Productivity Gains from Foreign Direct Investment Micro and Macro Approaches

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FDI: Potential Positiveveffecve

Road Map

- Examine the relationship between foreign direct investment (FDI) and growth/productivity in host countries, particularly developing countries.
- Macro Approach:

  The role of complementary local conditions conducive to reaping the benefits of FDI
- Micro Approach:

  S*ources* of effects and gains
- Theoretical Framework:

  Guide research

Role of Local Conditions…

While FDI has the potential to contribute to the development efforts of a country, domestic conditions (institutions) matter as well:

- Productive assets available
- Policy environment
- … and *the development of local financial markets*, which can limit the economy's ability of taking advantage of potential FDI spillovers.

    Increase absorptive capacities of a country with respect to FDI

The Role of Financial Markets and FDI... How?

- Although FDI by its very nature relies on capital from abroad … FDI uses local funds and financial markets - Kindleberger (1969)

- To take advantage of new knowledge: local firms reorganize their structure, buy new machines, and hire new managers and skilled labor: internal financing + external financing.

- Well-functioning financial markets, by increasing the spectrum of sources of finance for entrepreneurs, play an important role in creating linkages between domestic and foreign investors.

The Role of Local Financial Markets

To summarize:

- The development of financial institutions may be a decisive

FDI, Financial Markets and Growth

- Alfaro, Chanda, Kalemli-Ozcan, and Sayek (2004) and Alfaro, Kalemli-Ozcan and Sayek (2009) empirically examine whether economies with better-developed financial markets are able to benefit from FDI to promote their economic growth

- Findings:
  - FDI alone plays an ambiguous role in contributing to economic growth
  - However …. countries with well-developed financial markets seem to gain significantly more from FDI

- Results are robust:
  - Controlling growth determinants
  - Numerous financial market indicators
  - Endogeneity

Data: Credit Markets and Stock Market

- *Liquid Liabilities of the Financial System* (*LLY*): currency + demand + interest-bearing liabilities of banks and non-financial interm. / GDP
- *Commercial-Central Bank Assets (BTOT):* ratio of commercial bank assets divided by commercial bank plus central bank assets
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Empirical Analysis

- Examine the capital markets channel through which FDI may have additional growth effects

$$Growth_i = \beta'_0 + \beta_1 FDI + \beta'_2 (FDI*FINANCE) + \beta'_3 FINANCE + \beta_4 CONTROLS_i + v_i$$

Table 3: Growth and FDI

Dependent Variable—Average annual per capita growth rate

Table 4: Growth and FDI: The Role of Financial Markets
Dependent Variable—Average annual real per capita growth rate

	(1) BTOT	(2) BANKCR	(3) LLY	(4) PRIVCR	(5) SCAPT	(6) SVALT
Period	1975-95	1975-95	1975-95	1975-95	1980-95	1980-95
Observations	71	71	71	71	49	53
log (Initial GDP)	-0.013	-0.012	-0.01	-0.012	-0.017	-0.017
	(-4.00)	(-3.81)	(-3.18)	(-3.76)	(-3.60)	(-4.22)
FDI/GDP	0.154	0.917	0.504	0.588	0.121	0.341
	(0.45)	(2.01)	(1.67)	(1.56)	(0.68)	(1.83)
(FDI/GDP)*Financ.	0.899	0.893	1.169	0.777	0.335	0.169

Endogeneity

- IV $\rightarrow$ Instruments

Alfaro, Chanda, Kalemli-Ozcan and Sayek (2010) Exploring the Mechanism

- Objective:
  - Formalize one mechanism through which the trickle down effect of

Benefits: Backward Linkages

- FDI spillovers more likely to be inter-industries:
  - Multinationals would like to prevent information leakage to potential local competitors but would benefit from knowledge spillovers to their local suppliers.
    - Javorcik (2004), Alfaro and Rodriguez-Clare (2004): evidence

+… Role of Local Conditions…

While FDI has the potential to contribute to the development efforts of a country, domestic conditions (absorptive capacities) matter as well:

- Market structure: interaction foreign – local firms.
- Productive assets available: e.g. human capital; Borensztein et al. (1998).
- Local financial mark0.8(o)-4(cal1(n)-5([(P)-)-4(an)-4(o:)1.5(t2.5( )6.4(h)-4

Key Elements of the Model

- Final Sector: foreign and local firms may be complements or substitutes.
- Local Intermediate Good Firms: backward linkages.
- Growth from Innovation in the Intermediate Goods Sector;
  - Entrepreneurs: produce intermediate goods in a monopolistic market,
    - Engage in innovation… and incur startup capital expenditures which must be borrowed from the domestic financial institutions at a positive cost.

The Financial Markets

- Entrepreneurs are resource constrained: If they choose to develop a new variety, they have to borrow the initial setup cost in the domestic financial market.
  - Only then can they manufacture the intermediate good.

- The domestic markets intermediate foreign funds at a cost (reflecting inefficiencies in the financial sector)
  - There is a wedge between the lending rate, r, and the borrowing rate, i, ($i>r$).

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Quantitative Implications of the Model

- For the same share of foreign production in total output, countries with more developed financial markets: twice as high growth rates.
- Increases in the amount of FDI (or the technology gap between foreign-owned firms and domestically owned firms), additional growth effects generated in the financially well-developed countries 3 x those financially poorly-developed countries.
- Differences in growth rates increase when domestic firms and MNEs are substitutes rather complements.
- Differences in higher growth rates increase by varying the relative skill ratios while assuming that MNEs use skilled labor more intensively.

FDI and Growth:
The Role of Local Financial Markets

- FDI plays an important role in contributing to economic growth
    - Local conditions matter,
        - Empirical/Simulation results.
        - Heterogeneity.

MNC Activity: Macro and Micro Data

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The D&B Data

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Foreign Ownership

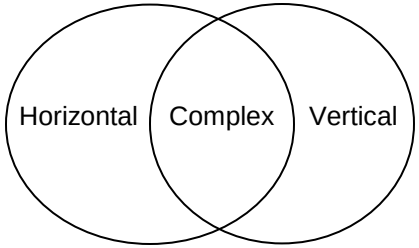
- Establishment: foreign owned if it satisfies two criteria:
  - Foreign owned: must report a global parent firm and that parent firm must be in a different country.
  - Parents are defined in the data as entities which have legal and financial responsibility for another firm.
- Combining the location and ownership information it is possible to identify 650 000+ firms in the database which are owned by a foreign parent.

Alfaro and Charlton (2009)

- Study patterns of vertical and horizontal multinational activity: large new data set of 650,000 multinational subsidiaries in 90+ countries (close to population of MNCs).
- Traditionally, the literature has distinguished between two forms of—and motivations for—multinational activity.
  - "Horizontal" FDI: locating production to be closer to customers and avoid trade costs (Markusen, 1984; Brainard, 1993),
  - "Vertical" FDI: firm's

Measuring Horizontal and Vertical

- We calculate bilateral horizontal and vertical FDI using firm ownership data and U.S. input output matrix.
  - Horizontal FDI: activity of those foreign owned subsidiaries in the same industry as their parent.
  - Vertical FDI: activity of foreign owned subsidiaries in industries which are upstream from their parent's industry (according to the US input output matrix).
  - Complex FDI: firms satisfy both.
  - None: If they satisfy neither of these criteria.



Patterns

- Consistent with conventional wisdom,
  - The bulk of multinational activity occurs between the rich nations.
  - At the 2 digit industry level: horizontal FDI (subsidiaries in the same industry as their paren3.9-4.3( )0.5(()5.5(p)-40 Tw 0.013 0 T20.0>.5(

Discrepancy: Misclassification of Vertical FDI

- Significant amount of vertical FDI was misclassified as horizontal:

  1. Most vertical FDI is north-north, it has been assumed to be market seeking (horizontal)
     - Firm level data indicates that these are vertical relationships.
  2. Skill differences between parent and subsidiaries are small (even within vertical FDI):
     - This also lends support to horizontal motivations.
  3. The vertical nature of these relationships is missed at the 2 digits:
     - Many subsidiaries are vertical sectors to their parents but both

Intra Industry FDI

- We call these subsidiaries unveiled at higher levels: '*intra*-industry vertical' FDI.
  - Qualitatively different to vertical subsidiaries which cross two-digit industry codes ('*inter*-industry vertical FDI').
    - High-skill products
    - Mostly located in high-skill countries.
- Patters are consistent with trade data documenting large flows of intra-firm trade in intermediate inputs between rich countries, Bernard et al. (2006).

Why does this Matter? Effects of FDI

- Different motivations for FDI differ on how multinational activity affects factor incomes within and across countries.
- Horizontal FDI: substitutes for trade
  - Multinational activity may raise income in each country without necessarily changing its distribution.
- Vertical FDI: complement to trade
  - Multinational activity may reduce absolute wage differences across countries and alter relative wages within countries.
- Intra-

Why does this Matter?
Effects of FDI

- Resilience to Shocks
  - The Global Financial Crisis: MNC Performance
    - Production Linkages (Vertical, Horizontal)

  Alfaro and Chen (2012a,b).

Global Financial Crisis and MNC activity Using Micro Data

- The severity of the Global Financial Crisis led many economists to explore its macro patterns and causes: mixed evidence.
  - Eaton et al. (2009), and Chor and Manova (2011), among others, find manufacturing demand, vertical specialization, and credit conditions to play important role in the great trade collapse.

- Less explored in this debate is the pattern of micro economic responses to the recent global financial crisis.

Alfaro and Chen (2012a, b)
Objective

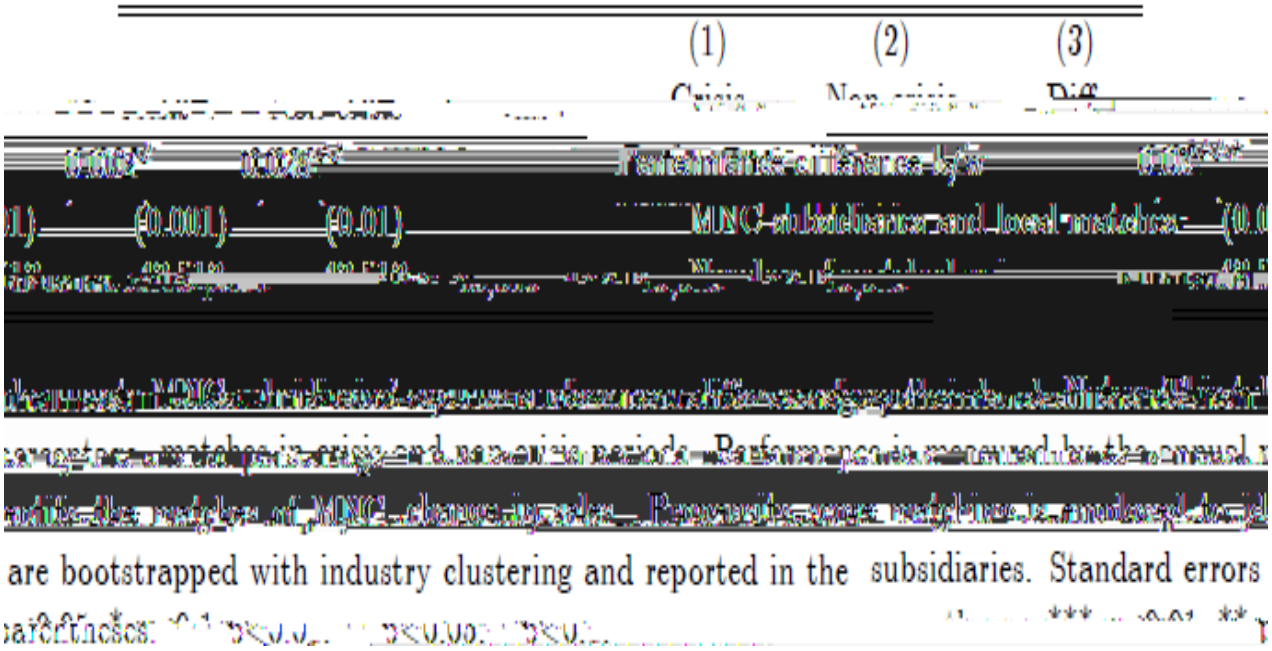
- We examine the differential performance of establishments during the global crisis with particular emphasis on the role of foreign ownership.
  - We exploit how multinational subsidiaries around the world responded to the crisis relative to local establishments and the underlying mechanisms that led to the differential impact.
  - We explore the time variation of the data and separately consider the non-crisis (2005-2007) and the crisis (2007-2008) periods.

Challenges

- It is difficult to disentangle the effect of foreign ownership from other establishment-level characteristics (size, productivity, and

How Do We Address the Question?

Empirical Results:
Estimated Average Effect of Foreign Owenship



MNC subsidiaries responded on average better than local controls with similar economic characteristics.

-Advantage clearly pronounced during the crisis, while relatively muted during non-crisis years.

Linkages

- Production linkages (Alfaro and Charlton, 2009).
  - Vertical
  - Horizontal
    - Subsidiaries sharing stronger vertical production linkages with the parents are expected to exhibit more resilience during the crisis.
      - Bernard et al. (2009) have shown that intra-firm trade fell less than unrelated-party trade during the Asian financial crisis.
- Financial linkages
  - MNCs' internal capital markets enable financial market diversification and lower MNC subsidiaries' dependence on host-country credit conditions, an advantage particularly important when host countries experience credit crunches.

Findings

- Establishments sharing stronger vertical production linkages with foreign parent firms exhibited more resilient performance during the crisis.
  - Horizontally linked establishments responded less positively.
- The role of vertical production linkages is found exclusive to the crisis period and absent in non-crisis years.
- Foreign ownership plays a significant and complex role in micro economic responses to economic crises.
  - Foreign ownership can either exacerbate or alleviate the adverse impact of the crises depending on the nature and the intensity of the linkages between MNC subsidiaries and parent firms.

Sources of Gains: Productivity, Spillovers, and Selection

- The positive correlation between MNC activity and productivity, when established casual, is often attributed to *within-firm productivity gains*, e.g. when foreign multinationals generate positive productivity externalities to domestic firms:
  - Knowledge transfer through partnerships, sharing inputs, interaction and movement in labor markets, etc.

- There is, however, a less stressed, alternative explanation, centering on *between firm selection and market reallocation*
  - Greater multinational activity leads to tougher competition and market reallocation, and allows only the most productive domestic firms to survive (Melitz, 2003).

MNC Activity and Productivity

- All imply a positive relationship between MP and productivity; their implications for domestic economies are different.
  - Within-firm productivity ("intensive margin"): foreign firms raise the productivity of continuing domestic firms:
    - expansion of domestic industries; stimulates local tech development.
  - Between firm selection and market reallocation ("extensive margin)"
    - contraction of domestic industries and may hinder domestic entrepreneurship.
- Disentangling the two effects is crucial for evaluating the effects of foreign investment and setting economic policies.
  - If within-firm improvements due to spillovers are the primary source of gains, special treatment to foreign MNCs may be justified;
  - If productivity increases arise also from firm selection and market reallocation: improve domestic factor market conditions to facilitate gains from reallocation.

Theoretical Framework: Setup

- Model of monopolistic competition with heterogeneous firms (Melitz, 2003 and Helpman,

Market Clearing Conditions: Labor and Capital

- Firms must make and initial investment cf_E.
  - Free entry condition:

The Impact of Multinational Production

- Productivity Distribution:
  - a) spillovers enhance productivity of domestic firms (rightward shift of the distribution)
  - b) increase in the domestic cutoff productivity level ϕ_D^* (assuming spillovers do not offset market reallocation through factor competipetttttttttttti.5(s)2.– •in ty lra0.6(t [(b)-5(5(o)-5(m

Data: Orbis

- Cross-country firm-level panel dataset, drawn from Orbis: comprehensive financial, operation, and ownership information. .
  - Ownership information, time-series financial information; broad country coverage.
- Four categories of information:
  - Industry information Ownership information including domestic and global parents and domestic and foreign subsidiaries;
  - Location information;
  - Financial information including revenue, employment, asset, and material cost.
- Over 1 million manufacturing firms in 33 countries, 36,000 foreign owned manufacturing subsidiaries in NAICS 4-digit industries.
- Two sub-periods: 2002-2004 and 2005-2007: how changes in multinational production between the two periods affect host-country domestic firms.

Empirical Evidence—Stage 1
The Self-Selection of Multinational Firms

- Estimate the following equation:

$$\Pr[entry_{kijs}=1]=[\ln\theta_{kijs}-\ln\underline{\theta}_{js}>0]=\Phi_{\theta>\underline{\theta}}\left[\ln\theta_{kijs}+\frac{1}{-1}\ln\varphi_{kijs}+FE_{ijs}>0\right]$$

  - $entry_{kijs}$ represents *k* foreign multinationals' (HQ in country *i)* binary decision to enter a given host country *j* in industry *s* in 2005-2007,
  - φ_{ki} is the lagged productivity of multinational firms (estimated based on headquarters activities in 2002-2004)
  - θ_{kijs} is the change in firms k HQ cash flow in host country PPP value.
  - FE_{ijs} is a vector of country-pair industry dummies.

Table 1: The Entry Decision of Multinational Firms (Firm-Country Level)

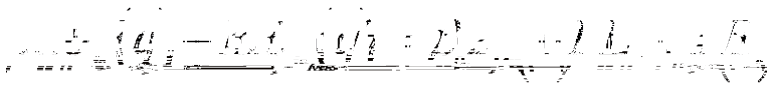
Dependent variable:	(1) MNC entry	(2) MNC entry
HQ TFP	0.002***	0.001*
	[illegible]	[illegible]
Financial shock	0.002***	0.003***
	(0.0001)	(0.0001)
[illegible]	Yes	Yes
Country-pair-ind FE	No	Yes
Firm cluster	Yes	Yes
Obs	405,728	405,728
R-square	0.04	0.33

Notes: Linear probability (LP) estimates are reported. Standard errors clustered [illegible] significance at 1, 5, and 10 percent, respectively.

- More productive firms/positive cash shock exhibit a greater likelihood of entering foreign countries, consistent with Helpman et al. (2004).

- Multinational activity exerts, on average, a positive and significant effect on the average productivity of domestic firms.
- But is the gain due to knowledge spillovers, selections, or both?

Empirical Evidence—Stage 2
Within-Firm Productivity Improvement



Empirical Evidence—Stage 2
Between-Firm Selection: Survival

- Survival of individual domestic firms by estimating

- $survival_{kjs}$: whether a domestic firm *k* in industry *s* and country

- Domestic firms are more likely to exit the market in the presence of new

Empirical Evidence—Stage 2
Between-Firm Selection: Cutoff Productivity

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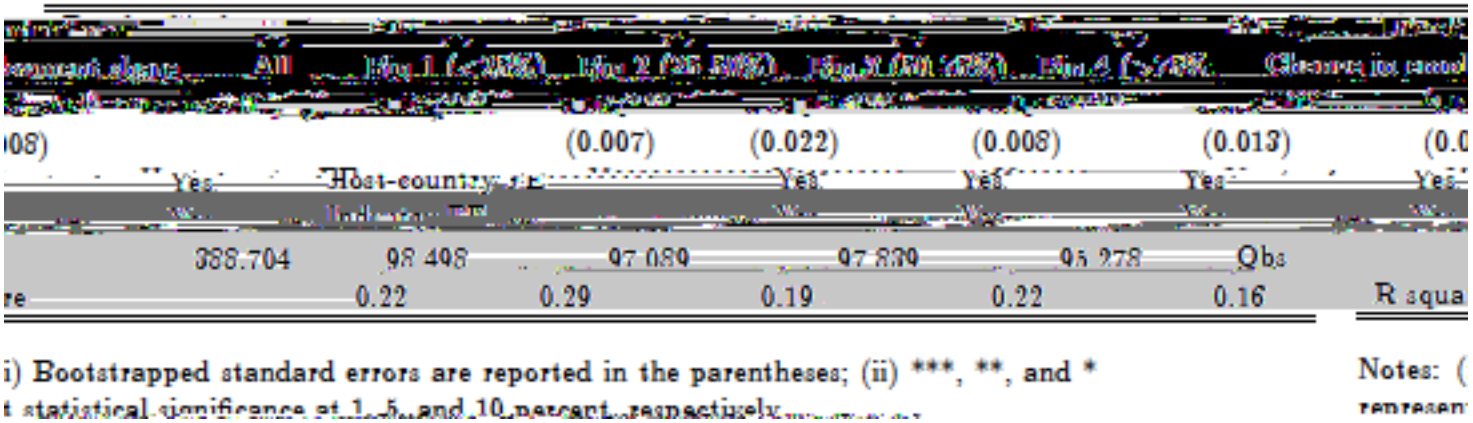
Between-Firm Market Reallocation: Labor Market Reallocation -- Employment Distribution

Table 8: The Shift of Domestic Employment Distribution



i) Bootstrapped standard errors are reported in the parentheses; (ii) ***, **, and * t statistical significance at 1, 5, and 10 percent, respectively.

Notes: (

Shifts of the employment distribution. Relatively smaller domestic firms are crowded out in the labor market by the new multinational firms: evidence of labor market reallocation.

Between-

Decomposition

$$\theta_t^w = \sum_i s_{it}\theta_{it} = \overline{\theta}_t + \sum_i (s_{it} - \overline{s}_{it})(\theta_{it} - \overline{\theta}_t)$$

- Change in weighted average productivity (d^w): unweighted aggregate productivity + total covariance between a firm's share of the industry output (s_{it}) and its productivity (d_{it})
  - 10-percent point higher probability of multinational entry leads to on average 0.2 increase in within-firm productivity.
  - Average productivity of surviving firms is 1.2 percent higher than that of exiting firms.
  - Covariance at country-industry level, 0.2 greater when there is 10 percentage higher probability of MNC entry.
- Ignoring the role of reallocation can lead to significant bias in understanding the nature of gains from multinational production.

FDI Promotion Policy

Table 9: [illegible]

		Aggregate	Multinational	Domestic	Spillover	Reall
001*	Any incentives	0.001	**-0.23****	0.01	0.01	**-0.**
.00)		(0.01)	(0.11)	(0.01)	(0.01)	(0
001*	Financial incentives	0.01	0.08	0.01	0.001	**-0.**
.00)		(0.02)	(0.12)	(0.02)	(0.01)	(0
001*	Tax holiday	0.03	**-0.35*****	**0.04***	**0.04****	**-0.**
		(0.03)	(0.11)	(0.02)	(0.02)	(0.00)
	Tax reduction	0.006	-0.22**	0.001	0.01	-0.000
	Number of incentives	0.004	-0.06**	0.001	-0.0000	
		(0.01)	(0.004)	(0.00)	(0.01)	(0.03)

stimated TFP gains, including both the aggregate and the decomposed, and countries' FDI promotion policies. The first ... dummies that indicate the existence of any or a specific type of ... policy variables are ... by a country.

Notes: The table reports the correlations between e[illegible]

Thanks