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## Mergers of Equals & Unequals

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**Working Paper No. 221**

**“Mergers of Equals & Unequals”**

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# MERGERS OF EQUALS & UNEQUALS<sup>\*</sup>

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We study post-merger organizational integration, using a sample of Danish mergers. Controlling for other effects, employees from the acquiring firm fare better than those from the acquired firm. Acquiring and acquired employees mix little within workplaces during the first three years after merger. The more that either firm dominates the other in number of employees, the better do its employees fare compared to employees from the other firm. This is reminiscent of the literature on ethnic conflict and assimilation. While merged firms tend to have higher turnover of acquired workers, they simultaneously hire new workers. This suggests a possible motive of acquiring a company to lower its generous compensation costs, but in our sample acquired companies do not have higher compensation costs. Our findings suggest that integration of two different workforces is a substantial challenge to successful implementation of merger, and that it may be easier to integrate new hires than an existing acquired workforce.

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# MERGERS OF EQUALS & UNEQUALS

## I. INTRODUCTION

A merger is a dramatic event for firms and employees, for it requires the integration of two organizations into one. Indeed, the business press and management literature often argue that organizational integration is the most difficult hurdle to successfully completing a merger. There are at least two general sources of integration costs. First, explicit structures and policies must change. Second, implicit policies and social structures need to evolve. This latter effect implies that workers are likely to be less productive when they have to work with colleagues who are more different from them. Thus, merger may generate both costs of changing the organization itself, and costs of decreasing productivity during transition.

Upon merger organizational structures must be reconciled, including business units, geographical locations, and hierarchies. Occupational functions must be integrated, and overlap and redundancies managed. Human resource policies will probably have to be changed for at least one of the merging organizations, and possibly for both. Compensation levels and systems must be reconciled.

An additional cost of merger involves subtler and probably more difficult social integration issues. Managers and employees from each firm have different corporate cultures, different firm-specific human capital and may come from different industries. They could have different personalities due to different hiring criteria. Individuals have developed personal networks of social relationships with colleagues, to increase communication and efficiency. These networks will have to evolve as the structure changes. Employees have implicit contracts with their employer, on the basis of which they provide effort, invest in human capital, and have expectations about career prospects. When organizations merge, many of these factors must change.

There is therefore a strong possibility of organizational conflict, most especially between the employees of the two pre-merger firms. Such conflict may also generate favoritism for colleagues of one's former firm, only worsening the integration problem. Since these issues tend to draw lines between employees of the two former firms, a struggle similar to ethnic conflict may arise during the organizational integration. That, in turn, implies that the relative power of the two firms matters to how the merger plays out. For example, the larger firm may end up dominating the merged organization, just as majorities tend to dominate minorities in politics. Similarly, employees from the acquiring firm may have greater power than those from the acquired firm, because the acquired firm tends to sell control rights to the acquiring.

An opposing force is the potential for a firm to gain from organizational integration. It is often argued that a more diverse workforce increases productivity, due to greater creativity and better decision making. Merging two organizations, especially ones with different approaches to business and possibly even in different industries, might lead to organizational synergies as the two organizations learn from and collaborate with each other. Which effect of these two dominates? This is an open empirical question, and the focus of this paper.

Organizational integration post-merger has been studied in the social psychology literature (Haveman & Cohen 1994; McEntire & Bentley 1996; Stovel & Savage 2005), but not much within economics. We attempt to shed some light on this issue by studying a sample of firms that merged in Denmark during the 1980s and 1990s. By using matched worker-firm data for the entire Danish economy over this period, we are able to examine what happens to the employees from two firms that merge. We compare the post-merger turnover of employees from the acquiring and acquired, and also analyze the effects of type of merger and differences in industry between the two merging firms.

Overall, there is greater turnover for acquired employees than for acquiring employees. This is consistent with the idea that the acquiring firm has greater power than the acquired firm post-merger. We also find that the more that one firm dominates the other in terms of number of employees, the more successful are its employees post-merger. The majority does tend to drive out the minority after the merger, consistent with our notion of ethnic conflict between the two groups. Interestingly, even though acquired employees are leaving the firm more post-merger, the merged firm is simultaneously hiring new employees in the same plants. This is inconsistent with economies of scale or scope leading to a smaller optimal workforce after merger. It also does not seem to be motivated by a desire to eliminate an overpaid acquired workforce, since acquired workers are actually paid less than acquiring workers. Finally, when there is less overlap in operations between the two firms (different primary industry), there is greater turnover of acquired employees. Our results are most consistent with the view that organizational integration creates political costs inside the firm. These may well be one of the primary reasons why researchers find that a high percentage of mergers fail.

## **II. THEORY**

We examine the effects of merger on the workforces of the acquiring and acquired firms. Most models of mergers generate at least implicit consequences for the total size of the merged firm, but few generate implications about the composition of the merged workforce. That is our focus. To think about the question, we consider the role of belonging to the acquiring or acquired firm; the extent of overlap in operations between the two firms; and the extent to which one or the other dominates the merged enterprise. In our discussion, we refer to a merger of firms A (the acquiring) and B (the acquired).

### ***Acquiring v. Acquired Employees***

An empirical regularity in the small literature on the effects of merger on workers is that those from the acquiring fare better than those from the acquired firm (Brown & Medoff 1988; Margolis 2003). Several possible models of post-merger organization generate this result. In our empirical work, we will examine how workers from the acquiring and acquired fare post merger, controlling for other factors.

For example, suppose that A buys B to increase capacity (economies of scale). We would expect A to try to implement its own technology rather than B's (since A is the acquiring). This implies that A's employees should be better adapted to the merged firm than B's, in terms of skills and firm-specific human capital.

Alternatively, suppose that A buys B to improve B's governance. B was allocating some rents to workers, perhaps in long-term contracts where at least some elements are implicit (Bertrand & Mullainathan 2003). These contracts may or may not be ex ante optimal for B's management and workforce, but after the merger, A's management can expropriate some of the rents. Once more we would expect B's workers to fare relatively less well than A's post-merger (Shleifer & Summers 1988).

Finally, the acquiring firm's employees may have greater organizational power than the acquired firm's employees, due to their status as acquirer and the ensuing merger negotiation. (The opposite is possible as well, of course.) If so, we would expect that acquiring employees fare better after merger than acquired employees.

### ***Dominance***

A merger of two organizations can be viewed as an assimilation problem, as in the ethnic conflict literature (see, e.g., Caselli & Coleman 2006, Monatalvo & Reynal-Querol 2005). Two groups must find a way to work together. A member of the dominant group finds it easier to fit in than a member of the minority group, so minority group members suffer. Might a similar effect occur in mergers? We present a simple model, based on Lazear (1996), to explore this idea.

Firms X and Y merge (either can be the acquiring firm). Consider a worker from firm X with skill  $\lambda$  (which may include innate abilities and accumulated human capital). The worker is paired with a colleague, c with skill  $\lambda_c$ . Output Q is determined according to the production function  $Q = \tau \cdot \lambda \cdot \lambda_c$ , where  $\tau$  is a shifter of production. A worker from firm X can be paired with a colleague from firm X or a colleague from firm Y. The function  $g(\lambda_c)$  with the appropriate subscript (X or Y) represents the distribution of  $\lambda$  among the relevant group of colleagues. Workers may earn quasi-rents from their employers, but pay varies positively and monotonically with expected productivity.

There are two cases of interest when workers of different types are mixed together. One possibility is that diversity promotes higher productivity. For example, it is frequently argued in the management literature that greater workforce diversity may increase innovation. In addition, two firms from different industries might enjoy economies of scope. Thus synergies could be driven by differences in product lines, technologies, geographical coverage, or customers, or from combining workforces with difference characteristics (e.g., scientific expertise).

The more pessimistic case of interest occurs when workers are more productive if they are paired with a similar colleague – diversity hurts productivity. In the context of a merger, there are several reasons why this might be so. Workers may be more productive when they collaborate with colleagues from the same firm because the innate traits they were recruited for, their human capital investments, their culture, and their social network are more similar. Even if such effects are not important compared to the benefits of diversity, integra-

tion costs in implementing the merger might have a similar effect. That is, the costs of getting the two workforces to function smoothly together (e.g., changing organizational structures, job titles, performance evaluations, compensation systems, explicit and implicit work rules, and corporate culture) may be so large that they outweigh any benefits from diversity. Regardless of underlying cause, this case leads to implications that are the opposite of the first case.

This question of the effects of post-merger integration is our primary interest. Since there are two interesting possible effects that go in opposite directions, our empirical results may be seen as a horse race between these competing views of workforce diversity, at least post-merger. In this section, we develop the model presuming that the second case – workers are more productive when paired with more similar colleagues – is the stronger effect. This stems from the economic literature on ethnic conflict and assimilation cited above. However, in the end which effect dominates is an empirical question.

To model the second case, assume that  $\tau(X) = 1$  if the worker is paired with a colleague from the same pre-merger firm  $X$ , and  $\tau(Y) < 1$  if the worker is paired with someone from the merging firm  $Y$ . Modeling the first case would simply amount to assuming that  $\tau(Y) > 1$ .

The probability that the worker is paired with a colleague from same firm =  $p(\Delta)$ .<sup>1</sup> This probability depends on the relative number of workers from each firm. The larger is the worker's firm compared to the firm that it merges with, the more likely is it that the worker finds himself paired with a colleague from his original firm. Call this firm  $X$ 's dominance ( $\Delta$ ) over the other firm. A natural measure of dominance is the proportion of employees from that worker's firm:

$$\Delta = \frac{N_X}{N_X + N_Y}.$$

Thus,  $\partial p / \partial \Delta > 0$ .

Expected productivity  $\bar{Q}$  for a worker from firm  $X$  is:

$$\begin{aligned} (1) \quad \bar{Q} &= p \cdot \int \lambda \lambda_c g_X(\lambda_c) d\lambda_c + (1-p) \cdot \int \tau \lambda \lambda_c g_Y(\lambda_c) d\lambda_c \\ &= p \lambda \bar{\lambda}_X + (1-p) \tau \lambda \bar{\lambda}_Y. \end{aligned}$$

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<sup>1</sup> We do not model the pairing of colleagues. One extreme would be to pair colleagues with each other randomly, as in Lazear's model of ethnic assimilation. That is clearly unrealistic, since the firm would pair workers strategically to reduce conflict. A more realistic approach would be to use positive assortative matching, whereby the firm pairs the most similar workers together first. Both of these assignment rules would imply that  $p$  rises with  $\Delta$ . All that we need for our argument is that a worker may be paired with a colleague from the other firm as a result of merger, and that the likelihood of such a pairing is lower, the more that the worker's firm dominates the merged firm.

Productivity before the merger =  $\lambda \bar{\lambda}_X$ , and is larger than  $\bar{Q}$  unless average productivity of workers at the other firm is much higher than it is at the worker's original firm. Therefore, productivity generally falls as a result of merger. This captures the idea that organizational integration is a cost of merger. The merger must have some other justification, such as economies of scale or scope, which we do not model since our interest is in the costs of organizational integration caused by merger. Of course, if the synergies from organizational integration were large enough, this prediction would be in the opposite direction.

Each worker has the option of working at the merged firm, or quitting and working elsewhere. Assume that workers earn quasi-rents at their pre-merger firm. If productivity falls after a merger, the probability of efficient worker turnover rises, since the wage equals expected productivity. Thus, comparative statics on  $\bar{Q}$  generate our empirical predictions about wage growth and turnover. (We include predictions about post-merger wage growth for completeness, but our empirical work studies turnover exclusively.)

We can now see the effect of dominance on workers from each firm. Expected productivity is increasing in the extent that the worker's pre-merger firm dominates the other firm:

$$\frac{\partial \bar{Q}}{\partial p} = \lambda \bar{\lambda}_X - \tau \lambda \bar{\lambda}_Y = \lambda (\bar{\lambda}_X - \tau \bar{\lambda}_Y).$$

Unless expected productivity is much higher at the acquired firm, this expression is positive. Being a member of the dominant group improves expected productivity, because the worker is more likely to be well matched to the skills of his colleague. Similarly, being a member of the minority group reduces expected productivity. This prediction is quite similar to that in the ethnic conflict literature, where the dominant group is more successful and thus grows more dominant, and vice versa. It is also similar to tipping-point models of market share in industries with positive network externalities.

This model predicts the following: the more dominant is the worker's pre-merger firm, the higher should be that worker's wage growth, and the lower should be turnover, post merger. If the worker is from a less dominant firm, wage growth should be lower, and turnover should be higher. These effects should hold for workers from *both* the acquired and acquiring firms. While workers from the acquiring may have an advantage, that advantage can be reinforced or attenuated to the extent that the acquiring is larger or smaller in size compared to the acquired firm.

### ***Industry Overlap***

The discussion of dominance emphasizes the costs of integrating workers with different backgrounds. Dominance matters because differences in firm-specific human capital, corporate culture, personnel policies, and implicit contracts must be reconciled. An even more extreme integration problem occurs if the two firms operate in different industries. In that case, workers are likely to have industry-specific skills and human capital. Similarly, the more different the two businesses are, the more likely is it that explicit policies and implicit con-



tracts are different. Thus, a merger of firms in different industries is likely to exacerbate the organizational conflict modeled above. (Of course, organizational synergies may be stronger if the merging firms have less overlap in operations; once more the alternative story has the opposite implication.)

To see the effect of such overlap, assume now that firm X operated in a single industry pre-merger, and firm Y operated in two industries, one of which was the same as firm X's industry. Thus there is some but not complete overlap of industry across the two firms. Workers who were employed in different industries are even more likely to be difficult to integrate with each other. Each group is likely to be more productive when paired with workers with similar backgrounds and training, which should be more similar if they have worked in the same industry prior to merger.

We can augment the model to account for this by breaking  $1-p$ , the probability that the worker is paired with a colleague from firm Y, into the probability that the colleague in firm Y is from the same industry ( $q_s$ ) and the probability that the colleague is from a different industry ( $q_d$ ). Thus  $q_s + q_d = 1-p$ . In addition, let the shifter  $\tau$  be a function of whether the colleague is from the same industry or a different one:  $\tau = \tau(\bullet, s \text{ or } d)$ . If workers are less productive when paired with less similar colleagues, then  $\tau_s = \tau(\bullet, s) > \tau(\bullet, d) = \tau_d$ . Equation (1) becomes:

$$(2) \quad \bar{Q} = p \cdot \int \lambda \lambda_c g_X(\lambda_c) d\lambda_c + q_s \cdot \int \tau(Y, s) \lambda \lambda_c g_{Ys}(\lambda_c) d\lambda_c + q_d \cdot \int \tau(Y, d) \lambda \lambda_c g_{Yd}(\lambda_c) d\lambda_c$$

$$= p \lambda \bar{\lambda}_X + q_s \tau_s \lambda \bar{\lambda}_{Ys} + q_d \tau_d \lambda \bar{\lambda}_{Yd}.$$

Less overlap between operations implies that  $q_s$  is smaller. Since  $q_s + q_d = 1-p$ , we have:

$$\frac{d\bar{Q}}{dq_s} = \tau_s \lambda \bar{\lambda}_{Ys} - \tau_d \lambda \bar{\lambda}_{Yd} = \lambda (\tau_s \bar{\lambda}_{Ys} - \tau_d \bar{\lambda}_{Yd}).$$

Once again, unless expected productivity is very different across the two comparison groups (colleagues from the same or different industry), we have an unambiguous result: expected productivity is lower, the smaller is the overlap between firms X and Y. We therefore predict that less overlap (greater difference) between the firms' industries will imply lower wage growth and higher turnover.

### ***Economies of Scale & Scope***

Economies of scale and scope also have implications for the effects of overlap in operations. A merger of two firms from different industries may be based on a desire for economies of scope. If that is the case, then both types of workers may be needed to implement the new strategy (despite integration costs), resulting in lower turnover. Similarly, a merger of two firms in the same industry might imply economies of scale, resulting in excess workers and higher turnover. These economies of scope and scale effects would imply the opposite prediction of the one in the last sub-section: less overlap (greater difference) between the firm's industries will imp-

ly higher wage growth and lower turnover. Therefore, the actual effect of overlap or difference in operations is an empirical question. Higher post-merger turnover in firms from different industries would be good evidence in favor of the idea that organizational conflict is an important practical issue.

### ***Favoritism***

We have made predictions about the effects on the employee's wage growth and turnover of being from the acquiring or acquired firm; of the dominance of his pre-merger firm; and of difference or overlap in operations pre-merger. Many of our arguments are based on the importance of politics to organizational integration. Favoritism (Prendergast & Topel 1993, 1996) reinforces all of these predictions. All three effects imply that workers from A and B will to some extent be at odds with each other. That generates incentives for both types to exert favoritism for workers from their side. Such favoritism should be more successful for employees from the acquired firm, if they have greater power due to acquirer status. Favoritism is also more likely to be exerted successfully on behalf of a worker if that worker is from the dominant group. Finally, workers may have incentives to form alliances – a form of favoritism – with those in the same industry (not just the same firm), if the post-merger firm involves several lines of business. This would reinforce any conflict created by less overlap in operations between the two firms.

## **III. DATA**

The data were provided by Statistics Denmark, the central statistics agency for the Danish government. Statistics Denmark maintains several databases that can be matched and merged. For the purposes of this paper, two were combined. Both are snapshots collected in November each year. First, a sample of private sector firms from 1980 through 2001 was constructed from a database of all Danish firms. The data include codes for each business location within the firm (plants), and the industry that each plant is in. Information on plants was used to define the sample of merged firms. Unfortunately, Statistics Denmark lacks data on financial or business performance of firms, so we are unable to analyze performance after merger, except by looking at employment growth. The firm data were matched with information on all employees in each plant. Data on individuals include education codes, age, gender, wages, and experience.<sup>2</sup> Since individual identification codes do not change when a worker changes a firm or leaves the labor market, we were able to measure tenure with the employee's employer.

### ***Identifying Mergers***

Statistics Denmark does not flag mergers, so the first step was to identify a merger sample.<sup>3</sup> This was done by looking for cases where plants from the same firm changed firm code from one year to the next. This

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<sup>2</sup> Labor market experience to 1964 is calculated by Statistics Denmark and truncated at that date.

<sup>3</sup> Hostile takeovers are virtually unheard of in Denmark.

identified mergers because plant codes did not change if a plant changed ownership, even if the firm code did change. Therefore, it was possible to follow plants as they changed ownership over time. There are several possibilities:

- *Firm name / code change*: All plants in a single firm changed to a new firm code in the same year, but no plants from any other firm changed to the new firm code at the same time. Such cases were rare, and dropped from the sample.
- *Single merger*: A firm merged with another firm (partially or fully). This would be a case where all (or some) plants from one firm changed to the same *existing firm code* in the same year. For example, part or all of firm B might merge with all of A, with the merged firm called A.
- *Multiple merger*: A firm merged with more than one firm (partially or fully). This would be a case where all (or part of all) plants from multiple firms changed to the same *existing firm code* in the same year. For example, part or all of firms B and C might merge with all of A, with the merged firm called A.
- *Mutual merger*: Two or more firms merged together to form a new firm. This would be a case where all plants from two or more firms changed to the same *new firm code* in the same year. For example, firms A and B might merge, forming the new entity C. These were easy to identify, since a new firm code appeared and typically the old firm codes disappeared (though it is possible that some vestigial part of A or B remained outside of C).

One objective is to study post merger integration of workers of acquiring and acquired firms, our first step was to clearly identify *acquiring* and *acquired* firms. This was obvious for single and multiple mergers, where firm A absorbed one or multiple firms with the resulting firm still called A. However, identifying acquiring firms was impossible in the case of mutual mergers. In the data, we observe a new code for the post-merger entity, but do not have any information on which firm was acquiring the other. We therefore excluded these mergers from our analysis.<sup>4</sup> We also exclude multiple mergers (9% of mergers) because the dynamics of organizational integration are likely to be substantially different when three or more firms merge at once.

The set of mergers was narrowed further to the most unambiguous cases. We filtered the sample to include only mergers for which two years of pre-merger data was available for both firms, and three years of post-merger data for the combined firm (thus limiting our sample to mergers taking place from 1982 through 1998). This enables us to study the dynamics of employees pre- and post-merger. We dropped cases where a firm went through more than one merger in different years during the sample window. Finally, all mergers where any pre merger firm had less than 5 employees were dropped. This left a sample of 631 relatively uncomplicated mergers with 16,065 acquired and 93,379 acquiring workers present at the time of the merger.

Those 631 mergers are evenly distributed over the sample period, with a slight increase in 1991. About 90% are full mergers (the merged firm included all plants from A and B), and 10% are partial mergers (firm A merged with only some plants from firm B). In the analyses we will look for any evidence of cherry picking of workers by implementing a partial merger.

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<sup>4</sup> In previous versions of this paper, we included mutual mergers, and assumed that the larger firm was the acquirer. We also included multiple mergers. Our results were not qualitatively affected by including or excluding these observations.

### Summary Statistics

Table 1 shows the distribution of industries for the acquiring and acquired firms. For this table industry is defined as the modal 1-digit industry calculated across all employees in the firm (recall that industry is defined by Statistics Denmark at the plant level, so all employees in the same plant are in the same industry). The two most important industry groups are Retail, Hotels and Restaurants; and Manufacturing, which together represent about 70% of observations. The diagonals in the table indicate that about 90% of mergers are between two firms in the same 1-digit industry. This provides a measure of whether the merger is related or not. A merger between two firms in the same industry is a horizontal merger. A merger between two firms in different industries might be for diversification, vertical integration, or economies of scope, among other reasons. While Table 1 presents statistics for industries defined at the 1-digit level, in our analyses we will define mergers at the 2-digit level for greater precision. Measured that way, the percentage of unrelated mergers increases somewhat, but not substantially.

To proxy for the extent to which the merger is between related or unrelated firms, or of overlap in pre-merger operations, we define the variable *Industry Overlap*:<sup>5</sup>

$$\text{Industry Overlap} = \frac{\# \text{ of employees from my industry}}{\# \text{ of employees in the firm}} \text{ from acquiring \& acquired firms.}$$

This variable is measured for each employee. All employees in a single plant are defined as working in the same (2-digit) industry. Consider a merger of firms A (which has 2 plants,  $A_1$  and  $A_2$ ) and B (with 1 plant). Suppose that A's plants are in the same industry. If B's plant is also in that industry, overlap equals 1. If B's plant is not in that industry, overlap is lower. In cases where a firm has plants in different industries, this variable measures the extent to which the merger is related or not, from the perspective of the individual worker. For example, suppose that plant  $A_1$  is in the same industry as B, but  $A_2$  is in a different industry. In that case,  $A_1$  workers are in a horizontal merger with B workers, but  $A_2$  workers are not.  $A_1$ 's and B's workers will have greater overlap than  $A_2$ 's.

Table 2 shows demographics of employees from acquiring firms, acquired firms, and firms that do not merge. Characteristics are averaged by firm. Previous studies (Margolis 2003) found some differences in the demographics of employees from acquiring and acquired firms. In our Danish sample, employees look virtually identical in the two firms. Acquiring employees earn more per hour, and are a little more likely to have a college degree, but both differences have little economic significance. The two substantive differences are that acquiring employees are also more likely to work full time (37.5 or more hours per week) by a non-trivial margin, and that acquiring firms typically have about six times more employees than acquired firms. Though not shown in the table, acquiring firms average about 5 plants, while most acquired firms have only 1 plant. Overall, there is little

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<sup>5</sup> We are investigating measuring horizontal mergers using Danish industry input-output tables (Hortaçsu & Syverson 2007), and will report on this in the next draft.

indication that Danish firms merge for reasons having to do with differences in the two labor forces. We will look at the question of differences in compensation more carefully below.

In the theory section we presented a simple model in which integration may be more or less effective to the extent that workers are more or less similar. In one view, diversity (defined broadly) creates synergies. In the opposite view, diversity makes integration more difficult to implement. Whether either effect matters is an empirical question. To capture the ideas of the model, we defined three variables that we now describe. The first is Industry Overlap, described above. That variable provides a measure of the extent to which the merger is related or unrelated. It also captures the idea that differences in industry is one firm of workforce diversity that may be relevant to organizational integration.

The other two variables correspond to the first part of the model, measuring the relative size of an employee's coalition. The first is *Firm Dominance*, which equals the number of workers from my previous firm divided by the total number of workers in the firm at the time of merger:

$$\text{Firm Dominance} = \frac{\text{\#of employees from my previous firm}}{\text{\#of employees from acquiring \& acquired firms}}.$$

This is a straightforward measure of the extent to which one firm's workforce dominates the other. A higher ratio implies greater dominance. Table 3a presents summary statistics on this measure. Acquiring workers have average dominance of about 70%, compared to about 30% for acquired workers. This reflects the fact that acquiring companies tend to be much larger than acquired companies, though there are exceptions. Firm dominance is not symmetrically distributed; the median is above 70%. Thus the lower tail of the distribution is spread out.

While firm dominance represents the relative size of each group in the merged firm, we are also interested in capturing whether workers from different pre-merger firms work in close proximity after the merger. We may face two opposite scenarios: (i) acquired and acquiring workers stay in the plants they belonged to before the merger and there is no real organizational integration, or (ii) acquired and acquiring workers move across plants, and plants reflect a mix of acquired and acquiring workers over time. We construct the variable *Plant Dominance*, which equals the number of workers in my current plant, from my previous firm, divided by the total number of workers in my plant after the merger:

$$\text{Plant Dominance} = \frac{\text{\#of employees from my previous firm}}{\text{\# of employees from acquiring \& acquired firms}} \text{ in my plant.}$$

Plant dominance cannot be calculated until the merger is executed and workers start moving between plants. We define plant dominance 1, 2 and 3 years after the merger. A higher ratio implies more dominance at the plant level. By contrast, firm dominance is a constant over time, measuring the starting conditions at merger. Table 3b provides summary statistics on plant dominance. Three years after merger, 96% of an acquiring worker's colleagues in the same plant are also from the acquiring firm; 86% of an acquired worker's colleagues in the same

plant are from the acquired firm. This suggests something that we will demonstrate more fully below: there is not a great deal of mixing of workers within plants after merger.

Acquired workers are minorities at the firm level (their firm dominance tends to be low), but majorities at the plant level (their plant dominance tends to be high). If dominance matters at all, it will be interesting to see which level is more important. Plant dominance measures actual integration of day-to-day work. If conflicts between workforces in work methods, culture, human capital, etc. are important, we would expect plant dominance to play an important role. Firm dominance is more likely to capture the effects of overall policies such as strategy, technology, evaluation and promotion, and compensation. It is also likely to capture relative power in governance. Finding that firm dominance is more important than plant dominance would suggest that workforce conflicts are resolved primarily at higher levels and through firm policies.

## IV. RESULTS

### *Post-Merger Integration*

Tables 4-7 explore the dynamics of organizational integration. Table 4a analyzes overall employee movements after merger, dividing the sample into full and partial mergers. Table 4b repeats this analysis, but dividing the sample into mergers between firms with the same modal industry, and between firms with different modal industries. Consider first Table 4a. The three sets of rows show employee movements in the first full year after merger; the second and third sets of rows show the same movements in the second and third years. For example, 11.9% of acquired employees change plants in the year after merger for full mergers, and 7.2% do so for partial mergers.

There is non-trivial movement between plants; roughly 10% move in the first year, and roughly 15-20% in the second and third years. Thus, firms are moving employees around. It is not clear why overall movement would be lower in the year after merger. Perhaps some movements were accelerated in anticipation of the merger, or the firm to some extent freezes movements during the implementation phase of the merger, while it determines how to set new policies.

More of this movement is between plants that were in the same firm pre-merger.<sup>6</sup> In the first year, acquired employees are twice or more as likely to move to a plant that was in their old firm than they are to move to a plant in the firm they merged with. Acquiring employees are roughly ten times more likely to move within their old firm, instead of moving to an acquired plant. Some of this difference is mechanical. As noted above, acquiring firms have an average of 5 plants, compared to 1 for acquired firms. However, the relative likelihood that a worker moves between firms is lower than if workers were randomly moved to plants. This is generally

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<sup>6</sup> The rate of movement between plants, but within the same pre-merger firm, was calculated only for employees with two or more plants surviving the merger.

true for both acquiring and acquired employees. This does suggest that workers tend to be more productive if paired with colleagues from their old firm.

A corollary of this pattern of moves is that acquiring workers only rarely end up moving to an acquired plant; 99% stay within their pre-merger company. By contrast, acquired workers are much more likely to have to work with new colleagues from a different firm; 6-10% end up doing so. Therefore, any costs to an individual worker from mixing with colleagues from a different firm fall disproportionately on acquired workers. If, on the other hand, integration is also difficult across plants within the *same* firm, we should expect to see no difference between the effect of mergers on acquiring and acquired employees.

Exit rates suggest that acquired workers do indeed bear a disproportionate burden from merger. They exit at a rate of about 6% more than acquiring workers. Finally, Table 4a also shows that both types of workers are sometimes deployed to newly created plants after merger. Acquiring workers are more likely to move to such new plants, which is the opposite of what would be expected from random reassignment. Summing up, there is a bias toward keeping acquiring workers; toward mixing acquired workers into acquiring plants more than the opposite; and toward deploying acquiring workers to new plants.

Table 4a also shows the same statistics for partial mergers, where the acquiring firm merges with a subset of plants from the acquired firm. In such a merger, we might expect cherry picking, where plants that are the closest fit are merged and others are not. We see that partial mergers result in substantially less overall movement of workers between plants (except for acquiring workers in the first period). Movement between firms is not much lower, if at all, compared to full mergers. Instead the reduction in movement occurs within a worker's pre-merger firm, and to new plants. Cherry picking reduces the need to reallocate workers after merger, and to create new plants, but there is still some mixing of workers between the firms.

Table 4b repeats the statistics from Table 4a, but divides the sample into mergers between firms in the same 2-digit industry, and mergers across different industries. Mergers within the same industry are more likely to be for economies of scale, while mergers across industries are more likely to reflect economies of scope. We would expect more mixing of workers from the two firms in the same workplace in across-industry mergers, to realize the benefits of sharing methods and integrating product lines. There is some tendency for more movement between firms in across-industry mergers than within-industry mergers. Acquired workers are substantially more likely to move to acquiring plants in years 2-3 when the merger is across industries. However, acquiring workers are only slightly more likely to do so. In across-industry mergers, acquired workers are more likely to be deployed to newly created plants, while the opposite is true for acquiring workers. Thus, there is some evidence that when firms from different industries merge, the acquiring firm does so to capture expertise from acquired workers and use it in both existing acquiring plants and new plants that combine workers. To the extent that this is true, it goes against the arguments about industry overlap described in the theory section. Of course, the importance of overlap as a cost or benefit of organizational integration depends on the motive for merger. It may be that overlap helps integration when the firms merge for economies of scale, but hinders it when they merge for economies of scope.

Tables 4a-b show greater turnover for acquired workers than for acquiring workers post-merger; we will analyze this turnover more formally in the next section. Table 4b also provided some evidence consistent with the view that some mergers are motivated by economies of scale, and others by economies of scope. Might turnover of acquired workers simply reflect higher productivity, and therefore a smaller optimal workforce when combined (even if output rises)? Tables 5-6 provide some evidence on that view. First, Table 5 shows the mean number of plants in the merged firm, broken into three types: acquiring plants, acquired plants, and new plants created post-merger. There is some closing of acquired plants, but not very much. There is at least as much closing of acquiring plants. This does not seem consistent with higher turnover of acquired workers. In addition, the average number of plants does not fall post-merger (nor does firm size as measured by total number of employees). Merged firms create approximately as many plants as they shut down. Therefore, it is not the case that merged firms on average contract in size or labor force.

Table 6 shows the rates at which new employees are hired in merged firms, also broken down by type of plant. Not surprisingly, most hiring is in newly created plants. However, there is also substantial hiring in acquiring and acquired plants, with somewhat more at acquired plants. In other words, while merged firms have higher turnover of acquired workers, they simultaneously are hiring new employees in those same plants. This is not consistent with the argument that economies of scale or scope allow the firm to reduce total employment. It does imply that at least some acquired employees are less desirable to the merged firm than are new hires, despite their greater experience and (acquired) firm specific capital. The question is why.

To get some handle on this question, Table 7 summarizes demographics of workers by type of job move, including “mixers” who switch to a plant in the firm that their firm merged with, “non-mixers” who either stay in their plant or move to another plant within their pre-merger firm, new hires, and those who exit. Mixers are more highly paid than non-mixers. However, the difference in pay is not great, and mixers are still near the middle of the wage distribution in the firm. Mixers are also more likely to be males, and are younger than non-mixers. The gender difference may reflect that women tend to be more resistant to job changes that involve moving to a new location (although Denmark is a small country, with much employment at larger firms centered around Copenhagen or Aarhus). The fact that mixers are younger but slightly higher paid suggests that the acquiring firm may move relatively talented middle managers across the two firms to implement the merger.

We also see that new hires are younger, less experienced, and have lower pay than acquired or acquiring workers. One possible explanation for merger is to change generous compensation policies at the acquired firm. The acquiring firm might implement that by higher turnover of acquired workers, combined with new hiring. These patterns are consistent with that view. However, acquired workers are actually paid less on average than are acquiring workers. This may be because acquiring firms are larger, and it is well known that wages tend to rise with firm size. Whether that is the cause or not, a merger will only increase firm size, and so seems likely to raise wages for both acquired employees and any new hires who replace them if they leave. Of course, the acquiring firm might use the merger to force out older, higher paid acquired employees and replace them with younger workers. This is what is happening in our sample, but there is no evidence that it is a *motive* for the



merger. Since acquiring firms pay higher wages than acquired firms, it would seem more effective to reduce the size of their own older, higher paid workforce and replace them with younger new hires, avoiding the complexities of going through a merger. Nevertheless, we will control for the wage level of the worker in our turnover analysis below, to analyze this possibility.

### ***Post-Merger Turnover***

Our main focus being on turnover post-merger, it is worth noting that government labor market policies imply relatively high turnover in Danish companies.<sup>7</sup> The Danish government provides extensive benefits and unemployment insurance to workers who leave their job, including up to 90% of earnings. Danish firms are required to provide only one day of severance pay. Thus, the explicit turnover costs to both workers and firms are very low, resulting in turnover per year averaging 27% of a firm's workforce. What we will focus on is not the high level of turnover, but whether it changes as the result of merger.

We first estimate post-merger turnover of acquired and acquiring employees using probit estimation techniques. For each group of workers, we estimate the probability of 1-year and 3-year post-merger turnover; i.e., the probability that the employee leaves from year 0 to year 1 post-merger, or leaves from year 0 to year 3 post-merger. In this estimation, we pool all types of mergers together. Later we allow for estimations by merger type.

Table 8 reports the results. Marginal changes are reported instead of coefficients. All estimations include year and industry fixed effects. There is a distinct difference in predicted turnover rates for the two types of employees one year after merger: 20% of employees from the acquiring leave that year, while 25% leave from the acquired firm. The three-year predicted turnover rate is also higher for acquired workers: 50% compared to 39% of acquiring workers. This is evidence for the idea that acquiring workers have greater organizational power post-merger. We will see this pattern in all estimations.

The first explanatory variable we are interested in is the degree of dominance of a worker's group in the newly merged firm. For acquired workers, both the one- and three-year turnover probit indicate that turnover is smaller, the greater the degree of dominance of the worker's group, with the three-year effect substantially larger than the one-year effect (with a marginal effect of -14% on a 3-year basis vs. -13% on a 1-year basis). The effect of greater dominance is insignificant for both one- and three-year turnover of acquiring workers.

Being part of the dominant group decreases post-merger turnover for acquired workers and the effect is not small. First, take acquired workers and quantify the effect of an increase in firm dominance on post-merger turnover. Suppose that firm dominance increases from 29% (the average of firm dominance at the worker level for acquired) to 54% (the 67th percentile of firm dominance at the worker level for acquired). Such a change

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<sup>7</sup> Turnover in Denmark is high partly because a number of transitions are included in the official statistics: between work and education, job training, and generous family leave, as well as the many transitions between part-time employment and any of the previous states. Over two-thirds of Danes work part-time, many at more than one part-time job. See Westergaard-Nielsen (2002).

would lead to a reduction in 3-year turnover of -3.5% ( $-0.14 \cdot (54-29)$ ), which represents a decrease of 7% in 3-year post-merger turnover ( $-3.5/50$ ).

This finding is difficult to explain with simple stories of economies of scale, which have little to do with the internal composition of the combining firms. Instead, this finding is more consistent with the idea that composition of the firm – and potential conflict between the two source firms – plays an important role in subsequent turnover. There are two effects which our model highlights. First, the more asymmetric the merger, the weaker the relative position of employees from the dominated firm, since the firm culture is more representative of the dominating firm. Second, the more similar the employees of the merged firm, the more productive they are. Both effects might be captured in our firm dominance variable.

Now consider the industry overlap variable, with industry overlap computed at the two-digit level. Being in a merger where firms come from different industries slightly increases the probability of post-merger turnover of the acquired on a 3-year basis. There does not seem to be any significant short term effect for them, however. There are two possible explanations for this finding. First, it is more difficult to integrate the firm when the production processes of the acquiring and acquired firms are different. Second, the employees may be poorer substitutes for each other.

To capture heterogeneity in merger types, we introduce a dummy variable for being in a partial merger (firm A merges with part but not all of firm B). Partial mergers positively affect acquired workers, as it decreases their probability of turnover over both time spans, but the coefficients lack statistical significance. If we think of partial merger as “cherry-picking,” where A chooses only a part of B to merge with, presumably that part which complements A’s strengths, then acquired employees may be at an advantage while the opposite may be true for acquiring workers. Indeed, turnover of acquireds does decrease in a partial merger, but not with statistical significance.

The probit in Table 8 also contains controls that are typically included in turnover analyses. Turnover is lower for those who have more experience and tenure with their firm at the time of merger. The greater the level of education, the less likely is the employee to leave the merged firm. This may suggest that employees at higher hierarchical levels are more shielded from losing their jobs because of the merger. Finally, there is some effect of wage level on likelihood of turnover, with more highly-paid workers more likely to leave the merged firm. This finding addresses the relevance of the model of merger for governance, since it indicates that any supposed economies from fixing previously inefficient (too high) compensation levels in the acquired firm is also accompanied by fixing too-high compensation in the acquiring firm as well. (Bertrand & Mullainathan 2003; Margolis 2003)<sup>8</sup>

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<sup>8</sup> To test the robustness of our dominance result, we also tried other specifications of post-merger turnover. First, we added interactions between individual characteristics of workers (such as age, education, female and tenure at the pre-merger firm) with the dominance and industry overlap variables to check whether some groups were targeted more for turnover than others. In most specifications the interactions were not significant. In the few cases where they were, the magnitude of effects was slight. None of these specifications changed the magnitude of the effect of dominance on post-merger turnover. We also added pre-merger turnover (measured as one year before the

### *Duration Analysis*

In the probit estimations, we present what are essentially point estimates of the survivor function at one and three years after the merger. This subsection analyses in more detail the whole survivor function of acquired and acquiring workers. We study the survival of workers from both groups in a time span of three years after the merger (for  $T \geq 0$  with  $T=0$  the time of the merger). Note that our sample is censored 3 years after the merger, as we only keep data 2 years before and 3 years after the merger. Our analysis takes into account the fact that our data are censored in the last period.

Figure 1 reports the Kaplan-Meier survival function of acquired and acquiring workers. From this figure, the raw data illustrate what we previously saw: the survival function decreases over time and acquired workers experience a higher turnover than acquiring workers.

To measure the effects of variables of interest on the survival of acquired and acquiring workers, we estimate a discrete duration model (complementary Log Log hazard model.) Results are reported in Tables 9a and 9b. Each specification includes year and industry fixed effects. For ease of interpretation, coefficients are reported instead of hazard ratios. Variables reflecting characteristics of workers are time-varying covariates, except gender and education.

In order to compare the survival analysis to previous results, consider whether we obtain effects similar to those from the probit. Firm dominance again decreases turnover, and this effect is more important for acquired than acquiring workers. Estimating the effect using survival analysis also leads to higher coefficient estimates, as we now have -0.475 (vs. -0.144) for acquired. To quantify the effect of firm dominance on turnover, consider again a change of firm dominance from 29% (average) to 54% (67th percentile) for acquired workers. Such an increase would lead to a reduction of 11.9% ( $-0.5(54-29)$ ) in yearly post-merger turnover. Industry overlap and partial merger have the same effect as before, and coefficients again are larger in magnitude and similar in significance. As in previous estimation, the effect of industry overlap on turnover is negative for acquired workers. In all estimations, the other controls show patterns similar to those seen in the probits.

### *Nonlinearities*

Our results showed that dominance strongly affects the fate of workers after a merger, especially workers belonging to the acquired firm. However, our previous estimations relied on the assumption of a linear relationship. We estimate a discrete duration model (complementary Log Log hazard model) with firm dominance as a nonlinear covariate for all mergers, separately for acquired and acquiring workers. Figure 2 reports graphically the nonlinear function of firm dominance using the coefficient estimates. On each graph, two lines are drawn: one for the entire distribution of firm dominance (in grey) and the other one for the 10-90% percentiles of firm dominance (in black). The relationship between firm dominance and turnover appears to have a nonmo-

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merger) to control for potential internal reorganization prior to merger. While we found a positive and significant relationship between pre- and post-merger turnover, the effect and the magnitude of the dominance variable was unaffected.

notonic shape for acquired workers and a convex shape for acquiring workers (in grey). However, if we look at the shape of the relationship for the 10/90% percentiles of firm dominance (in black), we obtain the negative relationship we had before with an effect bigger for acquired workers. Note that the graph does not differ much from a linear relationship inside the 10/90% percentiles.

### ***Plant Integration***

Up to now, we have investigated whether the relative power of each group in the new merged firm affects post-merger turnover of acquired and acquiring workers. However, as our theory relies on post-merger integration, we are also interested in analyzing if workers from different groups work together after the merger or continue to work only with members of their own group. In other words, how much mixing of workforces occurs post-merger at the plant level, and does this affect post-merger turnover as well?

We estimate a discrete duration model (complementary Log Log hazard model) this time using group dominance at the plant level (plant dominance) instead of firm dominance. We study the survival of acquired and acquiring workers post merger. The time span is slightly different from the estimations with firm dominance, as groups have to be exposed to mixing, which only happens one period after the merger (for  $T \geq 1$ , with  $T=0$  the time of the merger). Results are reported in Table 9b. Each specification includes year and industry fixed effects, coefficients are reported instead of hazard ratios, variables reflecting characteristics of workers (except gender and education) and plant dominance are time-varying covariates.

Starting with the plant dominance variable, we can see that plant dominance of acquired workers does not seem to have any effect on post-merger turnover, and the same result holds for acquiring workers; the coefficient estimates is 0.12 and -.114, respectively, and neither is significant. These results could indicate that the dominance at the firm level is what really matters for turnover of acquired workers, while for acquiring, neither firm nor plant dominance have significant effects. The coefficient on industry overlap for acquired workers is again negative and significant, which points up the apparent importance of similarity to acquiring workers for retention of acquired workers. The coefficients on partial merger are insignificant for both acquired and acquiring workers. The other control variables have similar effects to the ones presented in previous estimations. We therefore do not discuss them further.

## **V. CONCLUSION**

Mergers are difficult and costly to implement. Management often faces sweeping changes in production, composition of its labor force, financing, product markets, organizational design, compensation schemes, and the nebulous but critical element called corporate culture. The focus here has been the effect of this large disruption on workers, and how it varies between acquiring and acquired firms. We posit two general kinds of effects. One is that workers who are more different from each other are likely to be less productive colleagues, because of differences in personality, human capital, etc. The second is that different factions – acquiring workers being

one faction, and acquired workers the other – may have incentives to work against each other and for their own group. This second effect reinforces the first.

We find that employees from the acquiring firm fare better, all else equal, than those from the acquired firm. That result is consistent with the prior literature on the employment effects of merger. It suggests that the acquiring firm A has greater power (presumably derived from control rights negotiated at merger), which it uses to implement a merged organization more similar to A than to firm B, and to play favorites for its own workers.

Our second finding is more novel: employees from the firm that dominates in size tend to fare better post merger. This is evidence that workers from the minority firm are at a disadvantage after a merger. It may also be a sign that workers from both firms engage in something like ethnic conflict with each other. The effect is particularly strong for acquired workers. Our results are robust to different specifications, econometric techniques and to estimation by merger type.

Our third finding is that if the merged firms had different modal industries pre-merger, turnover is higher for acquired workers. This is not consistent with the simple view that economies of scope and scale drive employment effects of merger. However, it is consistent with the idea that organizational integration is more difficult, the more different are workers before the merger. That could be driven by lower productivity when workers from different backgrounds work together, an additional dimension of factionalism and favoritism, or both.

We disaggregate our analysis one step further and investigate whether group dominance at the plant level affects post-merger turnover. We are interested to see if workforces mix after a merger and if such a mixing affects the fate of acquired and acquiring workers. There is actually very little mixing of the two workforces in either direction.

Finally, while acquired workers have higher turnover after merger, the firm simultaneously hires new employees, even in the same plants. This is strong evidence that acquired worker turnover is not due to a desire for a smaller workforce (caused by economies of scale or scope). It is also not consistent with a desire to reduce a highly-compensated acquired workforce, since acquiring workers are paid more than acquired workers. This pattern of replacing acquired workers with new hires, combined with the other evidence, strongly suggests that organizational integration and the politics associated with it are costly. If it is very difficult to integrate two existing workforces, and the acquiring firm is larger and has a strong role in governance, then it should not be surprising that acquired workers suffer most as a result of the merger.

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**Table 1. Industries of Merging Firms**

(N = 631)		Modal industry of acquired firm					Total
		Retail, hotels & rest.	Mfg.	Finance, RE & R&D	Constr. & transport	Agr. & mining	
Modal industry of acquiring firm	Retail, hotels & restaurants	39.8	1.3	0.3	0.3	0.3	42.0%
	Manufacturing	2.2	26.8	0.2	0.0	0.2	29.3%
	Finance, real estate & R&D	0.6	0.8	11.3	0.0	0.3	13.0%
	Construction & transport	0.5	0.5	0.0	10.6	0.3	11.9%
	Agriculture & mining	0.5	0.3	0.2	0.0	1.3	2.2%
Total		43.6%	29.6%	11.9%	10.9%	2.4%	98.4%

**Table 2. Employee Demographics in  
Acquiring, Acquired & Non-merging Firms**

	Acquiring (n = 631)		Acquired (n = 631)		Non-merging (n = 671,939)	
	mean	s.d.	mean	s.d.	mean	s.d.
Hourly wage (kroner)*	126.9	43.4	120.6	43.1	111.3	49.3
% female	36.0	24.9	34.0	28.8	35.2	29.1
Age	35.5	5.8	34.9	6.9	33.5	7.2
Experience	11.8	4.5	11.5	5.0	9.6	4.7
Tenure	4.4	2.6	4.3	2.9	3.4	2.8
Years of schooling*	11.2	1.0	11.1	1.1	10.9	1.1
% college & masters*	8.3	14.1	6.1	13.2	5.1	11.8
% community college	3.7	5.7	3.1	6.9	2.6	6.2
% vocational	49.9	17.4	50.9	22.2	47.9	22.7
% full-time*	37.0	20.1	26.9	26.2	33.7	24.2
Firm size*	194.6	618.8	33.5	68.7	28.1	189.3

\* = difference between acquiring & acquired statistically significant at 1%.

**Table 3a. Firm Dominance of Acquiring & Acquired Workers**

		Overall	Firm dominance tertile		
			1	2	3
Acquiring	mean	0.71	0.44	0.75	0.92
	s.d.	0.22	0.16	0.06	0.05
	min	0.01	0.01	0.65	0.84
	max	1.00	0.65	0.84	0.99
Acquired	mean	0.29	0.07	0.24	0.54
	s.d.	0.22	0.04	0.06	0.16
	min	0.01	0.01	0.15	0.33
	max	0.99	0.15	0.33	0.99

Firm dominance = share of employees who came from the acquiring or acquired firm at time of merger. Statistics are calculated across firms.

**Table 3b. Plant Dominance of Acquiring & Acquired Workers**

		Date relative to merger			
		0	1	2	3
Acquiring	mean	1.00	0.99	0.97	0.96
	s.d.	0.00	0.10	0.14	0.14
	min	1.00	0.01	0.02	0.02
	max	1.00	1.00	1.00	1.00
Acquired	mean	1.00	0.93	0.92	0.86
	s.d.	0.00	0.18	0.21	0.29
	min	1.00	0.00	0.03	0.01
	max	1.00	1.00	1.00	1.00

Plant dominance = share of employees in a worker's plant in each period who came from the acquiring or acquired firm at time of merger. Statistics are calculated across plants.



**Table 4a. Post-Merger Movement Between Plants -  
Full & Partial Mergers**

				Full		Partial	
				Acquiring	Acquired	Acquiring	Acquired
From t=0 to t=1	% who change plant			9.2%	11.9%	12.0%	7.2%
	of which:	w/in pre-merger firm*		8.5%	12.0%	11.7%	1.7%
		between merged firms		0.8%	6.3%	0.7%	5.8%
		to newly-created plant		1.4%	2.6%	0.7%	0.5%
	% who exit			19.8%	25.4%	25.5%	27.8%
N			89,051	14,640	8,807	1,098	
From t=1 to t=2	% who change plant			20.4%	18.0%	10.9%	10.0%
	of which:	w/in pre-merger firm*		17.6%	11.1%	10.2%	6.5%
		between merged firms		0.7%	10.0%	0.7%	6.2%
		to newly-created plant		4.9%	2.4%	1.2%	0.5%
	% who exit			13.6%	20.1%	17.9%	20.7%
N			76,972	11,700	7,229	871	
From t=2 to t=3	% who change plant			25.3%	17.6%	14.9%	14.0%
	of which:	w/in pre-merger firm*		21.6%	13.3%	13.0%	2.7%
		between merged firms		1.1%	11.0%	0.8%	11.9%
		to newly-created plant		6.0%	2.9%	2.7%	0.7%
	% who exit			12.1%	17.0%	12.9%	14.1%
N			67,668	9,713	6,294	748	

\*% movement w/in pre-merger firm is calculated only for workers in firms with two or more plants that were kept after the merger. For this reason, the % who change plant statistic is not the sum of the 3 statistics below it.

**Table 4b. Post-Merger Movement Between Plants -  
Mergers Within & Across Industries**

				Within industry		Across industries	
				Acquiring	Acquired	Acquiring	Acquired
From t=0 to t=1	% who change plant			8.6%	10.3%	11.9%	15.5%
	of which:	w/in pre-merger firm*		8.1%	6.5%	10.8%	20.4%
		between merged firms		0.6%	7.2%	1.2%	3.3%
		to newly-created plant		1.3%	1.5%	1.4%	5.4%
	% who exit			20.9%	26.3%	18.5%	23.5%
N			73,886	11,844	23,972	3,894	
From t=1 to t=2	% who change plant			19.1%	13.1%	21.0%	21.4%
	of which:	w/in pre-merger firm*		16.0%	9.7%	19.5%	12.5%
		between merged firms		0.7%	8.5%	0.8%	13.7%
		to newly-created plant		5.1%	2.1%	3.1%	2.9%
	% who exit			13.6%	19.2%	15.1%	22.9%
N			63,853	9,569	20,348	3,002	
From t=2 to t=3	% who change plant			23.9%	14.9%	25.8%	24.7%
	of which:	w/in pre-merger firm*		19.7%	10.4%	24.2%	15.0%
		between merged firms		1.1%	9.7%	1.2%	14.9%
		to newly-created plant		6.5%	2.4%	3.4%	3.9%
	% who exit			15.1%	22.9%	12.1%	12.0%
N			56,081	7,819	17,881	2,642	

\*% movement w/in pre-merger firm is calculated only for workers in firms with two or more plants that were kept after the merger. For this reason, the % who change plant statistic is not the sum of the 3 statistics below it.

**Table 5. Plant Closings & Creation Post-Merger**

	Mean # of plants that are ...			Total
	from acquiring co.	from acquired co.	created post- merger	
t = 0	6.10	1.23	0.00	7.33
t = 1	5.65	1.13	0.69	7.47
t = 2	5.48	1.05	0.94	7.47
t = 3	5.32	0.96	1.08	7.36

**Table 6. New Hiring Post-Merger**

	% of employees hired post- merger in plants that are ...			Total
	from acquiring co.	from acquired co.	created post- merger	
t = 1	18.90	23.60	73.90	21.90
t = 2	30.30	37.40	62.00	33.80
t = 3	39.20	45.40	67.20	42.70

**Table 7. Employee Demographics by Type of Post-Merger Job Move**

		Mixers from ...		Non	New	Exits
		acquiring	acquired	mixers	hires	
From t=0 to t=1	Female	0.27	0.20	0.36	0.36	0.35
	Age	37.5	39.3	38.9	30.2	35.2
	Years of schooling	11.9	12.0	11.6	11.4	11.3
	Experience	14.5	15.7	15.0	7.7	10.9
	Wage percentile	0.56	0.58	0.52	0.41	0.46
	Full time	0.47	0.47	0.47	0.17	0.39
From t=1 to t=2	Female	0.30	0.20	0.37	0.37	0.36
	Age	37.9	40.3	40.4	30.7	37.4
	Years of schooling	11.8	12.2	11.7	11.4	11.4
	Experience	15.3	17.2	16.5	8.0	12.6
	Wage percentile	0.57	0.61	0.54	0.41	0.48
	Full time	0.46	0.47	0.46	0.29	0.50
From t=2 to t=3	Female	0.28	0.19	0.37	0.36	0.37
	Age	41.3	41.4	41.6	31.8	40.6
	Years of schooling	12.1	12.1	11.7	11.5	11.7
	Experience	16.8	18.4	17.9	9.0	17.0
	Wage percentile	0.59	0.60	0.55	0.42	0.55
	Full time	0.49	0.52	0.45	0.35	0.46

Mixers are employees who switch to a plant that was in the other company pre-merger.

**Table 8. Probit Estimates of Post-Merger Turnover, with Firm Dominance**

	a. Exit - first year after merger				b. Exit - first three years after merger			
	Acquiring		Acquired		Acquiring		Acquired	
	dF/dx	s.e.	dF/dx	s.e.	dF/dx	s.e.	dF/dx	s.e.
Firm dominance	0.036	0.070	-0.127	0.035 ***	-0.045	0.080	-0.144	0.048 ***
Industry overlap	0.026	0.049	-0.045	0.039	-0.001	0.081	-0.129	0.066 *
Partial merger	0.016	0.027	-0.016	0.037	0.015	0.035	-0.038	0.049
Age	-0.017	0.002 ***	-0.018	0.004 ***	-0.049	0.003 ***	-0.045	0.005 ***
Age <sup>2</sup>	0.000	0.000 ***	0.000	0.000 ***	0.001	0.000 ***	0.001	0.000 ***
Experience	-0.006	0.002 ***	-0.012	0.003 ***	-0.010	0.003 ***	-0.016	0.004 ***
Experience <sup>2</sup>	0.000	0.000	0.000	0.000 *	0.000	0.000	0.000	0.000 **
Tenure	-0.020	0.002 ***	-0.023	0.003 ***	-0.031	0.003 ***	-0.032	0.004 ***
Tenure <sup>2</sup>	0.001	0.000 ***	0.001	0.000 ***	0.001	0.000 ***	0.001	0.000 ***
Female	-0.020	0.010 **	0.001	0.011	-0.025	0.014 *	-0.001	0.015
Education college	-0.054	0.014 ***	-0.071	0.019 ***	-0.055	0.019 ***	-0.026	0.031
Education vocational	-0.034	0.009 ***	-0.025	0.009 ***	-0.053	0.010 ***	-0.040	0.012 ***
Education community	-0.051	0.012 ***	-0.056	0.017 ***	-0.072	0.019 ***	-0.056	0.024 **
Full time	-0.058	0.008 ***	-0.088	0.011 ***	-0.051	0.012 ***	-0.088	0.017 ***
Hourly wage (100 dkk)	0.201	0.076 ***	0.186	0.108 *	0.262	0.108 **	0.000	0.135
Firm size at merger (100s)	-0.001	0.001	-0.005	0.001 ***	-0.001	0.001 *	-0.006	0.002 ***
Sample probability	0.20		0.25		0.39		0.50	
Log Likelihood	-53,991		-10,328		-70,067		-12,160	
Chi <sup>2</sup>	3,050		1,027		3,980		1,359	
Pseudo R <sup>2</sup>	0.11		0.11		0.13		0.14	
N	120,662		20,427		120,662		20,427	

\*\*\*, \*\*, \* indicates significant at 1,5 or 10%. Coefficients are marginal effects. All models controls for year and industry. Standard errors are clustered by merger.

**Table 9a. Complementary Log-Log Estimates of  
Post-Merger Turnover, with Firm Dominance**

	Acquiring		Acquired	
	coef.	s.e.	coef.	s.e.
Firm dominance	-0.015	0.302	-0.475	0.134 ***
Industry overlap	0.010	0.221	-0.367	0.191 *
Partial merger	0.050	0.109	-0.094	0.145
Age	-0.124	0.013 ***	-0.091	0.014 ***
Age <sup>2</sup>	0.002	0.000 ***	0.001	0.000 ***
Experience	-0.033	0.008 ***	-0.050	0.010 ***
Experience <sup>2</sup>	0.000	0.000	0.001	0.000 **
Tenure	-0.112	0.013 ***	-0.104	0.012 ***
Tenure <sup>2</sup>	0.003	0.001 ***	0.003	0.000 ***
Female	-0.095	0.042 **	-0.039	0.043
college	-0.233	0.073 ***	-0.181	0.101 *
Education vocational	-0.142	0.032 ***	-0.093	0.038 **
community	-0.289	0.093 ***	-0.235	0.070 ***
Full time	-0.314	0.035 ***	-0.390	0.049 ***
Hourly wage (100 dkk)	1.226	0.243 ***	0.563	0.364
Firm size at merger (100s)	-0.004	0.003	-0.019	0.009 **
Log Likelihood	-118,243		-22,687	
Chi <sup>2</sup>	14,428		3,389	
N	300,256		48,294	

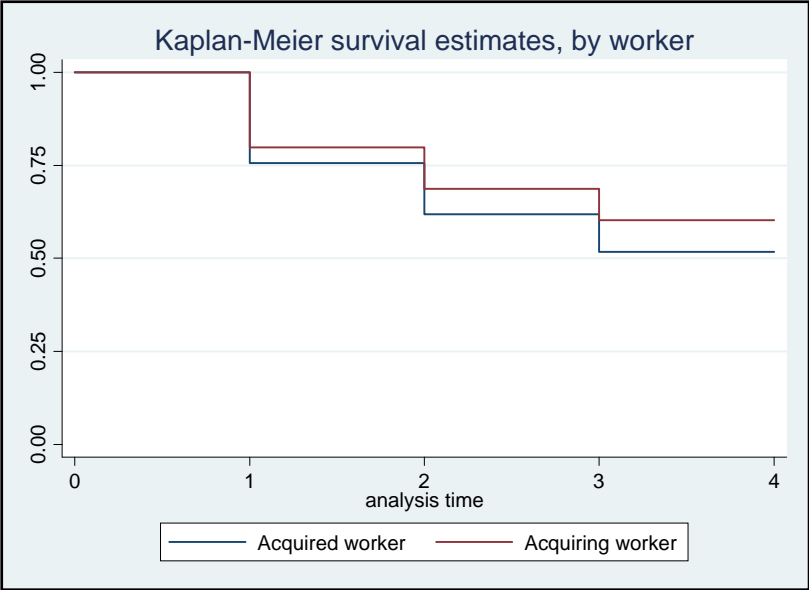
\*\*\*, \*\*, \* indicates significant at 1,5 or 10%. All models controls for year and industry. Standard errors are clustered by merger.

**Table 9b. Complementary Log-Log Estimates of  
Post-Merger Turnover, with Plant Dominance**

	Acquiring		Acquired	
	coef.	s.e.	coef.	s.e.
Plant dominance	-0.114	0.182	0.122	0.251
Industry overlap	-0.189	0.257	-0.524	0.292 *
Partial merger	-0.020	0.084	-0.105	0.156 *
Age	-0.171	0.010 ***	-0.120	0.015 ***
Age <sup>2</sup>	0.002	0.000 ***	0.002	0.000 ***
Experience	-0.034	0.008 ***	-0.043	0.013 ***
Experience <sup>2</sup>	0.000	0.000	0.001	0.000
Tenure	-0.101	0.010 ***	-0.089	0.016 ***
Tenure <sup>2</sup>	0.003	0.000 ***	0.003	0.000 ***
Female	-0.060	0.040	-0.078	0.060
college	-0.116	0.071 *	-0.018	0.123
Education vocational	-0.109	0.029 ***	-0.076	0.055
community	-0.201	0.078 ***	-0.195	0.093 **
Full time	-0.262	0.038 ***	-0.357	0.064 ***
Hourly wage (100 dkk)	1.597	0.232 ***	0.493	0.534
Firm size at merger (100s)	-0.005	0.002 **	-0.013	0.012
Log Likelihood	-63,390		-12,234	
Chi <sup>2</sup>	10,282		2,694	
N	179,594		27,867	

\*\*\*, \*\*, \* indicates significant at 1, 5 or 10%. All models controls for year and industry. Standard errors are clustered by merger.

Figure 1. Kaplan-Meier Survival Function & Firm Dominance – Acquiring v. Acquired





**Figure 2. Non Linear Effect of Firm Dominance on Turnover by Worker Type**

