

54

111/539897(039)

# GLOBAL & INTEGRATION & TECHNOLOGY TRANSFER

Editors

Bernard Hoekman • Beata Smarzynska Javorcik



# CONTENTS

	Foreword	xi
	Acknowledgments	xv
	Contributors	xvii
	Abbreviations and Acronyms	xix
1	Lessons from Empirical Research on International Technology Diffusion through Trade and Foreign Direct Investment <i>Bernard Hoekman and Beata Smarzynska Javorcik</i>	1
<b>Part I LITERATURE SURVEYS</b>		
2	Econometric versus Case Study Approaches to Technology Transfer <i>Howard Pack</i>	29
3	Foreign Direct Investment, Linkages, and Technology Spillovers <i>Kamal Saggi</i>	51
4	Plant- and Firm-Level Evidence on “New” Trade Theories <i>James R. Tybout</i>	67
<b>Part II FOREIGN TRADE AND PRODUCTIVITY</b>		
5	On the Quantity and Quality of Knowledge: The Impact of Openness and Foreign R&D on North-North and North-South Technology Spillovers <i>Maurice Schiff and Yanling Wang</i>	99

6	<b>The Knowledge Content of Machines: North-South Trade and Technology Diffusion</b> <i>Giorgio Barba Navaretti, Maurice Schiff, and Isidro Soloaga</i>	113
7	<b>Exports and Economic Performance: Evidence from a Panel of Chinese Enterprises</b> <i>Aart Kraay</i>	139
<b>Part III FOREIGN DIRECT INVESTMENT, TECHNOLOGY TRANSFER, AND PRODUCTIVITY</b>		
8	<b>Foreign Investment and Productivity Growth in Czech Enterprises</b> <i>Simeon Djankov and Bernard Hoekman</i>	161
9	<b>Technological Leadership and the Choice of Entry Mode by Foreign Investors</b> <i>Beata Smarzynska Javorcik</i>	179
10	<b>Does Foreign Direct Investment Increase the Productivity of Domestic Firms? In Search of Spillovers through Backward Linkages</b> <i>Beata Smarzynska Javorcik</i>	207
11	<b>Product Quality, Productive Efficiency, and International Technology Diffusion: Evidence from Plant-Level Panel Data</b> <i>Aart Kraay, Isidro Soloaga, and James R. Tybout</i>	241
12	<b>Market Discipline and Corporate Efficiency: Evidence from Bulgaria</b> <i>Simeon Djankov and Bernard Hoekman</i>	281
13	<b>Innovation in Mexico: NAFTA Is Not Enough</b> <i>Daniel Lederman and William F. Maloney</i>	305
	<b>Index</b>	339
<b>Figures</b>		
1.1	Perceived Effects of FDI in the Czech Republic and Latvia	11
6.1	Average Unit Values in Select Countries, 1989–97	121
6D.1	Persistency of the Technology Gap with One-Year Lag	133
6D.2	Persistency of the Technology Gap with Two-Year Lag	134
6D.3	Persistency of the Technology Gap with Seven-Year Lag	134
8.1	Labor Productivity of Czech Firms with and without Foreign Partners, 1991	167

8.2	Total Factor Productivity Growth in Czech Firms with and without Foreign Partners, 1992–96	168
8.3	Training and New Technology in Czech Firms with and without Foreign Partners	168
9.1	R&D Intensity and Probability of a Joint Venture: Case 1	184
9.2	R&D Intensity and Probability of a Joint Venture: Case 2	184
9.3	R&D Intensity and Probability of a Joint Venture: Case 3	185
10.1	Net FDI Inflows to Lithuania, 1993–2000	213
10.2	Change in Horizontal Measure, 1996–2000	220
10.3	Change in Backward Measure, 1996–2000	220
10.4	Change in Forward Variable, 1996–2000	221
13.1	Growth Rates of Total Factor Productivity in Selected Countries and Regions, 1960–99	307
13.2	Patents per Million Workers in Selected Regions, 1960–2000	308
13.3	Number of Scientific Publications and Patents in Mexico Relative to Comparative Countries, 1960–2000	310
13.4	Ratio of R&D to GDP in Selected Countries	315
13.5	Innovation Inputs in Mexico	316
13.6	Efficiency of Research and Development in Selected Countries, 1985–2000	322
13.7	IRCA Index in Selected Industries and Countries, 1980–2000	323
13.8	Private Sector Perceptions of Quality of Scientific Institutions and University–Private Sector Collaboration, Selected Countries, 1994–2001	328

## Tables

2.1	Technological Capabilities in Manufacturing Industry	36
5.1	Determinants of Total Factor Productivity in OECD Countries	104
5.2	Determinants of Total Factory Productivity in Developing Countries	108
6.1	Determinants of Total Factor Productivity	125
6.2	Choice of Technology	126
6A.1	Matching between Machines and Products	128
6C.1	Description and Source of Data for Variables	131
6C.2	Descriptive Statistics	132
7.1	Summary Statistics for Enterprise Sample	141
7.2	Distribution of Sample by Ownership and Sector, 1990	142
7.3	Summary Statistics on Exporters, 1988–92	143
7.4	Summary Statistics on Exporters by Ownership and Sector, 1990	144

7.5	Size of Exporters and Nonexporters, 1988–92	145
7.6	Persistence and Volatility of Export Status	145
7.7	Performance of Exporters and Nonexporters	147
7.8	Basic Model Results	150
7.9	Export Histories	152
7.10	Basic Model Controlling for Export Histories	153
8.1	Descriptive Statistics of the Sample	166
8.2	Revenue Shares of Inputs, Mark-Up, and Scale Estimates by Sector	171
8.3	Panel Regression Estimates	172
8.4	Spillover Effects on Firms without Foreign Linkages	173
8.5	Spillover Effects on Firms without FDI	174
9.1	Entry Modes Chosen by Investors in the Sample, by Country	188
9.2	Entry Modes Chosen by Investors in the Sample, by Industry	189
9.3	Probit Model with Firm- and Industry-Level R&D and Advertising Intensities	192
9.4	Classification of Industries by Technology Level	193
9.5	R&D Intensity of FDI Projects in Three-Digit SIC Industries	194
9.6	Probit Model with Relative R&D and Advertising Intensities	197
9.7	Bivariate Probit with Sample Selection	199
9.8	Marginal Effects of Bivariate Probit with Sample Selection: Entry Mode Equation	200
10.1	FDI Inflows to Central and Eastern European Countries, 1993–2000	214
10.2	Distribution of Firms with Foreign Capital, by Industry, 2000	215
10.3	Summary Statistics	219
10.4	Additional Summary Statistics for Spillover Variables	219
10.5	OLS with Lagged and Contemporaneous Spillover Variables	222
10.6	Comparison of Coefficients from OLS and Olley-Pakes Regressions	226
10.7	Results of OLS and Olley-Pakes Regressions in First, Second, and Fourth Differences	228
10.8	Share of Foreign Ownership and Productivity Spillovers	231
10.9	Concentration of Downstream Sectors and Productivity Spillovers	233
11A.1	Colombian Chemical Industries: Dynamic Model	260
11A.2	Moroccan Chemical Industries: Dynamic Model	262
11A.3	Mexican Chemical Industries: Dynamic Model	264
11A.4	Colombian Chemical Industries: Static Model	266
11A.5	Moroccan Chemical Industries: Static Model	268
11A.6	Mexican Chemical Industries: Static Model	270

11B.1	Activity Dynamics in the Colombian Chemicals Industry: Descriptive Evidence	272
11B.2	Activity Dynamics in the Moroccan Chemicals Industry: Descriptive Evidence	273
11B.3	Activity Dynamics in the Colombian Chemicals Industry: Econometric Results	274
11B.4	Activity Dynamics in the Moroccan Chemicals Industry: Econometric Results	276
12.1	Performance Statistics, 1991–96	286
12.2	Descriptive Statistics	288
12.3	Pearson Correlation Table	296
12.4	Estimation Results	297
12.5	Estimation Results: Random-Effects Model	300
13.1	Determinants of Patent Counts	320
13.2	Structure of R&D Effort in Selected Countries, 1995–2000	327