negative impact on your company? Can you elaborate on it?
- Did you experience broader 'market distortions' due to the granted aid? Can you elaborate on it?

Closure:

- Are there other elements we need to discuss in the context of this case study?
- Do you have suggestions for other persons / organisations to talk to?
- Do you have specific documentation we might use?

Labour unions – interview guidelines

Section A: Introduction

At the beginning of the interview, we want to make sure that the interviewee is familiar with our project and their position in the process (e.g. regarding the confidentiality).

- Do you have specific questions about this project?
- Can you briefly elaborate on your role during the time the restructuring aid was granted?

Section B: A company in difficulty: understanding the situation

In this part, it is important to 1) get a good picture of the difficulties that the [case study company] faced before receiving the restructuring aid; and 2) understand what could have happened in the situation that the firm did not receive his restructuring aid (counterfactual situation)

- To what extent are you familiar with the problems that [case study company] was facing? Can you elaborate how you understand the situation? How were the labour unions involved?
- Can you describe the situation before / during the period in which the restructuring aid was granted? Please elaborate on the market conditions, economic context, etc.
- Can you elaborate on the counterfactual situation: what would have happened without the granted aid?

Section C: The received restructuring aid / restructuring plan

At this point, the interview shall move to the details of the restructuring plan itself.

- Were you in any way involved/consulted in the situation before the company received the restructuring aid?
- Were you in any way involved/consulted in the situation when the restructuring plan was negotiated / designed?
- Were you in any way involved/consulted in the situation when the restructuring plan was implemented and in operation?
- How do you perceive that the restructuring plan was enforced?

Section D: Impact of the restructuring aid

The answers in this section are important to determine the impact of the restructuring plan in terms of its viability as well as possible market distortions.

- Looking back, how would you assess the impact of the restructuring aid? Did the aid contribute to the overall viability of the company?
 - Can you illustrate / prove this “impact” with concrete insights?
 - What conditions influenced the ‘outcomes’ of the restructuring plan?
 - Can you prove / illustrate your judgement about the impact (e.g. specific examples, specific data, etc.)?
- What have you found as successful about the restructuring plan/aid? What aspects had a positive impact on the company?
- What have you found as not successful about the restructuring plan/aid? What aspects had a negative impact?

Closure:

- Are there other elements we need to discuss in the context of this case study?
- Do you have suggestions for other persons / organisations to talk to?
- Do you have specific documentation we might use?

EC case handler – interview guidelines

Section A: Introduction / understanding the situation

At the beginning of the interview, we want to make sure that the interviewee is familiar with our project and their position in the process (e.g. regarding the confidentiality).

- What was your role in the procedure for granting the restructuring aid to [the case study company]
- Can you elaborate on this case from your perspective?
- Can you elaborate on the counterfactual situation: what would have happened without the granted aid?

Section B: The received restructuring aid / restructuring plan

At this point, the interview shall move to the details of the restructuring plan itself.

- Can you elaborate on the process which led to granting the restructuring aid to [the case study company]?
- What was the position of the European Commission throughout the process?
- How did you go about negotiating conditions of the restructuring aid?
- Where there specific flaws / barriers in the process?

The restructuring plan in detail:

- Can you elaborate on the restructuring plan / received aid?
 - How was this restructuring plan set-up and developed? What was the role of the EC in the development of the restructuring plan?
 - Can you elaborate on the specific objectives formulated? What was the role of the EC in formulating these objectives?
 - How did you assess the financial analysis carried out?
 - Can you explain the underlying rationale for the restructuring aid? Was there a specific 'design' of the restructuring aid?
 - Can you elaborate on the different scenarios developed?
 - To what extent were the underlying assumptions (for the restructuring plan / scenarios) based on well-founded argumentation / analysis?
- Was there any follow-up on the implementation? Where there specific criteria were used?

Section C: Overall assessment of the effectiveness of the aid

The answers in this section are important to determine the impact of the restructuring plan in terms of its viability as well as possible market distortions.

- Is it possible for you to assess the impact of the restructuring aid? Did the aid contribute to the overall viability of the company?
 - Can you illustrate / prove this “impact” with concrete insights?
 - What do you see as the most important element of the aid instrument?
 - What would have happened without the restructuring aid?
- Looking back, how would you judge the ‘quality’ of the restructuring plan / scenarios?
 - To what extent was the underlying plan / scenario realistic?
 - To what extent were the assumptions realistic?
- Based on your experience (with the specific case), what can be improved in the overall process? What would you do different?

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