



Institute of Economic Growth



RIS

Research and Information System
for Developing Countries

Seminar on
India and Globalization
[A Seminar in Honour of Professor N.S. Siddharthan]

RIS Conference Hall, India Habitat Centre, New Delhi on 1 February 2007

Impact of Trade Liberalization on Foreign Direct Investment in Indian Industries

Bishwanath Goldar
and
Rashmi Banga

Context

- The relationship between FDI and trade has become far more complex in the current WTO regime than theoretically envisaged.
- focus of policy makers-now shifted from whether FDI causes trade to whether trade can boost FDI inflows.
- what kind of trade can boost FDI inflows?

Analytical reasons: Different kinds of trade have differential impact

- international vertical integration reduces costs of production and increases economies of scale.
- Intra-industry trade-are of two type-vertical (quality differential) and horizontal (attributes differ).
- Vertical ITT may encourage FDI as it assures them of ownership advantages and a market.
- Horizontal IIT may discourage FDI as the product is not produced locally so trade substitutes FDI.
- Net effect is an empirical question. India-most of the intra-industry trade is horizontal

Existing Literature

- FDI follows exports (Grosse and Trevino, 1996, Eaton and Tamura, 1994).
- Empirically-3 categories of studies:
 - a. determinants of FDI and trade are similar (Ekholm, 2002).
 - b. FDI, exports and imports are determined simultaneously-endogenous variables (Hejazi and Safarian, 2003).
 - c. Impact of regional trade agreements on FDI flows (Binh and Haughton, 2002; Worth, 2002; Banga 2004).

Contribution to Literature on FDI

- Empirical study for India on differential impact of different kinds of trade on FDI inflows.
- Impact of vertical trade (cross-border trade) on FDI inflows.
- Impact of intra-industry trade on FDI-Grubel-Lloyd index of IIT is constructed.
- The analysis is undertaken at the industry-level, firm-level data and state level.

Some observations on FDI and Trade in India

- The NRP fell from 90.8 % for the aggregate manufacturing sector in the year 1980-81 to 35 % in the year 1997-98, while ERP fell from 99.5 to 41 per cent during the same period.
- Simple average of applied tariffs on all products declined from 78.7 % in 1990 to 28.1 % in 2003.
- the coverage of non-tariff barriers (NTB) has also been reduced in the post-reforms period

Figure 1: India's Applied Tariffs (Simple and Weighted Averages): 1990-2003

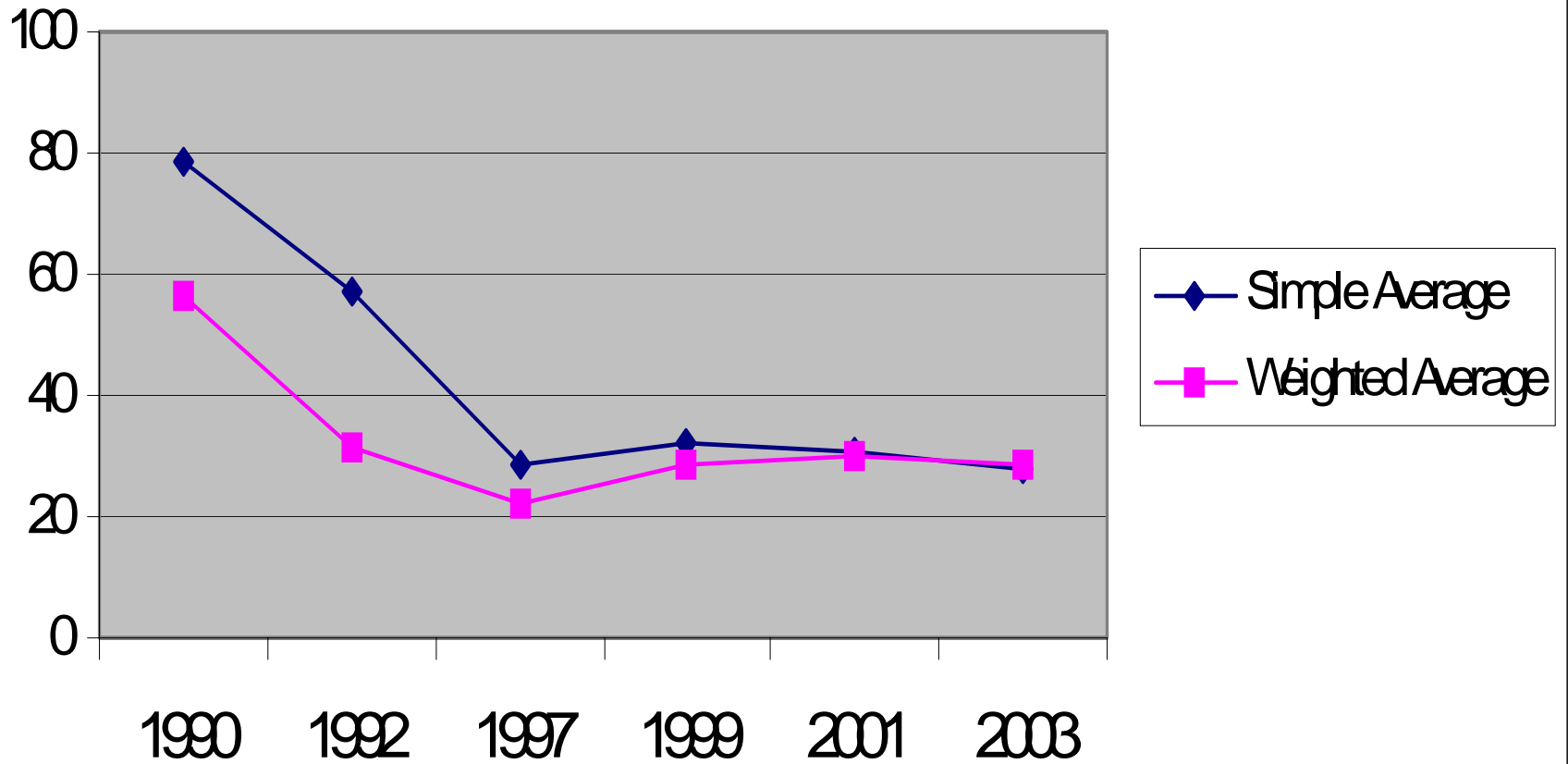
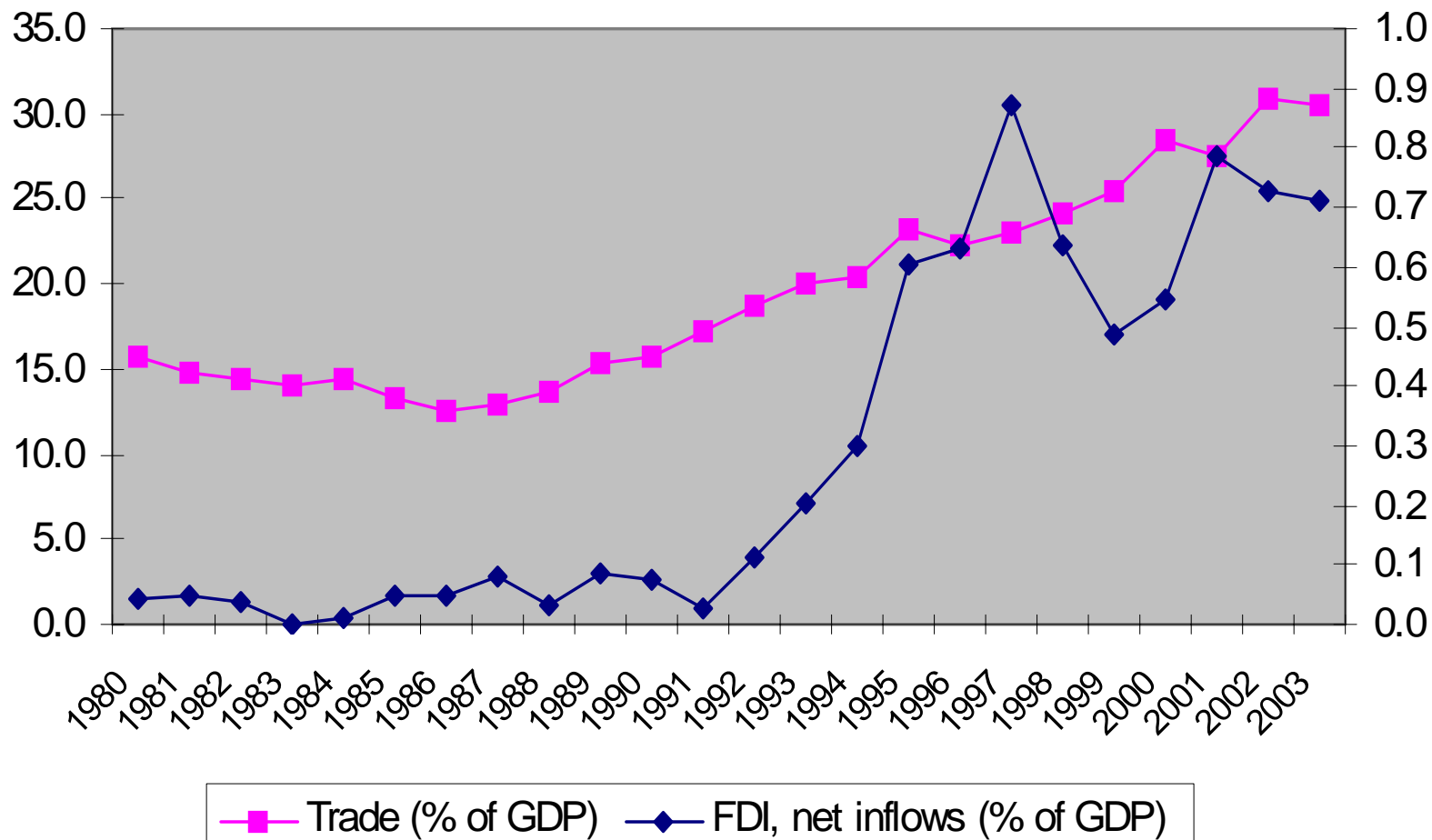


Figure 2: Trade and FDI as a Percentage of GDP in India



| Year | Import of Capital Goods as a Percentage of Total Imports | R&D Expenditures as a Percentage of Total Sales | Import of Technology as a Percentage of Total Sales |
|----------------|---|--|--|
| 1990-91 | 2.4 | 0.5 | 0.7 |
| 1991-92 | 2.1 | 0.9 | 0.9 |
| 1992-93 | 2.0 | 1.6 | 1.5 |
| 1993-94 | 2.6 | 1.6 | 2.5 |
| 1994-95 | 2.6 | 1.9 | 3.1 |
| 1995-96 | 2.8 | 2.5 | 4.4 |
| 1996-97 | 2.5 | 3.3 | 4.8 |

Hypotheses regarding the effect of trade reforms on FDI inflows

- **Hypothesis 1:** *Increase in trade flows associated with international vertical integration in the post-reform period led to higher inflow of FDI in India in the post-reform period.*
- **Hypothesis 2:** *Vertical intra-industry trade will attract FDI whereas horizontal intra-industry trade may not attract FDI.*
- *The net effect will depend on the balance between the two opposing forces.*

Econometric Analysis

- Industry-level analysis uses panel data for 78 industries at three-digit level for the period 1991-92 to 1997-98.
- Inter-firm cross-sectional analysis uses data for 2,500 firms for the latest year available (2005).
- State-level analysis uses data for 16 states for 2005-2006.

Data Sources

- Industry-level: data-matching of Prowess with ASI
- Tariff rates and non-tariff barriers at 3 digit level- Goldar and S. Agarwal (2005).
- World Bank's-"Trade and Production Database CD-Rom".ISIC classification matched into ASI.
- Firm-level data and state-level – *Capitaline and* Input-Output tables.
- Trade at state-level-*Capitaline*- export and import of plants of companies aggregated to states.

Variables

| Variable | Abbreviation | Definition |
|--|----------------------------------|--|
| Output | Y | Total industry sales by value |
| Intra-industry trade | IIT | Grubel-Lloyd index computed from trade data at 4-digit ISIC |
| Foreign Direct Investment | FDI | Sales of foreign firms / total industry sales; foreign firm defined as one with more than 10% foreign share in equity |
| Cross-Border vertical integration | MII | Material import intensity |
| Export Intensity | EXP | Exports/Sales |
| Tariff | TARIFF | Average tariff rate for products of the industry |
| Non-tariff barrier | NTB | Percentage of imports covered by non-tariff barriers |
| Import competition | Import availability ratio | Using input-output ratio-import of product |
| Quantitative restrictions | QR | Import coverage ratio |
| Wage share | WS | Wages divided by value of output |

$$GL_i = \frac{(Xi + Mi) - |Xi - Mi|}{(X_i + M_i)} \times 100,$$

Equations estimated

- **Foreign share in industry** = f (Material import intensity, intra-industry index, Technology import intensity, capital goods import intensity, industry output, K/L, wage share, export intensity, R&D intensity)
- **Foreign share in firms** = f(Material import intensity, intra-industry index, Export intensity, firm size, ratio of net block to gross block, K/L, advertisement intensity, technology import intensity)
- **FDI in State** = f (TRADE, Net SDP)

Results-Industry-level

- A closer examination of the data reveals that the share of foreign companies in industry output is lopsided.
- The sample average is 14%, but there are cases where the variable takes value above 90%.
- So analysis is done for all 78 industries and also for the subset removing cases with very high level of foreign share (above 45%) i.e., for 71 industries.-Better results.

Industry Level Results

| Explanatory variables | Estimation method | |
|--|-----------------------|----------------------|
| | Fixed Effects model | Random effects model |
| Materials import intensity (VI) | 0.15 (1.7)* | 0.14 (1.7)* |
| Intra-industry trade index | 0.0086 (0.2) | 0.0207 (0.7) |
| Technology import intensity | 2.04 (2.50)* | 2.22 (2.75)* |
| R&D intensity | -3.76 (-1.95)* | -3.55 (-1.9)* |
| Capital goods import intensity | 0.098 (1.1) | 0.075 (0.8) |
| Industry output (10⁻⁸) | 3.00 (2.75)* | 2.16 (2.33)* |
| Capital-labour ratio (10 ⁻⁴) | 2.79 (0.7) | 3.19 (0.8) |
| Wage share | -0.35 (-1.33) | -0.31 (-1.35) |
| Hausman test: chi-sqr (7) | | 3.32 |
| No. of observations | 499 | 499 |

t-ratios in parentheses

* statistically significant at 10% or higher level of significance

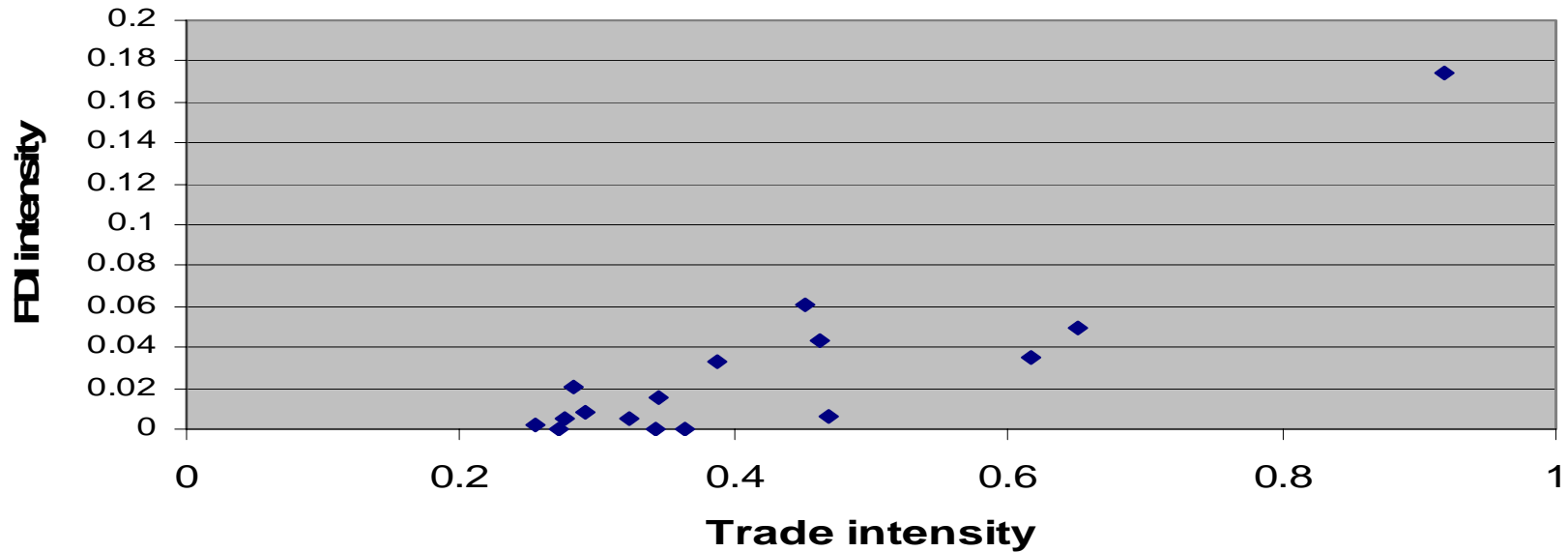
Firm-Level Results

| Explanatory variables | Estimation method | |
|--|---------------------|---------------------|
| | OLS | Tobit model |
| Materials import intensity (VI) | 2.71 (2.3)* | 3.91 (2.8)* |
| Intra-industry trade index | -0.0083 (-1.42) | -0.0081 (-1.2) |
| Import availability ratio | 2.16 (2.36)* | 3.18 (2.96)* |
| Technology import intensity | 1.58 (0.11) | 3.51 (0.2) |
| Export intensity | 1.48(2.3)* | 1.92 (2.53)* |
| Firm size (log of sales) | 0.48(6.7)* | 0.78 (9.2)* |
| Ratio of net block to gross block | 4.39 (5.19)* | 5.12 (5.1)* |
| Capital-labour ratio | 0.00022 (0.9) | 0.00016 (0.5) |
| Advertisement intensity | -0.72 (-0.5) | -1.01 (-0.5) |
| R-squared | 0.038 | |
| LR chi2(0) | | 150.7 |
| No. of observations | 2543 | 2543 |

State-Level Results (2001-02 to 2005-06)

| State | FDI inflows | FDI approvals | Exports | Imports | Trade |
|--|--------------|---------------|--------------|--------------|--------------|
| Andhra Pradesh | 4.92 | 6.02 | 4.03 | 3.12 | 3.49 |
| Assam, Arunachal Pradesh, Manipur, Meghalaya, Mizoram, Nagaland, Tripura | 0.07 | 0.01 | 0.36 | 3.37 | 2.13 |
| Bihar & Jharkhand | 0.00 | 0.01 | 1.11 | 2.69 | 2.04 |
| Gujarat | 5.13 | 11.16 | 17.11 | 27.24 | 23.07 |
| Karnataka | 11.14 | 13.80 | 13.43 | 11.24 | 12.14 |
| Kerala, Lakshadweep | 0.48 | 1.28 | 1.14 | 3.41 | 2.47 |
| Madhya Pradesh | 0.30 | 0.34 | 2.18 | 1.60 | 1.84 |
| Maharashtra | 29.34 | 30.14 | 20.56 | 18.68 | 19.45 |
| Orissa | 0.57 | 0.03 | 1.84 | 1.16 | 1.44 |
| Rajasthan | 0.03 | 1.11 | 1.90 | 1.03 | 1.39 |
| Tamil Nadu, Pondicherry | 8.63 | 9.71 | 5.24 | 9.24 | 7.59 |
| Uttar Pradesh, Uttaranchal | 0.00 | 2.29 | 3.88 | 6.51 | 5.43 |
| West Bengal, Sikkim, Andaman & Nicobar Islands | 2.20 | 3.23 | 7.66 | 1.57 | 4.08 |
| Punjab, Haryana, Himachal Pradesh, | 2.37 | 7.94 | 4.04 | 4.76 | 4.46 |
| Delhi, Part of Uttar Pradesh & Haryana* | 34.01 | 11.74 | 14.53 | 3.35 | 7.95 |
| Goa | 0.81 | 1.19 | 1.00 | 1.03 | 1.02 |

Figure 7: Trade and FDI intensity across states



Correlation coefficient = 0.9

$$\text{FDI}_a = \text{constant} + 0.051 \text{ TRADE} + 0.013 \text{ NSDP}$$

(3.85) (1.64)

R² = 0.72

Conclusions

- Trade liberalization has had a favourable effect on FDI inflows in Indian manufacturing industries.
- Regions having greater involvement in international trade are able to attract greater amount of FDI.
- Vertical integration and intra-industry trade have differential effects on FDI inflows.
- It was argued in the paper that the liberalization has led to a substantial increase in intra-industry trade, but much of the intra-industry being horizontal in nature, it did not have a significant effect on FDI.
- On the other hand, the trade associated with cross-border vertical integration had a favourable effect on FDI.

Thank you