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**On the Use of Event Studies to Evaluate Economic Policy  
Decisions: A Note of Caution**

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# **On the Use of Event Studies to Evaluate Economic Policy Decisions:**

## **A Note of Caution**

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**Abstract:** Event studies represent an increasingly popular method to evaluate (future) welfare effects of economic policy decisions. The basic idea is to hire the stock market as a referee, i.e. that stock market reactions to the announcement of policy decision are interpreted to contain superior information about the (future) welfare effects of these decisions. This paper investigates the degree of reliability of event studies as a policy programs evaluation method by critically reflecting upon two underlying assumptions. Since both the information superiority and efficiency of financial markets and, in particular, the conclusion from abnormal returns to (future) economic welfare effects consist of considerable interpretation problems, we issue a note of caution: scientists and policymakers should be very reluctant to rely on stock market reactions as a referee on economic policy decisions. Event studies cannot replace thorough theory-driven economic analysis.

**Keywords:** event studies, abnormal returns, economic policy evaluation, regional free trade agreements, merger control decisions, IMF supported programs

**JEL-Classification:** G14, D81, H00, L40, L50

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## 1. Introduction

Recently, there is a growing literature that attempts to evaluate economic policy decisions or regulatory reforms by analyzing the stock market reactions to the announcement of these decisions. So-called 'event studies' isolate with sophisticated econometric techniques so-called abnormal returns, i.e. movements in stock prices that correlate only to the 'event' (announcement) and not to other influences. This is a well-established method for the empirical analysis of drivers of stock market prices. However, event studies are increasingly used to evaluate the welfare effects of regulatory reforms. The event-specific reaction of the stock prices is believed to reveal superior information about the welfare effects of announced economic policy decisions (which represent the events). Thus, they are believed to be able to serve as a referee for the economic 'quality' of the announced reforms. The underlying conceptual idea is "hiring the stock market as an advisor" (Moser & Rose 2011a). Along these lines, inter alia, regional trade agreements (Moser & Rose 2011b), merger control decisions (Duso et al. 2011), sector regulation (Dnes et al. 1998) or economic recovery and anti-crisis programs (Miyakoshi et al. 2007) are exposed and subjected to the judgment of the stock markets with the intention of deriving economic policy recommendations. While this is usually done by scientists, also a couple of competition authorities have already employed event studies themselves in order to evaluate some of their merger control decisions (namely Greece, Japan, and Switzerland<sup>1</sup>).

This paper reflects upon the question: shall we 'hire' the stock market to tell us about right or wrong economic policy decisions (in terms of welfare effects)? We call for a note of caution: skepticism about the competence of stock markets to reveal superior knowledge about economic policy programs is justified when looking at the empirical validity of the assumptions on which the event study approach to evaluating policy programs rests. The paper is organized as follows. Section 2 briefly describes the event study methodology. Section 3 analyzes event studies as an evaluation approach by introducing three selected examples from the more re-

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<sup>1</sup> According to these countries' written reports to the 2011 OECD roundtable on 'Impact Evaluation of Merger Decisions' (reports on file with the authors).

cent literature. Following that, section 4 critically reviews the general approach of using stock market reactions as policy evaluators (section 4.1) as well as demonstrates the principal ambiguities of interpreting the stock market signals in terms of welfare effects of policy decisions (section 4.2). The three examples from section 3 are exemplarily employed here. Section 5 concludes with a note of caution.

## 2. Fundamentals of Event Studies

Event Studies are a statistical methodology which was initially employed in economics in areas like accounting and financial markets' analysis. In a nutshell, event studies quantitatively estimate the influence of specified 'events' (often announcements distributed via media regarding, for instance, business and company news, merger announcements, economic policy decisions, regulatory changes, strategic business decisions, enactment of major legislation, etc.) on the price of securities, stocks and bonds listed and traded on stock exchanges (Corrado 2011; McWilliams & Siegel 1997). The generic model in the econometric analysis of most event studies is the following market model:

$$R_{t,j} = a_j + b_j * RM_{t,j} + e_{t,j} .$$

$R_{t,j}$  denotes the return of security  $j$  on day  $t$  with  $RM_{t,j}$  denoting the overall market return and the term  $e_{t,j}$  defines firm related return.  $a_j$  and  $b_j$  are the linear coefficients for the regression equation above. The target in event studies is to estimate the *abnormal returns* ( $A_t$ ), i.e. the unexpected return obtained on the day of the announcement given the expected overall market return.

$$A_t = R_t - E(R_t|RM_t) = R_t - a - b * RM_t$$

The significance of abnormal returns is tested by definition of statistical tests. The tests results will be captured by defining critical values as thresholds. A large variety of tests have been proposed for exploring and validating the existence of abnormal return in response to an event. The inherent technical challenge of event studies lies in the proper distinction of event-specific effects from other, more general influences on the observed stock price movement (Corrado 2011).

However, this paper does not aim to discuss the sophisticated econometrics of event studies.<sup>2</sup> Instead, the interpretation of event study results and the derivation of economic policy conclusions stand in the focus of our analysis. In this specific context, two different types of the application of the event study method must be distinguished.

- (i) Studies that try to find out how announcements ("events") in the media or from companies, policymakers, authorities, governments or agencies influence stock market prices (*event studies to identify drivers of stock market prices*). Here the aim is to explore whether or not significant abnormal returns result as a consequence of the announcements of decisions. Thus, the research targets to explain the determinants of stock price dynamics and to identify which factors influence stock prices and how they do so. This is the original way how event studies used to be applied and, here, this method represents an important and hardly controversial ingredient to economic research.
- (ii) Studies that try to evaluate the welfare effects of economic policy decisions by measuring stock market price changes (abnormal returns) caused by the announcement of these decisions (*event studies to evaluate policy programs*). It is this second way of applying event studies that we focus on in this paper.

Even though both types rest on the same method, they are distinguishable regarding their research targets: while the first type explains stock market reactions, the second type uses stock market reactions to evaluate policy decisions. The inherent logic of this second type of event studies crucially and sensitively rests on two (interrelated) assumptions:

1. Traders on the stock market exchange correctly anticipate the effects of the announced economic policy decisions on the profitability – including the future profitability – of the companies whose stocks they are trading. The anticipated profitability changes are immediately reflected into the current prices.

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<sup>2</sup> See for this the recent overview article by *Corrado* (2011) and the literature cited therein.

Eventually this first assumption rests on the so-called efficient financial market hypothesis (EFMH). According to the EFMH, stock markets process the information codified in the event in a perfectly rational and efficient way.

2. The increasing or decreasing profitability of the stock market companies allows for conclusions regarding the welfare effects of the announced economic policy decisions.

The second assumption rests on the special economic theory of the effects of the announced policy decision. Thus, the exact expression of this second assumption differs among studies of different application fields.

### **3. Evaluating Policy Programs or Decisions with the Help of Event Studies: Three Examples**

Three recent examples from the literature serve to illustrate how economic theory is employed to specify the link between profitability expectations of stock market traders and expected economic effects of policy programs or regulatory decisions. This link is crucial for the role of stock markets as referees on the 'quality' of political decisions.

The first example refers to the announcement of Regional Free Trade Agreements (RFTA; Moser & Rose 2011a, 2011b). If the announcement causes an increase in stock prices (i.e. increasing profits of the companies are expected), this is interpreted as indication that the agreement leads to more trade and, therefore, according to standard trade theory to an increase in welfare. However, if the abnormal returns are negative, the interpretation is that the country in question will not benefit from the RFTA, possibly because the negotiated trade conditions for this country are disadvantageous.<sup>3</sup> Thus, abnormal stock market returns are employed as a referee in order to judge whether an announced RFTA is welfare-increasing ('good policy decision') or welfare-decreasing ('bad policy decision'). Since stock markets do not only react to final RFTA announcements but also already to leaking infor-

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<sup>3</sup> Maybe, the liberalization predominantly includes industries where this country suffers from a competitive disadvantage whereas industries where it enjoys a competitive advantage are excluded from the RFTA.

mation about the conditions of the RFTA and the probability of an agreement, the referee service of the stock markets reactions could actually already be used during the negotiation process to inform politicians about the effects of their possible decisions.

A second example refers to merger control decisions (*Duso et al. 2011*).<sup>4</sup> It is assumed that the welfare effects of horizontal mergers can be evaluated by looking at the stock price reactions of stocks of the merging companies and especially those of their rivals. Positive abnormal returns for the merging companies signal expectations of increasing profitability of the merger partners. However, this signal is ambiguous since increasing profitability, on the one hand, can be caused by market power (anticompetitive effect detrimental to welfare) but, on the other hand, also by efficiency gains (procompetitive effect). Therefore, the focus is usually on the remaining rivals to the merging companies and follows a specific economic logic: an anticompetitive merger, reducing competition in the relevant market, will increase the price level in the relevant market. As a consequence, the rivals to merging companies will benefit from the merger to the degree that the lower post-merger competition intensity allows them to increase their prices, too, thus boosting their profitability. A procompetitive merger, however, will increase post-merger competition in the relevant market due to the efficiency effects and thus harm the profitability of the outsiders to the merger. Consequently, positive abnormal returns for rivals to the announced merger signal an anticompetitive merger whereas negative abnormal returns for rivals to the announced merger signal a procompetitive merger. This example shows that sometimes rather sophisticated economic theory is required to make the stock market signals unambiguously interpretable.

The third example addresses economic recovery programs supported International Monetary Fund (IMF) (*Miyakoshi et al. 2007; Kutan et al. 2012*). In case of economic or financial crises, the IMF offers support to programs that help the affected countries to improve their economic conditions and overcome the crisis situation. The welfare effects of such programs are evaluated by looking at the reactions of

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<sup>4</sup> The study by *Duso et al. (2011)* represents one of the best-developed examples. See *Budzinski (2011, 2012a, b)* for various other examples.



stock market prices of companies from different sectors to the announcement of IMF supported programs. The general assumption in this case is that positive abnormal returns for some specific sectors imply increasing profitability of the companies within this sector and thus positive average welfare effects of the programs. In contrast, negative abnormal returns for the companies within other sectors signal decreasing profitability and thus negative welfare effects. Thus, the stock market reactions are employed to evaluate the effects of IMF supported reform programs on different sectors of the economy. The underlying economic mechanism rests on the assumption that increasing profitability stems from a better sector-specific economic climate, in particular increasing demand (i.e. the programs inducing an economic upswing) or decreasing costs (i.e. the programs inducing structural reforms decreasing factor and/or input costs).

#### **4. A Critical Reflection of Event Studies as Referees**

So, shall we hire the stock market as a referee on economic policy decisions? The answer corresponds to the reliability of the basic underlying assumption – the EFMH – as well as to the soundness and unambiguity of the employed economic theories interpreting the stock market signals.<sup>5</sup>

##### **4.1. Shall We Rely on the Rational Efficiencies of Financial Markets?**

The central question regarding the empirical reliability of the EFMH is whether stock markets are truly efficient and rational. Only if they worked perfectly, i.e. only if traders acted (hyper-) rational, all relevant information were available and this information was perfectly and efficiently processed, then event-triggered stock prices changes would reflect the true value of the traded stocks for the investors. However, within financial economics the reliability of the EFMH is viewed rather critical (inter alia, *Shleifer & Summers* 1990; *Shleifer* 2000; *Shiller* 2003). In particular, the increasingly popular branch of behavioral finance (and behavioral econom-

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<sup>5</sup> See, inter alia, *Hopkins & Connor* (1992), *Reynolds* (2008) and *Budzinski* (2011, 2012a, b) and the literature cited therein.

ics in general) casts doubt on the EFMH and particularly on assumptions like availability of all relevant information and efficient and undistorted information processing. Also referring to cognitive and psychological economics as well as based upon extensive empirical and experimental evidence, (subjectively) rational behavior is instead viewed to be something very different from 'correct' behavior (in the sense of 'being always right in assessments and decisions'). Behavioral stock market phenomena like herd behavior, bubbles, over- and under-shooting effects, etc. as well as all sorts of biases in individual (selective) information perception, processing and interpretation are not very well compatible to a referee role on economic policy programs and decisions.

Even if only the assumption of the availability of all relevant information is relaxed, it becomes doubtful whether stock market abnormal returns reliably signal future profitability effects. Already then, the effects anticipated by the investors (ex ante expected impact) start to deviate from the real effects (ex post actual impact) with the latter only coming into existence in the course of time (*Cichello & Lamdin 2006; Reynolds 2008*). The more the assumptions of complete information, perfect information processing and perfect (hyper-) rationality have to be relaxed, the bigger becomes the discrepancy between investor expectations and effects. As a consequence, the use of event studies as referees on the welfare effects of economic policy decisions must be viewed very skeptical if incomplete information, imperfect, selective and biased information processing as well as subjective rationality represent an adequate description of real-world stock markets.

Furthermore, it can be questioned whether investors reacting to an announcement make their trading decisions with the same time horizon in mind that the welfare effects of the announced policy decision need to unfold. For instance, many economic effects of RFTAs and IMF supported recovery programs will require some time before they manifest. Additionally, effects may follow a j-curve, i.e. (larger) positive welfare (profitability) effects may yield after an interim period of (smaller) negative effects. If investors do not plan to hold the stocks over a longer time they will rationally try to anticipate the stock prices at a point in time where the eventual effects may not have occurred. For instance, there are some patterns that (in times of economic upswings) merger announcements temporarily increase the

stock prices of merging companies and rivals before they eventually decrease after the merger is consummated. An investor who is not planning to hold his shares until the merger process is completed may well speculate on these temporary increase and buy as soon as first information become available (thus contributing to the rise in stock prices) – just in order to sell the stocks again before the merger is completed. Consequently, instead of anticipation of future profitability, the name of the game at the stock market may rather be: guessing what others probably guess and strategically including this in speculative and short-run stock trade. And this type of trade is likely to be very event (i.e. announcements, but also rumors)-sensitive and represent event-specific effects (abnormal returns).

Another obvious problem with using event studies as referees for welfare effects is the question whether stock market companies are sufficiently representative for the whole economy. Companies whose stocks are traded at the stock market with sufficient frequency (to allow for a meaningful inclusion) represent only a subset of the whole economy. Furthermore, their structure in terms of size, affected industries, regional distribution, etc. is usually not representative.

#### **4.2. Are the Economic Theories Used to Interpret the Signals Sufficiently Unambiguous?**

So, what about the second step of the referee role of event studies: can welfare effects of policies be fully concluded from changes in (expected) profitability of stock market companies following the announcement of such policies? This leads us back to the three different events cases introduced in section 3.

##### *Example One: Regional Free Trade Agreements*

Is it really sensible to conclude positive welfare effects from expected increasing profits (positive abnormal returns) triggered by the announcement of the RFTA? Next to liberalization gains and trade advantages, positive returns could also be due to the absence of hitherto expected (or suspected) liberalization effort in the agreement. If the RFTA protects the anticompetitive rents of big stock market companies (or creates even more protectionism) in the shadow of an ostensible (politi-

cally labeled) 'liberalization' agreement, then abnormal returns merely signal the maintenance (or new creation) of supra-competitive profits. The announcement-specific reaction may be due to expectations that these anticompetitive rents would be eroded by the free trade agreement or by an unexpected inclusion of new protectionism. This effect would be especially strong if the gains from freer trade predominantly benefit smaller and/or non-stock market companies and, thus, are neglected or under-proportionally reflected in the stock market reactions. A decrease in stock prices as a reaction to the announcement of a trade agreement can go hand in hand with welfare gains, if the losses are centralized with few big stock market companies (hitherto enjoying anticompetitive protection rents) whereas the gains are decentralized and dispersed among a large number of companies including a large share of non-stock market companies as well as the emergence of new entrepreneurship.

#### *Example Two: Merger Control Decisions*

In this case, a central link is represented by the theory that anticompetitive mergers increase the profits of its rivals through the provision of a price umbrella (i.e. higher prices benefitting all companies in the market) whereas procompetitive mergers decrease the profits of their rivals due to the price-reducing effects of efficiencies. First of all, it is widely accepted that this holds only for horizontal mergers and not for vertical or conglomerate mergers. Since many mergers involve complex multi-product companies, there is often a mixture of horizontal, vertical and conglomerate effects that might be difficult to disentangle. Furthermore, among the many affected (product as well as geographical) markets of such a merger, the (often few) markets that drive anticompetitive concerns of competition authorities must be important enough for the overall multiproduct and multinational companies to dominate the abnormal returns. Secondly, even in the case of pure horizontal mergers, the price umbrella effect is strongest in markets that resemble quantity competition in rather homogenous Cournot oligopolies. In cases of price competition in differentiated product markets, the price umbrella differs in strength for different rivals and may become rather marginal for some. If horizontal mergers take place in markets that do not display sufficient similarities to the standard oligopoly mod-

els, then the interpretation of rivals' profit changes becomes ambiguous and unclear. Thirdly, economic theory also refers to cases in which anticompetitive horizontal mergers harms rivals' profits, inter alia, through (vertical) foreclosure effects regarding procurement and distribution or predatory and deterrence strategies as well as raising rivals' costs strategies that enrich the arsenal of the (horizontally) merged companies as a consequence of their more powerful post-merger position. Fourthly, merger announcements often create 'fantasy' (in stock exchange parlance) about follow-up mergers among rivals to the merging companies. As a consequence, abnormal returns may be driven by those speculations *about* rivals rather than by a rational assessment of the profitability effects *on* rivals. Eventually, we are not aware of any study that empirically analyses whether investors actually believe in the 'anticompetitive mergers are good for rivals' theory from industrial economics. If the mental models of investors rather represent the belief that anticompetitive mergers are usually harming rivals' profitability (even if this may be based on diffuse ordinary-man knowledge rather than game-theoretic economic theory), then the interpretation of the stock market signals is systematically flawed. In summary, it appears to be rather heroic to conclude from expectations about rivals' profits on the competitive effects of a merger. Relying on ambiguous stock market signals when evaluating a merger control decisions involves a considerable risk of getting it wrong.

#### *Example Three: IMF Supported Recovery Programs*

Policy decisions on short-run macroeconomic strategies, for instance directed at the stabilization of exchange rates, or long run fundamental policy strategies targeting structural reforms are particularly prone to the general problems of differing time horizons between investors and effects, j-curve effects, lack of representativeness of stock market companies, etc. This is even more true since the actual ex-post impacts will be based on how the society reacts to the announcement of the IMF program and more importantly on how the government reacts to the advices from the IMF. Experience shows that there may be a considerable difference between the program and the implemented policies, for instance due to the government evading or diluting necessary (but unpopular) reforms are contradicting their effects

with other policy strategies. This further stretches the anticipation capabilities of the investors. Furthermore, negative abnormal returns of a sector (triggered by the IMF supported program) need not necessarily correspond to negative welfare effects. If the major companies of a sector (maybe very few if the sector is highly concentrated or even dominated by a government-related quasi-monopolist) lose privileges, protection from international competition or other anticompetitive rents in the course of the reforms of the IMF supported program, then investors will rationally expect their profits to decline. However, economic theory predicts that the corresponding increase in consumers' rent will outweigh the loss of the anticompetitive rents by some margin and the welfare effect will be positive. Thus, negative abnormal returns may well correspond to welfare gains. In addition, the same reservation as in the case of the RFTAs about centralized and stock market relevant losses being overcompensated by decentralized and stock market irrelevant gains applies here.

## 5. Conclusion

It is tempting to hire the stock market as a 'neutral' referee for assessing economic policy decisions. One reason is certainly the desire for having an external, unbiased and neutral evaluator who is not subject to party interests or career concerns. Another reason is related to the feasibility bias (*Budzinski 2012b*): the data availability for event studies is often much easier and better than for other evaluation methods, thus facilitating the production of this type of academic studies. Yet, it is necessary to issue a note of caution. Firstly, it is doubtful whether stock market reactions (abnormal returns) really reveal superior knowledge about economic effects.<sup>6</sup> Secondly, the obtained signals usually offer more than one economic interpretation and thus are considerably ambiguous. Consequently, it is rather doubtful that event studies can be successfully employed to evaluate the 'quality' of economic policy decisions, programs or reforms with a sufficient reliability. Even if conducted to the highest econometric standards, it would represent a risky gambling to adjust policy decisions according to the reactions of the stock market. Consequently, any ten-

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<sup>6</sup> See *Neven & Zenger (2008)* for a reasoning that experts may enjoy superior knowledge to stock markets.

dency to increasingly using event studies as an instrument to evaluate economic policy decisions must be viewed with serious concerns. Event studies represent a highly valuable method in the context of their original employment, i.e. research aiming to identify what drives stock market prices. However, they are not suited to replace or complement thorough economic analysis of the effects of policy decisions, programs and regulatory reforms.

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