

What a Difference Trade Makes – Export Activity and the Flexibility of Collective Bargaining Agreements*

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The prevalence of opening clauses in collective bargaining agreements may indicate a tendency towards more decentralised wage setting. Increasing competition on international product markets is assumed to be one reason for the decentralisation of collective bargaining. Current theoretical explanations focus merely on firm-level differences in the exposure to international competition. Unlike non-exporting firms, exporters are assumed to be exposed to international competition and are therefore in need of greater wage flexibility. However, incorporating stylised facts about exporting firms, new theoretical trade models suggest that firms differ from each other in how they adjust to increasing competition depending on their export behaviour as a measure of productivity. While large, highly productive exporters expand into new markets, small, low-productive non-exporters are threatened by import competition. Based on a trade model by Bernard et al. (2003), we are able to explain verbally how a decentralisation of wage bargaining arises due to different labour demand reactions of exporters and non-exporters. In contrast to the result assuming differences in the exposure to international competition, we find non-exporters to require greater wage flexibility. As the introduction of opening clauses increases wage flexibility at firm level, we examine empirically whether exporters or non-exporters have a higher probability of using opening clauses. Based on IAB establishment data covering the western German manufacturing sector, our results suggest that firms exporting to EMU countries – but not exporters in general – have a lower propensity for using opening clauses than non-exporters.

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1 Introduction

Due to persistently high unemployment rates and stiffer international competition on product markets, the social partners are often criticised for inflexible collective wage agreements. In the public debate, a stronger firm-level differentiation of collectively agreed wages is often demanded. Critics suggest that remuneration should be more in line with a firm's profit situation since rising competition causes dissimilarities between firms within an industry to increase. A more decentralised wage setting in terms of greater wage flexibility at firm level would allow firms to overcome crisis situations without having to lay off employees.

Even though collective bargaining coverage has declined in recent years, around 41 % of all western German manufacturers were covered by collective wage agreements in 2005. In the manufacturing sector, bargaining takes place mainly at industry level.¹ Wage differentiation between regions and qualifications varies substantially between the collective agreements. To a certain extent, firms are able to adjust wages to their economic situation. Firms covered by collective bargaining agreements are allowed without restriction to differentiate wages above the collectively agreed pay scale (*übertarifliche Entlohnung*). This can also be a matter of additional variable remuneration whose amount depends on the performance of the firm or the job (Kurdelbusch 2002). Firms remunerating above the collectively agreed pay scale can offset a collectively agreed wage rise against these wage elements (Bahnmüller et al. 1999). To reduce or revoke wages above the collectively agreed pay scale, an agreement between the management and the works council (*betriebliches Bündnis*) might be necessary (Hübler 2005). The possibility to go below collectively agreed wages at firm level emerged at the beginning of the 1990s, when the social partners started to include so-called opening or hardship clauses in collective wage agreements. While opening clauses on working time are often associated with a reduction of wages by introducing flexible working hours, opening clauses on wages allow firms to go below the collective wage directly (Bispinck/WSI-Tarifarchiv 2003; Heinbach 2007; Kohaut/Schnabel 2007). Alternatively, firms can leave collective bargaining coverage in order to negotiate at firm or individual level.

Besides the decline in collective bargaining coverage, the introduction of opening clauses may indicate a decentralisation of wage setting. The question

arises whether an increase in international competition on product markets is the reason why some firms need opening clauses while others in the same industry do not. So far there is no empirical evidence regarding whether the use of opening clauses is related to an increase in competition. Existing theoretical approaches explaining a decentralisation of wage setting refer to increased firm differentials, which result in a growing heterogeneity of firms on the labour market. However, differences between firms due to increased international competition are merely considered as differences in the exposure to competition (see e.g. Kohaut/Schnabel 2007). As wages and employment are more volatile in exporting firms and as exporters face lower profits, it is assumed that they are more exposed to international competition than non-exporters. In contrast to non-exporting firms, exporters require greater wage flexibility at firm level. These are the firms which are assumed to leave collective bargaining coverage or to require opening clauses in order to be able to adjust to increased competition.

The reason why some firms export and some do not, may be due to the elasticity of substitution of domestically produced goods for foreign produced ones, which varies mainly among firms of different industries. However, even within the same industry, the firms' needs for wage flexibility appear to differ. Assuming exporters and non-exporters to be equally exposed to international competition, new trade theories referring solely to industries producing tradeable goods suggest a different *reaction* of firms to a rise in competition. While exporters act on international markets, non-exporters face import competition. Hence, an increase in competition reduces the price-setting margins of exporters and non-exporters. Using the implications of the theoretical trade model of Bernard et al. (2003), which incorporates firm-level differences, we argue that the reaction of a firm's labour demand to increased competition depends on the export behaviour as a measure of productivity. We explain verbally how the different reactions of exporters and non-exporters lead to a rise in the heterogeneity of labour demand and thus to a more decentralised wage setting. In contrast to the result assuming differences in the exposure to international competition, we find that non-exporters need greater wage flexibility. Using establishment-level data for the German manufacturing sector, we investigate the two competing hypotheses as we test whether exporting or non-exporting firms have a higher probability of using opening clauses.

This paper is organised as follows. Section 2 provides a definition of decentralisation and sheds some

¹ Calculation based on German IAB establishment data.

light on the extent to which opening clauses can be seen as an indication of a more decentralised wage setting. Furthermore, we summarise previous empirical evidence on the prevalence, usage and wage effects of opening clauses. In Section 3, the current approach is outlined, explaining a decentralisation of wage bargaining as a result of increasing differences between firms in their exposure to international competition. Then we present the main implications of the theoretical trade model of Bernard et al. (2003) in order to explain verbally how different reactions of firms to rising competition may cause decentralisation. In Section 4 we investigate the formulated hypotheses empirically. We describe the data base initially and present a way to improve the information from the IAB Establishment Panel on the prevalence of opening clauses using additional data on collective bargaining agreements. Finally, we provide first insights by means of descriptive statistics and present our estimation results. Section 5 concludes.

2 Opening clauses – one indicator of Germany's decentralisation of wage bargaining

2.1 Institutional background

As a process, the decentralisation of collective wage setting denotes the displacement of the bargaining level from the sector or industry to firm level. Traxler et al. (2001) distinguish between organised decentralisation and disorganisation. While disorganisation takes place when a firm leaves the collective bargaining coverage and negotiates at firm or individual level, organised decentralisation emerges if the employers' association achieves an enhancement of its member-firms' authority to decide about the wage rate. Though wages are negotiated at central level as a matter of principle, the firm is permitted to adapt remuneration to its situation based on the wage bargaining outcome. The extent of wage flexibility within the collective bargaining regime depends on the character of the bargaining agreement. At best – as seen by a firm – the negotiated wage rate is of recommendatory nature. A firm possesses less decision-making authority if the collectively agreed wage rate constitutes a binding minimum requirement (Traxler et al. 2001).

Indicating that firms require greater wage flexibility, the recent decline in collective bargaining coverage constitutes a decentralisation of wage setting (Schnabel 2005). Firms which are not covered by

collective bargaining agreements can negotiate wages with each employee individually or conclude firm-specific agreements, which are often adopted from collective agreements but allow for firm-specific deviations. A way to offer firms more flexibility within the bargaining regime was found by introducing opening clauses into collective wage agreements allowing firms to go below collectively agreed minimum standards (Visser 2005). Hence, also the introduction of opening clauses constitutes a trend towards a more decentralised wage setting (Silvia/Schröder 2007). Since firms are obliged to continue paying collectively agreed wages for a certain period after terminating their membership of the employers' association (*Nachwirkungspflicht*), the use of opening clauses might represent an appropriate alternative to opting out of collective bargaining – at least in the short run.

The extent to which the introduction of opening clauses forms a part of the decentralisation should be discussed by considering the wage flexibility that a firm gains by using opening clauses. First, the extent to which a firm may deviate from the collectively agreed minimum standard varies substantially between the individual regulated opening clauses, which are classified into two basic types. Firms are allowed to reduce or lengthen the weekly working time by using opening clauses on working time. Some of them have a wage-reducing effect. Opening clauses on wages affect the amount of basic remuneration or of collectively agreed extra payments (e.g. holiday bonuses) directly. Some of them allow firms to reduce extra payments by a determined percentage or to postpone or intermit the date of disbursement. Other wage-related opening clauses involve a reduction of the basic remuneration or make it possible to postpone or to intermit an increase in collectively agreed wages (Heinbach 2007). Second, the use of opening clauses requires a firm to be in a certain economic situation. For example, the firm must be in financial distress or threatened by a deterioration of its price competitiveness (Silvia/Schröder 2007). Third, the decision about the use of opening clauses cannot be made unilaterally by the management. Some opening clauses require an agreement at firm level between the management and the works council, while others require an agreement between the trade union and the employers' association. If the management and the works council have to negotiate the use, they often have to provide information on their decision for the social partners. In some cases, the social partners have to be asked to arbitrate between the management and the works council. Altogether, the flexibility a firm gains through opening clauses depends on the type of opening clause and on the requirements with

which a firm has to comply.² A crucial point is the level and procedure of decision making, since the gain in wage flexibility through opening clauses is lowered by the passing of time between the management's aim and the final decision about the use of opening clauses. Furthermore, the prevalence of opening clauses varies substantially between collective bargaining agreements even within industries (Heinbach/Schröpfer 2007). Overall, although the firms' gain in flexibility might be assessed as minor, opening clauses can be seen as local elements of wage bargaining and thus their introduction as a decentralisation of wage setting.

2.2 Previous empirical evidence

Using data on the prevalence of opening clauses (IAW data set on opening clauses) and official statistics (German Structure of Earnings Survey), Heinbach/Schröpfer (2007) reveal that opening clauses are widespread in the manufacturing sector. In Baden-Württemberg, 91 % of all employees in firms covered by collective bargaining agreements were potentially affected by opening clauses in 2001. 83 % of the employees in covered firms could have been affected by opening clauses allowing firms to go below the collectively agreed wage. Furthermore, primarily large firms have the opportunity to use opening clauses (Heinbach 2006).

Using the same data sets, Heinbach (2007) examines the effects of opening clauses on the wage structure in Baden-Württemberg. He finds that – irrespective of the availability or the type of opening clauses – wages under collective bargaining coverage are in either case significantly higher than wages agreed at individual level. Compared to individually agreed wages, the results suggest a lower wage dispersion in firms covered by collective bargaining agreements containing wage-related opening clauses. Regarding the wage development, wages under collective bargaining coverage with opening clauses on working time increased between 1995 and 2001, while wages under collective bargaining coverage with wage-related opening clauses declined during the same period. Referring to Fitzenberger/Franz (1999), Heinbach (2007) argues that an increase in wages can be traced back to the implementation of opening clauses. As trade unions are aware of the fact that firms in a poor economic situation would use opening clauses, they attempt to participate employ-

ees in the increasing profits of prosperous firms (Fitzenberger/Franz 1999).

Hitherto, Kohaut/Schnabel (2007) have provided the only empirical evidence on firm-level determinants of the use of opening clauses based on IAB establishment data. While factors determining the use of opening clauses on working time have not been detected, the use of opening clauses on wages is apparently influenced by several variables. The likelihood of using opening clauses increases significantly with negative expectations regarding the future profit situation and the development of the workforce. Furthermore, firms with a level of technology that has been evaluated as obsolete show a higher propensity for using opening clauses than firms whose technological level has been evaluated as new. Firm size, measured in number of employees, and export activity seem to be irrelevant. Compared to Heinbach (2006), Kohaut/Schnabel (2007) find a considerably smaller share of firms covered by collective bargaining agreements containing opening clauses.

Like Kohaut/Schnabel (2007), we use the IAB establishment data in order to test the formulated hypotheses. Since Kohaut/Schnabel (2007) also include firms of industries producing non-tradeable goods, a separate analysis of the manufacturing sector may reveal different results particularly concerning export activity. Moreover, we mitigate the problem of missing and incorrect IAB data by adding information about the availability of opening clauses.

3 International competition and the decentralisation of wage setting – theoretical background

3.1 Firm differences in the exposure to international competition

Collectively agreed wages are assumed to be affordable for all covered firms. A collective change of firms' interests affects the wage-setting strategy of an employers' association. A tendency towards more decentralised bargaining must be initiated by a growing diversity of the firms' interests. Hence, a rise in international competition must affect firms differently (Artus 2001), resulting in an increased heterogeneity of the firms' labour demand curves. Previous theoretical approaches explain the decentralisation of wage bargaining as a result of increasing differences between firms in their expo-

² See Heinbach (2005), Heinbach (2007), and Heinbach/Schröpfer (2007) for detailed information on types and design of opening clauses.

sure to international competition.³ Firms that are heavily exposed to international competition face a downsized price-setting margin when competition increases. In order to maintain their price competitiveness, these firms are forced to reduce the cost pressure by investing in more efficient technologies, launching innovative products, and substituting self-produced goods for cheaper imported intermediates.

Taking the economy's openness to international trade as a measure of the exposure to competition, Rodrik (1997) distinguishes three effects of trade openness on aggregate labour demand. First, he suggests that the elasticity of labour demand increases with the economy's openness to international trade. Second, due to the exposure to exogenous labour demand shocks, open economies face a higher volatility of employment and wages compared to closed economies. And third, since profits decline with increasing trade openness, bargaining over lower rents weakens the trade unions' power and leads to lower wages.⁴

Disaggregated to the firm level, these differences between economies can be used to identify differences in firms' exposure to international competition and to show how a decentralisation of bargaining may arise. Regarding the reaction and the exposure to exogenous demand and supply shocks, Barba-Navaretti/Venables (2004) find differences between firms focusing on the domestic market and internationally active firms. First, a firm's reaction to labour market shocks may vary with its international openness. Compared to nationally focused firms, those that export, import, or produce abroad might exhibit a higher elasticity of labour demand, so a rise in wages would lead to a more severe reduction in employment. Second, firms engaging in foreign markets are more frequently hit by exogenous shocks. Which firms are affected more depends on the magnitude and correlation of the shocks. If exogenous shocks have a stronger effect on the labour demand of internationally active firms, wages and employment are more volatile there than in nationally focused firms. Hence, internationally active firms might need greater wage flexibility in order to smooth demand fluctuations without reducing em-

ployment. The need for highly flexible wages makes collective bargaining difficult when employers' associations act for both internationally active and nationally focused firms. To consider the third issue of lower rents, if profits, and therefore rents, decline solely in firms that are exposed to competition, an increase in competition deepens the differences in rents between firms over which the social partners bargain.

Berthold/Fehn (1996) and Kohaut/Schnabel (2007) find that an increase in international competition might motivate firms which are exposed to international competition and are covered by collective bargaining agreements to bargain at a lower level. Kohaut/Schnabel (2007) argue that these firms have to react quickly and need greater wage flexibility than firms which are less affected by international competition. As a result, their advantage of being covered by inflexible collective wage agreements declines as a rise in competition increases their need for flexibility. For Berthold/Fehn (1996), wage bargaining at firm level is the most convincing bargaining strategy. Firms have to exploit information and reaction advantages over their competitors to implement new technologies. This requires firms to be authorised to adjust wages and working conditions immediately. To summarise, looking at differences in firms' exposure to competition reveals that internationally active firms require greater wage flexibility. Taking firms' export activity as a measure of the exposure to international competition, the question arises of what makes exporters export and non-exporters focus on the domestic market. One important reason is the difference in the elasticity of substitution of domestically produced goods for foreign produced ones. Non-exporting firms might produce goods that are not in demand by foreign consumers and which, therefore, do not compete with foreign substitutes. However, differences in the elasticity of substitution are mainly a matter of differences between industries, whereas the need for wage flexibility also varies among firms within the same industry. Hence, only examining firm differences in the exposure to competition might be inadequate. Alternatively, by focusing on manufacturers that produce mainly tradeable goods, firms can be equally exposed to international competition. An increase in competition causes exporters and non-exporters to face a reduction of their price-setting margins as non-exporters are threatened by import competitors. When the elasticity of substitution between all goods is assumed to be equal and constant, looking at differences between exporters and non-exporters reveals differences in their reaction to a rise in competition, which we contemplate in the following.

³ In this context, Katz (1993) argues that a change in production structure (Post-Fordism) causes a decentralisation of bargaining as this requires an adjustment of work processes and organisation structures and therefore a relaxation of collectively agreed regulations relating to working time and wage setting.

⁴ Traxler et al. (2001) argue that an increased international openness of firms may give rise to a strengthened bargaining power of the employers' association since the influence and the coverage of collective bargaining agreements stops at the country's frontier, while firms are able to shift production abroad.

3.2 Firm differences in the reaction to increased competition – implications of a trade model

New trade theories based on stylised facts about the correlation of export behaviour and productivity suggest that exporters' and non-exporters' different reactions to increased competition result in a decentralisation of wage bargaining. Empirical evidence suggests that firm-level productivity is crucial in determining whether a firm exports. While the most productive firms are larger and can afford to export, the least productive ones are small and focus on the domestic market.⁵ Furthermore, export costs seem to increase with the distance to the export destination. Empirical results indicate that only the most productive firms are able to export to countries beyond the euro zone (Wagner 2007c). Bernard/Wagner (1997) examine wage-level differences in dependency on the export status. They find evidence of a significantly larger share and a higher average wage of white-collar employees in exporting firms. This so-called export premium seems to increase with rising export intensity.⁶ The results from Schank et al. (2007) using linked employer-employee data do not indicate a significant difference between the average wages of exporting and non-exporting firms. However, an increase in the export intensity is related to an increase in the wage disparity for blue-collar and white-collar employees. These results hold when controlling for employee characteristics.

Incorporating dissimilarities of firms, recent developments in trade theory make it possible to examine the effects of trade on the firm-specific performance and on the reallocation of production within a country. In their trade model, Bernard, Eaton, Jensen and Kortum (2003) allow for differences between firms in their technological efficiency. Transportation costs are the only trade barrier, which accrue from export activities.⁷ Bernard et al. (2003) show that in a world with a finite number of countries, producers select themselves into exporting and non-exporting firms depending on their production and

transportation costs. Only highly productive producers supply foreign markets. Although exporters set the highest mark-ups to maximise profits, they charge lower prices than their rivals. Due to export activities and high sales on the domestic market, highly productive suppliers are larger than low-productive ones. Those with the highest productivity are even able to serve distant foreign markets as they charge the lowest prices on these markets in spite of high transportation costs. By contrast, low-productive suppliers focus solely on the domestic market, are small, and set lower mark-ups.

Bearing in mind firm differences that arise from differences in productivity, how does an increase in competition on the product markets affect firms in detail? Bernard et al. (2003) show that a rise in competition modelled as a global reduction in transportation costs enables the most productive suppliers to increase their sales. Due to new cost advantages over foreign competitors, highly productive exporters launch goods onto new markets, while highly productive non-exporting firms start to export. By contrast, low-productive non-exporters face a falling cost advantage over their nearest foreign competitor. Some of them have to leave the market because foreign suppliers gain cost advantages over them.

While firms gaining cost advantages on further foreign markets face a rise in sales, firms losing cost advantages on the domestic market have to cope with decreasing sales. Hence, the labour demand of exporters and non-exporters is expected to react differently. However, in the general equilibrium, Bernard et al. (2003) treat labour as the input factor to produce a preliminary product to avoid income effects. This preliminary product enters the fabrication of each final good as an intermediate. As we look at firms producing final goods, labour is demanded indirectly by demanding the preliminary product.⁸ However, assuming a more realistic framework, where firms use labour as a direct input factor instead, an increase in competition will shift the labour demand curve of expanding exporters to the right and the curve of crisis-ridden non-exporters to the left. Hence, labour demand will become (more) heterogeneous across firms.⁹

Based on the described theoretical implications of the Bernard model and the assumption that firms

⁵ Arnold/Hussinger (2005) and Wagner (2007b) provide empirical evidence based on different plant-level data from western Germany. Wagner (2007a) provides a survey of the empirical results from several countries.

⁶ The empirical results refer to manufacturing plants in Lower Saxony.

⁷ In a framework of Bertrand competition, every good is potentially produced in every country, but a country exclusively purchases a good from the (possibly foreign) supplier which has the lowest costs and therefore charges the lowest price. In the related popular trade model of Melitz (2003), firms compete as monopolists on product markets. Since the assumption of Bertrand competition is appropriate in our context, we opt for the Bernard model. The qualitative results of the two models are similar.

⁸ As a result of increased competition, the demand for the preliminary product increases in firms that face a rise in sales, whereas it declines in crisis-ridden firms. Hence, only the aggregate labour demand is affected by a change in the demand for the preliminary good. Representing its price, workers are paid the market-clearing wage rate.

⁹ Since firms differ in their productivity, labour demand is supposed to differ already between firms when they are assumed to demand labour directly.

demand labour directly, we are able to explain how a decentralisation of wage bargaining may arise due to an increase in competition. For this purpose, we take a more detailed look at the reaction of expanding exporters and crisis-ridden non-exporters when firms are bound by a collectively agreed wage. Small, low-productive non-exporters face greater import competition resulting in increased cost pressure. A decline in sales and a deteriorating profit situation force non-exporters to reduce employment. Lower wages might prevent them from doing this. Highly productive exporters are in the opposite situation. They expand in new markets and, as a result of increasing sales, they face higher profits. An increase in competition raises their employment and even wages. Consequently, the divergent labour demand of prosperous exporters and crisis-ridden non-exporters may lead to a growing variance of individual labour demand curves and thus to more heterogeneous wage-setting interests among employers. Tendencies towards a more decentralised wage setting may arise when the social partners attempt to avoid a reduction of employment in crisis-ridden non-exporting firms and when trade unions simultaneously want their members to participate in the increasing profits of prosperous exporters.¹⁰ To achieve both, local elements of wage setting, such as opening clauses, are a possible outcome of negotiations between trade unions and employers' associations. As Fitzenberger/Franz (1999) suggest, the social partners may bargain a wage with the option to reduce it, which is higher than a bargained wage without this option. Actually, as the use of opening clauses is conditioned on a certain firm-level situation, the introduction of opening clauses into collective agreements seems to indicate more decentralised wage bargaining accounting for a firm's situation. Alternatively, firms which are unable to pay the collectively agreed wage any longer might leave the collective bargaining coverage in order to enforce a wage reduction. However, a firm's duty to continue paying collectively agreed wages for a certain period after leaving the collective bargaining coverage, might bar firms – at least in the short run – from lowering remuneration by shifting wage setting to the firm level.

Summarising the theoretical results, an increase in international competition may lead to a decentralisation of wage bargaining due to differences between

large, high-productive exporters and small, low-productive non-exporters in how they adjust their labour demand. While exporters capturing further foreign markets face an increase in employment and wages, non-exporters are confronted with greater import competition and therefore have to reduce employment and wages. Hence, in contrast to exporters, non-exporters are in need of greater wage flexibility in order to deviate downwards from collectively agreed wages. If the social partners are willing to take into account prosperous exporters and crisis-ridden non-exporters, they might bargain for opening clauses in favour of non-exporting firms. This result is the opposite to that obtained by considering firm differences in the exposure to international competition. Accordingly, exporters need a strong ability to adapt to increased competition. Hence, exporters, not non-exporters, require greater wage flexibility.

To shed some light on the question of which firms need greater wage flexibility, we examine empirically potential firm-level determinants of the use of wage flexibility provided by opening clauses. Since we focus on the manufacturing sector, we are able to investigate both hypotheses simultaneously. The theoretical results based on the Bernard model not only suggest that non-exporting firms require opening clauses but also that they are smaller, have lower profits, and pay lower wages compared to exporters. Therefore, we additionally examine the potential effects of firm size, wage level, and profit situation.

4 Empirical investigation

4.1 Data

For the empirical analysis, we use data from the Establishment Panel of the Institute for Employment Research (IAB). The Establishment Panel is a representative sample of German establishments that employ at least one employee subject to social security (Kölling 2000). In addition to comprehensive establishment-specific information, the cross section of 2005 provides information on whether an establishment is covered by an industry-wide collective wage agreement, a firm-specific wage agreement, or by no collective agreement at all. In 2005, firms reported for the first time whether the collective bargaining agreement contains opening clauses and, if so, whether they had made use of them. We confine the data basis to firms in the manufacturing sector in western Germany which were covered by a central collective bargaining agreement in 2005.¹¹ We focus

¹⁰ In this context, a reduction in transportation costs in general equilibrium leads to an increase in aggregate productivity and a change in firm composition due to market exits and reallocation processes of production. From a dynamic point of view, it might affect the general framework of the next wage negotiations since the impact of large firms will increase. However, this is not of interest at this point.

¹¹ We consider solely firms with collective bargaining agreements. Establishments with firm-specific wage agreements are excluded, even though they apply the corresponding collective agreements. There are two reasons why we take only covered firms into ac-

only on those establishments whose collective bargaining agreement includes opening clauses.

In their study, Kohaut/Schnabel (2007) report that 23 % of all establishments under collective bargaining coverage in western Germany do not know whether opening clauses are included or not, while only 13 % stated that they were subject to collective bargaining agreements containing opening clauses. Using a data set from official statistics (German Structure of Earnings Survey) and an own survey of the prevalence of opening clauses in the manufacturing sector of Baden-Württemberg (IAW data set on opening clauses), Heinbach (2006) reports that in 2001 the relevant collective bargaining agreements provide wage-related opening clauses for 81 % of all employees covered by collective agreements. For another 10 % of all covered employees, the agreements contain opening clauses on working time.¹² Although Heinbach (2006) focuses only on employees in Baden-Württemberg, the share of establishments covered by a collective bargaining agreement with opening clauses in (western) Germany should be higher than reported in Kohaut/Schnabel (2007). Comparing the results based on register data on collective bargaining agreements and survey data on firms, firms covered by collective agreements appear not to know much about the prevalence of opening clauses.

The firm-specific knowledge on the prevalence of opening clauses within the relevant collective bargaining agreements therefore seems to be less reliable, especially in firms which do not need to use them. Hence, Kohaut/Schnabel (2007) conclude that the employers' associations should inform their members of the prevalence of opening clauses since a large share of (smaller) firms seems to have little knowledge of flexible collective bargaining agreements. To augment the share of firms covered by collective bargaining agreements with opening clauses, we add information about whether the dominating collective agreement within a collective bar-

count, although this constitutes a selection of firms. First, the cross section represents a selected sample and for covered firms the only way to decentralise wage setting is by using opening clauses, at least in the short run. Leaving the collective bargaining coverage is a possibility only in the long run, since firms are obliged to continue paying collectively agreed wages for a certain period after terminating their membership of the employers' association (*Nachwirkungspflicht*). Second, when also considering firms which were covered in 2004 and left collective bargaining coverage in 2005, the number of observations falls dramatically. Leaving coverage represents an alternative to the use of opening clauses, however in the short run merely from a hypothetical point of view.

¹² The share of establishments covered by collective bargaining agreements is larger in the manufacturing sector but reaches its maximum in the mining and energy sector in western Germany, where 28 % of all establishments report that opening clauses are available.

Table 1

Establishments covered by collective bargaining agreements with opening clauses. A comparison of IAB data and IAB data with CBA information, manufacturing sector in western Germany

	IAB data	IAB data with CBA information
	%	%
Establishments ...		
... with opening clauses	18	72
... without opening clauses	64	23
... do not know/not applicable	19	5
Total	100	100
Observations	1,192	1,203

Source: IAB Establishment Panel (Wave 2005) and IAW data set on opening clauses, own calculations (controlled remote data access via FDZ).

gaining area contains opening clauses.¹³ Information is then available for 104 out of 126 collective bargaining areas.¹⁴ We distinguish four types of opening clauses (Heinbach/Schröpfer 2007; Heinbach 2007): “no opening clauses”, “wage-relevant opening clauses”, “working-time opening clauses”, and “other opening clauses”. A collective bargaining area is classified if at least 80 % of the covered establishments can use the same type of opening clauses.¹⁵ Adding this information to the IAB Establishment Panel reduces the share of establishments answering “do not know/not applicable” by 14 percentage points. Table 1 shows a comparison of the

¹³ The added information on opening clauses is a kind of industry-specific information that is collected from the national archive of collective bargaining agreements. From this collection, over 90 collective bargaining agreements have been read carefully to determine the exact type and year of introduction of opening clauses.

¹⁴ The collective bargaining areas are based on 7 regions and 18 sectors (at the two-digit Nace Rev 1.1 level). There are 7 · 18 = 126 such areas.

¹⁵ The classification of the collective bargaining areas is taken from the combination of the German Structure of Earnings Survey (GSES) and the IAW data set of opening clauses. The GSES 2001 cross section is a linked-employer-employee data set from official statistics. It provides information on establishments from the manufacturing sector in Germany, as well as information about their workforces. For each worker, the data reports the collective bargaining agreement that is applied exactly. This creates an interface to add the IAW data set on opening clauses. The collective bargaining information is aggregated in two steps. At the establishment level, the collective bargaining agreement that is applied to the majority of workers is selected. Then the collective bargaining agreement is classified according to its type of opening clauses. In the second step, the establishments are aggregated to the collective bargaining area level. At the collective

original IAB data and IAB data with added information on opening clauses in collective bargaining agreements (IAB data with CBA information). Afterwards, additional information on opening clauses is only unavailable for 5 % (instead of 19 %) of the covered establishments in the manufacturing sector in western Germany, while the share of firms with opening clauses increases from 18 % to 72 %.¹⁶

By adding the information about opening clauses, we assume that all covered firms belonging to the same collective bargaining area can make use of the same type of opening clauses. This assumption disregards the fact that, firstly, firms in the same industry are sometimes covered by different (collective bargaining) agreements (Fitzenberger et al. 2008) and secondly, some firms adopt collective bargaining agreements from a different industry (Heinbach 2005). Since firms were only asked whether they were using opening clauses at that time, we do not know when they began using opening clauses. If a firm has been using opening clauses for some time, the data might already reflect an improvement in the firm's economic situation. Hence, an endogeneity problem occurs when it is difficult to separate the causes and the effects of using opening clauses. On account of this, we remove firms using opening clauses which evaluated their profit situation as positive. Since the use of opening clauses is not restricted to firms in poor economic situations, but is also possible if a firm's price competitiveness is in danger of deteriorating, we keep those firms which reported a positive profit situation but constant or decreasing sales.

4.2 Variables

Potential firm-level determinants of using opening clauses and their operationalisation are shown in Table 2. The theoretical results on differences in the exposure to competition suggest that exporters are more likely to use opening clauses. In contrast, the implications of the Bernard model suggest that only the most productive firms export and that non-ex-

porters use opening clauses. Examining both hypotheses, we focus on export as a measure of productivity as the key variable to explain the use of opening clauses. Since the theoretical results on differences in the reaction to competition also suggest that non-exporters are typically small, pay lower wages, and earn lower profits compared to exporters, we include firm size, wage level, and profit situation.

Following the Bernard model, export costs increase with the distance from the production location. Therefore, only the most productive firms can afford to export to far-off countries, whereas the least productive firms focus on the domestic market. Hence, the distance to the farthest region to which a firm exports should reflect its productivity. To rank the productivity of firms by their farthest export area, three dummy variables are included, distinguishing between exports to member states of the European Monetary Union (EMU), exports to countries of the European Union (EU), but non-EMU states, and exports beyond the EU, to non-EU countries. Firms exporting to non-EU countries are presumed to possess the highest productivity, while non-exporting firms are presumed to have the lowest. Accordingly, firms exporting to adjacent countries are expected to show a lower propensity for using opening clauses than non-exporting firms, but might be more likely to use them compared to firms exporting to far-off countries.¹⁷ By contrast, expecting exporters to require opening clauses due to a stronger exposure to international competition, the export dummy variables should show a positive sign.

To control for import competition, to which in particular non-exporting firms are exposed, we examine the corresponding industry-specific effect. We include a variable measuring the import openness at industry level as import shares in the sum of imports and gross value added by each industry. According to the implications of the Bernard model, we expect the marginal effect to be positive, as firms in industries with large import shares will be more likely to use opening clauses. Otherwise, if only exporters are exposed to international competition, import competition should have no effect on the use of opening clauses.

According to the implications of the Bernard model, the probability of using opening clauses might di-

bargaining area level, the collective bargaining area is classified analogously if the majority of firms (>80 %) is classified as having the same type of opening clauses.

¹⁶ No information is available for 22 collective bargaining areas as the share of establishments classified as having the same type of opening clauses is less than 80 %: "manufacture of food products and beverages" (2 regions), "manufacture of paper and paper products" (4), "manufacture of wood and wood products except furniture" (5), "recycling" (5), "manufacture of fabricated metal products, exclusive machinery" (1), "manufacture of machinery and equipment" (1), "manufacture of motor vehicles, trailers and semi-trailers" (1), "manufacture of furniture, jewelry and musical instruments" (2), "construction" (1).

¹⁷ In order to test whether export, that is the used dummy variables for the farthest export areas, is an appropriate measure for ranking productivity, we use the gross value added (sales minus intermediate inputs) per employee as a productivity measure instead of the export dummy variables. Since mainly large firms do not report their sales (Jensen/Rässler 2007), the estimation results are not representative of firms of all sizes.

Table 2
Operationalisation of potential determinants

Determinant	Operationalisation
Firm size	Dummy variables, number of employees (5 categories) reference: 1–9 employees
Export	Dummy variables, productivity ranking: export destination level: EMU countries (= 1) export destination level: EU countries, not EMU (= 1) export destination level: other countries, not EU (= 1) reference: firm does not export (= 0)
Industry import shares	Imports of industry/(imports + gross value added in industry)
Wage level	Wage bill/number of employees, adjusted for industry-level mean
Share of highly skilled employees	Share of employees with university (or university of applied sciences) degree, adjusted for industry-level mean
Wages above general pay scale	Dummy (1 = yes, exists)
Performance-dependent payments	Dummy (1 = yes, exists)
Profit situation	Dummy, firm's own evaluation 0 positive (rank 1, 2) 1 poor (rank 3 to 5)
Development of sales	Dummy, firm's own evaluation 0 certain expectations 1 uncertain expectations
Multiple-site establishment	Dummy (1 = yes)

Adjustment for industry-level means by division.

minish with increasing firm size, measured as the number of employees and subdivided into five categories. In a crisis situation, a firm is assumed to be more likely to use opening clauses. The firm's evaluation of its profit situation is included as a binary variable. It takes on the value 1 if the profit situation is evaluated as poor (0 positive).

We include the wage level of a firm adjusted for the industry-level mean. Although we have to consider that wages are endogenous due to the fact that the use of opening clauses lowers the wage level, the direction of a potential effect of the wage level can be determined for the following reason: due to payments above the collectively agreed pay scale, the variation in wage levels between firms is assumed to be high, whereas the extent to which firms are allowed to deviate from the present wage level is fairly low (Heinbach 2007). Hence, the estimated coefficient will be downwardly biased. Following the theoretical results of the Bernard model, highly productive, exporting firms are assumed to afford high wages and to be less likely to use opening clauses. Therefore we expect a negative effect of the wage

level on the use of opening clauses that is partially caused by the potential downward bias resulting from endogeneity. In contrast, if only exporters are strongly exposed to international competition and are therefore forced to use opening clauses, the coefficient of the wage level should show a positive sign (provided that exporters pay higher wages, see section 4.3). A potential downward bias resulting from using opening clauses will compensate for this effect to some extent.

A dummy variable indicating whether a firm remunerates above the collectively agreed pay scale (value 1) or not (value 0) is included. Since those wage elements can be conditioned on the firm's performance and allow a firm to adjust wages to the profit situation to some extent, a binary variable taking on the value 1 if variable remuneration exists should account for a potential impact on the propensity for using opening clauses. A wage level above the industry-level mean might be traced back to a larger share of highly skilled employees. A potential impact of the wage level on the probability of using opening clauses might diminish. For this

Table 3**Share of establishments covered by collective bargaining agreements, manufacturing sector in western Germany**

	CB coverage (%)
Total	41
1 to 19 employees	39
20 to 199 employees	45
200 or more employees	69
Exporters	37
Non-exporters	42

Source: IAB Establishment Panel (Wave 2005), own calculations (controlled remote data access via FDZ).

reason, we introduce the share of a firm's employees with university degrees (or degrees from a university of applied sciences) adjusted for the industry-level mean, as well.

In order to take into account differences in the exposure to exogenous shocks, an additional dummy variable is included indicating a firm's uncertain expectations regarding the development of sales (value 1). Since the need for greater wage flexibility should arise from increasing production fluctuations, we expect a positive sign.

Since our data basis provides information at establishment level, we have to take into account the fact that establishments which are part of an enterprise with more than one site (multiple-site enterprise) might behave differently in their use of opening clauses compared to one-site enterprises. For this

reason, a dummy variable is included which takes on the value 1 if the establishment is part of a multiple-site enterprise and 0 if the establishment is a one-site enterprise.¹⁸ Industry dummy variables control for potentially remaining industry-specific effects on the use of opening clauses, where "machinery and equipment" is used as reference.

4.3 Descriptive evidence

In the manufacturing sector, 41 % of all firms in western Germany are covered by a collective bargaining agreement (see Table 3).

In 2005, the share of firms covered by collective bargaining agreements is larger the larger the firms are. The share of covered firms is also larger among non-exporters. Overall, opening clauses are available for 72 % of the covered firms, though they are less prevalent in small firms than in large¹⁹ ones (see Table 4). A comparison of the figures based on IAB data with and without additional CBA information reveals that mainly small and medium-sized firms are unaware of the existence of opening clauses in their collective bargaining agreements. Among firms whose agreements have opening clauses, 34 % of the largest firms and 35 % of non-exporters use them.²⁰

¹⁸ The Bernard model assumes single-product suppliers with one manufacturing base, implying that firm size effects in theory should correspond to establishment size effects in the data.

¹⁹ Large firms have 200 or more employees. Data protection rules prohibit the publication of descriptive statistics for a more detailed categorisation.

²⁰ As the share of firms covered by collective bargaining agreements with opening clauses rose after adding information from the IAW data set on opening clauses, the share of firms using opening clauses is smaller than reported in Kohaut/Schnabel (2007).

Table 4**Establishments covered by collective bargaining agreements, manufacturing sector in western Germany**

	Number of employees			Non-exporters	Exporters	Total
	1-19	20-199	>200			
	%	%	%	%	%	%
IAB data						
Opening clauses provided	11	28	61	35	12	18
IAB data with CBA information						
Opening clauses provided	71	73	88	71	78	72
Opening clauses used	*	21	34	35	8	16

* insufficient number of cases.

Source: IAB Establishment Panel (Wave 2005) and IAW data set on opening clauses, own calculations (controlled remote data access via FDZ).

Table 5

Establishments covered by collective bargaining agreements with opening clauses, manufacturing sector in western Germany

	Number of employees			Non-exporters	Exporters	Total
	1–19	20–199	>200			
	%	%	%			
Wage level above average	37	7	84	38	77	48
Share of highly skilled above average	*	34	63	5	41	15
Wages above agreed pay scale	52	70	75	53	71	58
Performance-dependent payments	5	22	51	5	32	12
Profit situation evaluated as poor	92	76	64	91	76	87
Uncertain sales expectations	11	5	6	10	7	9
Multiple-site enterprise	5	21	62	7	26	12

* insufficient number of cases.

Source: IAB Establishment Panel (Wave 2005) and IAW data set on opening clauses, own calculations (controlled remote data access via FDZ).

Table 6

Potential determinants of using opening clauses, manufacturing sector in western Germany

Variable	Opening clauses not used (Y = 0), n = 890			Opening clauses used (Y = 1), n = 114		
	Obs.	Mean	St. Dev.	Obs.	Mean	St. Dev.
1–9 employees	875	0.520	0.500	114	0.275	0.448
10–49 employees	875	0.328	0.470	114	0.308	0.463
50–249 employees	875	0.109	0.312	114	0.314	0.466
250–499 employees	875	0.024	0.152	114	0.056	0.231
500 or more employees	875	0.020	0.139	114	0.048	0.214
Export (1 = yes)	831	0.251	0.434	106	0.375	0.486
Export destination level: EMU	831	0.091	0.288	106	0.032	0.176
Export destination level: EU	832	0.017	0.128	106	0.084	0.279
Export destination level: other countries	874	0.149	0.357	114	0.267	0.444
Industry import share	873	0.480	0.129	114	0.493	0.101
Profit situation: poor (ref.: positive)	875	0.866	0.340	114	0.920	0.273
Share of highly skilled employees	873	0.955	5.013	114	1.714	4.459
Wage level	790	0.981	0.460	100	1.305	0.380
Wages above agreed pay scale (1=yes)	870	0.573	0.495	114	0.668	0.473
Performance-dependent payments (1 = yes)	866	0.113	0.317	112	0.188	0.393
Sales expectations: uncertain (ref.: certain)	867	0.098	0.298	114	0.016	0.125
Multiple-site enterprise (1 = yes)	863	0.121	0.327	113	0.174	0.381

Number of observations varies due to missing values.

Source: IAB Establishment Panel (Wave 2005) and IAW data set on opening clauses, own calculations (controlled remote data access via FDZ).

Consistent with the theoretical results from the Bernard model, only 8 % of exporters do so.

The descriptive statistics depicted in Table 5 provide a first insight regarding the empirical relevance of the theoretically derived conclusions on the inter-relationship between firm size, export activity and other explanatory variables. Apparently, more than half of the plants with 200 or more employees are multiple-site enterprises. Also, the proportion of multiple-site exporters seems to be larger than the share of multiple-site non-exporters.

Large and exporting firms appear to be more likely to remunerate above the average wage for the industry. Among large firms, 84 % of the establishments pay above the industry average, while this is only the case in 37 % of the smallest firms. The share of exporters paying above the industry average is 77 % compared to a share of 38 % among non-exporters. Consequently, the corresponding proportions of firms paying wages above the collectively agreed pay scale and firms with variable remuneration are largest among the largest firms and among exporters. Also, the proportion of firms with shares of highly skilled employees which are above the industry average is largest in large and in exporting firms. Small firms are apparently more likely to evaluate their profit situation as poor than the largest ones. Among the non-exporters, 91 % reported being confronted with poor profit situations, while only 76 % of the exporters did. Also, uncertainty about future sales seems to be slightly higher in small and non-exporting firms.

Overall, particularly regarding a higher wage level in large, exporting firms, these findings are consistent with the theoretical conclusions drawn on the Bernard model. Whether these large exporters with wage levels above the industry average exhibit a lower propensity for using opening clauses is examined next. Table 6 provides information on the means and standard deviations of the regressors for firms using opening clauses and those not using them, respectively.

4.4 Econometric results

Based on year 2005 of the IAB Establishment Panel, we estimate cross-section logit models.²¹ The results discussed in this section refer to the estimated coef-

ficients and the average marginal effects (AME) of the exogenous variables.²² The results are depicted in Table 7.

All of the estimated models indicate that firms exporting solely to EMU member states have a slightly lower propensity for using opening clauses than non-exporters. Depending on the specification, the average marginal effect ranges between -0.05 and -0.04. The estimated coefficient of the corresponding variable is significant at the 5 % level across all specifications. However, there seems to be no difference between the propensity for use of non-exporting firms and that of firms exporting to countries beyond the euro zone since the coefficients of both corresponding export variables "EU countries" and "other countries" remain insignificant.²³

There are several possible reasons for this. Firstly, using the three dummy variables for the farthest export area to rank the productivity might be an imprecise measure. More precisely, differences in the relative distance to several export countries may not correspond with the intended productivity ranking generated by the dummy variables. For example, the distance to Switzerland (captured by "other countries") is shorter than to Greece ("EMU countries"). Secondly, we rely on the theory assuming that the distances to export regions reflect the firm's productivity, which we cannot scrutinise.²⁴ Thirdly, assuming that the export variables represent a precise and appropriate measure of productivity, the results may indicate further impact sources which compensate for the productivity advantage of firms exporting to non-EMU countries over non-exporters, e.g. currency effects.

Including the import share in model (3), we find no industry-level effect of import competition on the use of opening clauses.²⁵ Even though the marginal

²² Average marginal effects are the average changes in the probabilities of using opening clauses (Cameron/Trivedi 2005 and Train 2003). Varying the value of a continuous variable, the marginal effect denotes the average difference in the probability of using opening clauses expressed as percentage points. In the case of a binary variable, the marginal effect represents the average change in the probability when the dummy variable alters its value. Average marginal effects are calculated from the estimation results based on weighted observations. The corresponding standard errors are computed using the Delta method (Bartus 2005).

²³ Including a binary variable indicating the export status of a firm instead of the three export dummy variables (results not depicted), we find no significant difference between exporting and non-exporting firms in their use of opening clauses.

²⁴ Taking the gross value added per employee instead of the export dummy variables, there are no significant effects of productivity on the propensity for using opening clauses. However, these results are not representative of large firms (results not depicted).

²⁵ In the models (1), (2), and (4), we include industry dummy variables to control for industry effects. To estimate a potential impact of the industry-specific import share on the propensity for using opening clauses and to control simultaneously for residual

²¹ The use of the panel dimension of the data set would have led to a substantial reduction in the number of observations since we focus on the manufacturing sector.

Table 7

Determinants of using opening clauses, manufacturing sector in western Germany, ML-logit estimation, coefficients and average marginal effects

	(1)		(2)		(3)		(4)	
	coeff.	AME	coeff.	AME	coeff.	AME	coeff.	AME
10-49 employees (ref.: 1-9 employees)	1.0413 (0.7157)	0.0569 (0.063)	0.4254 (0.7978)	0.0202 (0.043)	0.0817 (1.0470)	0.0041 (0.054)	0.8329 (0.8632)	0.0391 (0.048)
50-249 employees	2.5237 (0.5917)***	0.2301 (0.097)**	1.5628 (0.7376)**	0.1013 (0.079)	1.2892 (1.0968)	0.0923 (0.127)	2.3831 (0.8009)***	0.1716 (0.109)
250-499 employees	2.5546 (0.6530)***	0.2636 (0.110)**	1.2348 (0.8007)	0.0811 (0.078)	1.1043 (1.0487)	0.0824 (0.117)	2.0891 (0.9258)**	0.1604 (0.118)
500 or more employees	2.3248 (0.6760)***	0.2284 (0.109)	1.1694 (0.8934)	0.0759 (0.084)	1.0887 (1.2462)	0.0812 (0.137)	2.1778 (1.1249)*	0.1722 (0.146)
Export destination level: EMU	-1.5071 (0.7404)**	-0.0461 (0.020)**	-1.6046 (0.7569)**	-0.0468 (0.022)**	-1.5328 (0.7754)**	-0.0476 (0.027)*	-1.6810 (0.7444)**	-0.0467 (0.021)**
Export destination level: EU	1.1303 (0.7997)	0.0785 (0.079)	0.9899 (1.0268)	0.0607 (0.084)	0.7838 (1.0069)	0.0522 (0.090)	0.9978 (0.9748)	0.0572 (0.073)
Export destination level: other countries	-0.3568 (0.5165)	-0.0159 (0.020)	-0.2961 (0.5136)	-0.0127 (0.020)	-0.3496 (0.5461)	-0.0163 (0.026)	-0.0962 (0.5065)	-0.0041 (0.021)
Profit situation: poor (ref.: positive)	1.2128 (0.4126)***	0.0430 (0.035)	1.2492 (0.4726)***	0.0424 (0.035)	0.9493 (1.6229)	0.0428 (0.032)	1.3175 (0.5094)***	0.0427 (0.035)
Wage level			1.2345 (0.7566)	0.0014 (0.034)	1.1779 (0.3251)***	0.0009 (0.045)	1.5167 (0.7581)**	0.0232 (0.032)
Industry import share					1.1109 (0.9089)	0.0472 (0.094)		
Share of highly skilled employees							-0.0703 (0.0455)	0.0000 (0.002)
Wages above agreed pay scale							-0.7724 (0.6022)	-0.0356 (0.019)*
Performance- dependent payments							-0.2630 (0.4642)	-0.0107 (0.018)
Sales expectations: uncertain (ref.: certain)							-2.1447 (0.9638)**	-0.0498 (0.023)**
Multiple-site enterprise							-0.5144 (0.5751)	-0.0200 (0.017)
Constant	-5.8762 (0.6796)***		-6.6333 (0.8004)***		-5.7836 (0.9604)***		-6.8660 (0.8410)***	
Observations	937		849		847		824	
Log-likelihood	-169.0461		-143.8916		-164.6711		-130.5784	
Pseudo-R ²	0.1861		0.2213		0.1108		0.2617	
LR test. model specification	103.6***		122.45***		257.93***		162.13***	
Wald test. firm size dummies	22.79***		6.43		3.85		14.89***	
Wald test. industry dummies	18.39		21.78**				23.85**	

Estimates refer to observations weighted by the inverse sample selection probabilities. Robust standard errors for model (1), (2), (4) and clustered robust standard errors for model (3) in parentheses, coeff. coefficient, AME average marginal effect.

* significant at 10 %; ** significant at 5 %; *** significant at 1 %

Source: IAB Establishment Panel (Wave 2005) and IAW data set on opening clauses, own calculations (controlled remote data access via FDZ).

effect has a positive sign, the estimated coefficient remains insignificant. Instead of an effect of the in-

industry effects, we estimate model (3) with data clustered by industries. Estimating clustered robust standard errors, we allow for correlated firms within the same industry, but require firms to be independent across industries (Rogers 1993 and Cameron/Trivedi 2005).

dustry-specific import competition, we find overall industry effects on the propensity for using opening clauses when entering industry dummy variables in all models except (3). Testing for the joint significance of the estimated coefficients by performing a Wald test, the results in model (2) and (4) indicate that differences exist between industries.

A firm's profit situation seems to be relevant as the estimated coefficients are significantly positive in nearly all specifications. Firms which evaluate their profit situation as poor have a 4 percentage points higher probability of using opening clauses compared to firms which evaluate their profit situation as positive.

With respect to the firm size, models (1) and (2) indicate an effect on the use of opening clauses. The estimated coefficients of the three dummy variables capturing the largest firms are positive and significant in both models. However, only model (1) exhibits significant marginal effects. Compared to a small firm, a firm with at least 50 employees has on average a higher propensity for using opening clauses. The largest firms with at least 500 employees seem not to differ from the smallest. The firm size effect disappears when the wage level is introduced (model 2). Based on the Wald test, the estimated coefficients of the firm-size dummy variables are tested for joint significance. Even though we control for the wage level, the null hypothesis of zero-coefficients is rejected in model (4) at a 1 % level. Though the result with respect to firm size seems to be sensitive to the specification, it suggests that predominantly small firms use opening clauses.²⁶

We find slight evidence of a positive impact of the wage level, indicating that firms with a high wage level make use of opening clauses more frequently. Even though the average marginal effect is insignificant across all specifications, the estimated coefficients are significant at the 5 % level. In model (4), we control for the share of highly skilled employees, whether a firm remunerates above the collectively agreed pay scale, and whether a firm pays variable wage elements. The respective coefficients remain insignificant. However, the existence of wages above the collectively agreed pay scale appears to have a negative impact on the propensity for using opening clauses as the average marginal effect of the dummy variable is slightly significant. In contrast, the existence of variable wage elements seems to have no effect.

With respect to the exposure to exogenous shocks depending on a firm's international activities, the coefficient of the dummy variable capturing sales expectations is found to be significant but has the wrong sign. Apparently, firms with uncertain expecta-

tations about the development of sales are less likely to use opening clauses than firms with certain expectations.

Overall, regarding the two competing hypotheses about whether exporters or non-exporters need greater wage flexibility, our results are ambiguous. Supporting the implications of the Bernard model, we find exporters supplying EMU countries to be less likely to use opening clauses than non-exporting firms. Moreover, firms evaluating their profit situation as poor appear to use opening clauses more frequently than other firms. However, firms exporting to countries beyond the euro zone do not seem to differ from non-exporters. Also, concerning firm size and wage level, our results are not in line with the implications of the Bernard model. On the contrary, they suggest that mainly large firms use opening clauses and that the probability of use increases as the wage level rises.

5 Summary and outlook

In this paper, we have asked theoretically whether an increase in international competition leads to a decentralisation of wage bargaining. Current theories refer to firm-level differences in the exposure to international competition and suggest that exporters, not non-exporters, are in need of greater wage flexibility due to a rise in competition. By contrast, we consider firms to be equally affected by competition but assume differences in their reaction to tougher competition. Drawing on the implications of the theoretical trade model of Bernard et al. (2003), we are able to explain verbally how differences between firms in their adjustment to increased competition leads to an increase in the heterogeneity of individual labour demand and, thus, to more decentralised bargaining. In contrast to the result assuming differences in the exposure to international competition, we found low-productive non-exporters to need greater wage flexibility than highly productive exporters. By using the firms' export activity as a measure of productivity, we have tested both hypotheses empirically. Using establishment-level data on the western German manufacturing sector, we have examined whether the use of opening clauses is related to export activity, firm size, wage level, and profit situation. We have added information on the existence of opening clauses at the level of collective bargaining areas to improve the IAB data. The share of establishments that do not know whether the relevant collective bargaining agreement contains opening clauses could be reduced considerably.

²⁶ One has to bear in mind that the share of large firms allowed to use opening clauses is larger than the proportion of small firms (Heinbach 2006).

Empirical findings on both hypotheses exhibit an ambiguous picture for the manufacturing sector in western Germany. Summarising the results, firms whose farthest export destinations are EMU countries are found to have a lower propensity for using opening clauses than non-exporters. This is in line with the implications of the Bernard model which suggest that firms differ from each other in their reaction to increased competition rather than in their exposure to competition. However, it seems that there is no difference between non-exporters and firms exporting to the remaining EU countries or beyond. Furthermore, firms which evaluate their profit situation as poor have a higher probability of using opening clauses than prosperous firms, which is also consistent with the implications of the Bernard model. Our results concerning firm size and wage level are ambiguous. Large firms seem to be more likely to use opening clauses, but the firm size effect vanishes when the firm's wage level is controlled for. Nevertheless, we find the coefficients of the firm size dummy variables jointly significant. Although the marginal effect of the wage level is insignificant, slight evidence is found of an increasing propensity to use opening clauses with increasing wage levels.

Since we found non-exporters to be more likely to use opening clauses than firms exporting to EMU countries, our results slightly support the hypothesis that the reaction to increased competition rather than the exposure to competition is crucial for whether a firm uses opening clauses or not. However, conclusions from this analysis must be drawn with caution for the following reasons. As we had to rely on cross-section data, we were not able to examine the effect of increased competition on the propensity for using opening clauses. Moreover, even a causal interpretation of these results might be spurious due to potential endogeneity problems. However, providing a first insight into the relationship between using opening clauses and – in the first instance – the firms' export behaviour, our results suggest rejecting the hypothesis that only exporting firms are exposed to international competition and that they therefore require greater wage flexibility than non-exporters. Hence, the discussion about greater wage flexibility at firm level should be resumed taking into account that a firm's trade openness also represents its ability to cope with international competition. Negative effects on employment might be prevented if the social partners agree on elements of flexible wage setting being developed to allow for divergent labour market reactions due to increased competition.

The results of this paper provide only a first insight into whether an increase in international competi-

tion causes a decentralisation of wage bargaining. Regarding international trade theory, further research on the consequences of a rise in competition on the level of bargaining represents an interesting issue. Further empirical research on the use of opening clauses should incorporate the panel dimension. This will allow us to study the impact of a firm's performance on the use of opening clauses taking into account firms which leave the collective bargaining coverage. Moreover, examining the impact of using opening clauses on a firm's performance will clarify whether they represent an appropriate action to overcome crisis situations.

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