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German Foreign Direct Investment and Wages

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German Foreign Direct Investment and Wages

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Abstract:

Over the last decade, German multinationals created about two million jobs abroad with increasing foreign direct investment (FDI). While there are many reasons for firms to go multinational and probably just as many for Germany's high unemployment, this paper aims to investigate the relationship between domestic labour costs and foreign direct investment. We apply a theoretical model for an econometric analysis examining the determinants of FDI using panel data of German firms' foreign capital stocks in 22 countries between 1994 and 2003. Estimating elasticities, we find that while domestic wages do not significantly influence total FDI by German firms, they positively affect the FDI stock in countries where cheap labour is abundant. Thus, although Germany's high labour costs are not the sole driver of foreign direct investment, they may accelerate the outsourcing of German jobs.

JEL-Classification: F16, F21, F23

Keywords: Foreign direct investment, wages, trade, German multinational firms

I Introduction

Although economic literature brought forward a significant number of theories and comprehensive explanations for the emergence of foreign direct investment (FDI), models rarely existed until the 1980s. Helpman (1984) presented a first general-equilibrium model of foreign direct investment. In the model, the location of production plants is the decision variable which is influenced by relative country size and differences in relative factor endowments. Firm-specific assets are assumend and production involves a labour and a capital-intensive activity which may be separated geographically. However, as transport costs are neglected in the model, firms will only choose to locate each activity in one country until factor prices equalize. Furthermore, as the incentive for FDI stems from differences in relative factor prices and endowments, foreign direct investment between countries similar in terms of factor prices and endowments may not take place. Therefore, Helpman's model can explain the existence of vertically integrated firms but fails to account for market-seeking FDI. At the same time, Markusen developed a model for horizontal multinational corporations (see Markusen, 2002, p. 127). He focuses on firm-level scale economies arising from the public good characteristics of knowledge-based assets. Thus, he presents a motive for firms conducting the same activity in more than one country but excludes any explanations for vertical specialization.

Evidence suggests that within multinational enterprises (MNEs) both, horizontal and vertical FDI flows, do exist[1]. Therefore, the need of a general equilibrium model being able to explain both arose. According to Markusen (2002), market-seeking FDI will take place between countries which are similar in terms of income and factor prices and when transaction costs between these countries are relatively high, be it due to trade barriers or transport costs. Resource- and efficiency-seeking FDI will take place when trade costs are low and countries are asymmetric in terms of factor prices (Mukherjee and Broll, 2007). If trade costs are low but factor prices equal, then exporting will be more profitable than opening a foreign plant.

However, as good as the predictions of Markusen's theory may be, due to its focus on MNEs it requires micro-level data to estimate. Therefore, we will use a model brought forward by Cushman (1987) as a foundation for the econometric analysis in this paper.

The paper is structured as follows. In section II we present the model, the empirical analysis is discribed in section III and its results are displayed in section IV. The final section offers some concluding remarks.

[1] For a survey on multinational firms, see Navaretti and Venables (2004).

II Wage Effects on Foreign Direct Investment

Cushman's model (1987) provides a suitable framework for investigating how labour costs affect FDI. It is assumed firms decide whether to export from their home country or to establish a local plant for production in the host country. The following assumptions are made: a firm can produce in the home or foreign country to serve the foreign market; there is only one good and two factors of production, capital and labour: output of the good is a function of the two factors; the firm has some price-setting power (arising from a differntiated product due to firm-specific assets), therefore the price in the foreign market decreases when output (=offered quantity) increases; the firm has decreasing returns to scale production technology in both plants; capital and labour are not perfect substitutes meaning a change in the employment of one factor affects the other factors productivity.

A firm's profit from sales in the foreign market takes the shape of

$$\Pi = \left[P^*(Q+Q^*) - iP^*_{K^*}K^* - W^*L^*\right]R - iP_KK - WL \ , \tag{1}$$

i.e. profits (Π) are a function of the foreign price of output P^*, home country production Q (equals exports) and foreign production Q^*, the domestic interest rate i, home and foreign capital prices P_K and $P^*_{K^*}$, the home and foreign wage rates W and W^*, the real price of foreign currency R and home and foreign labour and capital inputs L and L^* and K and K^* respectively. All variables are in real terms.

Firms maximize profits over factor inputs in the domestic and foreign plant. To examine the effects of changes in W and W^*, we derive the first order conditions with respect to L, K, L^* and K^*. We obtain:

$$RP^*n^*Q_L = W \tag{2}$$

$$RP^*n^*Q_K = iP_K \tag{3}$$

$$P^*n^*Q^*_{L^*} = W^* \tag{4}$$

$$P^*n^*Q^*_{K^*} = iP^*_K \tag{5}$$

with F_X being the first derivative of F with respect to X and n^* being a measure for the price elasticity of demand in the foreign market.

Equations (2) to (5) represent a set of marginal revenue-marginal cost equalities. For home production (equations (2) and (3)), the right hand side depicts the cost for the marginal unit of labour (capital respectively) input. The left hand side shows the output Q_L (Q_K) produced by this marginal unit times the resale price converted to home currency. In optimum, the firm will expand production in both plants until all four marginal revenue-marginal cost equalities hold true.

Now consider the effects of exogenous changes of the wage rates on the equilibrium outcome. Therefore, in addition to the assumptions above we assume the real exchange rate R remains constant.

Considering an increase in the real home country wage rate, first focus on the effects on domestic production: a rise in W causes equation (2) to become an inequality. In order for the equation to be in equilibrium again, the employment of factor L will have to decrease as $dQ_L/dL<0$. Simultaneously, a decrease in L will lead to a decrease in Q_K resulting in marginal cost exceeding marginal revenue in equation (3). Thus, an increase in the home wage rate has led to a decrease in the productivity of capital in the home country. Again, to reach an equilibrium the employment of factor K will be reduced to increase Q_K. The decreased employment of K and L results in a reduction of the home country output Q.

Due to the inverse demand function, a change in Q will affect the (foreign) price which has consequences for the optimal factor allocation in the foreign plant. Therefore, as home output falls, price will rise.

How will this increase affect foreign capital employment? Considering equation (5), it is intuitive that the created disequilibrium

$$RP^*n^*Q^*_{K^*} > iP^*_{K^*} \tag{5a}$$

will be overcome by increasing foreign capital employment K^* until marginal revenue equals marginal costs. The increase in employment of capital will cause foreign labour employment to adjust (rise) in order to ensure productive efficiency so that equation (4) remains in equilibrium.

The increase in the employment of capital and labour will increase foreign output which decreases price and brings equations (4) and (5) back to equilibrium.

Summarizing, the rise in the home real wage rate had the following consequences (Cushman, 1987, p. 176): The employment of both capital and labour in the home country declined leading to a reduction in the retail price (unless capital and labour are perfect substitutes, in which case labour is merely replaced by capital leaving output and therefore prices unaffected). The increase in price causes an increase in the demand for capital (and labour) in the foreign country. Hence, FDI takes place.

Symmetrically to the first case, Cushman further shows that an increase in the foreign wage rate will lead to a decrease in FDI unless the substitutability between capital and labour in the foreign plant is strong. That the effects need to have opposite signs is not only intuitive but also evident from the first order conditions. Consequently, an increase in domestic productivity will deter FDI while a rise in foreign productivity will raise FDI.

As mentioned above, by showing that wage increases in the home country will encourage FDI while a rise in foreign wages diminishes FDI, the model, set up in a relatively simple neoclassical framework, provides us with some useful predictions in which ways FDI may be affected by which variables. However, like most models of FDI, it fails to take into account all possible determinants of FDI mentioned in the literature - for example internalization advantages. However, due to difficulties arising from the empirical compilation of data capturing such effects, incorporating them in the model is not a necessity in the context of this paper. Another deficit of the model is that it does not incorporate transport or trade costs. We believe that is less of a problem as the shape of transport costs differs depending on the type of FDI. Market-seeking FDI may or may not incur the shipping of intermediate goods, the same holds true for efficiency-seeking FDI. And while the delivery of final goods produced for the host country does not involve shipping costs, this may or may not be different for goods produced for exports (market- vs. efficiency seeking FDI). So adding transport costs in this simple model would not contribute much "value-added" but simply bias the outcome in favour of FDI. Therefore we believe the framework of this simple model is the preferable choice as a foundation for our empirical analysis.

The Main Results

We derive the following implications for the relationship of foreign direct investment and the domestic labour market. First, location advantages are a necessary condition for FDI. Location advantages can be lower factor prices such as labour costs. Thus, wages are important for FDI decisions. The condition represented in equations (2) to (5) in the model imply that a rise in domestic labour costs increases the foreign capital stock while an increase in foreign labour costs reduces the desired employment of capital abroad. Therefore, we derive:

Proposition 1 *An increase in a country's domestic labour costs increases the foreign capital stock of the country's firms. A rise in foreign wages has the opposite effect.*

Efficiency-seeking FDI is foremost motivated by factor price differences. Thus, we suggest:

Proposition 2 *As efficiency-seeking FDI is aimed at exploiting factor price differences, we expect the foreign capital stocks created out of the efficiency-seeking motive to be more elastic with respect to labour costs than the overall FDI stock.*

When it comes to labour productivities, the model predicts the effects of their changes to be inverse to those of labour costs, which leads us to the following hypothesis:

Proposition 3 *An increase in a country's labour productivity diminishes the desired foreign capital stock of the country's firms. The opposite is true for an increase in foreign labour productivity.*

III Empirical Analysis

Relying on the model by Cushman (1987) allows us to determine a number of factors which influence the FDI decision of the firm. According to Cushman (1987, p. 177), these factors lead firms to formulate a desired stock of capital in a foreign country, which hereafter will be denoted as $STOCK$. The determinants derived from the profit maximizing condition (equation (1)) are the domestic and foreign labour costs, now called $DWAGE$ and $FWAGE$, the real exchange rate RER, the capital cost for domestic and foreign (direct) investments, CCD and CCF, and the labour productivity for domestic and foreign production[2], called DVA and FVA because they will be approximated by value-added per hour worked data in the estimation.

However, Cushman argues (1987, p. 177) that in order to conduct a satisfying econometric analysis of FDI stock or flows, one needs to take other factors not resulting from the model into account. Those variables are foreign real demand, real exchange rate risk and a measure for the FDI-host country's political environment regarding foreign investors. We decide to include those variables in the following format:

- Foreign real demand will be measured by foreign Per capita-Gross Domestic Product (GDP) which we denote as $GDPCAP$.
- The real exchange rate risk will be approximated by its past volatility, denoted as $RERVOL$.
- The agglomeration of total foreign capital stock (by firms from all countries) in the given country as percentage of its GDP, denoted as $AGGLO$.

Using the right-hand side variables lacked by one period, the capital stock of domestic firms in a given country j in period $t+1$ can be expressed as the function:

$$\begin{aligned} STOCK_{j,t+1} &= f(DWAGE_t, FWAGE_{j,t}, CCD_t, \\ &\quad CCF_{j,t}, RER_{j,t}, DVA_t, FVA_{j,t}, \\ &\quad GDPCAP_{j,t}, RERVOL_{j,t}, AGGLO_{j,t}). \end{aligned} \tag{6}$$

The Data

For the endogenous variable, the FDI stock, we use data from the Deutsche Bundesbank's annual Special Statistical Publication No. 10 ("Kapitalverpflechtung mit dem Ausland") from 1994 to 2003. The publication provides aggregated data for direct investment stock[3] statistics at the end of a given calendar year and is broken down by country (31 selected countries) and sector.

[2] From the first order conditions in equations (2) and (4) in section II.

[3] Minority interests (10 to 49.9 %) and controlling stakes (50 % or more) if the balance-sheet total of the investment object exceeds five million Euro for minority interests or one million Euro for controlling interests.

To adjust for inflation, we convert the data into constant (year 2000) Euro. That yields our endogenous variable which hereafter will be referred to as $STOCK$ for foreign capital stock of German firms in a given year in a given country.

The data sources for the exogenous variables include the International Labour Organization's LABORSTA database (ILO, 2006), Eurostat (2006) and the U.S. Bureau of Labor Statistics (Banister, 2005) for the wage data, the Groningen Growth and Development Centre (GGDC, 2006) for figures on productivity and the World Development Indicators database (WDI, 2005) for data on capital costs, FDI agglomeration, per-capita GDP and real exchange rates[4].

Ten years (1994 to 2003) times 22 countries theoretically produces a panel data set of 220 observation. Due to a few limitations in the availability of the data, the maximum number of observations will be 194. Therefore our panel data set is unbalanced (meaning the number of observations for each country is not identical)[5].

Data Transformation

All variables except CCF, CCD, RER and $AGGLO$, the data for which is already in the form of percentage or index points, will enter the analysis in logarithmic form to allow the interpretation of the coefficients as elasticities of the foreign direct investment stock.

To avoid multicollinearity problems steming from a high correlation between exogenous variables, labour costs and value-added parameters will enter the regressions as relative factors, i.e. we express the labour cost as the relative labour costs in the source country in terms of the host country ($DWAGE/FWAGE$) and relative value-added as DVA/FVA.

Incorporating into equation (6) we obtain

$$\begin{aligned} STOCK_{j,t+1} &= f((DWAGE/FWAGE)_{j,t}, CCD_t, CCF_{j,t}, RER_{j,t}, \\ &\quad (DVA/FVA)_{j,t}, GDPCAP_{j,t}, RERVOL_{j,t}, AGGLO_{j,t}) \end{aligned} \tag{7}$$

as the new estimating equation.

In the regression analysis we use both simple ordinary least squares (OLS) and generalized least squares (GLS). Using a two-stage least squares approach to avoid possible problems from endogenously determined explanatory variables did not yield results differing significantly from the best of the two other estimators in terms of magnitude or quality.

[4] Which we use to calculate real exchange rate volatility along the lines of Wezel (2003).

[5] The major limitations for the availability of the data due to missing labour cost data in the Czech Republic and Hungary before 1997, in Canada after 2000 and in several countries for 2003 where data is not yet incorporated in the international databases.

IV Econometric Results

Country Level

First, we regress the effect of changes in relative labour costs, relative productivity, host-country income, the real exchange rate and its volatility, FDI agglomeration as well as domestic and foreign capital costs (all lagged by one year) on the foreign capital stock. Level effects between countries are accounted for by dummy variables. Results of a GLS regression are reported in the first column of table 1 (regression (1)).

Most importantly, the variable of greatest interest within the context of this paper, the relative labour costs ($DWAGE/FWAGE$) are not significant in that regression.

Relative value-added is significantly different from zero and negative: a one percent increase of the German value-added per hour worked relative to foreign vaule-added per hour worked decreases the foreign capital stock of German firms in the next period by 0.66 percent (regression (1)). This supports our proposition 3.

The foreign per-capita income is also significant at the five percent level, with the FDI stock's elasticity with respect to it being 1.03. The coefficients for $AGGLO$, RER, $RERVOL$ and CCF are insignificant in regression (1) which mirrors Cushman's results. Domestic capital costs (CCD) are found to impact the foreign FDI stock of domestic firms negatively. Broll and Wong (2006) show that minimizing the global weighted average cost of capital is the goal of MNEs. Therefore, as long as domestic capital costs are part of that weighted average, we would have expected them to negatively impact investment. Here, the FDI stock's elasticity with respect to domestic capital costs is estimated at -0.13.

Returning to the relative labour costs, an Extreme Bound Analysis has shown that they are not robust in this sample (regression (1)) as the sign of its regression coefficient changes depending on which explanatory variables are employed. Therefore, proposition 1 cannot be confirmed for the whole country sample.

A reason for that may be the assumption underlying proposition 1 that the capital-labour substitution as a consequence of rising labour costs as noted in the Cushman model is not present - or at least does not take place greatly. If it would - and there are signs of that happening in Germany in at least some sectors - all types of FDI might indeed not be affected by labour costs.

However, some types of FDI or some sectors surely are affected by labour costs. FDI is not only driven by location advantages but also by other factors. Especially market-seeking FDI is rather motivated by closeness to the market or the reduction of trade costs. This should however be different for efficiency-seeking FDI. Therefore, the total panel data set analysed in regression (1) may be too diverse in the motivations and structures of FDI leading us investigation of a subsets of the data. As we expect labour costs to be most important for efficiency-seeking FDI, it must be our aim to separate

Table 1: Country level regression results

Dependent Variable: *STOCK*		
Regression No.	(1)	(2)
Number of observations:	194	54
DWAGE/FWAGE	-0.270	-0.759**
DVA/FVA	-0.656**	-1.695**
GDPCAP	1.025**	3.213**
RERVOL	0.068	0.477*
RER	-0.003	-0.001
CCD	-0.131**	-0.174**
CCF	-0.007	-0.026*
AGGLO	0.001*	0.005**
R^2	0.943	0.959

Fixed country effects are suppressed (regression (1)). The stars imply significance of the coefficients (from the t-values) at the 10(*) and 5(**) percent level.

this type from total FDI. Before turning to an econometric analysis, we therefore got to attempt to determine efficiency-seeking FDI which is motivated by the aim to reduce production costs.

As shown in section (section II), production costs stem >from the employment of capital and labour and therefore depend on their prices. As in the case of FDI financed in the source-country, the cost of capital may be almost identical for all potential host countries, it makes sense to focus on labour costs. Firms wishing to save on labour costs will engage in efficiency-seeking FDI in countries with relatively lower labour costs compared to Germany. In order to create a subset of the full data set, we need to chose a number of countries with labour costs below Germany's (i.e. $FWAGE/DWAGE < 1$). To further reduce the sample we chose a treshold of 1/3, i.e. labour costs in the host country being no greater than one third of German labour costs. This reduces the original panel to six countries and creates a subset of nations with labour costs significantly differing from the rest of the 22 countries. Our sub panel analysed in this section consist of China, the Czech Republic, Hungary, Poland, Malaysia and South Korea which we identified as potential host countries for (mainly) efficiency-seeking FDI by German firms. Results of a seperate OLS regression are also reported in table 1 (regression (2)).

Contrary to regression (1), relative domestic labour costs (*DWAGE/FWAGE*) are now significant and match our expectations in terms of sign. (Furthermore, an EBA now confirms the relative labour costs to be robust and significant at the 10 percent level.) The elasticity is estimated at 0.76 indicating that a one percent increase of German labour costs relative to the host country labour costs c.p. increases the FDI stock of German firms in that low labour cost country by 0.76 percent. This confirms proposition 2.

Furthermore, the elasticity of the FDI stock with respect to relative productivity (DVA/FVA) is higher in absolute terms (-1.70) towards the low labour cost countries than towards all countries (regression (1)) and equally significant. (As in regressions (1), its negative sign confirms proposition 3.) If we conclude from proposition 2 that the FDI stock's higher elasticity in absolute terms cannot only be expected for relative labour costs but also for relative productivity, we have that conclusion confirmed by regression (2) vs. (1) as $|-1.70| > |-0.66|$.

$GDPCAP$ (3.21) and CCD (-0.17) also have the same coefficient signs and significance levels for the reduced country sample. Additionally, the foreign capital costs (CCF) and the agglomeration variable ($AGGLO$) are also positive and significant in regression (2). While the latter results meets our expectations, there seems to be no explanation in the literature as to why host country capital costs should positively influence FDI stocks of foreign firms in that country. One explanation may be that the FDI stock is highly correlated with host country economic growth, which in case of high growth (economic boom) may raise the price of capital in the host country.

The exchange rate volatility ($RERVOL$) is, compared to regression (1), significant in regression (2), albeit only at the ten percent level. That the coefficient is positive seems to comfirm the view of Sung and Lapan (2000) that exchange rate volatility creates an opportunity to shift production to lower-cost plants. Thus, high volatility increases the value of that option and therefore the value of FDI, which increases the incentive to invest abroad.

The findings in this section therefore support proposition 2. An increase in relative domestic labour costs leads to an increase of the efficiency-seeking FDI capital stock of German firms in that country. The opposite is true for relative domestic labour productivity (as the FDI stock's elasticity with respect to relative (domestic) value added per hour worked is negative) which again, like the findings of regression (1), supports proposition 3.

Sector Level

Proposition 2 from page 5 also allows sectoral predictions as it implies market-seeking FDI is not mainly motivated by factor price differences. Instead it is driven by the aim to reduce the costs of trade. Therefore, we can expect market-seeking FDI to be relatively more important in sectors with high trade costs such as services industries and relatively less important in sectors with lower trade costs such as tradeable goods. This section will analyse the determinants of FDI in three sectors: motor vehicles, sale & maintenance of consumer goods and banking. Due to the limited availability of sectoral data, we have to reduce the GLS regressions to 11 countries[6]. The results are

[6] Austria, Czech Republic, Hungary, Italy, Netherlands, Poland, Portugal, Spain, Sweden, United Kingdom, United States.

reported in table 2.

Table 2: Sector level regression results

Dependent Variable: *STOCK*			
Number of observations: 88			
Method: GLS			
Sector:	Motor vehicles	Sale & Maintenance	Banking
Regression No.	(3)	(4)	(5)
DWAGE/FWAGE	1.038**	-0.374*	0.353
DVA/FVA	-0.227**	0.146	-0.704**
GDPCAP	3.008**	2.531**	5.302**
RERVOL	-0.359**	0.227**	0.555**
RER	0.013**	0.004	-0.011
CCD	-0.008	-0.111**	-0.174**
CCF	0.010	0.018**	0.079**
AGGLO	0.001**	0.000**	0.000
R^2	0.944	0.983	0.931

Fixed country effects are suppressed. Standard errors were calculated using White's heteroscedasticity-consistent standard errors. Significance levels of 10(*) and 5(**) percent as before.

Comparing the regression results for the motor vehicle (3), sale & maintenance (4) and banking (5) sectors in table 2 it is obvious that the relative labour costs are not equally significant for the FDI stock in the three sectors. Specifically, they only seem to be significant (at the five percent level) in the motor vehicle industry where the elasticity of the German FDI stock with respect to relative labour costs is estimated at 1.04. This matches our expectations as proposition 2 suggests that the FDI is most elastic with respect to labour costs for efficiency-seeking FDI. Efficiency-seeking FDI is more likely where trade costs are low as it often involves the transport of final goods. Therefore, efficiency-seeking FDI is almost impossible in services such as sales & maintenance (4) where the regression coefficient for *DWAGE/FWAGE* is actually negative (-0.37) but of low significance. For banking, we estimate a positive but insignificant elasticity for the FDI stock with respect to relative labour costs.

The relative productivity coefficients match expectations from proposition 3 for the motor vehicle (3) and banking (5) sectors but appear to be insignificant for sales & maintenance FDI. That seems intuitive as this is a service sector where the productivity of services in a foreign country should not have any influence on investments.

Unsurprinsingly, as in the previous regressions, the FDI stock's elasticity with respect to host country income (*GDPCAP*) is found to be highest in absolute values and highly significant for all three sectors. Interestingly, between sectors it is highest for banking (5.30) which suggests that FDI in that sector is more dependent on the incomes of host-country inhabitants than, say, in the sales and maintenance sector (where the elasticity is 2.53). Another major difference between sectors stems from the *RERVOL* coefficient which is negative and significant for motor verhicles and positive

and significant for the other two sectors. This confirms the different theories/findings of previous papers for the same variable (Cushman (1987), Bloningen (2005), Sung and Lapan (2000)) depending on the type of FDI as some of them take place to limit exchange rate uncertainty (market-seeking FDI) while efficiency-seeking FDI may be hampered by uncertainity. Broll and Zilcha (1992) also emphasis the importance of currency-future markets to insure against volatility. Their presence stimulates FDI while the degree of the firm's risk aversion is the important factor in their absence.

The capital cost coeffients do not differ in terms of sign and significance from the findings in the previous regressions while the *AGGLO* variable appears not to alter the FDI stock significantly.

Furthermore, it can be concluded that there is a sector pattern in the foreign direct investment capital stock of firms. Manufacturing FDI seems to be more sensitive to relative labour costs than service and banking sector FDI.

We have shown that labour costs do affect foreign direct investment decisions by German multinationals - but not for all types of FDI into all countries. Rising labour costs increase the FDI stock in sectors where final goods are tradable and in countries where labour costs differ significantly from Germany - two characteristics associated with efficiency-seeking FDI.

One may argue that our analysis only considers relative labour costs and that due to a convergion of wages internationally (as a consequence of factor price equalization), German relative labour costs can hardly rise compared to the low labour cost countries identified for regression (2) as wages are rising more quickly in these countries. For example between 1996 and 2002, German relative per-hour labour cost did indeed decline by 33 percent compared with the unweighted average of these six countries. However, productivity increases in low labour cost countries need to be taken into account. The decline in German relative value-added per hour worked was relatively higher (43 percent) than its relative wage decline. Those foreign productivity increases therefore lead to relatively higher FDI stocks by German firms, especially as the elasticity of the FDI stock with respect to productivity was found to be higher (than with respect to labour costs) throughout our regressions.

V Summary

The model presented in this paper indicates the pattern of the labour cost-foreign direct investment relationship. Unless substitution between capital and labour is strong, an increase in domestic labour costs relative to foreign labour costs will in theory increase the FDI stock in that foreign country and vice versa. On the other hand, relative domestic productivity rises will diminish the FDI stock.

We derived three propositions. An increase in domestic labour costs increases FDI. This effects is stronger for efficiency-seeking foreign investments. And domestic productivity increases have a contrary impact. The latter two were confirmed in the empirical part of our paper while a general statement (first proposition) predicting an increase in the FDI stock when domestic labour costs rise cannot be endorsed. A reason for that could be the substitution of labour by capital as an alternative to FDI (for some types of FDI) in some sectors.

Our econometric analysis shows that it is important to distinguish FDI regarding its motiation. While investments aimed at capturing a foreign market are less dependent on labour cost differentials, FDI targeting cost reductions (efficiency-seeking FDI) is more sensitive to labour costs. In a regression of the FDI stock of German firms in six low labour cost countries, we find that the elasticity of that FDI stock with respect to relative domestic labour costs is 0.76. The elasticity of the FDI stock in all 22 countries in our panel with respect to relative labour costs is not found to be significantly different from zero. On a sector level, we find a positive elasticity for the automobile industry (tradable good) and no consistent coefficient for banking and sale & maintenance sectors. That confirms that service sector FDI may be mainly aimed at capturing a foreign market and is therefore inelastic with respect to (domestic) labour costs, which is not the case for manufacturing FDI possibly targeted at producing goods for exports. All the regressions however show that the FDI stock is most elastic with respect to variables other than relative labour costs. These are host country per-capita income (positive elasticity) and relative source country productivity (negative relationship). The latter one also explains the increased FDI flows out of Germany in the last decade because although German labour costs have fallen relative to low labour cost countries, relative German productivity has declined at a much faster pace.

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