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Do credit constraints reduce foreign jobs? A note on foreign direct employment

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This article studies the effect of credit constraints on the jobs created by multinational enterprises in host countries. Although most FDI is labour intensive, few studies delve into the determinants of foreign direct employment (FDE). This article constructs a model of limited commitment between the financed and financing parties to explain how FDE is affected by financial frictions. Moreover, this study examines FDE's determinants empirically on a global data set including FDE data from 161 countries during 2003–2010 by means of the gravity equation. Results show that credit constraints during the Great Recession roughly halved FDE, tripling the effect on FDI and suggesting that domestic jobs slightly outpaced foreign jobs.

Keywords: foreign employment; gravity equation; banking crises; Great Recession; FDI

JEL Classification: F20; F21; F23

I. Introduction

Just like trade economists in early stages of the global crisis, who were puzzled by the plunge of trade relative to the world's GDP, economists today are baffled with high unemployment to GDP ratios. For example, while GDP fell by only 1% in 2009, international trade volumes dropped by nearly 11%, FDI by roughly 7% and global employment by 33% (UNCTAD, 2013). Moreover, slow-growing economies show unprecedented unemployment rates (e.g. Spain 27%, Portugal 15.5% and Italy 12.7%), with a significant reduction in foreign jobs (Gómez-Plana and Latorre, 2014).

Despite the current academic hype surrounding the Great Recession, the effect of credit constraints on foreign direct employment (FDE) remains largely underexploited and its mechanisms unknown. Several questions remain unanswered, such as: (1) What are the determinants of FDE? (2) How does credit easiness contribute to foreign employment? (3) What is the effect of systemic banking crises on foreign jobs?

Unlike the extant body of literature on financial crises, little research exists on their effect on FDI, and the literature related to FDE is considerably smaller.¹ Researches have demonstrated that the gravity equation performs well in explaining bilateral FDE:

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¹ See Laeven (2011), Gil-Pareja *et al.* (2013) and Gómez-Plana and Latorre (2014) for an overview.

the number of jobs offered by multinationals in a host country is affected by the transaction costs (e.g. distance, linguistic, colonial and religious links); institutional agreements (Bilateral Investment Treaty and Free Trade Agreement); the relative wages and the host's governance (i.e. democracy, political competition and legal rights) (Seyf, 2000; Paniagua and Sapena, 2013, 2014). However, scholars have yet to examine the means by which financial constraints affect FDE. This article fills this gap.

The contributions of this article are the following: first, this article explains the effect of credit constraints on FDE as a result of limited commitment between the financing (i.e. bank) and financed party (i.e. multinational enterprise (MNE)). Stemming from a setup where FDI is the outcome of corporate control over foreign affiliates (Head and Ries, 2008), the model explains FDI employment through contractual frictions as in Thomas and Worrall (1994) or Antràs and Foley (forthcoming). Second, this research estimates the determinants of FDE in a set of 161 countries during 2003–2010 by means of the gravity equation. Third, this study explores the effect of systemic banking crisis on FDE. Results suggest that FDE halved as a result of systemic banking crises in home countries.

II. Theory and Calculation

The model

The model considers a firm producing and selling products in country i . The revenue is a strictly increasing and concave function of the quantity produced in that country x_i . The concavity in the revenue function may stem from technology or market preferences. The quantity produced is, therefore, assumed to be a constant elasticity of substitution Cobb–Douglas type:

$$x_i = \left(\frac{K}{(1+r_i)} \right)^\mu \left(\frac{\lambda L}{w_i} \right)^{(1-\mu)} \quad (1)$$

where λ is the technology shifter constant; L is the labour; K is the capital stock, w_i are the wages at i and r_i the interest rate and $\mu \in (0, 1)$. The maximization function faced by the enterprise for labour-intensive plants is given in Equation 2

$$\pi^i = \max \left\{ p_i \left(\frac{\lambda L}{w_i} \right) - f \right\} \quad (2)$$

where $\mu = 0$ and f is a fixed cost of production.

Foreign jobs. Consider now that the firm plans to build or acquire a similar plant in country j . We assume that the company uses mainly banks at the home country to finance its foreign operations. Financial frictions occur as a problem of limited commitment, as in Thomas and Worrall (1994). As a result of systemic banking crises, domestic banks at country i may not abide fully by the financial contract. When the contract is not enforced, the bank does not stand by the initial terms of the contract with the firm. In particular, the contract is enforced with probability $\gamma_i \in (0, 1)$, where γ_i is an index of the financial quality of country i .

For simplicity, we assume that the fixed costs from this new facility and that of the existing plant are the same with $f_i = f_j$ and the plant is highly labour intensive with a very low initial capital stock $\mu = 0$. The expected revenue will diminish by a fraction $\delta \in (0, 1)$, which captures the extent of financial contractual frictions. Therefore, the constraint of the MNE results in:

$$(1+r_i)FDI_{ij} \leq (\gamma_i + (1-\gamma_i)\delta)p_j \left(\frac{\lambda L}{w_j} \right) \quad (3)$$

which reads that with a probability $(1-\gamma_i)$, the bank is not abiding by the contract with the MNE and the expected revenue is reduced by δ . The expected revenue of the foreign plant results in

$$\pi^j = \max \left\{ \frac{(\gamma_i + (1-\gamma_i)\delta)p_j \left(\frac{\lambda L}{w_j} \right)}{(1+r_i)} - f \right\} \quad (4)$$

Applying the envelope theorem to expressions 2 and 4, the MNE prefers investing in country j over domestic production if and only if

$$\frac{(\gamma_i + (1-\gamma_i)\delta)}{(1+r_i)} \left(\frac{p_j/p_i}{p_i} \right) > \left(\frac{w_j/w_i}{w_i} \right) \quad (5)$$

From Equation 5, the following conclusions follow:

Proposition: *The likelihood that a labour-intensive greenfield investment occurs in country j as opposed to home country i is governed by the relative magnitude of the wages (w_j/w_i), prices (p_j/p_i), financial costs and the financial quality at i . It is increasing in the financial stability at home (γ_i), in the financial costs at home (r_i) and in the relative prices. It is decreasing in the relative wages.*

Data and empirical strategy

The empirical strategy focuses on the financial channel with the following empirical equation,

$$FDE_{ijt} = e^{(\beta_1 GR_{it} + \beta_2 GR_{jt} + \beta_3 GR_{ijt} + \varphi_{ijt} + \omega_{it} + \omega_{jt})} + v_{ijt} \quad (6)$$

where FDE_{ijt} are the jobs created by FDI greenfield projects from country i in country j ; GR_{it} is a dummy set to 1 when the home country is affected by the Great Recession, GR_{jt} for host countries and GR_{ijt} for simultaneous systemic banking crisis; φ_{ijt} are a set of control variables; ω_{it} and ω_{jt} represent time-varying country fixed effects to control for relative wages and prices and v_{ijt} is an error term. The data set and control variables are the same as in Gil-Pareja *et al.* (2013) and Paniagua and Sapena (2014). For a detailed description of the variables, countries and descriptive statistics, refer to Paniagua and Sapena (2013, 2014). The equation is estimated with the pseudo-Poisson maximum likelihood estimator proposed by Silva and Tenreyro (2006).

III. Results and Discussion

Table 1 shows the regression results. In general, the gravity equation performs well, explaining more than 72% of FDE. Column (1) uses the specification of Equation 6, with time-varying fixed country dummies. With this specification, the effect of contemporaneous financial restrictions and host banking crisis is similar, reducing FDE in 97% on average. Global employment dropped *only* by 42.3% during 2007–2009, suggesting that domestic jobs slightly outpaced foreign jobs (UNCTAD, 2013, p. 23). Moreover, the impact of the Great Recession on FDE triples that of FDI's extensive margin.²

In line with previous research, the rest of control variables show, in general, expected signs. Column (2) uses country and year dummies. In this case, only home banking crises are significant, deterring 17% FDE on average. To further unravel the effect of individual GDPs on employment, column (3) shows the results with country fixed effects only. While home GDP has a

Table 1. Results

Regressand Variable	(1) FDE_{ijt}	(2) FDE_{ijt}	(3) FDE_{ijt}	(4) FDE_{ijt}
GDP sum $\ln(Y_{it} \times Y_{jt})$		-0.690*** (0.24)		-0.748*** (0.35)
GDP home $\ln(Y_{it})$			0.796** (0.40)	
GDP host $\ln(Y_{jt})$			-0.639*** (0.21)	
Distance $\ln(D_{ij})$	-0.405*** (0.03)	-0.540*** (0.04)	-0.541*** (0.04)	
Border $border_{ij}$	0.019 (0.09)	0.025 (0.11)	0.028 (0.11)	
Common language $lang_{ij}$	0.677*** (0.07)	0.734*** (0.08)	0.732*** (0.08)	
Colony col_{ij}	0.430*** (0.07)	0.426*** (0.08)	0.426*** (0.08)	
Religion rel_{ij}	0.192* (0.11)	0.117 (0.16)	0.114 (0.16)	
Bilateral Investment Treaty BIT_{ijt}	-0.180*** (0.06)	-0.089 (0.05)	-0.111** (0.06)	0.028 (0.26)
Free Trade Agreement FTA_{ijt}	0.094 (0.14)	0.083 (0.17)	0.079 (0.17)	0.359 (0.26)
GR in home GR_{it}	-3.547*** (0.27)	-0.183* (0.11)	-0.148 (0.11)	-0.194* (0.13)
GR in host GR_{jt}	0.113 (0.14)	0.181 (0.14)	0.163 (0.12)	0.159 (0.15)
GR both GR_{ijt}	-3.141*** (0.37)	0.116 (0.34)	0.186 (0.30)	0.171 (0.35)
Hausman test				435***
Observations	32 530	32 530	32 530	32 530
R^2	0.72	0.66	0.60	
Log likelihood	-4 171 714	-4 863 852	-5 029 938	-3 025 033
Estimation	PPML	PPML	PPML	PML-CPFE
Fixed dummies	Country*Year	Country and year	Country	Year

Notes: Robust SEs in parentheses.

PPML, pseudo-Poisson maximum likelihood; PML-CPFE, Poisson maximum likelihood country-pair fixed effect.

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

² Gil-Pareja *et al.* (2013) calculate a reduction of 30% in new greenfield projects due to banking crises.

positive effect on FDE, the host's GDP deters foreign employment. In line with the factor-proportions model of FDI (Kleinert and Toubal, 2010), vertically integrated MNEs search opportunities in countries with the lower costs associated with an economic downturn. Moreover, Paniagua and Sapena (2014) show that GDP is negative only for employment in more developed host countries, linking this result to higher costs (e.g. wages), as in Rodrik (1999). For robustness, column (4) uses the Poisson maximum likelihood country-pair fixed effect, displaying similar results.

IV. Conclusions

The purpose of this article was to analyse the effect of financial constraints on foreign employment. The model in this study is, apparently, the first to explain FDI's jobs in the context of financial frictions. The empirical application of the model to a global panel data set highlights that credit constraints at the country of origin reduces foreign jobs in higher numbers than domestic employment.

This study proves useful to determine policy instruments and initiatives to foster foreign employment – for example, intra-firm financing or third-party financial endorsement (e.g. the host). Moreover, this study contributes to a better understanding of the record high unemployment rates in relatively open economies (e.g. Spain, Portugal and Italy).

This letter does have limitations, many of which are an invitation to future research. For example, this article overlooks MNE's endogenous financing and affiliate's reinvestment. This study may, therefore, show some bias towards smaller transnational corporations. Future research exploring the applicability of this model to FDI intra-firm financing is encouraged.

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