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

Stefanie Schröpfer Wolf Dieter Heinbach

- Preliminary Version, September 11, 2007-

Abstract

The prevalence of opening clauses in collective bargaining agreements may indicate a tendency to a higher decentralised wage setting. Increasing competition on international product markets is often assumed to be the reason for wage-setting decentralisation, whereas theoretical explanations focus currently on the change of production structure and the impact of exogenous shocks. Incorporating stylised facts about exporting firms, new trade models suggest a different way of adjustment to increasing competition depending on the firm's nature. While the most productive exporters expand into new markets, small, less productive non-exporters are threatened by import competition. Based on a model from Bernard et al. (2003) we apply the theoretical implications to explain why decentralisation in wage-setting may arise. We examine in a second step whether small, less productive, non-exporting firms paying low average wages, possess a higher propensity to use opening clauses than more productive, large exporters exhibiting a high wage level. Based on establishment data ("IAB-Betriebspanel") covering the German Manufacturing, our results suggest that exporters have a lower propensity of using opening clauses. However, inconsistent with theory we observe a rising propensity of usage with increasing firm size and increasing wage level.

^{*} Corresponding Author: Stefanie Schröpfer, Institute for Applied Economic Research (IAW), Ob dem Himmelreich 1, 72074 Tübingen, Germany, steffi.schroepfer@freenet.de. Financial Support from the German Science Foundation (DFG) under the programme "'Potentials for Flexibility in Heterogenous Labor Markets"' (RO 532-7/2) is greatfully acknowledged. We are also thankful to Martina Huber for data processing and accomplishing the data protection checks at the Research Data Centre (FDZ) of the Federal Employment Service (BA) in the Institute for Employment Research (IAB).

1 Introduction

With regard to the persistent high unemployment and a stiffer international competition on product markets, social agents are often criticised for undifferentiated collective wage agreements. In the public debate, a stronger firm-level differentiation of collectively agreed wages is often claimed. Remuneration should be more align with the firm's profit situation since dissimilarities would increase between firms within an industry by rising competition. A higher decentralised wage settlement in terms of a higher magnitude of wage flexibility on firm level would allow firms to counter occurring crisis situations by reducing wages temporarily in order to avoid staffing cutbacks.

Regarding firms covered by collective wage agreements of the German Manufacturing,¹ bargaining takes place predominantly on industry-level. Wage differentiation between regions and qualifications varies enormously between collective bargaining agreements. Contemplating the extent to which firms possess the possibility to adjust wages to the local situation, firms covered by a collective bargaining agreement are unrestrictedly allowed to differentiate wages above the general pay scale (","ubertariflich"). This can also be a matter of additional variable remuneration, whose amount depends on the performance of the firm or on the job (Kurdelbusch 2002). Firms remunerating above the general pay scale possess the possibility to offset a collectively agreed wage rise against these wage elements (e.g. Bahnmüller et al. 1999). Hence, wages above the general pay scale allow firms to adapt remuneration to the firm performance to a certain extent, even though an agreement between management and work council (,,betriebliche Bündnisse") might be necessary in order to reduce or revoke these wage elements (e.g. Hübler 2005). The possibility to undercut collectively agreed wages on the firm level has been finding its way in the beginning of the Nineties, when so-called opening and hardship clauses started to be introduced into 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 under-run the collective wage directly (Bispinck/WSI-Tarifarchiv 2003, Heinbach 2006, Kohaut/Schnabel 2007).

Keeping the demand on a higher decentralised wage setting in mind, so far no evidence exists on the question whether the use of opening clauses as an element of local wage flexibility is related to an increase in international competition on product markets. In this paper, we anal-

¹ The coverage of firms has declined in recent years. In 2005, around 41% of all manufacturing plants have been covered by collective bargaining agreements (own calculation based on German Establishment Data ("IAB-Betriebspanel).

yse theoretically why internationalisation in this terms may lead to a higher decentralised wage settlement. First presenting two existing explanatory approaches, we look then at the implications of the trade model from Bernard et al. (2003) which incorporates firm-level differences. Moreover, we use the model's implications to explain how a different way of adjustment to increased competition leads to a rise in heterogeneity of individual labour demand and thus possibly to a higher decentralised wage formation. Using plant-level data of German Manufacturing, we test the hypothesis whether small, less productive, non-exporting firms paying low average wages, possess a higher propensity to use opening clauses than more productive, large exporters exhibiting an high wage level.

This paper is organised as follows. Section 2 gives a definition of decentralisation and should shed some light on the question to which extent opening clauses can be seen as an indication for a higher decentralised wage settlement. At the beginning of Section 3, the two current approaches explaining decentralisation as a result of internationalization are outlined. Then, we present an own theoretical approach based on the model from Bernard et al. (2003) and provide previous empirical evidence on the prevalence and use of opening clauses. In Section 4 we investigate the formulated hypothesis empirically. We describe the database initially, give first insights by descriptive statistics and present our estimation results subsequently. Finanlly, section 5 concludes.

2 Opening Clauses – Indication of Wage-Setting Decentralisation?

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

The question to which extent the introduction of opening clauses constitutes a process of organised decentralisation should be discussed considering the flexibility a firm gains thereby. First, the use of opening clauses requires a firm to be in a certain economic situation, for instance in financial distress or threatened by a deterioration of its price competitiveness. Secondly, the degree of the firm's possibility to deviate from the agreed wage varies substantially. Governed by collective bargaining agreements some firms are allowed to reduce the basic remuneration or the collectively agreed extra payments (e.g. extra vacation payment) by a certain percentage, while other firms have merely the possibility to postpone the date of outpayment. The firm's flexibility is thirdly determined by the level of decision making about the use of opening clauses. Some collective bargaining agreements allow negotiation on local level, between management and working council, while other require an agreement between trade union and employers association. Mixed forms, for instance the social partners' right of information, are also common practice.² Overall, opening clauses can be seen as local elements of wage-setting – and thus their introduction as a process of organised decentralisation – although their use is strongly regularised by bargaining agreements.

3 Internationalisation and Decentralisation of Wage Settlement

3.1 Two Theoretical Approaches

Since the beginning of the Seventies, a reduction in communication, information and transport costs and a liberalisation of product and financial markets has been observed. Considering internationalisation as a possible reason for a higher decentralised wage bargaining, one has to account for interdependencies between internationalisation, technological progress, and structural change. An increased intensity of product market competition is associated with a downsized price setting margin of firms. In order to maintain price competitiveness, a firm is piled on a strengthening pressure to invest in more efficient technologies. By launching novel products, the cost pressure is reduceable as product-specific market power can be raised. From a macroe-

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

conomic point of view, a growing intensity of competition boosts the incentive to technological progress. This leads to an accelerated structural change even within the sector. A higher international division of labour – reflected in a growing share of imported inputs in revenue and labour-saving technological progress – affects changes on the labour market, for example an increasing demand of high-skilled employees at the expense of the low-skilled.

One might assume that a collective change of firms' interests should bear on the behaviour of the employers' association in a way that the result of wage negotiations should be alike for all firms. Hence, a tendency to higher decentralised wage bargaining should be initiated by a rising divergence of firms' interests. On this note, certain changes aroused by internationalisation must affect firms differently and might be reflected in an increasing heterogeneity of the individual labour demand functions. Some theoretical approaches exist to explain how internationalisation could have been led to higher decentralised wage bargaining. But a rise in heterogeneity of firms' interest seems not to occur inevitably.

Above all, a changing production structure accelerated by internationalisation is argued to be the reason for the incidence of higher decentralised wage formation. The fabrication of high-standardised mass products has been displaced by high-qualitative, customised, and human capital intensive goods. In comparison to mass production, this so-called post-fordistic production structure exhibits a less in-plant division of work. Katz (1993) argues that a change of production structure is associated with an adjustment of work processes and organisation structures in such a way, that more authority to decide and responsibility are placed on employees. At first, the implementation would require a relaxation of collectively agreed regulations relating to the working time. Subsequently, a tendency to a more decentralised wage setting should result from employees' stronger involvement in management decisions due to a rising own interest in local wage formation.

Berthold/Fehn (1996) argue for a firm-level wage formation by reason that firms should possess sufficient power-making authority to be able to take information and reaction advantages over competitors to implement new technologies. A more intensive employee participation on management issues necessitates furthermore a compensation which is charged by the firm or job performance. In conjunction with a highly skill-based wage dispersion, performance-related payments increase working motivation and the incentive to take part in professional training. For Berthold/Fehn (1996), the coexistence of both post-fordistic and mass production would lead to dehiscing firm interests. Predominantly emerging firms of small or medium size typically possessing post-fordistic production structures would be barred from rearranging working

processes and also from introducing variable remuneration components designed even to undercut the collectively agreed wage. This prompts firms with new production structure either to leave the coverage or a tendency to higher decentralised collective wage agreements emerges.

An alternative approach to explain, why tendencies to a higher decentralised collective wage setting may be traced back to internationalisation, concerns the exposure by and the reaction on exogenous demand and supply shocks (Barba-Navaretti/Venables 2004). Companies are more frequently hit by an exogenous shock if they are internationally active. Whether exporting or abroad producing firms are more concerned than national-focused companies depends on the magnitude and correlation of shocks, respectively. Moreover, the firm's reaction on labour market shocks may vary with its international openness. International-active firms might possess a higher elasticity of labour demand entailing a rise in wages to reduce employment more severe compared to nationally focused firms. Regarding the opposite direction of causality, 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 coverage of collective wage agreements ceases on country's boundaries, while firms are able to shift production abroad easier. In this connexion, the upper bound of wage claims should be adapted to labour costs in other, comparable countries, otherwise decentralisation tendencies would be provoked.

Combining both explanation approaches, a change of firms' production structure and a different impact of and reaction on exogenous shocks, Bertold/Stettes (2001) suggest that an increasing openness of product and financial markets would make the environment of firms more volatile, especially for these with post-fordistic production structure. They would be more concerned by industry-specific demand shocks since they focus solely on core business segments.

3.2 Own Conclusions on a Trade Model

Decentralisation tendencies as a result of internationalisation are often explained as a whole by a diverging performance of firms by reason of increasing international competition on product markets. For instance, Kohaut/Schnabel (2007) justify the emerging of opening clauses by a growing heterogeneity of firms. Regarding potential reasons of decentralisation tendencies, the change of production structure and the impact of exogenous shocks seem to be the sole theoretical explanations since in the literature nothing is to find about on how internationalisation

affects firms in such a way that decentralisation should arise with increasing heterogeneity of firms and what this divergence in firm performance might consists of.

However, stylised facts about the correlation of firm size, productivity and export behaviour give reason to conceive a different way of adjustment of firms to tougher competition depending on the firm's attributes. Empirical evidence suggests that firm productivity is crucial for whether it exports or not. While the most productive firms are larger and can afford to export, the less productive ones are small in size and focus on the domestic market.³ Furthermore, export costs seem to increase with higher distance to the export destination. Empirical results uncover that only the most productive firms appear to be able to export in countries beyond the euro-zone (Wagner 2007c). Examining wage level differences in dependency on export status, Bernard/Wagner (1997) find evidence for a significantly larger share and an higher average wage of white-collar employees in exporting firms. This so-called export premium seems to be to increase with rising export intensity.⁴ Using merged employee and plant data, results from Schank et al. (2007) indicate an equal average wage in exporting and non-exporting firms, but a rising remuneration disparity the higher the export intensity for both blue- and white-collar employees, respectively. These results hold even controlling for employees' characteristics.

Recent developments in trade theory incorporate dissimilarities of firms. Hence, besides examining the consequences of trade to a country as a whole, firm-specific performance and therefore reallocation processes in production within a country are observable. Besides the Melitz (2003) model, the trade model from Bernard et al. (2003) is one of the prominentest. Firm level heterogeneity is created by differences in technological efficiency between firms. Transport costs are the sole trade barrier, which accrue from export activity and depend on the production costs. In a framework of Bertrand competition, each country potentially produces a certain good, but each country demand exclusively from that (possibly foreign) supplier, which serves with the lowest costs and hence, charges the lowest price. Further on a constant, identical elasticity of substitution between goods and consumers which love product variety are assumed. Bernard et al. (2003) show that in a world with a finite number of countries producers select themselves into exporting and non-exporting firms in dependency on their production costs and the costs which arises from transport to foreign markets. It turns out that the most efficient producers possess the highest productivity and serve foreign markets. Although they set the highest mark-up to maximise profit, they charge a lower price than domestic or foreign rivals. Due to their export

³ Arnold/Hussinger 2005 and Wagner 2007b provide empirical evidence based on different plant level data from West-Germany. Wagner 2007a gives a survey on empirical results of several countries.

⁴ Empirical results base on plant level data of Lower Saxony.

activity and additionally as a result of attaining higher revenues on the domestic market, high efficient producers are larger in size. By contrast, less efficient suppliers are less productive, set lower mark-ups and focus on the domestic market.

Considering domestic suppliers of any country and keeping these firm level differences in mind, how does an increase in intensity of product market competition affect firms in detail? Bernard et al. (2003) show that a global reduction in transport costs enables the most productive suppliers to enhance their revenues. High-productive exporters launch goods in new markets, while more productive firms among the non-exporters start to export. By contrast, the least productive producers are confronted with a falling cost advantage over their next foreign competitor, some of them must even leave the market as foreign suppliers obtain cost advantages over them.⁵ Regarding the country's labour market and keeping wages constant, one might assume increasing employment in expanding firms, while firms losing their cost advantage might shed labour to compensate a decline in revenues. However, trying to draw conclusions on how labour demand is affected by an increase in competition intensity, the general equilibrium of any sector has to be considered. In order to avoid income effects, the general equilibrium requires a closed form developed by treating labour as input factor to produce one preliminary product. This enters the fabrication of each good considered. Workers are compensated by the market-clearing wage rate. Thus, neither situations of unemployment are possible, nor institutional facts are accounted for. Overall, even though the model reveals implications referring to differences in firm performance caused by rising competition, a possible change of firm-level and aggregated labour demand is ignored.

Albeit this fact, beyond the scope of the model basic consequences concerning the labour demand might be derived assuming additionally a collectively agreed wage. Rethinking the effect of a reduction in transport costs, covered firms threatened by market exit might secure their existence and thus jobs by paying lower wages. By contrast, producers expanding in new markets would raise their employment in order to face the quantity effect and might even hike wages since empirical evidence suggest higher average wages in exporting firms. Consequently, a potential dissimilarity of firms might appear also in a growing variance of individual labour demand curves and thus more heterogenous wage-setting interests of employers. While increased competition causes less productive, small non-exporters to reduce employment due to increased

⁵ Melitz (2003) establishes a similar trade model with firm level heterogeneity in a monopolistic framework. In contrary to Bernard et al. (2003), increasing competition on product markets may occur in three different ways: A rise in trade liberalisation as an increase in potential trading partners, a reduction of fixed export costs, and a reduction of variable transport costs. In order to describe basic consequences regarding firm performance, Bernard's et al. model framework is sufficient.

cost pressure and a worsened profit situation, exporters are in the opposite situation. Hence, tendencies to a higher decentralised wage-setting within the bargaining regime may come up when social agents attempt to avoid a reduction in employment, but simultaneously trade unions want their members to participate in increasing profits of prosperous firms.⁶ Since the use of opening clauses is conditioned on a certain firm level situation – in particular often on a bad profit situation – a more flexible wage-setting by introducing opening clauses seems to be plausible. Alternatively, firms which cannot bear the collectively agreed wage any longer might leave the coverage in order to enforce a wage reduction. However, the firm's duty to pay agreed wages even after terminating the employers association's membership ("Nachwirkungspflicht") might bar firms at least in the short run from lowering remunerations by downscaling the wage-setting to the firm level.

To shed some light on the question, which firms might rely on opening clauses, we examine potential firm level determinants of the use of opening clauses empirically. Concretely, we test the hypothesis whether small, less productive non-exporters paying low average wages, possess a higher propensity to use opening clauses than more productive, large, exporting firms exhibiting an high wage level.

3.3 Previous Empirical Evidence

Opening clauses allowing firms to go below collectively agreed minimum standards are widely spread in Manufacturing. For Baden-Wuerttemberg, Heinbach/Schröpfer (2007) find that 91% of all employees in firms covered by bargaining agreements has been potentially concerned by opening clauses in year 2001. 83% of employees in covered firms could have been concerned by opening clauses which allow to undercut the agreed wage. Furthermore, opening clauses exist obviously more frequently in large than in small firms (Heinbach 2006).

Kohaut/Schnabel (2007) provide the first and currently sole empirical evidence on firm level determinants of the use of opening clauses based on German establishment data ("IAB-Betriebspanel"). While factors determining the use of opening clauses on working time have not been detected, the use of opening clauses on wages is obviously influenced by several variables. The likelihood of use increases significantly with negative expectations regarding the future profit situation and

⁶ In this context, a reduction in transport costs in general equilibrium leads to an increase in aggregated productivity and a change in firm composition due to market exists and reallocation processes of production. From a dynamic point of view it might affect the general framwork of next wage negotiations since the impact of large firms would increase. However, this should not be of interest at this point.

the development of workforce. Likewise, firms with a situation of production facilities evaluated as obsolete possess a higher propensity to use opening clauses than firms with facilities judged as new. Firm size measured as number of employees and export activity seem to be irrelevant.

Like Kohaut/Schnabel (2007) we use the German establishment data ("IAB-Betriebspanel") in order to test the formulated hypothesis. Since Kohaut/Schnabel (2007) comprises also firms of industries producing non-tradables, a separate analysis of the Manufacturing Sector may reveal different results in particular concerning export activity. Moreover, we modify the database in order to mitigate problems concerning endogeneity and missing information about the availability of opening clauses.

4 Empirical Investigation

4.1 Data

In our empirical analysis we use data from the IAB Establishment Panel. The data base covers a representative sample of German establishments employing at least one employee subject to social insurance contributions (see e.g. Kölling 2000). Besides a large number of establishment-specific information, the cross-section in the year 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 addition, firms reported whether the collective bargaining agreement contains opening or hardship clauses and if so whether those clauses had been applied. The data is constrained to firms covered by a central collective bargaining agreement in the manufacturing sector in Western Germany in 2005. We focus only on those establishments whose bargaining agreement provides opening clauses.

In their study Kohaut/Schnabel (2007) report that 23% of all establishments under collective bargaining coverage in Western Germany and 16% in Eastern Germany do not know whether opening clauses are provided or not. Only 13% report that the respective bargaining agreement contains opening clauses. Using the German Salary and Earnings Survey, a data set from official statistics and an own survey of the prevalence of opening clauses in the manufacturing sector in the German state of Baden-Wuerttemberg, Heinbach (2006) reports for the year 2001 that for

81% of all collectively covered employees the relevant bargaining agreements provide wagerelated opening clauses. For another 10% of all collectively covered employees the bargaining agreements contain opening clauses on working time.⁷ Although the study of Heinbach (2006) focusses only on employees in Baden-Wuerttemberg, 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) as collectively covered firms do obviously not know much about the prevalence of opening clauses especially when they actually do not need them.

To reduce the share of establishment with "zero knowledge" on opening clauses, the information whether the collective bargaining agreement contains opening clauses was imputed extending results from Heinbach/Schröpfer (2007) to the IAB Establishment Panel. For each sector⁸ of the manufacturing sector in Western Germans an opening clause type was derived. A sector belongs either to the type "no opening clauses", "wage relevant opening clauses", "working-time opening clauses" or "other opening clauses" if at least 80% of the employees are covered by the same type of opening clauses within each sector. The information was then combined with the IAB Establishment Panel. Table 1 compares the original survey data with the imputed collective bargaining information data. Afterwards for only 5% of the covered establishments in the manufacturing sector in Western Germany no additional information on opening clauses is available.

This represents a reduction by 14 percentage points. In addition, the imputation of opening clauses information raises the share of firms with opening clauses from 18% to 62%.

	IAB Est. Panel	IAB Est. Panel with imputed cba-information		
	in %	in %		
no opening clauses	64	34		
opening clauses	18	62		
do not know	19 ⁹	5^{10}		
Total	100	100		
# obs	1134	1203		

 Table 1: Comparison of firms covered by collective bargaining agreements with opening clauses

⁷ The share of collectively covered establishments is higher in the manufacturing sector but achieves its maximum in the mining and energy sector in Western Germany where 28% of all establishments report that opening clauses are available.

⁸ Two-digit NACE Rev. 1.1 level

⁹ This is the share of establishments which do not know if the collective bargaining agreement provides opening clauses

¹⁰ This is the share of establishmens for which no additional information on opening clauses is available.

By imputing the opening clauses informations we assume that all covered firms which belong to the same sector can make use of the same opening clause type. This assumption ignores the fact that firms in the same sector are covered by different collective bargaining agreements and some firms adaptating bargaining agreements from a different sector (see Heinbach 2005).

[TO BE WRITTEN:

Reducing the endogeneity problem focussing only on firms in a bad economic situation.

Justify the focus on cross section instead of using panel dimension (no information on opening clauses in former waves, reduced number of observations,...).]

4.2 Descriptive Evidence

In the manufacturing sector in Western Germany 41% of all firms are covered by a collective bargaining agreement (see table 2). In 2005 for 62% of those firms opening clauses have been available (see table 1). The share of covered firms is the higher, the larger the firm and higher with non-exporting establishments.

	coverage
	in %
total	41
1 to 19 employees	39
20 to 199 employees	45
200 and more employees	69
exporting	37
non-exporting	42

Table 2: Bargaining Coverage. Manufacturing sector in Western Germany, 2005. Source: IABEstablishment Panel, own calculations

Taking only covered firms into account 56% of them report that they pay wages above the general pay scale, whereas in larger establishments this share is about 75%. More exporting firms pay wages above than non-exporting (see table 3). In smaller firms opening clauses are less prevalent than in larger firms. In 59% of the covered firms with less than 19 employees collective bargaining agreements contain opening clauses. The respective share is 70% in firms with 20 to 199 employees (83% in firms with 200 and more employees). But only 22% (37%) of those establishments make use of it.¹¹

¹¹ As the share of covered firms with opening clauses has risen after imputing additional information from the IAW

	number of employees					
	1–	20 -		non-		
	19	199	> 200	exporting	exporting	Total
above collective wage	49	72	75	52	69	56
opening clauses (imputed) ¹²	59	70	83	59	71	62
use of opening clauses	*	22	37	43	9	19
opening clauses (IAB est.)	11	28	61	35	12	18

 Table 3: Descriptive Statistics. Firms covered by collective bargaining agreement, manufacturing sector in Western Germany, 2005. Source: IAB Establishment Panel, own calculations

4.3 Econometric Estimation

4.3.1 Variables

Potential firm-level determinants of using opening clauses and their operationalisation are described in table 4. Following our hypothesis, we focus on firm size, productivity, export and wage level as key variables to explain the use of opening clauses.

According to the model's implications, only the most productive firms should export. Exporting firms should take higher mark-ups compared to non-exporting firms. They are expected to be larger due to export sales and higher revenues realised on the domestic market. Own conclusions (and previous empirical evidence) suggest that exporting firms are more likely to pay higher wages.

Since theoretically transport costs depend on the distance between countries, only the most productive firms can afford to export to far-off countries, while the less productive ones focus on the domestic market. Accordingly, firms exporting to adjacent countries are expected to show a lower propensity using opening clauses than non-exporting firms, but might be more likely to use them compared to firms exporting to far-off countries. To account for the firm's farthest export area, three dummies are included which distinguish between exports to member states of the European Monetary Union (EMU), exports to non-EMU countries but to states of the European Union (EU) and exports to non-EU countries.

Information on the firm-level capital stock is not available in the IAB establishment panel. In

data set on opening clauses, the share of firm using opening clauses is smaller than reported in Kohaut/Schnabel (2007).

¹² This is the share of establishmens for which no additional information on opening clauses is available.

Determinant	Operationalisation		
firm size	dummies, number of employees (5 categories)		
	reference: 1–9 employees		
	alternatively: logarithmic number of employees		
productivity	dummy, situation of the production facilities evaluated by the firm		
	0 new (rank 1, 2)		
	1 obsolete (rank 3 to 5)		
export	dummy, EMU member states are farthest-off export region $(= 1)$		
-	dummy, EU (non-EMU) member states are farthest-off export region (= 1)		
	dummy, non-EU states are farthest-off export region $(= 1)$		
	reference: firm does not export $(= 0)$		
wage level	wage bill/number of employees,		
	adjusted by industry-level mean		
share of high-skilled	share of employees with university (or university of applied sciences)		
	degree, adjusted by industry-level mean		
above collective wage	dummy (1 = yes, exists)		
firm-performance depend- ing remuneration	dummy (1 = yes, exists)		

Table 4:	Operational	isation of	determinants
----------	-------------	------------	--------------

Source: Own presentation.

this case it is common to use the labour productivity (turnover per employee) as productivity measure. Since predominantly large firms regularly do not declare their turnover (Jensen/Rässler 2007) our estimates using labour productivity as productivity measure are not representative for firms of all sizes. To avoid the problem of systematic missing values we use a variable with 5 categories giving information about the situation of the firm's production facility. Modified to a binary variable, it takes the value 1 (0) if a firm ranks its production facility as obsolete (new).

The probability of using opening clauses might diminish with increasing firm size measured as number of employees subdivided into five categories. Alternatively, all estimates are conducted using the logarithmic number of employees (not depicted).

Since theoretically more productive, exporting firms take a higher mark-up compared to nonexporters, they may afford a wage level above the industrial average and are supposed to be less likely to use opening clauses. Therefore, the wage level of a firm – adjusted by the industrylevel mean – and a dummy variable indicating if a firm pays wages above collectively agreed wages (value 1) or not (value 0) are included. Since above wage elements can be conditioned on the firm performance and allow firms to adjust wages to some extent to the profit situation, a binary variable taking the value 1 if variable remuneration exists (0 otherwise) should account for a potential negative impact on the propensity to use opening clauses. However, a wage level above the industry-level mean might one trace back to a larger share of high-skilled employees and hence, a potential negative impact of the wage level on the probability to use opening clauses should diminish. For this reason, we introduce the share of a firm's employees with university degree (or university of applied sciences degree) adjusted by the industry-level mean as well. Sector-specific dummies control for sector-specific impacts. The reference category is the machinery and equipment sector. There are no controls for regional effects.

4.3.2 Model

The estimated model consists of a binary variable ANW^* which is explained by a set of exogenous variables x:

$$ANW^* = x'\beta + \varepsilon \tag{1}$$

 ANW^* represents the unobserved notion to use opening clauses (see Greene 2003, p. 688pp.). β is the vector of coefficients and ε a independent logistic distributed error with mean 0 and variance $\pi^2/3$. The decision to use opening clauses (ANW = 1) or not (ANW = 0) depends on a treshold parameter κ . If the unobserved variable ANW^* is greater than κ , the indicator ANW equals one:

$$ANW = \begin{cases} 1 & \text{if } ANW^* = x'\beta + \varepsilon > \kappa \\ 0 & \text{otherwise.} \end{cases}$$
(2)

We use Maximum likedlihood (ML) with robust standard errors to estimate the logit model.

In contrast to a ordinary linear model with least squares, the coefficients cannot be interpreted as partial derivative. Consequently the marginal effects will be computed using the mean of all exogenous variables. The marginal effect of a continous variable is the difference in probability in percentage points to use opening clauses. In case of binary variables, the marginal effect is the change in probability if the variable changes its value.

4.3.3 Results

The results discussed in the following section refer to the estimated coefficients depicted in table 5.

All estimated models indicate that firms exporting to EMU member states does obviously possess a lower propensity to use opening clauses than non-exporters. An export distance effect cannot be endorsed as both other export-dummies do not show significant coefficients. Regarding the firm size only specification (1) indicates an effect of using opening clauses, which disappears as soon as the wage level is controlled for (2) with exception for one firm sizedummy. However, sign and magnitude of the significant firm size variables in model (1) are astonishing. Large firms with at least 50 employees are obviously more likely to use opening clauses compared to the smallest firms with maximum 9 employees. Controlling for the wage level in model (2) the coefficient of the corresponding variable shows a positive sign and is significant on a 10% level. Further on, the results of specifications (3) and (4) show that both an increasing share of high-skilled employees and the existence of collective wages above the general pay scale (compared to non-existence) reduce the probability of using opening clauses, while the existence of variable wage elements are obviously irrelevant. However, the positive impact of wage level on the propensity of using opening clauses is not compensated entirely thereby. Perhaps the binary information on the existence of collective wage above general pay scale is insufficient. Regarding the proxy for firm-level productivity no effect is observable. Even though the corresponding coefficients show a theory-consistent positive sign – firms with production facilities evaluated as new are expected to be less likely to use opening clauses compared to firms which ranked their facilities as obsolete – it exists no significant impact on all conventional levels.

[TO BE WRITTEN: Joint test on significance of the industry-dummies and firm size-dummies...

Using the log number of employees instead of dummy-variables...

Marginal effects for firms with certain attributes...

The results using the refined database which includes the information on the existence of industryrelevant opening clauses from the IAW data set on opening clauses are different to the estimation result using solely the information of the IAB establishment panel in many ways...]

	(1)	(2)	(3)	(4)
10-49 employees	1.174	0.469	0.478	0.564
(ref.:1-9 employees)	(0.779)	(0.861)	(0.875)	(0.839)
50-249 employees	2.488	1.446	1.634	1.659
	(0.658)***	(0.806)*	(0.765)**	(0.818)**
250-499 employees	2.387	0.946	1.108	1.025
	(0.742)***	(0.938)	(0.951)	(1.014)
500 and more employees	2.301	1.043	1.242	1.355
	(0.762)***	(1.007)	(0.997)	(1.037)
exporting to EMU	-1.242	-1.544	-1.553	-1.712
	(0.679)*	(0.814)*	(0.817)*	(0.849)**
Exporting to EU	0.635	0.495	0.578	0.683
	(0.740)	(0.922)	(0.962)	(0.903)
Exporting to non-EU	-0.354	-0.487	-0.318	-0.227
	(0.483)	(0.533)	(0.509)	(0.520)
state of the technology: out of date	0.349	0.283	0.265	0.188
(ref.: new)	(0.616)	(0.575)	(0.559)	(0.604)
wage level		1.354	1.547	1.874
		(0.731)*	(0.768)**	(0.740)**
share of high skilled			-0.078	-0.073
-			(0.046)*	(0.046)
wages above general pay scale				-1.210
				(0.516)**
profit based payments				-0.287
				(0.455)
Constant	-4.866	-5.550	-5.828	-5.462
	(0.784)***	(0.569)***	(0.596)***	(0.577)***
Observations	806	727	726	714
Log-Likelihood	-185.61	-153.12	-151.18	-140.33
Pseudo R ²	0.17	0.22	0.23	0.26

Table 5: Determinants of using opening clauses, Manufacturing Sector, Western Germany, ML-Logit estimation, coefficients.

Robust standard errors in parentheses * significant at 10%; ** significant at 5%; *** significant at 1%

5 Summary and Outlook

Based on a new trade model from Bernard et al. (2003) we presented a new approach to explain wage-setting decentralisation as a result of internationalisation in terms of increasing competition on product markets. Theoretical implications suggest that small, less productive, nonexporting firms paying low average wages, possess a higher propensity to use opening clauses than more productive, large exporters exhibiting a high wage level. Using establishment data ("IAB-Betriebspanel") our empirical findings on this hypothesis exhibit an ambiguous picture for the German Manufacturing. In line with theory, exporters obviously possess a lower propensity of using opening clauses, albeit the distance of the export region seems to be irrelevant in this context. The results concerning firms size, wage level and productivity are inconsistent with theoretical conclusions. While no productivity effects are uncovered, the probability to use opening clauses rises with increasing number of a firm's employees. However, this effect vanishes almost entirely if we control for wage level. Surprisingly, the propensity of using opening clauses seems to increase with the wage level. Although both an increasing share of high-skilled employees and the existence of wages above the general pay scale reduce the propensity of using opening clauses, a wage level effect remains.

However, that larger firms with wage level above industry-level average might be more likely to use opening clauses is plausible for different reasons. Firstly, one has to keep in mind that the share of large firms allowing to deviate from collectively agreed standards is higher than the fraction of small firms (Heinbach 2006). In this context, determinants of the introduction of opening clauses in bargaining agreements has to be analysed. Since compared to higher decentralised bargaining regimes the wage dispersion allowed by the central bargaining agreement seems to be the lowest (e.g. Gerlach/Stephan 2006), the predominance of using opening clauses in firms with high wages might one secondly trace back to an insufficient wage dispersion. If wages are (at least in part) above the general pay scale a firm might enforce a reduction or a retraction of these wage elements. However, if these wage elements predominantly refer to high-skilled employees the use of opening clauses. Seen by a firm – this way might appear less disadvantageous for efficiency wage reasons.

To come back to increasing international competition on product markets as a cause of higher decentralised wage settlement, results of this paper give only a first insight into a potential relationship since information on the use of opening clauses on firm level is hardly available. Referring to a growing heterogeneity of the labour demand firstly, further research must incorporate

the panel dimension to account for the development of firms and the use of opening clauses, whereas industry-level information about the development of the competition intensity would probably helpful. Secondly, research on the impact of the use of opening clauses on the firm performance and consequences involved for the industry-specific wage level variance would be enlighten a potential relation between internationalisation and wage-setting decentralisation.

References

- Arnold, M./K. Hussinger (2005): Export Behavior and Firm Productivity in German Manufacturing: A Firm-Level Analysis, in: *Review of World Economics (Weltwirtschaftliches Archiv)*, 141(2), p. 219–243.
- Bahnmüller, R./R. Bispinck/A. Weiler (1999): Tarifpolitik und Lohnbildung in Deutschland am Beispiel ausgewählter Wirtschaftszweige, Diskussionspapier 79, WSI, Düsseldorf.
- Barba-Navaretti, G./A. Venables (2004): *Multinational Firms in the World Economy*, Princeton University Press.
- Bernard, A. B./J. Eaton/J. B. Jensen/S. Kortum (2003): Plants and Productivity in International Trade, in: *American Economic Review*, 93(4), p. 1268–1290.
- Bernard, A. B./J. Wagner (1997): Exports and Success in German Manufacturing, in: *Review* of World Economics (Weltwirtschaftliches Archiv), 133(1), p. 134–157.
- Berthold, N./R. Fehn (1996): Evolution von Lohnverhandlungssystemen Macht oder ökonomisches Gesetz?, in: Zohlnhöfer, W., Editor, *Die Tarifautonomie auf dem Prüfstand*, Duncker und Humblot, Berlin, p. 57–94.
- Bertold, N./O. Stettes (2001): Globalisierung und Strukturwandel droht das Ende des Sozialstaates?, in: Theurl, E., Editor, *Der Sozialstaat an der Jahrtausendwende : Analysen und Perspektiven*, Physica Verlag, Heidelberg.
- Bispinck, R./WSI-Tarifarchiv (2003): Tarifliche Öffnungsklauseln. Eine Analyse von rund 30 Tarifbereichen, Elemente qualitativer Tarifpolitik Nr. 52, Düsseldorf.
- Gerlach, K./G. Stephan (2006): Bargaining Regimes and Wage Dispersion, in: *Jahrbücher für Nationalökonomie und Statistik*, 226(6), p. 629–645.
- Greene, W. H. (2003): Econometric Analysis, Prentice Hall, Upper Saddle River, NJ.

- Hübler, O. (2005): Sind betriebliche Bündnisse für Arbeit erfolgreich?, in: *Jahrbücher für Nationalökonomie und Statistik*, 225(6), p. 630–652.
- Heinbach, W. D. (2005): Ausmaß und Grad der tarifvertraglichen Öffnung, in: *IAW-Report*, 2005(2), p. 51–70.
- Heinbach, W. D. (2006): Immer mehr Tarifverträge sehen Öffnungsklauseln vor, in: *Statistisches Monatsheft Baden-Württemberg*, 2006(11), p. 44–47.
- Heinbach, W. D./S. Schröpfer (2007): Typisierung der Tarifvertragslandschaft Eine Clusteranalyse der tarifvertraglichen Öffnungsklauseln, in: *Jahrbücher für Nationalökonomie und Statistik*, 227(3), p. 1–17.
- Jensen, U./S. Rässler (2007): The effects of collective bargaining on firm performance: New evidence based on stochastic production frontiers and multiply imputed German establishment data, Iab forschungsbericht, Bundesagentur für Arbeit.
- Katz, H. (1993): The Decentralization of Collective Bargaining: A Literature Review and Comparative Analysis, in: *Industrial and Labor Relations Review*, 47, p. 3–22.
- Kölling, A. (2000): The IAB-Establishment Panel, in: *Schmollers Jahrbuch. Zeitschrift für Wirtschafts- und Sozialwissenschaften*, 120(2), p. 291–300.
- Kohaut, S./C. Schnabel (2007): Tarifliche Öffnungsklauseln Verbreitung, Inanspruchnahme und Bedeutung, in: *Sozialer Fortschritt*, 2007(2), p. 33–40.
- Kurdelbusch, A. (2002): Variable Vergütung in deutschen Großunternehmen. Entgeltsysteme zwischen Flexibilisierung und Flächentarifvertrag, Dissertation zur Erlangung des akademischen Grades eines Doktors der Sozialwissenschaft, Ruhr-Universität Bochum.
- Melitz, M. (2003): The Impact of Trade on Intra-Industry Reallocations and Aggregate Industry Productivity, in: *Econometrica*, 71(6), p. 1695–1725.
- Schank, T./C. Schnabel/J. Wagner (2007): Do exporters really pay higher wages? First evidence from German linked employer-employee data, in: *Journal of International Economics*, 72(1), p. 52–74.
- Traxler, F./S. Blaschke/B. Kittel (2001): National Labour Relations in Internationalized Markets. A Comparative Study of Institutions, Change, and Performance, Oxford University Press, Oxford.
- Wagner, J. (2007a): Exports and Productivity: A survey of the evidence from firm level data, in: *The World Economy*, 30(1), p. 60–82.

- Wagner, J. (2007b): Exports and Productivity in Germany, Discussionpaper 41, Universität Lüneburg.
- Wagner, J. (2007c): Productivity and Size of the Export Market: Evidence for West and East German Plants, 2004, Discussionpaper 2661, IZA, Bonn.