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FDI, Financial Constraints, and Productivity: Firm Level Study in Vietnam

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Introduction

- Foreign direct investment is the key engine of productivity growth for developing countries.

- Recent studies also highlight the importance of financial markets in inducing innovation and entrepreneurship (Alfaro et al., 2004).

- The present paper examines the contributions of foreign investment and financial constraints to productivity growth, using a panel of 5,302 firms in Vietnam spanning over the period 2002-2008.

Why Firms in Vietnam?

- Foreign ownership has been increasingly important to output and employment growth in the Vietnamese economy.

- The past decade witnessed rapid proliferation of multinational activities as a result of its market-driven momentum toward trade and investment liberalization, coupled with policy initiatives (tax exemption, legal reform, and improved institutional infrastructure).

Table 2. Output and Employment Growth by Ownership, 2000–2008

	Output Growth (% p.a.)	Employment Growth (% p.a.)
Total	7.5	2.3
State	6.8	1.85
Non-state	7.3	1.93
Foreign Firms	10.4	20.41

Source: General Statistics Office, Vietnam.

Table 3. Surveyed Firms by Foreign Ownership Characteristics

	2002	2003	2004	2005	2006	2007	2008
	Number of Firms						
Total	**51680**	**62908**	**72012**	**91756**	**112950**	**131318**	**155771**
Foreign Firms	**2011**	**2308**	**2641**	**3156**	**3697**	**4220**	**4961**
100% foreign capital	1294	1561	1869	2335	2852	3342	4018
Joint venture	717	747	772	821	845	878	943
	Percentage of Firms						
Total	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**
Foreign Firms	**3.89**	**3.67**	**3.67**	**3.44**	**3.27**	**3.21**	**3.19**
100% foreign capital	2.50	2.48	2.60	2.55	2.52	2.54	2.58
Joint venture	1.39	1.19	1.07	0.89	0.75	0.67	0.61

Source: General Statistics Office, Vietnam.

Existing Studies

- Evidence from developing countries highlights that foreign affiliates exhibit higher productivity performance than do domestic-owned firms.

- Aitken and Harrison (1999) for Venezuela; Arnold and Javorcik (2009) for Indonesia; Sabirianova et al. (2005) for the Czech Republic; and Javorcik (2004) for Lithuania.

- However, these studies focus on a productivity comparison between domestic and foreign-owned firms.

Existing Studies

- Much research points to the negative effects of financial constraints on firm survival and development (Levine, 2005; Beck et al., 2005; and Demirguc-Kunt and Maksimovic, 1998).

- Alfaro et al. (2006) show that firms in countries with well-developed financial market tend to experience positive gains from FDI.

- This issue is vital especially in developing countries where financial market development is usually limited.

Additional Firm-specific Treatment

- The effects of high-tech capital (e.g. computers and automated machinery) .
- The roles of human capital utilization (e.g. R&D, education and training).
- Scale economies.
- Trade openness.

Data sources

- The dataset is constructed from *Annual Statistical Censuses & Survey: Enterprises* from 2002 to 2008, gathered by General Statistical Office of Vietnam.

- Sample firms operate in a wide range of economic sectors; most of which are concerned with manufactures and service activities, e.g. trade, hotels, restaurants, real estate and consultancy.

- After data cleaning, the firm-level panel comprises a total of 5,302 annual observations spanning over the years 2002-2008.

Productivity Measurement

- This paper employs the semi-parametric framework of Levinsohn and Petrin (2003) to estimate total factor productivity (TFP).

- Alternative to L-P TFP is Olley-Pakes TFP measurement. However, a valid proxy of investment is not available (while complete material information is available!). Even it is available, the estimates would suffer from truncating all the establishment reporting "zero" investment.

Levinsohn-Petrin TFP

- Consider a log-linearized Cobb-Douglas technology.

$$y_t = \beta_0 + \beta_l l_t + \beta_k k_t + \beta_m m_t + \omega_t + \eta_t$$

- With an assumption a first-order Markov process, we can re-write this technology as

$$y_t = \beta_l l_t + \phi_t(k_t, m_t) + \eta_t,$$

where $\phi_t(k_t, m_t) = \beta_0 + \beta_k k_t + \beta_m m_t + \omega_t(k_t, m_t)$.

Table 1. Levinsohn–Petrin Estimation of Production Technology

Dependent Variable: y_t	
l_t	.3357*** (.0435)
m_t	.1065 (.2121)
k_t	.6716*** (.1714)
No. Obs.	1825
Wald's Test of Returns to Scale	3.31*

Note: 1) ***, * statistically significant at 1 and 10 percent, respectively.
2) Wald's test is Chi-square distributed against the null that the production technology is constant returns to scale.

Empirical Model

- The base-line econometric specification:

$$TFP_{it}^{L-P} = \alpha_0 + \alpha_1 \ln FDI_{it} + \alpha_2 \ln LIQUIDITY_{it} + \alpha_3 \ln LEVERAGE_{it} + \alpha_4 \ln SIZE_{it}$$
$$+ \alpha_5 \ln COM_{it} + \alpha_6 \ln HUMANK_{it} + \alpha_7 XM_{it} + \mu_i + u_{it},$$

- GMM Estimation:

$$TFP_{it}^{L-P} = \alpha_0 + \alpha_1 TFP_{it-1}^{L-P} + \alpha_2 \ln FDI_{it} + \alpha_3 \ln LIQUIDITY_{it} + \alpha_4 \ln LEVERAGE_{it}$$
$$+ \alpha_5 \ln SIZE_{it} + \alpha_6 \ln COM_{it} + \alpha_7 \ln HUMANK_{it} + \alpha_8 XM_{it} + \mu_i + u_{it},$$

Model Estimations

- FE and RE Estimations: Sample firms operate in a wide array of businesses, the standard OLS estimates may be biased due to firm heterogeneity.

- Two-step Blundell-Bond GMM Estimations: The structural variables are very likely to be endogenously determined by other unobserved variables. The lags of structural variables are chosen as IVs to correct any simultaneity bias.

Table A1. Summary of Statistics

Variable	Obs.	Mean	S.D.	Min	Max
ln *FDI*	5158	–.2833	.4515	–4.382	1.099
ln *LIQUIDITY*	5138	–.5264	.7160	–6.598	.0533
ln *LEVERAGE*	1845	–.6158	2.411	–10.55	6.743
ln *SIZE*	4905	9.136	2.475	.6932	17.99
ln *COM*	4642	–2.028	1.126	–5.622	2.481
ln *HUMANK*	5078	–1.121	.7046	–4.727	0
XM	3401	.8944	.3073	0	1

Table A2. Correlation Matrix of Structural Variables

	FDI	*LIQUIDITY*	*LEVERAGE*	*SIZE*	*COM*	*HUMANK*	*XM*
FDI	1.000						
LIQUIDITY	–.0117	1.000					
LEVERAGE	–.0185	.0816	1.000				
SIZE	–.0318	.0965	.2064	1.000			
COM	.0586	.1319	–.0634	–.2767	1.000		
HUMANK	.0248	–.0895	–.0579	–.1830	.1102	1.000	
XM	.0415	–.0351	–.1375	–.1255	.0130	–.0655	1.000

Note: All variables are represented in logarithmic forms, except for *XM*.

Table 4. OLS, FE, and RE Estimations for Levinsohn–Petrin TFP

Dependent Variable: TFP_{it}^{L-P}			
Independent Variable	**OLS**	**FE**	**RE**
$\ln FDI_{it}$	$.4603^{***}$ (.1164)	1.013^{***} (.3255)	$.5249^{***}$ (.1302)
$\ln LIQUIDITY_{it}$	1.650^{***} (.3034)	1.427^{***} (.5214)	1.613^{***} (.1328)
$\ln LEVERAGE_{it}$	$.2041^{***}$ (.0647)	$.1351^{*}$ (.0724)	$.1906^{***}$ (.0584)
$\ln SIZE_{it}$	$.7095^{***}$ (.0997)	1.170^{***} (.2649)	$.7811^{***}$ (.1107)
$\ln COM_{it}$	$.7441^{***}$ (.1352)	$.8439^{***}$ (.1967)	$.7816^{***}$ (.1328)
$\ln HUMANK_{it}$	$.4166^{**}$ (.1869)	$.5521^{*}$ (.3136)	$.4205^{**}$ (.1853)
XM_{it}	.2037 (.3210)	– .5079 (.3458)	– .0113 (.2828)
Constant	1.204 (.8292)	– .9246 (2.155)	1.020 (.8620)
No. of Obs.	726	726	726
R-squared	.1734	.1495	----
Wald's Chi-squared	----	----	124.50^{***}
Breusch–Pagan Test	----	----	5.13^{**}

Note: 1) Heteroskedasticity-robust standard errors in parentheses for OLS and RE.
2) RE estimates are based on Generalized Least Squares (GLS) with the Swamy–Arora estimators.
3) The Breusch–Pagan test statistic is Chi-squared distributed under the null hypothesis that there are no random effects.
4) ***, **, and * statistically significant at 1, 5, and 10 percent, respectively.

Table 5. GMM Estimations for Levinsohn–Petrin TFP

Dependent Variable: TFP_{it}^{L-P}			
Independent Variable	**Model 1**	**Model 2**	**Model 3**
TFP_{it-1}^{L-P}	−.0184 (.1316)	.0847 (.1406)	.0688 (.1313)
$\ln FDI_{it}$	.6629** (.2728)	.7090** (.2984)	.6306** (.2658)
$\ln LIQUIDITY_{it}$	1.648*** (.6277)	1.244** (.5909)	1.738*** (.6533)
$\ln LEVERAGE_{it}$	.1437* (.0814)	.1581** (.0790)	.1672** (.0738)
$\ln SIZE_{it}$	.9460*** (.2793)	.9776*** (.2614)	.9136*** (.2388)
$\ln COM_{it}$	.9080*** (.2819)	.8399*** (.2493)	.9027*** (.2485)
$\ln HUMANK_{it}$	.6598 (.4166)	—	.8540** (.4319)
XM_{it}	−.3789 (.5459)		—
Constant	.2390 (2.954)	−1.778 (2.348)	.0654 (2.505)
No. of Obs.	309	381	380
Wald's Chi-squared	34.17***	33.72***	33.72***
No. of IVs	15	17	17
Sargan test	7.88	11.90	10.78

Note: 1) The Bond–Blundell estimates are based on GMM with the two-step estimators.
2) The maximum lag for AR tests is 2.
3) Standard errors in parentheses.
4) ***, **, and * statistically significant at 1, 5, and 10 percent, respectively.
5) The Sargan test is chi-squared distributed under the null hypothesis that over-identifying restrictions are valid.

Empirical Results

- The degrees of foreign ownership contribute positively to TFP of firms in Vietnam. Greenfield FDI is more productive than joint venture!

- With an acquisition of a domestic firm by foreign investors, superior know-how, technology, and organizational management may be transferred cross-borders (Markusen, 2002).

- However, the productivity enhancement may also be market-driven as foreign investors tend to acquire the best-performing indigenous firms.

Empirical Results

- Firms with financial constraints in terms of either low liquidity or limited access to external sources of fund tend to have inferior productivity performance.

- Liquidity helps ease the obstacles facing firms, grow faster, and hence augment productivity (Beck et al., 2005 and Demirguc-Kunt and Maksimovic, 1998).

- Limited access to external credit imposes constraints on development, innovation and overall investment decisions (Beccheti and Trovato, 2002).

Empirical Results

- The estimates point to the role of scale efficiency.
- Firms with large high-tech capital accumulation and intensive human capital utilization tend to outperform others
- We find only weak evidence that international trade exposure is correlated with productivity of firms.

Thank you