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Ulrich Kaiser and Claudia Stirböck\*

# The Impact of the Introduction of the Euro on Firms' Expectations

## An Empirical Assessment of the German Business-related Services Sector

*Firms' expectations regarding their ability to enter new markets and to develop new products, and concerning the foreign competition they will face in future, are strongly affected by the introduction of the euro. The following article analyzes these expectations using panel data taken from a quarterly business survey in the service sector.*

While the bulk of studies focusing on issues related to European Monetary Union (EMU) mainly deal with macroeconomic aspects of European integration, not much is known about the way individual firms are affected by EMU. Researchers have put a lot of effort into investigating trade patterns within the European Union and the effects of the introduction of the euro on export and import flows.<sup>1</sup> This more aggregate view is of course crucial for the discussion on the advantages and disadvantages of EMU. However, to the authors' knowledge no reliable empirical analysis of the risks and opportunities of EMU for individual firms exists. Likewise, not much is known about the euro's impact on firms from the service sector.

Existing firm-level studies are mainly concerned with the degree of firms' preparation for the euro. Examples of these studies are those by the DIHT<sup>2</sup> and by the consultancy firms Cap Gemini,<sup>3</sup> Andersen Consulting<sup>4</sup> and KPMG.<sup>5</sup> A major shortcoming of these studies is that they do not give guidance on whether the introduction of the euro will have a stimulating effect on firms' export behaviour.<sup>6</sup>

Nerb<sup>7</sup> analyzes the effects of the euro on different business departments such as sales, distribution, marketing and finance. Using data from a German business survey of manufacturing industries, construction and retail trade, he finds that firms expect the euro to influence sales and distribution positively. Negative effects are expected for electronic data processing and accounting while with regard to finance and organization indifference prevails.

However, the probably most interesting aspect of the euro is its impact on firms' export behaviour since the main purpose of EMU is to complete the common market and to facilitate intra-European activity. Thus, this paper aims at supplementing the existing literature in that it uncovers the way the euro affects major strategic decisions and preparations by firms from the German services sector. Panel data from a unique business survey are used in the empirical analysis. The data allow a thorough investigation of the direction in which firms expect the introduction of the euro to influence

- firms' export decisions,
- firms' expectations of new foreign competition and
- firms' ability to develop new products such as software which can be used in the entire EMU or which is needed for conversion to the euro.

Of course, it is difficult to differentiate between effects induced by the common market and those induced by the euro itself, especially as the euro is supposed to complete the common market. It is

<sup>1</sup> For a summary of new developments in the field of new real trade theory and existing studies dealing e.g. with the macroeconomic effects of European integration see Fritz Breuss: Außenwirtschaft Band I: Realer Teil, Schwerpunkt Europäische Integration, Springer Verlag, Wien 1997.

<sup>2</sup> DIHT: Europäische Währungsunion vor dem Start: Zum Stand der Vorbereitung in den Unternehmen, IHK Euro-Reihe, 1998. The Deutscher Industrie und Handelstag (DIHT) is the German Association of Chambers of Industry and Commerce and thus the central organisation for 83 chambers. All German companies registered in Germany, with the exception of handicraft businesses, the free professions and farms, are required by law to join a chamber.

<sup>3</sup> Cap Gemini Consulting: Euro Studie, Cap Gemini Consulting mimeo, 1998 (copy available at <http://capgemini.de/de/issuesdefault.html>).

<sup>4</sup> Andersen Consulting: L'Opinion des Chefs D'Enterprise Européens sur la Monnaie Unique, Andersen Consulting mimeo, 1998.

<sup>5</sup> KPMG: Vorbereitung von Unternehmen auf die Europäische Wirtschafts- und Währungsunion: Forschungsbericht, KPMG mimeo, 1997 (copy available at <http://www.kpmg.de/forum/presse1.html>).

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important to note, however, that markets in the European Union (EU) are not fully integrated and that the euro will contribute to a large extent to the elimination of remaining barriers, e.g. in the financial sector. European-wide activity has formerly been international activity, while it now formally comes very close to domestic activity. In order to catch these euro-specific effects, in the business survey firms were asked directly to name only the effects they expect from the euro, i.e. our investigation comes close to a *ceteris paribus* analysis of the euro's impact. Additionally, this study is based only on expectations and not on *ex-post* actual behaviour. However, expectations directly influence the strategic orientation and therefore the future behaviour of firms.

Although the common market of the EU has already more or less eliminated trade barriers, we find that a considerable number of firms expect that the euro will enable them to enter new foreign markets. The effect is the larger the better prepared firms are for the euro. Firms which already export find it easier to enter additional foreign markets. As in many existing studies on firms' export behaviour, a U-shaped firm-size effect is found for the expectation of entering new foreign markets.<sup>6</sup> Despite the firm-size effect, similar results are presented for the expectation of being able to develop new products. For firms' expectations with regard to new foreign competition, it turns out that a U-shaped firm-size effect exists. The degree of preparation for the euro does not play a significant role here.

Finally, the paper examines whether firms' judgements on whether or not they expect to enter new markets, to be confronted with new foreign competitors or to develop new products due to EMU have changed between 1997 and 1998. This is an indication of whether there has been a reorientation in the firm's long-term strategy. We find significant negative time effects for both the expectation of being able to enter new markets and that of being able to develop new products.

<sup>6</sup> Moreover, the studies by Cap Gemini Consulting, KPMG and Andersen Consulting have several weaknesses from the statistical point of view. In addition to the fact that very small samples are considered, the studies are likely to suffer from severe selection biases since both consultancy firms interviewed (a) their own customers and (b) only those with more than 500 (Cap Gemini Consulting), 1,000 (Andersen Consulting) or 5,000 (KPMG) employees.

<sup>7</sup> Gernot Nerb: Einfluß des Euro auf Unternehmensstrategien, in: ifo-Schnelldienst, 17/18 (1998), pp. 13-18.

<sup>8</sup> The U-shaped effect means that the probability of expecting to enter new foreign markets first increases and then decreases with firm size.

<sup>9</sup> European Commission: One Market, one Money, in: European Economy, Vol. 44, 1990.

## Theoretical Considerations

The impacts of the EMU on export behaviour have recently been widely discussed from a theoretical point of view. In its report "One market, one money", the European Commission<sup>9</sup> presents a summary of the expected effects of the introduction of the euro on exports. According to the Commission, the euro will drive down factors impeding export activity such as transaction costs. This static gain will lead to efficiency gains, an optimal allocation of resources and, in the long run, to dynamic gains such as enhanced price stability and an increase in both production and international trade. Thus, a higher level of export and economic growth could be achieved.

Several aspects are said to be responsible for the decrease in transaction costs with the introduction of the euro. In EMU, currencies no longer need to be converted, and exchange costs are thus eliminated. European-wide financial transactions will be processed faster and will in the long run become less expensive for both firms and banks due the expected development of the more cost-efficient international payment system TARGET.<sup>10</sup> Further, exchange-rate risks are eliminated, rendering hedging activities unnecessary. With the conversion of national currencies into the euro, the intra-EMU volatility of exchange rates is reduced to zero, and hence profits from trans-European activities become more predictable even in the long run while the negative impacts of exchange-rate volatility on the real sector, e.g. on exports, are eliminated.<sup>11</sup>

Another reason why the EMU might induce firms to start or to increase their export activity is that the risk of exchange-rate appreciation no longer exists. Although the D-mark depreciated in real terms between 1972 and 1997 by seven per cent,<sup>12</sup> some periods of real appreciation existed even in that time-span, which has led German exporting firms to

<sup>10</sup> TARGET is the abbreviation for "Trans-European Automated Real-Time Gross Settlement Express Transfer". To use TARGET currently is quite expensive relative to the use of national clearing systems. In the long run, the costs of TARGET or/and charges might go down. Besides, banks are considering the installation of an alternative clearing system.

<sup>11</sup> For a discussion of the impacts of exchange-rate variability, see Claudia Müller and Herbert S. Buscher: Exchange Rate Volatility Effects on the German Labour Market: A Survey of Recent Results and Extensions, ZEW mimeo, 1999.

<sup>12</sup> This refers to the weighted external value of the German mark against the currencies of 18 industrialized countries in real terms, deflated by the different consumer price indices and published by the German Bundesbank in its monthly exchange-rate statistics. This external value was based to 100 in 1972 and had decreased to 93% of its 1972 value in 1997.

complain of their loss of competitiveness with regard to other European countries. Furthermore, the euro will improve price transparency in "Euroland". Price differentiation in different regions of EMU will become more difficult. Due to different tax levels and the existence of transportation costs, differences in prices across European countries will not be fully eliminated but reduced. As a consequence, there may be a tendency to lower input and output prices. The import of intermediate products and production factors, as well as their export, will, *ceteris paribus*, become more profitable.

It is important for our analysis to examine the extent to which firms from the service sector are involved in export activity. The contribution by Licht et al.<sup>13</sup> was among the first to shed light on export behaviour in the German service sector. According to Licht et al., 19 per cent of firms from the service sector – including not only business-related services but also banking, insurance and retail trade – are involved in export activities. As a comparison, in German manufacturing industries 53 per cent of all firms export. The data set used in our study indicates that roughly 40 per cent of the business-related services firms export. The business-related services sector evidently shows a higher level of export orientation than the service sector in general. The increased diffusion of information and communication technologies will lead to both improved export opportunities and to more rigorous foreign competition in the home market. Likewise, the introduction of the euro will have an enhancing impact on foreign competition as this study clearly shows. Despite the contribution by Licht et al., very few studies on the export activities of German services firms exist.<sup>14</sup> This is a severe shortcoming from the economic policy perspective since the service sector is the most dynamic sector of the German economy in terms of employment gains.<sup>15</sup>

### Data Description

In the study we use data taken from the Service Sector Business Survey (SSBS). The SSBS is collected by the Centre for European Economic Research (ZEW) in cooperation with Germany's largest credit rating agency Creditreform. Although the service sector is a fast growing part of the German economy, it suffers from very limited availability of data. Total employment in services increased by 23.7 per cent in West Germany between 1987 and 1995. While the number of employees in business-related services, which comprise roughly a third of all employees in the service sector, increased by 41.6 per

cent, the increase was considerably lower for social services (18.8 per cent), personal services (9.4 per cent) and distributive services (14 per cent). Employment in manufacturing decreased by 8.9 per cent in the same period.<sup>16</sup> The lack of appropriate data on the service sector has recently been criticized by various authors.<sup>17</sup> The ZEW and Creditreform started to conduct the SSBS as a reaction to earlier criticism.

Some 4,000 firms from ten business-related services sectors have been interviewed quarterly since 1994. The SSBS is constructed as a panel, i.e. the same firms are asked to fill out the questionnaire every quarter. The SSBS is a stratified random sample, stratified with respect to sectors, three employment classes and regions (East/West Germany). Data provided by Creditreform served as the sampling frame.<sup>18</sup> The population of the firms which participated in the SSBS in the 17<sup>th</sup> wave, which is used in this study and which is currently the latest available, is shown in Table 1.

The definition of business-related services is discussed controversially in the literature.<sup>19</sup> To the authors' knowledge, no clear-cut and broadly accepted definition exists. Some authors, e.g. Hass<sup>20</sup> and Strambach,<sup>21</sup> define business-related services by the simple enumeration of sectors. Since it is probably not worthwhile to add to the definition discussion, we will follow this convention. The sectors defined as business-related services are (NACE-Rev. 1 codes<sup>22</sup> in parenthesis): (1) software consultancy and supply, data processing and data base activities (72.20, 72.30, 72.40), (2) accounting, book-keeping, auditing, tax consultancy (74.12), (3) business and management consultancy activities (74.14), (4) architectural and engineering activities (74.20), (5) technical testing and analysis (74.30), (6) advertising (74.40), (7) renting

<sup>13</sup> Georg Licht, Christiane Hipp, Martin Kukuk, and Gunnar Münt: Innovationen im Dienstleistungssektor, Schriftenreihe des ZEW, Nomos Verlagsgesellschaft, Baden-Baden 1997.

<sup>14</sup> Another notable exception is the study by Günther Ebling, and Norbert Janz: Export Behaviour and Innovation Activities in the Service Sector, ZEW mimeo, 1998, which relates exports to innovative activity.

<sup>15</sup> Also, current initiatives by the German Federal Ministry of Education, Research, Science and Technology aim at increasing the orientation of the service sector to export activity.

<sup>16</sup> Source: Institut für Arbeitsmarkt- und Berufsforschung, Nuremberg, and ZEW (Mannheim Regions Monitor).

<sup>17</sup> Hans-Jörg Bullinger: Dienstleistungen für das 21. Jahrhundert, Schäffer-Poeschl Verlag, Stuttgart 1997; Sachverständigenrat: Wachstum, Beschäftigung, Währungsunion – Orientierungen für die Zukunft, Metzler-Poeschl, Stuttgart 1997; Sandra Waller: Struktureller Wandel – Konsequenzen für die amtliche Statistik und Konjunkturumfragen: Ausgewählte Beiträge von der 23. CIRET-Konferenz in Helsinki, in: ifo-Schnelldienst, 1997; Herbert Hax: Anforderungen an die Statistik zur Konjunkturbeobachtung und -prognose durch den Sachverständigenrat, in: Allgemeines Statistisches Archiv, Vol. 82, 1998, pp. 15-24.

of automobiles, renting of other transport equipment (71.10, 71.20), (8) renting of machinery and equipment (71.30), (9) cargo handling and storing, activities of other transport agencies (63.10, 63.4), (10) sewage and refuse disposal (90.00). By and large, these are "knowledge-based services".<sup>23</sup>

The SSBS questionnaire consists of two parts. In the first part, the firms are asked to indicate on a three-point scale ("up", "unchanged", "down") whether their prices, profits, turnover, employment and demand increased, remained unchanged or decreased during the last quarter. While the first part of the questionnaire does not change quarterly, the second does. The second part is used to cover topics of current economic interest. In the 13<sup>th</sup> and 17<sup>th</sup> waves, which are used in this paper, this second part was devoted to the preparation of the business-related services sector for EMU. In the questions which are in the focus of our analysis the firms were asked whether they expect

- that new foreign competitors will enter the home market
- that they can enter new markets and
- that they will be able to develop new services due to the introduction of the euro.

That is, judgments on the impact of the euro on trade flows were given all else being equal. For all of these three questions three answering categories were provided: "yes", "no" and "don't know". This question was asked in an identical way in the 13<sup>th</sup> and

17<sup>th</sup> waves of the SSBS. The 13<sup>th</sup> wave corresponds to the second quarter of 1997 and the 17<sup>th</sup> wave corresponds to the second quarter of 1998. The data were collected in June 1997 and 1998 respectively.

The SSBS is an unbalanced panel. On average, 1,000 firms take part in the SSBS quarterly. 544 firms participated in both wave 13 and wave 17, 482 firms participated in wave 13 only and 378 in wave 17 only.

The fact that we have, with regard to the questions asked, two comparable data sets available enables us to discover whether the expectations of the firms have changed over time. During the data collection period of wave 13 it was unknown whether EMU would start punctually and which countries would be taking part. Furthermore, during the data collection period there was much political controversy, such as the heated debate about the convergence criteria and the stability pact. The impact of this on the answering patterns of the survey participants is described in detail in another paper.<sup>24</sup> However, these uncertainties were removed on May 2, 1998 when it was announced that EMU would start punctually on January 1, 1999, and that Austria, Belgium, Germany, Finland, France, Ireland, Italy, Luxembourg, the Netherlands, Portugal and Spain would be the founding countries. Therefore, we can test whether firms changed their expectations with time and with the level of information and preparation for EMU.

### Descriptive Analysis

For a first look at the expected impact of the introduction of the euro, Figure 1 shows the distribution of the answer categories in 1998 for the three questions on the EMU-induced changes in export activity, foreign competition and new products.<sup>25</sup> The data are from the 17<sup>th</sup> wave of the

**Table 1**  
**The Distribution of Firms Participating in the 17<sup>th</sup> wave of the SSBS by Region, Sector and Employment Classes**

	West			East			Total
	No. of employees <50	50-99	>99	No. of employees <50	50-99	>99	
Software	41	10	26	19	2	7	105
Accounting	39	10	10	17	2	2	80
Management consulting	36	13	19	14	1	1	84
Architectural activities	51	5	3	13	2	2	76
Technical analysis	30	10	26	22	13	10	111
Advertising	45	32	14	9	2	-	102
Renting of automobiles	46	2	1	12	-	-	61
Renting of machinery	44	13	9	13	4	1	84
Cargo handling and storing	34	11	24	22	9	4	104
Sewage and refuse disposal	37	12	21	29	5	11	115
Total	403	118	153	170	40	38	922

<sup>18</sup> More details on the SSBS can be found in Ulrich Kaiser and Herbert S. Buscher: *Der Service Sentiment Indicator - Ein Konjunkturindikator für den Wirtschaftszweig unternehmensnahe Dienstleistungen*, ZEW Dokumentation 98-04 (1998).

<sup>19</sup> See Christian Homburg and Bernd Garbe: *Industrielle Dienstleistungen: Bestandsaufnahme und Entwicklungsrichtungen*, in: *Zeitschrift für Betriebswirtschaft*, Vol. 66, 1996, pp. 253-282 for a survey.

<sup>20</sup> H.-J. Hass: *Industrienaehe Dienstleistungen: Ökonomische Bedeutung und politische Herausforderung*; in: *Beiträge zur Wirtschafts- und Sozialpolitik*, No. 223, 1995, Institut der deutschen Wirtschaft, Cologne.

<sup>21</sup> Simone Strambach: *Wissensintensive unternehmensnahe Dienstleistungen: Netzwerke und Interaktion*. Universität Münster, Dissertation, 1995.

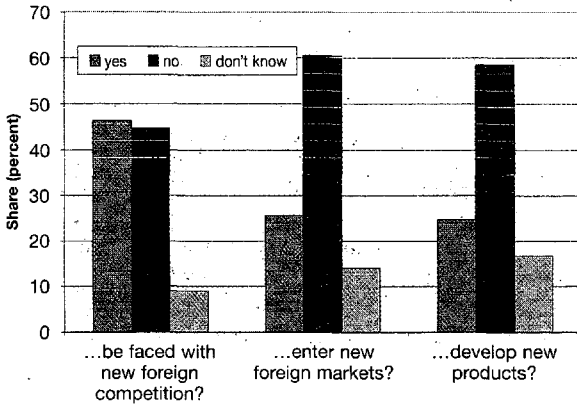
<sup>22</sup> The NACE-Rev. 1 is a sectoral classification system. It is used by the Federal Statistics offices in the European countries to associate any enterprise to the appropriate economic sector.

<sup>23</sup> John A. Alic: *Knowledge, Skill, and Education in the New Global Economy*, in: *Futures*, Vol. 29, 1997, pp. 5-16.

<sup>24</sup> Ulrich Kaiser: *The Impact of Political Announcements on Expectations Concerning the Starting Date of the EMU*, in: *ifo Studies*, Vol. 44, No.2, 1998, pp. 103-120.

Figure 1

Do you expect that – due to the euro – you will ...



Note: The figure is based on the data for 1998. The data were expanded using firm weights.

SSBS and thus give a summary of present expectations. The figure shows that 46 per cent of the participating firms presently expect new foreign competition due to the euro. Almost as many expect that international competition will not change because of the euro and nine per cent have not made up their mind so far. Surprisingly, not nearly as many firms expect to be able to enter new markets. A priori, it could be assumed that if a firm expects new foreign competition, it might be able to start exporting or to export more of its services as well. However, a large majority of firms do not expect any changes in their export behaviour. This is also true for expectations concerning the development of new products. But the effect of the introduction of the euro is still considerable. A quarter of the firms in business-related services expect that they will enter new

markets due to the existence of EMU. A quarter of the firms in this survey expect to be able to generate a product innovation. Thus, Figure 1 provides first evidence that the euro actually affects import and export behaviour as well as the development of new products. Positive effects, stemming from product innovation and improved export chances, are expected by about a quarter of firms, while negative effects, stemming from increases in foreign competition, are expected by almost half of the firms. This indicates that many firms are afraid of the reinforced foreign competition in the common market and do not yet see any export opportunities for themselves.

When comparing the answering patterns of June 1997 and June 1998, it turns out that the distribution of the answers did not change much in this one-year period in which a lot of insecurities concerning the shape of EMU were removed. There is an increase of only five percentage points in the expectation of being faced with new foreign competition and a decrease of two percentage points in the expectation of being able to develop new products.

However, in order to get more information on the time effect that influenced the way in which firms responded to the questionnaire, a useful and standard device from panel data analysis, the calculation of transition probabilities, can be applied. In the present example, transition probabilities give the probability that a firm which has stated in June 1997 that it expects to enter new foreign markets reports the same in June 1998 or has changed its opinion and now states that it does not expect to enter new foreign markets. By defining the three different possible answers as "states", transition probabilities give the probability that a firm switches from state  $i$  in period  $t-1$  to state  $j$  in period  $t$  given that it has reported to be in state  $i$  earlier.<sup>26</sup>

<sup>26</sup> Data are expanded by firm-proportional weights. Details on that procedure are given in: Ulrich Kaiser and Herbert S. Buscher, op. cit.

Table 2  
Transition Matrices

June 1997	Due you expect that due to the introduction of the euro ... June 1998								
	... new foreign comp. occurs?			... you can enter new markets?			... you can develop new products?		
	yes	no	don't know	yes	no	don't know	yes	no	don't know
yes	69.17 <i>175</i>	21.74 <i>55</i>	9.09 <i>23</i>	50.36 <i>70</i>	33.81 <i>47</i>	15.83 <i>22</i>	52.00 <i>65</i>	31.20 <i>39</i>	16.80 <i>21</i>
no	27.16 <i>63</i>	63.79 <i>148</i>	9.05 <i>21</i>	13.17 <i>44</i>	76.05 <i>254</i>	10.78 <i>36</i>	11.90 <i>32</i>	72.49 <i>195</i>	15.61 <i>42</i>
don't know	31.48 <i>17</i>	35.19 <i>19</i>	33.33 <i>18</i>	26.15 <i>17</i>	60.78 <i>26</i>	33.85 <i>22</i>	24.69 <i>20</i>	41.98 <i>34</i>	33.33 <i>27</i>

Note: The values printed in italics give actual frequencies.

Such transition probabilities are shown in Table 2. First of all, it is striking that most firms did not change their opinion on the euro's impact on foreign competition, export and new product development between June 1997 and June 1998. For example, 69.17 per cent of the firms which stated that they expect new competitors in the home market in 1997 state the same one year later. The probability of switching from not expecting foreign competition ("no") to expecting foreign competition ("yes") is six percentage points higher than the probability of switching in the other direction. Considerably more changes are found for the expectation of entering new markets. The probability of switching from "yes" to "no" is 20 percentage points higher than the probability of switching from "no" to "yes". The same results are found for the expectation of being able to develop new products.

It thus seems that firms view their individual opportunities in a less optimistic way in 1998 than they did one year before. There can be two reasons for this. First, firms may have benefited already from

general and individual preparation for the euro and from the exchange-rate stability reached in the EMS, which is a kind of pre-EMU effect. Second, firms may have become more pessimistic about the way the euro actually influences their business prospects during the one year period.

### Multivariate Analysis

The calculation of transition probabilities is a useful device in analyzing shifts in firms' answers across time. However, it is desirable to learn more about the characteristics of those firms indicating, say, that they expect new foreign competitors to occur in the home market. In this section we use binary probit models to analyze what types of firms will take most advantage of EMU.

In the SSBS, three alternative answers – "yes", "no" and "don't know" – could be given to the three questions on foreign competition, export activity and product innovation. In the following analysis, we discard the "don't know" category since this category is not informative for the focus of this study. In the empirical analysis the data from the 13<sup>th</sup> and 17<sup>th</sup> waves are pooled.

The decision to answer the questions on the expected impacts of the euro with either "yes" or "no" is modelled by a binary probit model.<sup>27</sup> In our empirical

<sup>26</sup> See James D. Hamilton: *Time Series Analysis*, Princeton University Press, Princeton 1994, ch. 22.2, for details on transition probabilities and Markov chains.

<sup>27</sup> See William H. Greene: *Econometric Analysis*, Prentice Hall, Upper Saddle River 1997, for details of the binary probit model.

**Table 3**  
**Descriptive Statistics**

Variable	Obs.	Mean/Share	Std. Dev.	Min.	Max.	Type
<b>Explained variables</b>						
New markets	1,674	0.3017	–	–	–	dummy
New foreign competition	1,731	0.5269	–	–	–	dummy
New products	1,488	0.3306	–	–	–	dummy
Box-Cox transf. of no. of employees	2,279	2.7254	0.8634	0	4.8775	continuous
(Box-Cox transf. of no. of employees) <sup>2</sup>	2,279	8.1729	4.8048	0	23.7904	continuous
Instrumented degree of preparation	1,948	1.0380	0.4875	0	2.2947	continuous
<b>Explanatory variables</b>						
Exporting firm	2,330	0.3330	–	–	–	dummy
East German firm	2,330	0.2193	–	–	–	dummy
Software consultancy	1,948	0.1191	–	–	–	dummy
Accountancy	1,948	0.0898	–	–	–	dummy
Management consultancy	1,948	0.0909	–	–	–	dummy
Architectural activities	1,948	0.0893	–	–	–	dummy
Technical planning	1,948	0.1217	–	–	–	dummy
Advertising	1,948	0.1027	–	–	–	dummy
Automobile renting	1,948	0.0739	–	–	–	dummy
Machine renting	1,948	0.0955	–	–	–	dummy
Cargo handling	1,948	0.0955	–	–	–	dummy





formation is a more flexible way of allowing for nonlinearities. It turns out that the Box-Cox transformation comes close to the natural logarithm ( $\lambda = -0.1225$ ). Earlier studies have found a U-shaped impact of the number of employees on the export decision and on export intensity.<sup>29</sup>

The differentiation between East and West Germany is important since the East German economy still has severe transition problems. Before the fall of the iron curtain, the East German economy was oriented towards Eastern Europe. For various reasons such as a lack of language skills in Western languages, marketing issues and financial constraints, East German firms are still less export-intensive than West German firms, even in services.<sup>30</sup>

The degree of preparation for the euro is included in our estimation equation since firms with a higher degree of preparation become more aware of the risks and opportunities induced by the euro. The degree of preparation for the euro is clearly not an exogenous variable to the expectations of entering new markets, being faced with new foreign competition and being able to develop new products. Therefore, we instrumented the degree of euro-preparation and have used the fitted values of this regression in our empirical model. Since the degree of preparation is dependent on the financial capacities of a firm, we included – as dummy variables – firms' judgments regarding turnover and demand. Our specification also included sector dummies, which were interacted with the mean of the corresponding preparation for the euro and three firm-size dummy variables as well as a dummy variable for East German firms.<sup>31</sup>

The state of being an exporting firm (base category: non-exporting firm) as well as the sector affiliation (base category: sewage and refuse disposal) and the regional affiliation (base category: West Germany) are incorporated as dummy variables.

A time dummy variable is often included in pooled panel regressions but is left out here since between 1997 and 1998 firms have become better prepared for the euro so that the inclusion of both a time dummy

and the degree of preparation would have led to collinearity within the set of explanatory variables.

Table 3 presents descriptive statistics of the variables used in the specification. Estimation results are given in Table 4. This table displays both the coefficients and the marginal effects which are calculated at the mean of remaining variables. For the dummy variables, the marginal effect is calculated as a discrete change from 0 to 1. Estimation results were yielded using STATA50. Our results are very robust against alternative specifications.<sup>32</sup>

## Conclusion

It turns out that the exporting firms have a significantly higher probability of expecting to enter new markets and develop new products. No significant effects of the state of being an exporting firm are found for the new competitors issue. The results support the hypothesis that firms which already export expect to gain most from the introduction of the euro. Exporting firms are significantly more likely to expect to enter new markets than non-exporting firms. The same is true for the expectations of developing new products.

The sectoral dummy variables are at least jointly significant in all equations. With regard to new markets, significant sectoral effects can be found for architectural activities, advertising and machinery rental firms. With regard to new foreign competition, the largest positive sectoral effects are found for the architectural services and the largest negative effects are found for accountancy. Accountancy, architectural services and business consultancy firms have the largest probability of expecting to develop new products.

Firm size matters for both the expectation of entering new markets and the expectation of being faced with new foreign competitors. The effect is U-shaped, a result which is often found in the empirical analysis of firm export behaviour.

East German firms do not differ from their West German competitors in their expectations both of entering new markets and of developing new products. They are considerably more pessimistic with regard to the expected foreign competition. East German firms not only see fewer opportunities of gaining access to new markets and developing new products as a consequence of EMU, they are also more likely to expect new foreign competition. This result is a little puzzling since East German firms on the one hand expect new foreign competitors to enter the home market but on the other hand do not expect

<sup>29</sup> See, inter alia, Joachim Wagner: Export Performance, Human Capital, and Product Innovation in Germany: A Micro View, in: *Jahrbuch für Wirtschaftswissenschaften*, Vol. 47, (1996, pp. 40-45); Katherine Wakelin: Innovation, Technological Spillovers and Export Behaviour at the Firm Level, MERIT discussion paper No. 2/96-020, 1996.<sup>30</sup> Cf. Licht et al., op. cit.

<sup>31</sup> The estimation results of the Instrument-Variables estimation is available from the authors upon request.

<sup>32</sup> The results hold qualitatively even if the estimations are run only for 1997 or only for 1998.

to be able to export themselves. This implies that with regard to their own export activity tacit trade barriers still exist for East German firms.

We also find large effects for the – instrumented – degree of preparation for the euro. The better firms are prepared for the euro, the more likely it is that they expect to be able to enter new markets. The same is true for the expectation of developing new products. This shows that with increasing information and adaptation to the new European Market, firms realize individual opportunities to export and to develop new products. No significant effect of the degree of

preparation is present for the expectation of being faced with new foreign competitors. For this category the variables for the degree of preparation are not even jointly significant.<sup>33</sup>

Altogether we find considerable effects on firms' expectations of the changes taking place in markets with the start of EMU. Both firms' strategic decisions and firms' expectations of being faced with new foreign competitors have been affected.

<sup>33</sup> A Wald test for joint significance was conducted here.

Bettina Burger\*

## How Important is Foreign Direct Investment for Late Industrialising Countries?

*While it has long been recognised that the process of development is necessarily linked to technology, the question of the efficiency of technological spillovers from foreign direct investment remains controversial. The following paper examines the theoretical background and then focuses on the case of Mexico, analysing the technological performance of multinational enterprises in that country.*

According to both historic trade patterns and theoretical insights, industrialised countries are specialised in the production of capital intensive and research and development (R&D) intensive goods while industrial latecomers export labour intensive goods and raw materials. Today, reality looks different: Asian countries especially not only challenge the industrialised world with their cost advantage but even compete through quality and innovation. One reason for this development is said to be imitation. With access to modern technologies in industrialised countries as well as access to service and information networks, industrial latecomers could catch up technologically with fewer resources than those needed for the original production and application of knowledge capital.

The real challenge for developing countries is to build up their domestic technological capabilities. In this sense, multinational enterprises (MNEs) are presumed to have a positive effect on the local economy because it is in their own interest to provide

their, foreign affiliates with advanced technology, to adapt it to local conditions and to make it operational. As some of the knowledge diffuses into the local economy, MNEs can powerfully affect the development of markets and economic agents in host countries. The efficiency of these technological spillovers through foreign direct investment (FDI) is still discussed controversially. The intention of this paper is to give reference to significant contributions in this field and to bring out some issues that are still underrepresented in the literature.

The paper is divided into four parts:

- an introduction into the concept of technological latecomer industrialisation and a briefing on what theory does and does not explain in this context;
- a sketching of those technological capabilities needed for local development and an explanation as to why FDI-based technological spillovers seem appropriate;
- a structural approach to the incentives of technology transfer and learning activities; and
- the results of an analysis of the technological performance of multinational enterprises (MNEs) in

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