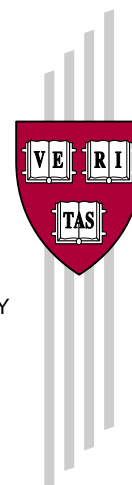


UNITED NATIONS CONFERENCE ON TRADE AND DEVELOPMENT



UNITED NATIONS

CENTER FOR
INTERNATIONAL
DEVELOPMENT
HARVARD UNIVERSITY



G-24 Discussion Paper Series

Should Countries Promote Foreign Direct Investment?

Gordon H. Hanson

No. 9, February 2001

**UNITED NATIONS CONFERENCE ON
TRADE AND DEVELOPMENT**

**CENTER FOR INTERNATIONAL DEVELOPMENT
HARVARD UNIVERSITY**

G-24 Discussion Paper Series

**Research papers for the Intergovernmental Group of Twenty-Four
on International Monetary Affairs**



UNITED NATIONS
New York and Geneva, February 2001

Note

Symbols of United Nations documents are composed of capital letters combined with figures. Mention of such a symbol indicates a reference to a United Nations document.

*

*

*

The views expressed in this Series are those of the authors and do not necessarily reflect the views of the UNCTAD secretariat. The designations employed and the presentation of the material do not imply the expression of any opinion whatsoever on the part of the Secretariat of the United Nations concerning the legal status of any country, territory, city or area, or of its authorities, or concerning the delimitation of its frontiers or boundaries.

*

*

*

Material in this publication may be freely quoted; acknowledgement, however, is requested (including reference to the document number). It would be appreciated if a copy of the publication containing the quotation were sent to the Editorial Assistant, Macroeconomic and Development Policies Branch, Division on Globalization and Development Strategies, UNCTAD, Palais des Nations, CH-1211 Geneva 10.

UNCTAD/GDS/MDPB/G24/9

UNITED NATIONS PUBLICATION

Copyright © United Nations, 2001
All rights reserved

PREFACE

The *G-24 Discussion Paper Series* is a collection of research papers prepared under the UNCTAD Project of Technical Support to the Intergovernmental Group of Twenty-Four on International Monetary Affairs (G-24). The G-24 was established in 1971 with a view to increasing the analytical capacity and the negotiating strength of the developing countries in discussions and negotiations in the international financial institutions. The G-24 is the only formal developing-country grouping within the IMF and the World Bank. Its meetings are open to all developing countries.

The G-24 Project, which is administered by UNCTAD's Macroeconomic and Development Policies Branch, aims at enhancing the understanding of policy makers in developing countries of the complex issues in the international monetary and financial system, and at raising awareness outside developing countries of the need to introduce a development dimension into the discussion of international financial and institutional reform.

The research carried out under the project is coordinated by Professor Dani Rodrik, John F. Kennedy School of Government, Harvard University. The research papers are discussed among experts and policy makers at the meetings of the G-24 Technical Group, and provide inputs to the meetings of the G-24 Ministers and Deputies in their preparations for negotiations and discussions in the framework of the IMF's International Monetary and Financial Committee (formerly Interim Committee) and the Joint IMF/IBRD Development Committee, as well as in other forums. Previously, the research papers for the G-24 were published by UNCTAD in the collection *International Monetary and Financial Issues for the 1990s*. Between 1992 and 1999 more than 80 papers were published in 11 volumes of this collection, covering a wide range of monetary and financial issues of major interest to developing countries. Since the beginning of 2000 the studies are published jointly by UNCTAD and the Center for International Development at Harvard University in the *G-24 Discussion Paper Series*.

The Project of Technical Support to the G-24 receives generous financial support from the International Development Research Centre of Canada and the Governments of Denmark and the Netherlands, as well as contributions from the countries participating in the meetings of the G-24.

SHOULD COUNTRIES PROMOTE FOREIGN DIRECT INVESTMENT?

Gordon H. Hanson

*Department of Economics and
School of Business Administration
University of Michigan, Ann Arbor, USA*

G-24 Discussion Paper No. 9

February 2001

Abstract

This paper examines whether policies to promote foreign direct investment (FDI) make economic sense. The discussion focuses on whether existing academic research suggests that the benefits of FDI are sufficient to justify the kind of policy interventions seen in practice.

For small open economies, efficient taxation of foreign and domestic capital depends on their relative mobility. If foreign and domestic capital are equally mobile internationally, it will be optimal for countries to subject both types of capital to equal tax treatment. If foreign capital is more mobile internationally, it will be optimal to have lower taxes on capital owned by foreign residents than on capital owned by domestic residents. Absent market failure, there is no justification for favouring FDI over foreign portfolio investment. In practice, countries appear to tax income from foreign capital at rates lower than those for domestic capital and to subject different forms of foreign investment to very different tax treatment. FDI appears to be sensitive to host-country characteristics. Higher taxes deter foreign investment, while a more educated work force and larger goods markets attract FDI. There is also some evidence that multinationals tend to agglomerate in a manner consistent with location-specific externalities.

There is weak evidence that FDI generates positive spillovers for host economies. While multinationals are attracted to high-productivity countries, and to high-productivity industries within these countries, there is little evidence at the firm or plant level that FDI raises the productivity of domestic enterprises. Indeed, it appears that plants in industries with a larger multinational presence tend to enjoy lower rates of productivity growth over time. Empirical research thus provides little support for the idea that promoting FDI is warranted on welfare grounds.

Subsidies to FDI are more likely to be warranted where multinationals are intensive in the use of elastically supplied factors, where the arrival of multinationals to a market does not lower the market share of domestic firms, and where FDI generates strong positive productivity spillovers for domestic agents. Empirical research suggests that the first and third conditions are unlikely to hold. In the three cases we examine, it appears that the second condition holds, but not the first or third conditions. This suggests that Brazil's subsidies to foreign automobile manufacturers may have lowered national welfare. Costa Rica appears to have been prudent in not offering subsidies in the case of Intel.

There clearly is a need for much more research on the host-economy consequences of FDI. The impression from existing academic literature is that countries should be sceptical about claims that promoting FDI will raise national welfare. A sensible approach for policy makes in host countries is to presume that subsidizing FDI is unwarranted, unless clear evidence is presented to support the argument that the social returns to FDI exceed the private returns.

Table of contents

	<i>Page</i>
<i>Preface</i>	<i>iii</i>
<i>Abstract</i>	<i>vii</i>
I. Introduction	1
Setting the stage: foreign versus domestic investment	2
II. Promotion of FDI in practice	3
III. FDI and host-country economic performance	9
A. What explains multinational production?	10
B. What determines the location of multinational production?	11
C. Does FDI generate positive spillovers for the host economy?	13
IV. Evaluation of FDI in practice	14
A. A theoretical model	15
B. The promotion of FDI in practice: three cases	19
C. Evaluation of FDI promotion cases	21
V. Concluding remarks	23
<i>Notes</i>	24
<i>References</i>	25
<i>Appendix: Derivation of the welfare effects for the host economy</i>	28

SHOULD COUNTRIES PROMOTE FOREIGN DIRECT INVESTMENT?

Gordon H. Hanson*

I. Introduction

There is a presumption among many academics and policy makers that foreign direct investment (FDI) is somehow special.¹ One common view is that FDI helps accelerate the process of economic development in host countries. Optimism about the economic consequences of foreign investment, coupled with heightened awareness about the importance of new technologies for economic growth, has contributed to wide-reaching changes in national policies on FDI. During the last two decades, many emerging economies have dramatically reduced barriers to FDI, and countries at all levels of development have created a policy infrastructure to attract multinational firms.² Standard tactics to promote FDI include the extension of tax holidays, exemptions from import duties, and the offer of direct subsidies. Since 1998, 103 countries have offered special tax concessions to foreign corporations that have set up production or administrative facilities within their borders (Avi-Yonah, 1999). Typically, these concessions are applied to multinational enterprises but not to local firms in the same lines of activity.

In this paper, we examine whether policies to promote FDI make economic sense. While eliminat-

ing barriers to foreign investment is a means of achieving global market integration, promoting FDI goes one step further by favouring one form of integration – expanded foreign control of productive assets – over others, such as increased trade in goods, more international licensing of technology, or larger cross-border flows of portfolio capital. Assessing the consequences of promoting FDI for national welfare is a big task and one we in no way pretend to complete in full. We focus on whether existing academic research suggests that the benefits of FDI are sufficient to justify the kind of policy interventions seen in practice. This will help to identify a set of practical guidelines for when and where promoting FDI might be welfare-enhancing.

In the remainder of the introduction, we frame the discussion by outlining the conditions under which economic theory suggests that government policies favouring foreign over domestic capital are justified. In section II, we briefly review the types of policy incentives that the Group of 24 (G-24) and other countries offer to multinational firms;³ this will help to establish notions of standard practice. In section III, we survey the theoretical and empirical literature on FDI, with emphasis on research which examines whether FDI is a source of positive exter-

* I should like to thank James Hines, Mustafa Mohaterem and Dani Rodrik for helpful comments and discussions, as well as Poh Boon Ung for providing excellent research assistance.

nalities for host countries. In section IV, we develop a simple theoretical model of FDI, which we then use to evaluate three cases in which developing-country governments have offered special incentives to multinational firms – as in the cases of Ford and General Motors (GM) in Brazil and Intel in Costa Rica. The purpose of these case studies is to see whether economic theory and relevant empirical literature would suggest that policy intervention in favour of FDI was justified. Finally, in section V we offer concluding remarks on factors to consider when trying to determine whether promoting FDI will raise host-country welfare.

Setting the stage: foreign versus domestic investment

To begin, it is helpful to specify what we mean by promoting FDI. The benchmark one adopts depends on whether it is optimal for countries to subject foreign and domestic capital to equal tax treatment. Countries may have reason to tax domestic and foreign capital differently. For a small open economy facing an immobile supply of labour and an internationally mobile supply of capital, the optimal factor income tax falls entirely on labour (Gordon, 1986; Razin and Sadka, 1991). Not taxing capital is sensible because the immobile factor bears the incidence of any tax on factor incomes, making it more efficient to tax the immobile factor directly.⁴ By extension, if foreign capital is perfectly mobile but domestic capital is not, then the optimal tax on factor incomes falls on domestic labour and capital but not on foreign capital. More generally, if foreign capital is elastic in its supply relative to domestic capital, then it is optimal for countries to tax income from domestic capital at higher rates (where the optimal tax rate on income from foreign capital may be positive if its supply elasticity is less than infinite).⁵

If one presumes that domestic and foreign capital are equally elastic in supply (for example, if they are equally mobile internationally), then promoting FDI means any policy which subjects FDI to favourable tax treatment relative to domestic investment and foreign portfolio investment (whether in the form of debt or equity). If, on the other hand, one presumes that foreign capital is more elastic in supply than domestic capital, then promoting FDI means any policy which favours direct investment inflows over portfolio investment inflows, holding constant a country's relative tax treatment of domestic investment income and foreign investment income.

For FDI to merit special treatment, there needs to be market failure that is specific to production by multinational firms.⁶ Asymmetric information between domestic and foreign investors is one commonly mentioned source of market failure, though one that is not specific to FDI. If domestic investors are better informed about domestic investment opportunities than foreign investors, then, all else equal, a capital-importing country would raise welfare by subsidizing foreign capital inflows (Gordon and Bovenberg, 1996). Could asymmetric information justify favouring FDI over foreign portfolio investment? Razin et al. (1998) suggest the answer is no. Since FDI, but not portfolio investment, gives a foreign investor a controlling interest in a domestic firm, multinational firms are likely to be at an informational advantage relative to foreign portfolio investors (though not relative to domestic ones). In this case, the optimal tax policy is to subsidize foreign portfolio investment and to leave FDI untaxed.⁷

There are other sources of market failure which could justify special treatment of FDI (Caves, 1995). A much cited possibility is that FDI generates productivity spillovers for the host economy (Blomstrom and Kokko, 1998). One idea is that multinational enterprises possess superior production technology and management techniques, some of which are captured by local firms when multinationals locate in a particular economy.⁸ A related source of spillovers is forward and backward linkages between multinational and host-economy firms (Rodriguez-Clare, 1996), which may result from multinationals providing inputs at lower cost to local downstream buyers or by their increasing demand for inputs produced by local upstream suppliers. A further possibility is that FDI shifts rents earned by multinationals to the host economy (Glass and Saggi, 1999; Janeba, 1996). Multinationals may have global market power and may share monopoly rents with managers and workers in their various operational units. By attracting multinational firms, the host economy may capture a portion of the rents that these firms generate.⁹

While these and other types of market failure are plausible, each is also subject to controversy. Spillovers associated with FDI are supported by casual evidence from many countries, but their existence and magnitude are, as we shall see, difficult to establish empirically. Indeed, micro evidence from large samples of manufacturing plants in developing countries fails to support the existence of positive productivity spillovers related to FDI. There is also reason to believe that multinational enterprises tend

to have market power in their respective industries. Whether or not they share rents with employees in their foreign affiliates is an empirical question. Attracting FDI may shift a portion of the rents that multinationals earn to the host economy, but it may also reduce the profits of local firms that compete with multinationals at home or abroad.¹⁰

Arguments for promoting FDI are based on claims concerning the economic environment, which can and should be subject to empirical verification. Before deciding to promote FDI, it is essential to evaluate possible sources of market failure associated with multinational firms. It is this task to which we devote much of the paper.

II. Promotion of FDI in practice

In this section, we summarize current government policies to promote FDI in G-24 and other countries. We begin with a brief review of corporate taxation at the national level and then discuss the range of tax and other incentives which countries offer to multinational enterprises. The source for all data, except where noted, are annual editions of *Corporate Taxes: A Worldwide Summary* by Price Waterhouse.

Policies to promote FDI take a variety of forms. The most common are partial or complete exemptions from corporate taxes and import duties. These policies are typically the result of formal legislation or presidential decree, which apply to all foreign corporations that meet certain restrictions. These restrictions vary considerably across countries. In many cases they require multinationals to establish production facilities in the host country in specified lines of activities or designated regions, such as export-processing zones (EPZs), and to export output embodying inputs imported duty-free. Direct subsidies and other types of concessions are often negotiated between multinational firms and host governments on a case-by-case basis. Such individualized subsidies appear to be common, but are hard to document systematically.

Table 1 shows corporate tax rates in 1990 and 1998 for each G-24 country for which data are available and averaged across regions for other selected countries.¹¹ Since some countries have progressive tax rates (lower rates for smaller corporations) or rates which vary across sectors, we report the minimum and maximum tax rates which apply to

corporate income. In 1998 the maximum tax rates on corporate income in the G-24 countries ranged from a high of 57 per cent in Iran to a low of 25 per cent in Brazil. Several countries – including Argentina, Columbia, Guatemala, Peru, the Philippines and Sri Lanka – tax corporate income at a flat rate, while others – including Ghana, Iran, Mexico, and Trinidad and Tobago – tax income earned by small corporations at rates much lower than for large corporations. Between 1990 and 1998 most countries reduced their maximum corporate income tax rates, with high-tax countries undertaking the largest cuts in absolute terms.

Tax rates in individual G-24 countries are roughly comparable to the averages for other countries in their respective regions. A few outliers are apparent. On a region-by-region basis, tax rates in 1998 were relatively high in the Republic of the Congo, India, Iran and Pakistan. Tax rates in North America, Oceania and Western Europe are on average similar to those in Latin America, and lower than those in Africa and Asia.

Tables 2–5 give a brief description of how G-24 and a sample of five other countries treat foreign corporations that operate within their borders.¹² Most countries for which data are available grant corporate income tax exemptions to foreign corporations making inward direct investments. Typically, these exemptions last for less than a decade from the initiation of a new project, though in some cases they are long-lived. Most countries also offer exemptions to foreign corporations on import duties, where these tend to be restricted to inputs that are used to produce exports or, in a few cases, capital goods. Exemptions from value-added taxes are a somewhat less common tax concession that countries grant multinational firms. Similar tax concessions are also available to domestic firms in some countries, though these concessions are for the most part tied to participation in EPZs, export activities outside of such zones, or production in officially designated priority sectors or regions. Comparing 1990 with 1998, there is a slight increase in the number of countries offering exemptions from valued-added taxes and import duties and supporting EPZs.¹³

Not included in the tables are details on direct subsidies which host governments offer to multinational firms on a case-by-case basis. These arrangements are frequently unpublicized, but the practice appears to be relatively common. Brazil is one country which actively pursues multinational firms and has offered generous subsidies in a number

Table 1

	1990		1998	
	<i>Min. rate</i>	<i>Max. rate</i>	<i>Min. rate</i>	<i>Max. rate</i>
Group of 24				
Congo	49.0	49.0	45.0	45.0
Egypt	34.0	42.0	34.0	42.0
Gabon	40.0	45.0	40.0	45.0
Ghana			8.0	35.0
Nigeria	20.0	40.0	20.0	30.0
India	50.0	64.8	40.0	43.0
Iran	12.0	75.0	15.0	57.0
Pakistan	45.0	66.0		
Philippines	35.0	35.0	34.0	34.0
Sri Lanka			35.0	35.0
Argentina	33.0	33.0	33.0	33.0
Brazil	6.3	41.5	15.0	25.0
Colombia	30.0	30.0	35.0	35.0
Guatemala	12.0	34.0	30.0	30.0
Mexico	36.0	36.0	17.0	34.0
Peru	35.0	35.0	30.0	30.0
Trinidad & Tobago	15.0	40.0	15.0	35.0
Venezuela	15.0	50.0		
Other countries (regional averages)				
Africa	36.2	46.5	25.8	35.6
East Asia	24.1	39.8	20.0	42.1
Eastern Europe	0.0	40.0	33.4	35.0
Latin America	19.2	31.7	24.5	28.5
Middle East	12.7	39.3	11.3	34.4
North America	27.5	47.3	26.6	48.3
Oceania	41.0	41.0	34.5	34.5
South East Asia	26.0	39.8	22.6	29.2
Western Europe	37.2	43.1	33.5	37.2

Source: Price Waterhouse (1990).

Note: This table shows minimum and maximum corporate income tax rates for selected countries. See text for details. Data is more detailed for some countries than others. Approximations are made in certain cases.

of instances (see the GM and Ford examples in section IV). For instance, the country gives generous tax incentives to firms that locate manufacturing facilities in the Amazon region. Unspecified government subsidies appeared to be important in luring Multibras (a US-owned firm) to construct a \$400 million plant to manufacture air conditioners and microwave ovens in Manaus in 1998. Investment subsidies also appeared to be important in convinc-

ing Honda to build a motorcycle plant in the area. In the absence of tax breaks, there appears to be little reason why multinationals would locate in the region.

Poorer countries in Europe have also been aggressive in pursuing multinational firms. To give a few examples: in 1991 Portugal provided a lump-sum subsidy and promised tax breaks on future

Table 2

TAX CONCESSIONS FOR INWARD FDI IN G-24 COUNTRIES, 1990												
Country	(I)			(II)		(III)		(IV)	Available to domestic corporations?			
	Corporate income tax exemption	Period	Sectors	Value-added tax exemption	Items	Import duty exemption	Items	EPZ provision	(I)	(II)	(III)	(IV)
Egypt	X	5–20 years ^a	All ^b						X			
Gabon	X	0–10 years	All						X ^c			
Nigeria	X	0–5 years	A, M, P	X ^d	E, M	X ^e	E, M, R		X	X	X	
Congo	X	5–15 years	P									
Argentina						X	E, R				X	
Brazil				X	E, P	X	E, P			X ^f		
Guatemala	X ^g		P			X ^h	P		X ⁱ		X ^j	
Mexico	(tax credits)					X	E, P		X	X		
Peru	X		A, P	*	P				X	X		
Venezuela	X		A									
India	X	5 years	All ^k			X	E	X			X	X
Pakistan	X	2–8 years	K, A, P	* ^l	E, M	X	E	X	X	X	X	X
Philippines	X	3–6 years	All ^m			X	E, K, P, R	X	X		X	X

Source: Price Waterhouse (1990).

Note: • * = taxed at lower rate. • A = agriculture. • E = exported goods/exporting. • K = capital.
 • M = manufacturing. • P = priority companies/industries. • R = raw materials. • X = country offered concession in indicated year.

• Data is more detailed for some countries than others. Approximations are made in certain cases.

a Maximum of 20 years if it is a project for medium-sized and economical housing, whose whole units are leased vacant for dwelling.

b In July 1989, a new investment law was issued and it offered a projects' profits to be exempt from tax on industrial and commercial profits and from corporate tax.

c More restrictions apply on domestic corporations than on foreign corporations.

d Excise duty paid on export manufactures is refundable.

e Refund of import duty.

f Excise and sales and service tax exemptions are granted to exporters of manufactured goods.

g The government may grant exemptions from duties and taxes if the enterprise is classified as either basic, necessary or useful, or if it is to be located outside the municipality of Guatemala.

h See 7.

i Exemptions from income taxes and import duties (up to 100 per cent for a maximum 10-year period) may also be granted to industries originally located (or, if existing, transferred) outside of the Department of Guatemala, site of the capital city.

j See 9.

k New industrial undertaking in free trade zones, or a 100 per cent export-oriented undertaking is entirely exempt from income tax, subject to certain conditions.

l Companies exporting goods manufactured in Pakistan can claim a rebate of 50 per cent on the tax attributable to such export sales. However, in respect of certain specified goods, the tax rebate is available at 25 per cent or 75 per cent.

m Income tax holiday giving full exemption from corporate income tax for six years for pioneer firms and four years for non-pioneer firms from date of commercial operation; expanding firms are given three years.

Table 3

TAX CONCESSIONS FOR INWARD FDI IN COMPARISON COUNTRIES, 1990												
Country	(I)			(II)		(III)		(IV)	Available to domestic corporations?			
	Corporate income tax exemption	Period	Sectors	Value-added tax exemption	Items	Import duty exemption	Items	EPZ provision	(I)	(II)	(III)	(IV)
Chile	X ^a		P			X ^b	E				X	
Ireland	X		All ^c									
Japan												
South Africa												
Thailand	X	3–8 years	P			X ^d	E, R, K	X			X	X

Source: Price Waterhouse (1990).

Note: • * = taxed at lower rate.

- A = agriculture.
- E = exported goods/exporting.
- K = capital.
- M = manufacturing.
- P = priority companies/industries.
- R = raw materials.
- X = country offered concession in indicated year.
- Data is more detailed for some countries than others. Approximations are made in certain cases.

a Tax benefits and other incentives for companies operating in northernmost and southernmost parts of the country. Tax benefits to forestry companies also.

b Reimbursement of taxes paid.

c Companies that commenced operation within the Shannon Free Airport before 1 January 1981 can obtain full exemption from corporation tax until 5 April 1990 if the income is derived from the carrying on of certain activities, including exporting goods and a wide range of services.

d Either exemption or reduction.

Table 4

TAX CONCESSIONS FOR INWARD FDI IN G-24 COUNTRIES, 1998												
Country	(I)			(II)		(III)		(IV)	Available to domestic corporations?			
	Corporate income tax exemption	Period	Sectors	Value-added tax exemption	Items	Import duty exemption	Items	EPZ provision	(I)	(II)	(III)	(IV)
Côte d'Ivoire	X	5–8 years	All			X	All					
Egypt	X	5–20 years	All ^a						X			
Gabon	X	0–10 years	All						X ^b			
Nigeria	X	0–5 years	P, E, A, M	X	All ^c	X	E, R	X	X	X	X	X
Congo	X ^d	0–10 years	A, P, M									
Argentina	(tax credit bonds)			X	E	X	E, R			X	X	
Brazil				X	E, P	X	E, P			X ^e		
Guatemala ^f	X		E			X	K, E, R	X	X		X	X
Mexico	(tax credits)					X	E					
Peru	X		All ^g	X	All ^h				X	X		
India	X	5 years	All ⁱ			X	E	X			X	X
Philippines	X	3–6 years	All ^j	X	All ^k	X	All	X	X	X	X	X
Sri Lanka	X		P			X	P		X		X	

Source: Price Waterhouse (1998).

- Note:
- * = taxed at lower rate.
 - A = agriculture.
 - E = exported goods/exporting.
 - K = capital.
 - M = manufacturing.
 - P = priority companies/industries.
 - R = raw materials.
 - X = country offered concession in indicated year.
- Data is more detailed for some countries than others. Approximations are made in certain cases.

a An investment and guarantee law effective as of 11 May 1997 offers the profits of a project formed under it to be exempt from tax on industrial and commercial profits and from corporate tax.

b More restrictions apply on domestic corporations than on foreign corporations.

c 1998 budget abolishes payment of excise duties.

d Tax priority status giving exemption (or a reduction) from various taxes and custom duties for up to 10 years can be obtained by notification of agreement.

e Excise and sales and service tax exemptions are granted to exporters of manufactured goods.

f In general, exemption from payment of import duties on machinery and equipment and on raw and packaging materials and from income tax is available for those corporations classified as exporting companies. These exemptions also apply to free trade zones.

g Industrial entities established in the jungle, frontier zones and free trade zones are exempt from income tax.

h Exemption from value-added tax (VAT) is provided for industrial entities established in the jungle and frontier zones.

i New industrial undertakings satisfying certain conditions established in a free trade zone, software technology park, or electronic hardware technology park, or a 100 per cent export-oriented undertaking is entirely exempt from income tax.

j Income tax holiday giving full exemption from corporate income tax for six years for pioneer firms and those locating in less-developed area, and four years for non-pioneer firms from the date of commercial operation; expanding export-oriented firms are given three years.

k Local purchases of goods and services from VAT-registered entities are either VAT exempt or zero rated.

Table 5

TAX CONCESSIONS FOR INWARD FDI IN COMPARISON COUNTRIES, 1998												
Country	(I)			(II)		(III)		(IV)	Available to domestic corporations?			
	Corporate income tax exemption	Period	Sectors	Value-added tax exemption	Items	Import duty exemption	Items	EPZ provision	(I)	(II)	(III)	(IV)
Chile	X ^a					X ^b	E					X
Ireland	* ^c											
Japan	(tax credits) ^d								X			
South Africa	X ^e								X			
Thailand	X	3–8 years	P			X ^f	K, R, E					

Source: Price Waterhouse (1998).

Note: • * = taxed at lower rate.

- A = agriculture.
- E = exported goods/exporting.
- K = capital.
- M = manufacturing.
- P = priority companies/industries.
- R = raw materials.
- X = country offered concession in indicated year.
- Data is more detailed for some countries than others. Approximations are made in certain cases.

a Tax benefits and other incentives for companies operating in northernmost and southernmost parts of the country. Tax benefits to forestry companies also.

b Reimbursement of taxes paid.

c Reduced rate of corporation tax of 10 per cent of profits from manufacturing operations arising between 1 January 1981 and 31 December 2010, regardless of whether the goods are exported. Definition of manufacturing operations is rather lenient.

d A corporation tax credit of 3.5 per cent or 7 per cent of the adjusted acquisition cost (25 per cent to 100 per cent) of certain designated, energy-saving machinery and equipment, or 7 per cent of the acquisition cost of certain designated machinery and equipment containing electronic computer systems acquired by designated small or medium-size corporations is available. The credit is limited to 20 per cent of the corporation tax otherwise payable.

e Tax holiday granted at discretion to an enterprise with qualifying assets in excess of R3 million, incorporated on or after 1 October 1996, for the sole object of carrying out a qualifying project.

f Either exemption or reduction.

earnings to Ford and Volkswagen in return for their constructing a jointly operated automobile production facility in the country; in 1995 Ireland granted employment subsidies to IBM and Citibank for locating data-processing jobs in the country (and granted similar subsidies to Berg Electronics the following year); and in 1996 Turkey enticed Honda to build a new automobile production facility in the country by easing tax rules on new plants and relaxing import duties on automobile parts. Subsidies are by no means limited to relatively low-income regions. Germany offered investment subsidies to Advanced Mirco Devices in 1995, after it decided to build a semi-conductor plant in Saxony, and to Motorola in 1998, after it decided to build a new facility in Bavaria. In the United States investment subsidies from state governments helped attract Mercedes-Benz to Alabama and BMW to North Carolina.

Tables 2–5 indicate that most countries do not follow the residence principle (see note 5) in setting tax policies.¹⁴ While many countries tax domestic income earned by foreign corporations at lower rates than domestic income earned by domestic corporations, the former rates are in most cases above zero in the long run (though often not during the first few years following the establishment of a project). Foreign tax credits, which allow corporations to deduct taxes paid to foreign governments from their tax liability on foreign income, complicates the picture. As of the mid-1990s, Japan, the United Kingdom and the United States granted foreign tax credits to multinational corporations based within their respective borders, and many other high-income countries – including Australia, Canada, France, Germany, the Netherlands and Switzerland – exempted the foreign earnings of their firms from domestic taxation (Hines, 1996). Where foreign tax credits apply, and where a country's tax rate on domestic income earned by foreign corporations does not exceed the home-country tax rate for these firms, taxing foreign corporations merely shifts tax revenue from FDI source countries to FDI host countries and does not necessarily distort investment.

One important question is whether the concessions offered to foreign corporations shown in table 2 represent favourable treatment of inward FDI relative to inward foreign portfolio investment. A full evaluation of the issue is beyond the scope of this paper. Income from inward portfolio equity investment, portfolio debt investment, and direct investment are governed by complicated tax rules, which

vary considerably across countries.¹⁵ We shall, however, hazard a few general comments. Table 2 shows that income from inward direct investment is subject to myriad tax breaks in G-24 and other countries. With regard to inward portfolio equity investment, the presence of capital gains taxes, which vary from country to country, would tend to disfavour this vehicle relative to FDI.¹⁶ With regard to portfolio debt investment, the recent abolition of withholding taxes on portfolio interest income for foreign residents (Avi-Yonah, 1999), which has occurred throughout the OECD and in many developing countries as well, would tend to favour this vehicle relative to FDI. The absence of portfolio interest income withholding taxes means that foreigners do not pay tax on income they earn from corporate or government bonds, bank accounts or certificates of deposit in a country. To summarize briefly, it appears that many countries may have tax policies which favour FDI relative to some types of inward portfolio investment, but disfavour it relative to others.

Other policies clearly do favour FDI. A country that offers exemptions to value-added taxes or import duties to foreign but not domestic corporations favours FDI, since domestic corporations which receive foreign bank loans, issue bonds to foreigners, or have a non-controlling portion of their stock owned by foreigners do not receive comparable tax breaks. EPZs do not favour FDI over foreign portfolio investment, so long as domestic firms have equal access to EPZs (which is often the case) and are equally likely to engage in export production as are multinationals (which is less likely to be the case). Direct subsidies to multinational firms (examples of which we discuss in section IV) also favour FDI relative to other forms of inward foreign investment.

III. FDI and host-country economic performance

There is immense academic literature on FDI and multinational firms. Since our interests are rather narrow, we focus here on empirical research which studies the impact of FDI on host economies. Within this literature, we emphasize two strands: one which examines the determinants of where multinationals locate production facilities and another which examines sources of market failure related to FDI. We shall begin with a brief review of theories of multinational production.

A. *What explains multinational production?*

Following Dunning (1981, 1993), it is standard practice to view multinational enterprises as arising from three distinct types of advantages. A firm must own or control a unique mobile asset (e.g. a patent or trademark) it wishes to exploit (*the ownership advantage*); it must be cost efficient to exploit the asset abroad in addition to, or instead of in, the firm's home country (*the location advantage*); and it must be in the firm's interest to control the asset's exploitation itself, rather than contracting out use of the asset to an independent foreign firm (*the internalization advantage*). For instance, GM will engage in FDI when it has a design for a car which could be manufactured abroad more efficiently than at home and whose production the firm wishes to control through ownership of the factory in which it is made. When GM wishes to sell cars in Brazil (a case we will consider later), it will choose FDI – setting up its own subsidiary in the region – when this option dominates exporting to Brazil from GM plants in the United States (or elsewhere) and contracting out production of GM cars (or licensing its technology and brand name) to an independent Brazilian firm.

The general equilibrium theories of multinationals attempt to explain how environmental conditions arise which favour production by multinationals over other forms of global market integration.¹⁷ Common to these theories is the idea that to produce a good a firm must incur fixed costs – such as R&D to generate a patent, advertising to create a brand name, or corporate investments to establish a management structure – which can support production in many plants. A firm consists of an upstream facility, which undertakes fixed-cost “headquarters” activities, and one or more downstream production plants. A multinational is simply a firm with upstream and downstream facilities located in multiple countries.

Suppose that headquarters activities are relatively skill- or capital-intensive and that production is relatively labour-intensive. If factor prices are not equalized across countries, then a firm has an incentive to become a multinational in order to exploit differences in factor costs between countries. It could do so by locating its headquarters in a capital-abundant (low-capital cost, high-wage) country and production in a labour-abundant (high-capital cost, low-wage) country. This would give rise to vertical FDI – the creation of a multinational whose country operations specialize each in a distinct vertical

stage of production (Helpman, 1984; Helpman and Krugman, 1985).

Alternatively, suppose that factor prices are equalized across countries, or nearly so, but trade barriers or transport costs make it expensive to ship goods abroad. When trade costs are low, a firm will produce all its output in domestic plants and serve foreign consumers through exports. When trade costs are high, it is optimal for the firm to build production plants both at home and abroad, so that it serves domestic consumers from its domestic plants and foreign consumers from its foreign plants (Markusen, 1984). This is a case of horizontal FDI, in which the multinational undertakes similar production activities in all countries. Activities at its headquarters, however, remain concentrated in one country only. Recent work combines cross-country differences in factor and trade costs to develop a general framework for determining when multinationals (versus purely national firms which may or may not export) will be in operation (Markusen and Venables, 1998 and 1999a).¹⁸

The creation of multinational firms raises global welfare by leading to a more efficient global allocation of resources.¹⁹ In the models described above, the absence of distortions specific to FDI means that there is no policy justification for treating multinationals differently from domestic firms. Nevertheless, policies to promote FDI would encourage multinational production by raising the advantages of multinationality. From the perspective of a multinational firm, subsidizing FDI (i) lowers production costs and so raises the incentive to create patents, trademarks, or other assets which sustain headquarters activities; (ii) enhances the relative attractiveness of locating production in the country offering incentives; and (iii) raises the economic benefits of FDI relative to exporting and arms-length production in the host country.

An emerging body of literature considers how production externalities affect the behaviour of multinationals and the impact of FDI on host economies. The existence of externalities associated with FDI raises the possibility that promoting FDI may be welfare-enhancing. One line of work suggests that the arrival of multinational firms in an economy may help jump-start the process of industrial development by increasing the scale of operations in domestic upstream and downstream industries – that is, by creating forward and backward linkages. In Rodriguez-Clare (1996), the arrival of multinationals increases an economy's access to specialized intermediate in-

puts (which are produced in more developed economies and accessible abroad only through multinationals), which in turn raises the economy's total factor productivity. The idea is that multinationals in effect give less developed economies access to the stock of knowledge capital (which is one interpretation of specialized intermediate inputs) in more developed economies. This access makes labour and other factors in the host economy more productive. Multinationals crowd domestic firms out of production, which raises the possibility that some domestic factors of production may lose from FDI. Under some conditions, the demand for labour by the entering multinationals is weaker than that for the exiting domestic firms, in which case the arrival of multinationals may lower national welfare. Thus, the "linkage" effect of multinationals on factor demand may be positive or negative.

There are other mechanisms through which multinationals impact industrial expansion in host countries. Gao (1999) offers a model in which the creation of multinational firms spreads industry from more to less industrialized countries, thereby reducing industrial concentration in the former. By lessening industry agglomeration, multinationals raise national welfare in less industrialized regions, but may lower it in more industrialized ones. Markusen and Venables (1999b) offer a similar model in which the "catalyst" effect of multinationals on a host economy (through forward and backward linkages) may spur domestic industry so much as to drive multinationals out of the market. Additionally, while multinationals create forward and backward linkages, they also increase competition for local firms, and thus may redistribute income away from some groups – e.g. specific factors in industrial production (Matouschek, 1999). If the impact of multinationals on the profitability of domestic firms is sufficiently negative, FDI may lower host-country welfare, in which case the optimal policy towards FDI is a tax (Glass and Saggi, 1999).

Another mechanism through which multinationals may create spillovers for local industry is worker training. If multinationals bring new technology into an economy, then local firms may benefit by being able to hire workers whose training costs have in effect been paid by the multinational (Motta et al., 1999). Of course, multinationals may bid to retain these workers, in which case domestic labour captures the full benefit of worker training. In either case, multinationals raise national welfare.

B. What determines the location of multinational production?

A large empirical literature examines the factors which determine where multinational enterprises locate their production facilities. We discuss this literature briefly in order to identify the potential efficacy of using tax incentives to attract FDI.

One strand of literature applies general equilibrium theories of multinationals to data to see whether FDI is associated with variation in trade costs or factor costs across countries. Theory predicts that firms will penetrate foreign markets through FDI when trade costs are low, firm-level scale economies are high (i.e. the fixed costs associated with headquarters activities are high), and plant-level scale economies are low (i.e. the costs of having plants both at home and abroad are low). Conversely, firms will penetrate foreign markets through exports when trade costs are low and plant level scale economies are high. Theory also predicts that firms will penetrate foreign markets through vertical FDI when factor-cost differences between countries are large, and through horizontal FDI when countries are similar in terms of market size and factor cost.

A common measure of how firms from a given source country penetrate a given host market is the level of sales in the host market by foreign affiliates of firms from the source country (normalized by total sales from the source country to the host country, which equal affiliate sales plus exports).²⁰ Using data on exports by US manufacturing industries and sales by foreign manufacturing affiliates of US multinationals, Brainard (1997) finds that affiliate sales in a given industry and country are positively correlated with trade costs (freight rates, tariff rates) to the country and average firm size in the industry, and negatively correlated with average plant size in the industry. Brainard interprets these results to mean that, consistent with theory, higher trade costs and stronger firm-level scale economies encourage FDI relative to exports, while stronger plant-level scale economies discourage FDI relative to exports. She also finds that higher host-country taxes appear to encourage affiliate sales over exporting, which is counter-intuitive.

Yeaple (1999) extends Brainard's approach and finds that for more skill-intensive industries affiliate sales are positively correlated with average educational attainment in the host country. He interprets

this result to mean that countries with larger supplies of human capital are more likely to attract FDI, especially in sectors which are relatively intensive in the use of skilled labour. In related work, Markusen and Maskus (1999a and 1999b), using data on aggregate sales by foreign affiliates of US multinationals and aggregate sales by affiliates of foreign multinationals in the United States, find that affiliate sales are higher when source and host countries have relatively similar market sizes but are unrelated to differences in the relative supply of skilled labour in source and host countries. They interpret these results to mean that multinationals have expanded their global production operations more through horizontal FDI than through vertical FDI.

The empirical work cited above is general equilibrium in orientation, in that it is based on estimating a reduced form relationship between exports and/or multinational sales and measures of industrial technology, and country trade costs, size and factor supplies. All prices and outputs are implicitly endogenous. Other research takes a partial equilibrium approach in that it examines the impact of policy or other host-country conditions on FDI, holding constant at least some prices and sectoral outputs. This line of work focuses on the country characteristics which appear to attract multinational firms.

In a widely cited paper, Wheeler and Mody (1992) examine outward foreign investments by US multinational enterprises. They find that US outward FDI is higher in countries with larger markets, a larger stock of initial FDI, higher quality of infrastructure, and more industrialized economies. These results are broadly consistent with theory. The authors interpret the correlation between current and past FDI to indicate that multinationals are attracted to locations with a larger concentration of industrial firms – that is, that there are agglomeration economies associated with FDI. Other results are less consistent with theory. FDI is slightly higher in countries with higher labour costs and corporate taxes.

These findings, which are representative of other papers in this literature, raise a number of important questions. Is FDI truly subject to agglomeration economies? Can it be that multinationals do not take labour costs or tax rates into account in making location decisions? If the answer to both questions is yes, then host-country governments may have limited ability to influence multinational location decisions through tax policy.

There are several reasons to be cautious in drawing policy conclusions from regressions like those

that Wheeler and Mody report. One common problem in empirical work which examines the impact of tax policy or agglomeration effects on firm location decisions is that it is often difficult to control for the impact of all relevant regional characteristics (e.g. efficiency of local bureaucracy and local factor productivity).²¹ Excluded characteristics are omitted variables, whose existence may contaminate regression results. California, for instance, attracts multinationals in part because it has a large pool of labour which is highly skilled (and highly paid). The state's abundant resources may allow it to get away with high corporate tax rates. If there are many instances like California in the data (as well as opposite cases like Arkansas which is a low wage, low tax, and low FDI region), we would find that FDI is positively correlated with tax rates, labour costs and industry agglomeration. But these correlations would just be picking up the more fundamental relationship between FDI and the local supply of skilled labour. Since Wheeler and Mody-style regressions do not control for this sort of possibility, they are difficult to interpret.

Recent work in public finance attempts to address these and other identification problems. Hines (1997) summarizes research on the impact of taxation on FDI. Contrary to the impression given by Wheeler and Mody (1992), Brainard (1997), Yeaple (1999) and others, a growing tax literature finds that FDI is lower in regions with higher corporate taxes. The elasticity of FDI with respect to the after-tax rate of return is approximately unity. One study which controls for omitted variables in a particularly convincing manner is Hines (1996), who examines the allocation of inward FDI across US states. He compares investment from countries which grant foreign tax credits with countries that do not in high-tax versus low-tax US states. Relative to investors from countries which grant foreign tax credits, investors from countries which grant no tax credits should be more sensitive to cross-state differences in tax rates. Hines' approach allows him to control for unobserved factors which influence the attractiveness of a state to foreign investors (and which are common to investors from different countries). His results imply an elasticity of capital ownership with respect to state taxes of -0.6 . This suggests that multinationals are influenced by cross-country or cross-region differences in tax rates.

With regard to agglomeration effects, Head et al. (1995) examine the location decisions of new Japanese manufacturing plants in the United States. They find that, controlling for the local concentra-

tion of US plants in the same industry (among other factors), Japanese plants are more likely to choose a location where the existing local concentration of Japanese manufacturing plants in the same industry is higher. This finding is similar to Wheeler and Mody's that firms are attracted to large concentrations of other industrial firms. But, by focusing on Japanese plants and controlling for the location of overall US manufacturing activity, this approach goes further than previous studies in controlling for the effects of unobserved, site-specific characteristics.²² This suggests that multinationals (at least the Japanese firms in Head et al.'s data) are attracted to locations with other firms in their own or related lines of activity.²³

C. Does FDI generate positive spillovers for the host economy?

That multinational firms are different from purely domestic firms is abundantly clear. Across countries and time, several empirical regularities are apparent. Relative to their domestic counterparts, multinationals are larger, pay their workers higher wages, have higher factor productivity, are more intensive in capital, skilled labour, and intellectual property are more profitable and are more likely to export (Haddad and Harrison, 1993; Aitken et al., 1997; Aitken et al., 1997; Aitken and Harrison, 1999; Blomstrom and Sjöholm, 1999).²⁴ That multinationals possess these attributes is not surprising, given that to become a viable multinational a firm must have outperformed domestic and foreign rivals in some dimension. The relative technological superiority of multinationals also makes it possible that they would be a direct or indirect source of technological advancement for domestic firms in host countries, especially where these countries are relatively far from the technological frontier.

Theory identifies several channels through which multinationals generate externalities that raise the productivity of host-country factors of production. It is entirely possible, however, for the net effect of such linkages on host-country welfare to be negative, once we take into account the impact of FDI on the profitability of domestic firms. Whether spillovers from multinationals raise host-country welfare is an empirical question.

Early literature is optimistic about the impact of multinationals on host-country productivity.²⁵ Caves (1974) finds a positive correlation between

industry average value-added per worker and the share of industry employment in foreign firms for Australian manufacturing in 1966.²⁶ More recent work confirms this basic finding in a wide array of environments. A partial list of studies which find a positive correlation between average industry productivity and the presence of foreign firms in the industry include Globerman (1979) for Canada in 1972; Blomstrom and Persson (1983), Blomstrom (1986), and Kokko (1994) for Mexico in the 1970s; and Blomstrom and Sjöholm (1999) for Indonesia in 1991. In related work, Borensztein et al. (1998) find a weak positive correlation between FDI inflows and per capita GDP growth for a panel of countries in the 1970s and 1980s (although when they interact FDI and the level of schooling, FDI has a negative "direct effect" on growth and a positive "indirect effect" through schooling).

Taking a slightly different approach, Mansfield and Romeo (1980) use a sample of US-based multinationals to examine which sorts of technology these firms transfer abroad and whether there is leakage of these technologies to non-US firms in host countries. They report that in 20 out of 26 cases transferred technologies became known to foreign rivals within six years. In nine of the cases, access to US technology appeared to accelerate foreign firms' introduction of competing products or processes by two years or more.²⁷

What does it mean for industry productivity or industry technology adoption to be positively correlated with the presence of multinational firms in an industry? A common interpretation of this finding is that FDI creates positive productivity spillovers for domestic firms in host countries. This interpretation, however, is subject to the same concerns about omitted variables and endogeneity bias that we encountered in empirical work on the impact of taxes and agglomeration effects on firm location decisions. Most empirical studies in the literature use cross-section data on average industry characteristics. A positive simple correlation between industry productivity and the presence of multinationals is, in principle, just as likely to mean that multinationals are attracted to high-productivity industries as it is to mean that multinationals raise host-country productivity. Though most empirical studies introduce additional controls in estimating the correlation between industry productivity and multinational presence, the included variables surely do not exhaust the set of factors which are likely to influence industry productivity and multinationality.²⁸

Recent work attempts to address these identification problems through using micro-level, time-series data on individual manufacturing plants. By looking at how the productivity of domestic plants changes over time in response to the presence of multinationals, it is possible to control for the presence of unobserved factors which influence both the productivity of domestic plants and the behaviour of multinationals. Haddad and Harrison (1993), using data on Moroccan manufacturing plants for the period 1985–1989, find a weak negative correlation between plant total factor productivity growth and the presence of foreign firms in the sector. Foreign-owned plants do have higher productivity (though not higher productivity growth), and the industries in which they are concentrated demonstrate less dispersion in plant productivity. In related work, Aitken and Harrison (1999), using data on Venezuelan manufacturing plants for the period 1976–1989, find that productivity growth in domestic plants is negatively correlated with foreign presence in the sector.²⁹ Based on their estimates, a domestic plant in a sector with 50 per cent of employment in foreign-owned plants would on average have 13 per cent lower annual productivity growth than a domestic plant in a sector with no foreign firms. They also find that foreign plants are relatively productive and that higher-productivity foreign plants tend to concentrate in certain sectors. Productivity growth in foreign plants, in contrast to domestic plants, is positively correlated with multinational presence.

The results of Haddad and Harrison and Aitken and Harrison are consistent with a simple story, which is quite different from that derived from older, industry-level, analyses. This is that multinational firms concentrate in high-productivity sectors and that domestic plants in these sectors, while having high relative levels of productivity, experience even or negative growth in productivity relative to plants in other sectors. Micro-level data, then, appears to undermine empirical support for positive net productivity spillovers from FDI, perhaps indicating that multinationals confine competing domestic firms to less profitable segments of industry.³⁰

Another strand of literature examines whether multinationals improve the access of host-country firms to foreign markets. Based on casual observation and firm-level interviews, Rhee (1990) and Rhee and Belot (1990) find that the arrival of multinational firms contributed to the eventual export success of one or more labour-intensive industries in 11 developing economies. Using data on Mexican manufacturing plants in the 1980s, Aitken et al. (1997) find

that the larger the concentration of multinational firms in their region and industry, the more likely Mexican manufacturing firms are to export. This correlation is robust to controlling for industry agglomeration in the region and for the endogeneity of multinational location. In interpreting these results, it is important to recognize that these studies examine economies in the aftermath of liberalization episodes, in which barriers to trade and FDI fell considerably. Hence, the information spillovers these studies detect may be confined to post-reform transition periods and therefore short-lived.³¹

IV. Evaluation of FDI in practice

To summarize key results of the literature on FDI, we have seen that:

- (i) the only justification for favouring FDI over both foreign portfolio investment and domestic investment is the existence of market failure that is specific to multinational production;
- (ii) G-24 and other countries offer myriad tax concessions to FDI, which violates the residence principle (by taxing non-resident income) and subjects FDI and foreign portfolio investment to unequal tax treatment;
- (iii) in theory, FDI raises national welfare by bringing foreign technology and other foreign resources into an economy, which raises the productivity of domestic factors, but in the absence of externalities there is no justification for taxes or subsidies which are specific to FDI;
- (iv) in theory, externalities associated with FDI may raise or lower national welfare, depending on whether positive productivity spillovers from multinationals more than offset the loss in profits due to crowding domestic firms out of the market;
- (v) empirical research suggests that FDI is sensitive to both host-country tax policies and economic conditions, including the education level of the labour force, overall market size, and the size of the local industrial base;
- (vi) empirical research shows mixed support for the idea that FDI generates positive spillovers for domestic industry, while multinationals tend to be high-productivity firms which pay relatively

high wages; on average (in at least some countries) their presence appears to depress the productivity of domestic plants (perhaps by driving them into less profitable market segments).

In this section, we apply insights from the literature to examine several cases of FDI promotion policies. First, we build a simple theoretical model of FDI. In this model, FDI raises the productivity of domestic factors and possibly domestic firms, but also increases competition with these firms. The effect of FDI on national welfare depends on the relative magnitude of increased domestic factor income versus the reduced profitability of domestic industry. To show these effects in as transparent a manner as possible, we identify some but not all the general equilibrium effects of FDI. In particular, we assume that subsidies to FDI are financed by lump-sum taxes and we ignore other forms of foreign investment. Given that tax policies in many countries may be inefficient [see (i) and (ii) above], we are in a sense giving FDI promotion policies the maximum benefit of the doubt by ignoring some of their possibly more adverse distortionary consequences.

Second, we describe three cases of FDI promotion: projects by GM and Ford to build automobile production plants in Brazil, and a project by Intel to build a semi-conductor factory in Costa Rica. After presenting the relevant details of the cases, we examine whether the theory developed in the first part of this section and estimates of key behavioural parameters culled from empirical literature would suggest that these policies were justified on welfare grounds. This exercise is obviously far from exact, since there are many details about the industries we cannot observe and so do not address. Our intent is to identify simple guidelines which policy makers should take into account (under the presumption that the point of promoting FDI is to raise national welfare), and then see if the facts of the cases examined suggest that policy makers adhered to these guidelines.

A. A theoretical model

In this section we develop a simple model of multinational production, which we use to examine the conditions under which subsidizing multinational activities enhance host-economy welfare. Based on the discussion in the last section, the arrival of a

multinational firm in a host economy potentially (i) raises the demand for labour and other factors, thus raising factor incomes; (ii) crowds domestic firms out of the market, by bidding away resources and capturing the market share from these firms; and (iii) generates spillovers, which may raise or lower the productivity (and profitability) of domestic firms. The net effect of FDI on an economy is ambiguous; in order to justify subsidies to FDI, the net welfare effect of FDI should be positive and the social return to FDI exceed the private return.

We would like a model which captures effects (i)–(iii), facilitates analysis of FDI promotion policies and is tractable. With this in mind, we extend the framework in Dixit and Grossman (1986) and Glass and Saggi (1999) to allow for spillovers from FDI.

Consider a host economy which has two sectors: an agricultural one, which is perfectly competitive and hires unskilled labour only, and a manufacturing sector consisting of N industries, each of which is imperfectly competitive and hires unskilled and skilled labour. Agriculture can be thought of as a composite good, embodying the rest of the economy. We take agriculture to be the numeraire for the economy and define units of the good such that it takes one unskilled worker to produce one unit of output. The price of the good and the wage for unskilled labour are then both equal to one. To begin, we assume that the majority of manufacturing output is exported, which avoids complications involved with calculating consumer surplus. We later discuss relaxing this assumption.

Skilled labour represents a scarce resource, which is used by relatively high-technology sectors, such as manufacturing. We have in mind managers, engineers and other high-skill workers, who tend to be employed in technology-intensive, imperfectly competitive industries. We could, alternatively, re-define skilled labour as an input (management, R&D) which is produced by a scarce factor and consumed by manufacturing industries. This would be an equivalent statement of the model.

We assume that each of the N manufacturing industries contains a single domestic firm, which “Cournot-competes” with a single foreign firm. The model easily generalizes to the case of more domestic and foreign firms. There may be fixed costs which account for the industries’ oligopolistic structure, but we do not need to account for them explicitly. A single foreign firm in industry 1 contemplates locating production in the host country.

These assumptions imply that firms in the domestic economy have power to set prices on world markets. This may be unrealistic for local firms in many developing countries, but is likely to apply to many multinationals which locate in developing regions (including the firms we shall consider later on in this paper: GM, Ford and Intel). In the event that multinationals are the only firms with global market power in the domestic economy, then the model collapses to the case of a single perfectly competitive sector and a single imperfectly competitive sector, where the latter is dominated by a multinational.

Detailed assumptions of the model are as follows:

- (a1) There are l units of unskilled labour and k units of skilled labour in the host economy, where skilled labour earns wage z . Total agricultural output is x ;
- (a2) To produce one unit of output, a domestic firm in industry i requires a_i units of unskilled labour and one unit of skilled labour. If the foreign firm in industry 1 chooses to produce in the host economy, it requires A_1 unit of unskilled labour and D_1 units of skilled labour per unit of output;
- (a3) The revenue function for the domestic firm in industry i is $r^i(y_i, Y_i, \lambda_i(Y_1^d))$, where y_i is the output of the domestic firm, Y_i is the output of the rival foreign firm, Y_1^d is the domestic output of foreign firm 1, and the function $\lambda_i(\cdot)$ captures productivity spillovers from foreign firm 1's domestic production to domestic industry i . As is standard, $r^i_{y_i} \geq 0$, $r^i_{Y_i} \leq 0$, $r^i_{Y_1^d} \leq 0$, and $r^i_{x} \geq 0$ (where subscripts indicate partial derivatives by order of argument in the revenue function). λ'_i may be positive or negative. The revenue function for the rival foreign firm in industry i is $R^i(Y_p, y_i)$, where $R^i_{Y_p} \geq 0$, $R^i_{y_i} \leq 0$, and $R^i_{x} \leq 0$.

The first assumption is that factors are inelastic supply. This assumption is not essential but does help simplify the analysis. The second assumption specifies that the unit factor demands of the foreign firm may differ from those of the domestic firm, which allows for the possibility that multinationals may have relatively weak or strong linkage effects. The third assumption says that a domestic firm's revenue is increasing (at a decreasing rate) in its own output, decreasing in the output of its foreign rival, and increasing (decreasing) in the domestic output of foreign firm 1 if that firm is a source of

positive (negative) spillovers to the industry. Later in the analysis, we shall introduce additional assumptions.

Before developing the model, we need to specify the FDI promotion policies that a domestic government contemplates enacting. The obvious alternatives are (i) a fixed subsidy to multinationals that set up production facilities within the borders of the host economy, and (ii) a subsidy per unit of domestic output granted to multinationals. Both are straightforward to analyse, but to examine the effects of a fixed subsidy requires comparing discrete changes in equilibrium outcomes, which in turn requires making assumptions about functional forms and parameter values. Additionally, for a lump-sum subsidy to raise welfare, FDI must generate positive spillovers and not occur in the absence of a subsidy. In most such cases, a per-unit subsidy will be the optimal policy, not a lump-sum subsidy (since the former equates the private and social return to FDI while the latter does not). In light of these issues, we consider the effect of a per unit production subsidy by the host economy on domestic output of foreign firm 1. This allows us to examine whether a small increase in the subsidy raises or lowers national welfare, and so determine whether the *laissez-faire* level of FDI is too high or too low from the perspective of the host economy. A per unit production subsidy roughly approximates many types of actual FDI promotion policies.³²

A related issue is how we treat production outside the host economy by foreign firm 1. Since the firm is producing for the world market, it would only maintain production in multiple countries if its unit factor costs were equalized in those countries. Glass and Saggi (1999) consider the case where FDI equalizes wages between host and source countries for multinational firms. We consider this outcome to be unrealistic, but our model could be easily extended to treat this case. For simplicity, we assume that the foreign firm moves its entire production of good 1 to the host economy. This would occur in the event that FDI by foreign firm 1 did not equalize factor prices between the host economy and the foreign firm's home country. Foreign firm 1 may, of course, have operations devoted to other products and industries at home or in other countries. We ignore these, as they do not impact on the host economy's welfare.

Given the simple setup of the model, we need to focus on just two sets of equilibrium conditions: those for factor-market clearing and those for profit maximization of firms producing in the host

economy. Factor-market equilibrium requires that supply equals demand in the market for unskilled labour,

$$l = x + \sum_i a_i y_i + A_1 Y_1 \quad (1)$$

and in the market for skilled labour,

$$k = \sum_i y_i + D_1 Y_1 \quad (2)$$

By assumption, each domestic firm chooses output to maximize profit, taking as given the output of its rival foreign firm. For domestic firm i , profit maximization implies the following first-order condition:

$$r_1^i - a_i - z = 0 \quad (3)$$

Second-order conditions are standard. There is a similar first-order condition for the foreign firm with whom firm i competes. Except possibly for industry 1, these foreign firms are located abroad. If foreign firm 1 chooses to manufacture in the host economy, its output choice is implicitly defined by the first-order condition,

$$R_1^i - A_1 - D_1 z + s = 0 \quad (4)$$

which reflects the fact that foreign firm 1 may be given a per unit subsidy for producing in the host economy. Since pairs of domestic and foreign firms compete in a single world market, we can summarize their profit-maximizing output choices in terms of Cournot Best-Response Functions, $y_i = b_i(Y_i)$ and $Y_i = B_i(y_i)$, which are subject to standard conditions.³³

The arrival of foreign firm 1 in the host economy has three effects. First, an increase in production by foreign firm 1 raises the demand for unskilled and skilled labour in the host economy. Since manufacturing is relatively intensive in the use of skilled labour, the relative demand for and the relative wage of skilled labour rises. For domestic firms in the host economy, the rise in z increases their marginal costs. All else equal, higher marginal costs mean lower output and lower profits. This effect applies to all firms in manufacturing, and not just to the domestic firm competing directly with foreign firm 1. Second, an increase in production by foreign firm 1 generates a productivity spillover for domestic firms. If this spillover is positive, it will, all else equal, cause

domestic firms to raise their output and earn higher profits. The first and second effects work in opposite directions, and so have an ambiguous impact on domestic firm output and profits. The third effect is isolated to domestic firm 1: as foreign firm 1 raises its output, the price for domestic firm 1's output falls, causing it to reduce output and thereby earn lower profits.

To consider these effects in more detail, we examine the impact of a change in the production subsidy to foreign firm 1 on host-economy welfare. Since we have assumed that manufacturing firms produce for the world market, we can examine the welfare effects of a subsidy to foreign firm 1 without taking consumer surplus in the host economy into account. As long as the final consumers of foreign firm 1's products are located abroad, this simplification is reasonable.³⁴ For our purposes, the relevant components of host-economy welfare are incomes to unskilled and skilled labour, profits to domestic firms, and the subsidy to foreign firm 1,³⁵

$$W = l + zk + \sum_i [r_1^i - (a_i + z)y_i] - sY_1 \quad (5)$$

Using the factor-market clearing condition for skilled labour in equation (2), we can rewrite host-economy welfare as:

$$W = l + zD_1 Y_1 + \sum_i [r_1^i - a_i y_i] - sY_1 \quad (6)$$

We turn now to the thought experiment that is the motivation for the model: what is the impact of an increase in the production subsidy to foreign firm 1 on host-economy welfare? The base case from which we begin is *laissez-faire* (zero subsidy). Determining the welfare consequences of a subsidy to the multinational firm will then also determine whether the social return to FDI exceeds the private return.

Totally differentiating equation (6), we obtain:

$$\begin{aligned} dW = & dzD_1 Y_1 + zD_1 dY_1 \\ & + \sum_i [r_1^i + r_2^i B_i' - a_i] dy_i \\ & + \sum_i r_3^i \lambda_i' dY_1 - dsY_1 \end{aligned} \quad (7)$$

The first two terms in equation (7) represent the change in factor income, which is positive as long as the subsidy causes foreign firm 1 to increase its output. The third and fourth terms represent the change in profits for domestic firms, which depends on the

signs of the dy_i terms and whether productivity spillovers are positive or negative. If the rise in marginal costs is the dominant effect, domestic output and profits fall, while if the productivity-spillover effect dominates (and spillovers are positive), domestic output and profits rise. The fifth term is the direct cost of the subsidy to multinational production.

To help interpret equation (7), we simplify the expression. First, define $\phi_i \equiv r^i_2 B_i' \geq 0$, which is the strategic effect of own-industry changes in domestic output on domestic profits. Given outputs are strategic substitutes (by assumption), as a domestic firm raises its output, it induces a reduction in output by its rival firm, which in turn serves to raise domestic firm profits. Next, define $\beta_i \equiv r^i_3 \lambda_i'$, which is the direct effect of the multinational productivity spillover on domestic firm profits. Using $r^i_1 - a_i = z$ from equation (3) and combining equation (2) and assumption (a1), we see that

$$dk = 0 = \sum_i dy_i + D_1 dY_1 \quad (8)$$

Given that skilled labour is in inelastic supply, any increase in output by foreign firm 1 must be met by a net reduction in output by domestic firms, such that the total demand for skilled labour is unchanged. Applying the definitions and equation (8) to equation (7), we obtain

$$dW = (dzD_1 - ds)Y_1 + \sum_i \phi_i dy_i + dY_1 \sum_i \beta_i \quad (9)$$

The welfare effects of the subsidy are transparent in equation (9). The first term is the effect of the subsidy to foreign firm 1 on factor incomes, net of the direct subsidy cost. This term has to be negative. We show this formally in a technical appendix, but the intuition is straightforward. Beginning from a situation where the subsidy is zero, the foreign firm has chosen output to maximize profits. If it increases output, its profits, net of the subsidy, will fall. The only way a subsidy can induce the firm to raise output, therefore, is if it more than compensates the firm for the extra costs it will incur by expanding output.

The second term in equation (9) is the strategic impact of the subsidy to foreign firm 1 on the profits of domestic firms. Absent spillovers, the rise in factor costs would induce domestic firms to lower output, yielding them lower profits. Any firm that does not receive a positive spillover, will without

question lower its output, producing a negative value for $\phi_i dy_i$. Even for those firms that do receive a positive spillover, the effect of rising factor costs may dominate, leading to a fall in output. We show this formally in the appendix. From equation (8), for the foreign firm to raise output the net change in output for domestic firms must be negative. We anticipate, then, that the only domestic firms whose output will rise will be those receiving a substantial positive productivity spillover.

The third term in equation (9) captures the impact of the productivity spillover on domestic profits. The larger the increase in foreign firm 1's output, the larger is this term. But larger increases in foreign firm output also lay upward pressure on demand for skilled labour, making it more likely that the second term in (9) will be negative.

Under what conditions will a subsidy to domestic production by a multinational firm be likely to raise national welfare? We identify four key conditions:

- (i) the factors used most intensively in production by the multinational firm are in elastic supply;
- (ii) the domestic firms that compete for resources with the multinational firm earn low to zero economic profits;
- (iii) multinational production generates large positive productivity spillovers for domestic firms in competing and non-competing industries; and
- (iv) the gain in consumer surplus from increased competition in the domestic market is small.

Condition (i) guarantees that the impact of the subsidy on factor costs for domestic firms will be small; condition (ii) guarantees that the welfare consequences from shifting production away from domestic firms and towards foreign firms will be small; and condition (iii) is necessary for a subsidy to be worthwhile under any circumstances. Condition (iv) goes beyond the theoretical analysis we have presented, but is an obvious point. We do not emphasize changes in consumer surplus, since if FDI does happen to raise domestic market competition, then the optimal policy is not a subsidy to multinational firms but a generalized production subsidy to offset the distortionary consequences of imperfect competition.³⁶ These conditions form the basis for evaluating actual cases of FDI promotion policies, to which we turn in the next section.

B. The promotion of FDI in practice: three cases

*1. General Motors in Brazil*³⁷

In the last decade, Brazil captured the attention of global automobile manufacturers. With Mercosur providing tariff barriers against competition from outside the southern cone, Brazil having the world's eighth largest automobile market, and strong projected growth in regional automobile demand (only one in nine Brazilians owns a car), the major automobile producers either established or expanded production capacity in Brazil and Argentina. By the late 1990s, there were a dozen automobile manufacturers in Brazil alone. In 1998, VW owned 28 per cent of the Brazilian market, Fiat 24 per cent, GM 22 per cent and Ford 13 per cent, with the rest of the market divided among smaller manufacturers.

In the early 1990s, GM began to move aggressively into Brazil, focusing initially on higher end-products and touting its confidence in the country. By the late 1990s, GM had an annual production capacity of 500,000 units, up from 170,000 in 1992. VW, Fiat and Ford, in contrast, were introducing new models relatively slowly, reflecting the cautious approach of many durable-goods manufacturers in the wake of Brazil's continuing struggle against high inflation and slow growth. GM decided to make Brazil a showcase for its new global production strategy, based on simple and flexible manufacturing plants, global sourcing of automobile parts, rapid introduction of new models, and a lean dealer network. This strategy had shown success in Europe and the idea was to develop it further in Brazil, with the goal of applying it in Asia, Eastern Europe, and perhaps ultimately the United States.

GM's long-run aim is to have half of its production capacity outside the United States, compared with only one fifth in 1990. (As GM has stepped up its Brazilian operations, it has also expanded automobile production in other emerging economies, including Argentina, China, Poland and Thailand.) By the late 1990s, other automobile makers in Brazil were following an approach similar to GM's. VW, Fiat and Ford, among others, decided to build new plants or add capacity to their existing plants in the country.

In 1997 GM made the Blue Macaw project the centerpiece of its Brazilian strategy. The project revolved around a new automobile assembly plant, which would be GM's third in the country, with an

annual capacity of 150,000 units. The plant would produce a stripped-down version of the Opel Corsa, a subcompact car, with an under \$10,000 price tag. Much of the production of the car would be outsourced to suppliers, who would deliver entire subassemblies of components to GM for final assembly. GM's plan was to develop this concept of "modular assembly" in Brazil and then apply it to other production facilities in Europe and North America. GM chose the state of Rio Grande do Sul as the site for the \$600 million plant, with the idea of completing the facility by the end of 1999. However, Brazil's currency crisis in early 1999 and the ensuing recession caused GM's sales in Brazil to fall by 27 per cent and delayed completion of the project until early 2000.

GM's plant, which recently opened, employs 1,300 workers, and locally based suppliers employ another 1,300 workers. The plant houses 20 suppliers, the most important of which are US, French and Japanese companies. GM outsources all components except powertrains, body welding, body panels, paint, and final assembly.

The advantages of locating in Rio Grande do Sul is that the state is close to the southern cone's major markets in southern Brazil, the Buenos Aires region of Argentina and Uruguay. The state has a more educated work force compared to the rest of Brazil, but lower wages than in the highly industrialized nearby region of Sao Paulo. (Total compensation for GM workers in Rio Grande do Sul is expected to be \$9 per hour, compared to \$13 for automobile workers in Sao Paulo.)

In return for agreeing to build a plant in a lightly industrialized area, GM received a package of subsidies from the state government of Rio Grande do Sul. These included promises for direct subsidies to GM to offset the costs of building roads, ports and other infrastructure related to the plant; temporary exemptions from value-added taxes; and a waiver of import duties on machinery used in the construction of the plant. While neither GM nor the state government is willing to give precise figures, the subsidies were reported to amount to \$250 million, and the tax breaks appeared to have the potential to equal \$1.5 billion over a 15-year period. GM executives maintain that in the absence of these subsidies, the firm would have located the plant in a more developed part of Brazil.

In May 1999, the government of Rio Grande do Sul, under a newly elected, more populist gover-

nor, threatened to renege on the promised subsidies to GM. Sharply higher interest rates in the aftermath of Brazil's currency crisis had raised borrowing and debt-service costs in the country, and forced state and federal governments to raise taxes and cut back on spending. Rio Grande do Sul's governor claimed that his state could no longer afford the subsidies. GM felt it was too close to completion of the project to pull out. Instead, the firm lobbied the state government and the president's office to have the subsidies maintained. GM and the governor reached an accommodation, whose details were not published but appeared to involve a partial (but far from complete) reduction in the subsidy. As part of this deal, GM agreed to an early pay back a \$150 million loan from the state government which had been part of the subsidy package.

2. *Ford Motor Co. in Brazil*³⁸

Though Ford was initially cautious in its approach to the Brazilian market, the company ultimately moved to expand its automobile production capacity in the country in a manner similar to GM. Throughout the 1990s Ford's Brazilian operations lost money. To reverse the situation, Ford decided to speed the introduction of new models, reduce financing costs and reorganize its dealer network. A key part of this strategy was Project Amazon, the construction of a \$700 million automobile assembly plant in Rio Grande do Sul to produce subcompact cars for the southern cone market. The plant, which would be Ford's fourth in Brazil, was to employ 1,500 workers and was initially scheduled for completion in 2001. The project would allow Ford to incorporate Brazil into its global production strategy of reducing the number of vehicle platforms and engine/transmission families on which its cars are based, while simultaneously increasing the number of models available and the speed with which new models are introduced. At the global level, Ford aims to design and develop vehicles for worldwide markets in five vehicle centres: four in the United States and one in Europe.

Similar to GM, Ford negotiated a package of subsidies from the Rio Grande do Sul government in return for locating in the state. The value of the subsidies appeared to be quite similar to the package GM received, consisting of \$250 million in straight subsidies for the construction of infrastructure related to the plant and temporary exemptions from value-added taxes and import duties for plant machinery, whose total value was expected to reach

\$1.5 billion over the life of the project (also set at 15 years).

In contrast to GM, Ford had barely initiated construction of its project when Brazil's currency crisis hit in early 1999. Consequently, it had received little in the way of subsidies from the Rio Grande do Sul government, and in fact claimed to be owed \$40 million in promised payments. Brazil's crash hit Ford hard, causing the company's sales in the country to fall by 27 per cent in the first half of 1999 relative to the same period in the previous year. Ford's market share fell to 9 per cent (from 14 per cent two years earlier). When the new governor of Rio Grande do Sul announced in May 1999 that he was taking away Ford's subsidies, just as he was threatening to do to GM, Ford decided to terminate construction in the state and move the Amazon project to a new location in Brazil. Later in 1999, Ford chose the north-east state of Bahia, in a relatively poor region of Brazil, as the new site for its plant, after considering several other states (Parana and Santa Catarina). Although few details are known, the package of incentives the Bahian state government promised Ford appears to be even more generous than what Rio Grande do Sul had initially offered. The relocation of the plant site has delayed completion of the facility until 2002.

The Bahia plant will be larger than the one originally planned for Rio Grande do Sul, requiring a \$1.2 billion initial investment, and will produce five different models of the Ford Focus, a subcompact car, with an annual production capacity of 250,000 units. The plant will have a similar design to GM's Blue Macaw plant, with suppliers of 17 parts housed under the same roof as the automobile assembly facility. Also like GM, Ford's suppliers will be primarily foreign firms, which work with Ford in other regions.

3. *Intel in Costa Rica*³⁹

In 1996, Intel decided to build a \$300 million semi-conductor assembly and testing plant in Costa Rica. Intel, which at the time had silicon-wafer fabrication plants in Israel and Ireland and semi-conductor assembly and testing plants in China, Malaysia and the Philippines, chose Costa Rica over alternative sites in Brazil, Chile, Indonesia and Mexico. What makes the Intel decision notable is that Costa Rica, a low-income country with a population of 3.5 million, offered little in the way of special inducements to Intel. The firm, with a few exceptions, received the standard package of incentives avail-

able to other foreign firms that set up operations in the country's EPZs. In contrast to Brazil's aggressive luring of automobile production plants, Costa Rica did not enter into a bidding war with other potential locations.

Production of semi-conductors involves three stages: the fabrication of silicon wafers and of semiconductor chips, and final assembly and testing. The first two stages are the most skill- and capital-intensive, with the fixed costs of constructing a fabrication plant exceeding \$1 billion by the mid-1990s. The assembly and testing stages, in which wafers are thinned and then cut into individual chips or integrated circuits, is more labour-intensive than fabrication, but is still skill- and capital-intensive relative to many other manufacturing activities. While chip fabrication plants are concentrated in Japan, the Republic of Korea, Taiwan Province of China and the United States, assembly and testing plants are increasingly located in developing countries. During the 1990s, Intel on average built a new plant every nine months to meet the steadily increasing demand for chips. Given short product life cycles and rapid imitation by rivals, what Intel needs in its global production sites is speed in ramping up production and access to a dependable, well-educated labour pool.

In Costa Rica's EPZs, firms enjoy a series of tax breaks as long as they engage in export production.⁴⁰ All firms are exempt from (i) import duties on raw materials, components and capital goods; (ii) export, sales, excise and municipal taxes; and (iii) taxes on corporate income during the first eight years following an investment, with a 50 per cent exemption applying for the next four years. Foreign investors face no restrictions on repatriating profits or foreign currency management. Certain EPZs offer additional incentives, including longer-term exemptions from corporate income taxes and subsidies for employment or employee training. As of 1997, there were 190 companies in eight industrial parks operating under Costa Rica's EPZ system.

With its rapid expansion of production capacity, Intel is constantly looking for new production facilities. In early 1996 it decided to build a 400,000 square feet plant, which would employ 2,000 workers to assemble and test the latest Pentium micro-processors. At the time, Intel anticipated that by 1999 the plant would process one quarter to one third of the chips that it manufactured. For Intel, the required features of a production site (given moderately large fixed costs and the need to begin production quickly)

include political and economic stability, a sufficient supply of professional and technical operators (preferably in a non-union environment), ease of importing components and exporting final products and minimal lags in obtaining necessary permits and licenses. Costa Rica showered Intel with attention and information, but did not employ extraordinary measures to attract the firm. Costa Rica did offer a few concessions to Intel, all of which were extended to other firms as well. These included waiving a 1 per cent tax on assets (extended to all firms in EPZs), increasing the number of foreign air carriers allowed to fly into Costa Rica, lowering energy prices for large buyers of electricity, and expanding training in electronics and English in several of Costa Rica's technical high schools. Intel executives stated that they chose Costa Rica based on the country's long history of stability, open trade and investment regime, relatively high-quality primary and secondary educational systems, and recent success in attracting other multinational firms in electronics.

C. *Evaluation of FDI promotion cases*

In this subsection we use the insights from the theoretical model developed earlier to examine whether on welfare grounds (i) Brazil was justified in offering subsidies to GM and Ford, and (b) Costa Rica would have been justified in subsidizing Intel. We focus on the issue of subsidies and not tax breaks, as tax breaks on income to foreign capital tend to move a country towards to the residence principle and therefore more efficient taxation (Costa Rica, in particular, appears to have been close to having zero taxes on direct foreign capital). Since state governments are the entities offering subsidies in Brazil, we consider whether subsidies to FDI would be likely to raise state welfare. A full treatment of this issue requires a much more complete analysis than we offer here. Our goals are simply to identify the key questions behind whether subsidizing FDI was likely to raise welfare and, based on casual evidence, to identify some possible answers to these questions.

The model we developed earlier appears to be applicable to both the Brazilian and the Costa Rican contexts. In each, foreign firms are technologically advanced relative to domestic ones; they operate in markets which appear to be imperfectly competitive at a regional, national, or global level; and they produce primarily for export (Intel to the world market, and GM and Ford to the broader Mercosur market).

- (i) *Is FDI likely to raise production costs for domestic firms (i.e. is the multinational firm relatively intensive in the use of inelastically supplied factors)?*

To the extent that the scale of new production by a multinational firm is large, the prices of inelastically supplied factors used in production may rise. As we showed earlier, a subsidy to FDI in this context, all else equal, would lower national welfare. Higher incomes (resulting from the subsidy) to factors employed in domestic firms would simply offset higher production costs to domestic firms, and higher incomes to factors employed in the multinational would be insufficient to cover the direct cost of the subsidy.

Production of both automobiles and semi-conductors appears to use relatively intensively skilled labour: Intel prefers workers with at least a high-school education, and a level of schooling well above the average in Costa Rica; GM's (and presumably Ford's, also) hourly wage of \$9 is well above the Brazilian average. We would expect skilled labour to be relatively scarce in both Costa Rica, Rio Grande do Sul and Bahia, such that the arrival of a multinational firm would put upward pressure on the local relative factor price.

- (ii) *Are there domestic firms which compete directly with the multinational firm?*

To the extent that a foreign firm faces no domestic rivals, then any increase in its production in the host economy is unlikely to directly lower the profitability of domestic firms. In this case, a subsidy to FDI would have no direct consequences for competition in the industry of relevance to host-economy welfare. (The absence of domestic rivals, however, also means the potential absence of firms which could benefit from productivity spillovers.) In Brazil, foreign firms overwhelmingly dominate production of automobiles and also appear to dominate production of automobile parts. In Costa Rica Intel faces no domestic competitors and would appear to have few domestic suppliers.

- (iii) *Are there domestic firms which are likely to benefit from productivity spillovers, or forward or backward linkage effects from FDI?*

If no domestic agents benefit from productivity spillovers from FDI, then a subsidy to FDI will

lower national welfare (assuming the absence of other distortions in the economy). This issue is obviously difficult to evaluate in full. However, that GM, Ford and Intel face no domestic rivals of any significance and rely primarily on foreign firms for parts and components suggests that there are few candidate domestic firms to benefit from productivity spillovers in either Brazil or Costa Rica (to the extent that such spillovers even exist). Of course, domestic firms in disparate industries may learn basic management skills simply from observing how multinationals like GM, Ford and Intel structure their supply chains, introduce new products, treat their workers, etc. But such learning effects would have to be substantial to justify the subsidies Brazil granted to GM and Ford. Empirical literature to date shows little evidence of such effects.

- (iv) *Is the multinational likely to repatriate most profits to its home country?*

To the extent that a foreign firm does not share rents with host-country suppliers or employees, all returns to FDI accrue to shareholders of the multinational, who are likely to be located abroad. This issue is also difficult to evaluate, but given the global reach of firms like GM, Ford and Intel (and their clear preference for a non-union environment), there is no obvious reason to expect these firms to share profits with their host-country workers. Again, the magnitude of such profit-sharing would have to be large to justify the Brazilian subsidies given to Ford and GM.

A preliminary evaluation of the three cases of FDI promotion suggests that the case for subsidies to GM and Ford in Brazil was weak, and that subsidies to Intel in Costa Rica would have been difficult to justify. In both Brazil and Costa Rica, subsidy-induced increases in production would appear to have been likely to lay upward pressure on the relative wage of skilled workers, thus reducing the profitability of domestic firms. While the foreign firms in question would appear to face few domestic rivals, limiting the direct consequences of FDI for domestic profitability, there would also appear to be a few firms in the same lines of business which would benefit from spillovers.

A particularly troubling feature of FDI subsidies in Brazil is that they appeared to result from competition between Brazilian states for the right to

host foreign plants. Both GM and Ford appeared to have already concluded that they needed to increase production capacity in Brazil. The subsidies, then, may have had little effect on whether the automobile companies invested in the country and only have had an impact on where they located their facilities within Brazil. The end result of this inter-state fiscal competition for FDI may be limited to extra burdens for Brazilian taxpayers and excess capacity in the regional automobile industry.

V. Concluding remarks

In this paper we have examined whether it makes sense for countries to promote FDI. Our work falls short of an in-depth analysis. The goal has been, instead, to identify the key issues which determine whether FDI promotion policies are justified, and then to examine relevant academic literature to see whether there is evidence that such conditions appear to hold in practice. Our focus has been, in particular, on whether spillovers related to multinational production justify FDI promotion.

For small open economies, efficient taxation may or may not require lower taxes on capital income to foreign residents than on capital income to domestic residents. Absent market failure, there is no reason to favour FDI over foreign portfolio investment. In practice, countries appear to tax income from foreign capital at positive rates (if rates that are lower than those for domestic capital) and to subject different forms of foreign investment to unequal tax treatment.

FDI appears to be quite sensitive to host-country characteristics. Higher taxes deter foreign investment, while a more educated work force and larger consumer and industrial markets attract FDI. There is also some evidence that multinationals tend to agglomerate in a manner consistent with location-specific externalities.

There is weak evidence that FDI generates positive spillovers for host economies. An oft-mentioned possibility is that FDI raises the productivity of domestic agents. While multinationals are attracted to high-productivity countries, and to high-productivity industries within these countries, there is little evidence at the plant level that FDI raises the productivity of domestic enterprises. Indeed, it appears that plants in industries with a larger multinational presence enjoy lower rates of productivity growth.

Empirical research thus provides little support for the idea that promoting FDI is warranted on welfare grounds.

Using a simple theoretical model, we derived conditions under which subsidies to FDI would be more likely to raise host-country welfare. Subsidies to FDI are likely to be warranted where multinationals are intensive in the use of elastically supplied factors, the arrival of multinationals to a market does not lower the market share of domestic firms, and FDI generates strong positive productivity spillovers for domestic agents. Empirical research suggests the first and third conditions are unlikely to hold. In the three cases we examined – Ford and GM in Brazil and Intel in Costa Rica – it appeared that the second condition held but not the first or third conditions. It thus appears likely that Brazil's subsidies to foreign automobile manufacturers may have lowered national welfare. Costa Rica appears to have been prudent in not offering subsidies to Intel.

There clearly is a need for much more research on the consequences of FDI, but the impression from the literature is that countries should be sceptical about claims that promoting FDI will raise their welfare. A sensible approach for host countries is to presume that subsidies to FDI are not warranted, and so avoid preferential treatment of FDI relative to foreign portfolio investment or domestic investment. Deviations from such a policy would be justified only where there is clear and direct evidence of substantial positive spillovers associated with multinational production and where multinationals are unlikely to choose the optimal level of production (from the host country's perspective) without a subsidy or other inducement.

If it is true that the benefits of FDI for host countries are insufficient to justify FDI promotion policies, then why do host-country governments continue to offer multinationals special treatment? One answer is that governments feel compelled to offer concessions given that multinationals subject their location decisions to bidding by potential host-country governments. The appropriate response is not to validate auctions of this type but instead to seek international cooperation among governments to prevent multinationals from extracting all gains associated with their presence in host economies. A second answer is that promoting FDI serves the interests of host-country politicians. Attracting multinationals may benefit specific constituencies, from whom politicians derive support, or may fit into political strategies of empire-building. Whatever the ex-

planation, countries are likely to be better served by being cautious about promoting FDI, until we see strong empirical evidence that the social rate of return on FDI exceeds the private rate of return.

Notes

- 1 Throughout the paper foreign investment refers to inward foreign investment.
- 2 A recent UN study shows that during the period 1990–1998 over 135 countries reduced regulatory restrictions on FDI (UNCTAD, 1999c).
- 3 The Group of 24 consists of: Algeria, Côte d’Ivoire, Egypt, Ethiopia, Gabon, Ghana, Nigeria and the Democratic Republic of Congo; Argentina, Brazil, Colombia, Guatemala, Mexico, Peru, Trinidad and Tobago and Venezuela; India, Iran, Lebanon, Pakistan, the Philippines, Sri Lanka and the Syrian Arab Republic.
- 4 That small open economies do tax corporate income at rates comparable to or higher than large economies is something of a puzzle. See Gordon (1992) and Gordon and MacKie-Mason (1995) for a discussion. Relatedly, Rodrik (1997) discusses how globalization contributes to conflicts between an electorate demanding more social insurance and a government able to tax fewer factors of production.
- 5 From the perspective of global welfare, the residence principle provides the basis for efficient international taxation. The income of all residents, whether originating from domestic or foreign sources, is taxed at equal rates, while non-resident income is untaxed. However, if all governments were to grant foreign tax credits (and many do), a small open economy would lose little by taxing non-resident income up to the rates at which income is taxed in the home countries of non-residents (see Avi-Yonah, 1999, for a discussion).
- 6 One potential source of market failure we do not consider is that related to imperfections in financial markets, which some suggest may make FDI preferable to foreign portfolio investment in that it may be less volatile (see Rodrik and Velasco, 1999, on short-term capital flows). Hausmann and Fernandez-Arias (2000) and Fernandez-Arias and Hausmann (2000) cast doubt on this hypothesis, and also discuss recent literature on currency crises and foreign capital inflows.
- 7 Another argument for promoting FDI is that multinational firms oblige governments to “bid” for the right to host their new facilities. If governments fail to offer sufficiently generous tax breaks, they may not attract FDI. A multinational enterprise considering a large investment project may be able to extract tax concessions because countries have in effect granted it market power by allowing the firm to hold a one-sided auction. The auction allows the multinational to extract all benefits associated with its presence in a country. A preferred solution for host countries in this case is multilateral cooperation to avoid one-sided bidding for FDI. See Bond and Samuelson (1986), Black and Hoyt (1989), and Janeba (1998) for alternative views on the subject.
- 8 That multinational enterprises may be technologically advanced relative to local firms (Davies, 1977; Teece, 1977) is not in itself a justification for promoting FDI. If multinationals do possess superior technology, then we expect the rate of return on their investments to be higher than that for local firms, in which case multinationals require no artificial inducement to choose the optimal level of FDI.
- 9 Yet another possibility is that FDI reduces informational barriers to trade and investment between the host economy and the rest of the world (Rhee, 1990). Agents elsewhere may lack complete information about factor productivity, government policy, or the general business climate in the host economy. By attracting FDI, the host economy may signal to the rest of the world that it has a positive environment in which to do business. In this case, there are likely to be diminishing returns to promoting FDI. After the first several multinational firms have established themselves in a country, any signal from additional FDI is likely to be uninformative.
- 10 Other research suggests FDI may be detrimental to the host economy. Recent variants of this argument include the idea that, once established in a country, multinationals favour high trade barriers and will lobby the host-country government to raise tariffs (Bhagwati et al., 1987; Blonigen and Ohno, 1998). There is some empirical support for this view (Blonigen and Figlio, 1998). The difficulty of evaluating the economic impact of potential policy changes resulting from FDI leaves these issues beyond the scope of this paper.
- 11 We include all countries for which data are available.
- 12 The non-G-24 countries were chosen to represent regional diversity, important FDI sources (Japan), and countries with policies that are relatively friendly towards FDI (Costa Rica, Ireland, Thailand).
- 13 See Madani (1999) for more details on EPZs.
- 14 This statement is based on the presumption that foreign capital is more mobile than domestic capital.
- 15 A comparison is further complicated by the proliferation of bilateral investment treaties and the indirect effects of trade policies on FDI. See UNCTAD (1999a and 1999b).
- 16 However, given widespread evasion of capital gains taxes by non-resident foreigners in emerging economies, the effective capital gains tax may be zero in many cases.
- 17 See Markusen (1995, 1998) for surveys of the literature.
- 18 Formal theories of multinational enterprises address the origins of ownership and location advantages in multinational production, but not internalization advantages. While there is extensive informal literature on transaction costs and the organization of multinational production (Caves, 1995), there is as of yet little formal modelling of why multinational firms choose to own foreign subsidiaries versus licensing technology or contracting out production.
- 19 Although, FDI may lower incomes for some factors of production in some countries.
- 20 To give an example: for US sales to Germany, the ratio would be sales by affiliates of US multinationals in Germany divided by the sum of these affiliate sales plus US exports to Germany.
- 21 See Hanson (2000a and 2000b) for surveys of the literature and discussion of these issues.
- 22 Aitken et al. (1997) take a similar approach.
- 23 Many Japanese firms which invest in the United States are part of industrial groups, which may influence their response to host-region economic conditions (Belderbos and Sleuwaegen, 1996).
- 24 For a detailed discussion of manufacturing plants in developing countries see Tybout (2000). In the United States, Figlio and Blonigen (1999) find that counties in South Carolina with more employment in multinational firms experience higher wage growth, lower growth in public

- expenditure, and shifts in the composition of public spending away from education towards transportation and public safety.
- 25 For a survey of the literature see Blomstrom and Kokko (1998).
- 26 Caves also finds that for Canadian manufacturing (1965–1967) industry average profitability of domestic plants is positively correlated with industry average profitability of foreign plants and negatively correlated with the average share of foreign plants in industry sales (which he interprets as a pro-competitive effect of FDI).
- 27 See Veugelers and Cassiman (1999) for evidence that the propensity to transfer technology abroad is not linked to multinationality per se but rather to access to international markets.
- 28 Other works cite less direct evidence of spillovers related to FDI. In many contexts, multinational firms develop backward linkages with local industry (Behrman and Wallender, 1976; Lall, 1980) or provide training to local workers (Chen, 1983; Gehrschenberg, 1987). These activities may create channels through which spillovers could flow from multinationals to host economies, but their occurrence in no way establishes that such spillovers actually exist. Anecdotal evidence of FDI “demonstration effects”, in which local firms learn about modern technology or management techniques by watching multinationals (Blomstrom and Kokko, 1998), are plausible but pure conjecture in the absence of formal statistical analysis.
- 29 In a related work, Gorg and Strobl (2000) find that in Ireland the larger the presence of multinational firms in the sector, the smaller is the size of domestic startup firms.
- 30 It is important to note that these results are for the direct impact of FDI on domestic enterprises in the same lines of activity. It is possible that FDI raises the productivity of domestic agents through indirect, general-equilibrium effects, such as backward-forward linkages or productivity spillovers common to all industries.
- 31 There are other potential spillovers from multinationals, which in the interest of space are not discussed here. See Blomstrom and Kokko (1998) for a discussion of empirical research on the impact of multinationals on worker training, industry linkages, industry competition, and source-country economies.
- 32 Though subsidies for FDI are typically negotiated before MNEs begin production, making them appear lump-sum in nature, the fact that subsidies are often proportional to plant capacity and delivered in portions as a project moves towards completion makes them similar in effect to per-unit production subsidies (e.g. imagine capacity subsidies in a world in which firms choose capacities and then engage in Bertrand price competition).
- 33 These are that $b_i' \leq 0$, $B_i' \leq 0$, and $b_i' > 1/B_i'$. By the second-order conditions to profit maximization, Cournot stability conditions require that $r_{11}^i + r_{12}^i B_i' \leq 0$ and $R_{11}^i + R_{12}^i B_i' \leq 0$.
- 34 Industry 1 may, for instance, produce an input that is consumed by domestic firms and then exported in the form of a final good (e.g. hard disk drives which are assembled into personal computers).
- 35 We assume that foreign firm 1 repatriates to its home country any profits it earns in the host economy.
- 36 That is, the market failure in this case is due to imperfect competition, not to multinational production.
- 37 This subsection is based on material from the following sources: Interview with Mustafa Mohaterem, Chief Economist for General Motors, 31 May 2000; Fritsch (1999: A11); Kerwin and Muller (1999: 114); Fritsch and White (1999: A1); Simonian (1997: 5). “GM picks suppliers for Blue Macaw”, *Automotive News Europe* (1997: 8); Craig (1999: 1); Kolodziejewski et al. (1999: 66).
- 38 This subsection is based on material from the following sources (in addition to those listed in the previous footnote): “Jac’s turnaround team”, *Automotive News International* (1 February 2000: 16); “Ford plans to spend \$1 billion on its Brazilian operations”, *The Detroit News* (22 September 1999: B3); Connelly (2000: 1); Mulligan (2000: 5).
- 39 This subsection is based on material from Spar (1998) and Reinhardt (2000: 110).
- 40 As in many countries, firms in Costa Rica’s EPZs are allowed to sell a fraction of their output on the domestic market (though few actually do).

References

- AITKEN B, HANSON G and HARRISON A (1997). Spillovers, foreign investment and export behaviour. *Journal of International Economics*, 43: 103–132.
- AITKEN B and HARRISON A (1999). Do domestic firms benefit from foreign investment? Evidence from Venezuela. *American Economic Review*, 89: 605–618.
- AITKEN B, HARRISON A and LIPSEY R (1996). Wages and foreign ownership: A comparative study of Mexico, Venezuela and the United States. *Journal of International Economics*, 40: 345–371.
- AVI-YONAH RS (1999). Globalization, tax competition, and the fiscal crisis of the welfare state (mimeo). Cambridge, MA, Harvard University.
- BEHRMAN J and WALLENDER H (1976). *Transfer of Manufacturing Technology within Multinational Enterprises*. Cambridge, MA, Ballinger.
- BELDERBOS R and SLEUWAEGEN L (1996). Japanese firms and the decision to invest abroad. *Review of Economics and Statistics*, 78: 214–220.
- BHAGWATI J, BRECHER R, DINOPOULOS E and SRINIVASAN TN (1987). Quid pro quo foreign investment and welfare: A political-economy approach. *Journal of Development Economics*, 27: 127–138.
- BLACK DA and HOYT WH (1989). Bidding for firms. *American Economic Review*, 79: 1249–1256.
- BLOMSTROM M (1986). Foreign investment and productive efficiency: The case of Mexico. *Journal of Industrial Economics*, 35: 97–110.
- BLOMSTROM M and KOKKO A (1998). Multinational corporations and spillovers. *Journal of Economic Surveys*, 12: 247–277.
- BLOMSTROM M and PERSSON H (1983). Foreign investment and spillover efficiency in an underdeveloped economy: Evidence from Mexican manufacturing industry. *World Development*, 11: 493–501.
- BLOMSTROM M and SJOHOLM F (1999). Technology transfer and spillovers: Does local participation with multinationals matter? *European Economic Review*, 43: 915–923.
- BLONIGEN B and FIGLIO D (1998). Voting for protection: Does direct foreign investment influence legislator behaviour? *American Economic Review*, 88: 1002–1014.
- BLONIGEN B and OHNO Y (1998). Endogenous protection, foreign direct investment and protection-building trade. *Journal of International Economics*: 205–228.
- BOND E and SAMUELSON L (1986). Tax holidays as signals. *American Economic Review*, 76: 820–826.

- BORENSZTEIN E, DE GREGORIO J and LEE J-W (1998). How does foreign direct investment affect economic growth? *Journal of International Economics*, 45: 115–135.
- BRAINARD L (1997). An empirical assessment of the proximity-concentration tradeoff between multinational sales and trade. *American Economic Review*, 87: 520–544.
- CAVES RE (1974). Multinational firms, competition and productivity in host-country markets. *Economica*, 41: 176–193.
- CAVES RE (1995). *Multinational Enterprise and Economic Analysis* (second edition). Cambridge, Cambridge University Press.
- CHEN EKY (1983). *Multinational Corporations, Technology and Employment*. London, Macmillan.
- CONNELLY M (2000). Ford whittles platforms. *Automotive News*, 19 June.
- CRAIG C (1999). Ford, General Motors may lose their Brazilian incentives. *Detroit Free Press*, 23 March.
- DAVIES H (1977). Technological transfer through commercial transactions. *Journal of Industrial Economics*, 26: 165–171.
- DIXIT A and GROSSMAN G (1986). Targeted export promotion with several oligopolistic industries. *Journal of International Economics*, 21: 233–249.
- DUNNING JH (1981). *International Production and the Multinational Enterprise*. London, George, Allen and Unwin.
- DUNNING JH (1993). *The Globalization of Business*. London, Routledge.
- FELDSTEIN M, HINES J and HUBBARD RG (1995). *The Effects of Taxation on Multinational Corporations*. Chicago, University of Chicago Press.
- FERNANDEZ-ARIAS E and HAUSMANN R (2000). Is FDI a safer form of financing? (mimeo). Washington, DC, Inter-American Development Bank.
- FIGLIO DN and BLONIGEN BA (1999). The effects of direct foreign investment on local communities (mimeo). Gainesville, FL, University of Florida.
- FRITSCH P (1999). Ford and GM clash with Brazilian State. *Wall Street Journal*, 9 April.
- FRITSCH P and WHITE G (1999). Latin formula: Even rivals concede GM has deftly steered road to success in Brazil. *Wall Street Journal*, 25 February.
- GAO T (1999). Economic geography and the department of vertical multinational production. *Journal of International Economics*, 48.
- GERSCHENBERG I (1987). The training and spread of managerial know-how: A comparative analysis of multinational and other firms in Kenya. *World Development*, 15: 931–939.
- GLASS A and SAGGI K (1999). FDI policies under shared factor markets. *Journal of International Economics*, 49: 309–332.
- GLOBERMAN S (1979). Foreign direct investment and “spillover” efficiency benefits in Canadian manufacturing industries. *Canadian Journal of Economics*, 12: 42–56.
- GORDON R (1986). Taxation of investment and savings in a world economy. *American Economic Review*, 76: 1086–1102.
- GORDON R (1992). Can capital income taxes survive in open economies? *Journal of Finance*, 47: 1159–1180.
- GORDON R and BOVENBERG L (1996). Why is capital so mobile internationally? Possible explanations and implications for capital income taxation. *American Economic Review*, 86: 1057–1075.
- GORDON R and MACKIE-MASON J (1995). Why is there corporate taxation in a small open economy? The role of transfer pricing and income shifting. In: Feldstein M, Hines JR Jr. and Hubbard RG, eds. *The Effects of Taxation on Multinational Corporations*. Chicago, University of Chicago Press.
- GORG J and STROBL E (2000). Multinational companies and the development of firm start-up size: Evidence from quantile regressions for Ireland. *Centre for Research on Globalization and Labour Markets Research Paper No. 11*. Dublin.
- HADDAD M and HARRISON A (1993). Are there positive spillovers from direct foreign investment? *Journal of Development Economics*, 42: 51–74.
- HANSON GH (2000a). Scale economies and the geographic concentration of industry. *Journal of Economic Geography*, forthcoming.
- HANSON GH (2000b). Firms, workers and the geographic concentration of economic activity. In: Clark GL, Gertler MS and Feldman M, eds. *Handbook of Economic Geography*. Oxford University Press, forthcoming.
- HAUSMANN R and FERNANDEZ-ARIAS E (2000). Foreign direct investment: Good cholesterol? (mimeo). Washington, DC, Inter-American Development Bank.
- HEAD K, RIES J and SWENSON D (1995). Agglomeration benefits and location choice: Evidence from Japanese manufacturing investment in the United States. *Journal of International Economics*, 38: 223–247.
- HELPMAN E (1984). A simple theory of trade with multinational corporations. *Journal of Political Economy*, 92: 451–471.
- HELPMAN E and KRUGMAN P (1985). *Market Structure and Foreign Trade*. Cambridge, MA, MIT Press.
- HINES J (1996). Altered states: Taxes and the location of foreign direct investment in America. *American Economic Review*, 86: 1076–1094.
- HINES J (1997). Tax policy and the activities of multinational corporations. In: Auerbach AJ, ed. *Fiscal Policy: Lessons from Economic Research*. Cambridge, MA, MIT Press: 401–445.
- JANEBA E (1996). Foreign direct investment under oligopoly: Profit shifting or profit capturing? *Journal of Public Economics*, 60: 423–445.
- JANEBA E (1998). Tax competition in imperfectly competitive markets. *Journal of International Economics*, 44: 135–154.
- KERWIN K and MULLER J (1999). A close look at President Rick Wagoner and his strategy for GM. *Business Week*, 1 February.
- KOKKO A (1994). Technology, market characteristics and spillovers. *Journal of Development Economics*, 43: 279–293.
- KOLODZIEJSKI J, KATZ I, KERWIN K and NAUGHTON K (1999). A high stakes game of chicken: Its Ford and GM vs. a Brazilian governor. *Business Week*, 10 May.
- LALL S (1980). Vertical interfirm linkages in LDCs: An empirical study. *Oxford Bulletin of Economics and Statistics*, 42: 203–226.
- MADANI D (1999). A review of the role and impact of export processing zones (mimeo). Washington, DC, World Bank.
- MANSFIELD E and ROMEO A (1980). Technology transfer to overseas subsidiaries by US-based firms. *Quarterly Journal of Economics*, 95: 737–750.
- MARKUSEN JR (1984). Multinationals, multi-plant economies and the gains from trade. *Journal of International Economics*, 16: 205–226.
- MARKUSEN JR and MASKUS K (1999a). Multinational firms: reconciling theory and evidence. *NBER Working Paper No. 7163*. New York.
- MARKUSEN JR and MASKUS K (1999b). Discriminating among alternative theories of the multinational enterprise. *NBER Working Paper No. 7164*. New York.
- MARKUSEN J and VENABLES A (1998). Multinational firms and the new trade theory. *Journal of International Economics*, 46: 183–203.
- MARKUSEN J and VENABLES A (1999a). The theory of endowment, intra-industry and multinational trade (mimeo). Boulder, CO, University of Colorado; London, London School of Economics.

- MARKUSEN J and VENABLES A (1999b). Foreign direct investment as a catalyst for industrial development. *European Economic Review*, 43: 335–356.
- MATOUSCHEK N (1999). Foreign direct investment and spillovers through backward linkages. *CEPR Discussion Paper No. 2283*. London, Centre for Economic Policy Research.
- MOTTA M, FOSFURI A and RONDE T (1999). Foreign direct investment and spillovers through workers' mobility. *CEPR Discussion Paper No. 2194*. London, Centre for Economic Policy Research.
- MULLIGAN M (2000). Survey – FT Auto. *Financial Times*, 29 February.
- PRICE WATERHOUSE (various years). *Corporate Taxes: A Worldwide Summary*. New York.
- RAZIN A and SADKA E (1991). International tax competition and gains from tax harmonization. *Economics Letters*, 37: 69–76.
- RAZIN A, SADKA E and YUEN CW (1998). A pecking order of capital flows and international tax principles. *Journal of International Economics*, 44: 45–68.
- REINHARDT A (2000). The new Intel. *Business Week*, 13 March.
- RHEE YW (1990). The catalyst model of development: Lessons from Bangladesh's success with garment exports. *World Development*, 18: 333–346.
- RHEE YW and BELOT T (1990). Export catalysts in low-income countries. *World Bank Discussion Paper No. 72*, Washington, DC, World Bank.
- RODRIGUEZ-CLARE A (1996). Multinationals, linkages and economic development. *American Economic Review*, 86: 852–873.
- RODRIG D (1997). *Has Globalization Gone Too Far?* Washington, DC: Institute for International Economics.
- RODRIG D and VELASCO A (1999). Short-term capital flows. NBER Working Paper, no. 7364.
- SIMONIAN H (1997). GM plans to develop car in Brazil. *Financial Times*, 3 June.
- SPAR D (1998). Attracting high technology investment: Intel's Costa Rica plant. *World Bank Occasional Paper No. 11*, Washington, DC, World Bank.
- TEECE DJ (1977). Technology transfer by multinational firms: The resource cost of transferring technological knowhow. *Economic Journal*, 87: 242–261.
- TYBOUT J (2000). Manufacturing firms in developing countries: How well do they do, and why? *Journal of Economic Literature*, 37: 11–44.
- UNCTAD (1999a). *Investment-Related Trade Measures*. New York: United Nations. UNCTAD (1999b). *Trends in International Investment Agreements: An Overview*. New York: United Nations.
- UNCTAD (1999c). *World Investment Report 1999: Foreign Direct Investment and the Challenge of Development*. New York and Geneva, United Nations.
- VEUGELERS R and CASSIMAN B (1999). Importance of international linkages for local know-how flows. *CEPR Discussion Paper No. 2337*. London, Centre for Economic Policy Research.
- WHEELER D and MODY A (1992). International investment location decisions. *Journal of International Economics*, 33: 57–76.
- YEAPLE SR (1999). The determinants of US outward foreign direct investment: Market access versus comparative advantage (mimeo). Madison, University of Wisconsin.

Appendix

DERIVATION OF THE WELFARE EFFECTS FOR THE HOST ECONOMY

In this appendix, we derive a more complete expression for the change in host-economy welfare, as stated in equation (9). We begin by deriving equilibrium expressions for the change in output of domestic firms and foreign firm 1. Totally differentiating the first-order conditions to profit maximization for foreign firm 1, we obtain:

$$R_{11}^1 dY_1 + R_{12}^1 b_1' dY_1 - D_1 dz + ds = 0 \quad (\text{A1})$$

Cournot stability conditions (see note 34) imply that

$$\Delta_1 \equiv -1/(R_{11}^1 + R_{12}^1 b_1') \geq 0 \quad (\text{A2})$$

which defines the curvature of the revenue function for foreign firm 1. A larger value for Δ_1 implies that marginal additions to revenue change relatively little as output expands (which we expect to be the case where demand is more inelastic). Using (A2), we derive the change in output for foreign firm 1 as,

$$dY_1 = \Delta_1 (ds - D_1 dz) \quad (\text{A3})$$

This shows that output for foreign firm 1 rises only if the unit production subsidy exceeds the increase in marginal costs from expanding output (as discussed in the text). Similarly, totally differentiating the first-order conditions for domestic firm 1, we obtain,

$$r_{11}^1 dy_1 + r_{12}^1 B_1' dy_1 + r_{13}^1 \lambda_1' B_1' dy_1 - dz = 0 \quad (\text{A4})$$

Cournot stability conditions imply that

$$\gamma_1 \equiv -1/(r_{11}^1 + r_{12}^1 B_1' + r_{13}^1 \lambda_1' B_1') \geq 0 \quad (\text{A5})$$

which allows us to write:

$$dy_1 = -\gamma_1 dz \quad (\text{A6})$$

For domestic firm 1, then, output unambiguously falls (the indirect strategic productivity effect is implicitly embodied in the Cournot stability condition, since foreign firm 1, the source of the spillovers, is a direct competitor of domestic firm 1).

For domestic firms $i=2, \dots, N$, the derivation is somewhat different, since these firms by assumption do not interact strategically with foreign firm 1. Totally differentiating the first-order conditions for these firms, we obtain:

$$r_{11}^i dy_i + r_{12}^i B_i' dy_i + r_{13}^i \lambda_i' dY_1 - dz = 0 \quad (\text{A7})$$

Using the Cournot stability conditions for these firms, which are analogous to (A2), we find:

$$dy_i = -\gamma_i (dz - r_{13}^i \lambda_i' dY_1) \quad (\text{A8})$$

Defining $\rho_i \equiv r_{13}^i \lambda_i'$, which is the effect of the productivity spillover on the marginal productivity of output (which we expect to be positive if the spillover is positive) and using equation (A3), we find that

$$dy_i = -\gamma_i dz + \rho_i \Delta_1 (ds - D_1 dz) \quad (\text{A9})$$

For domestic firms that do not compete against foreign firm 1 in product markets, the FDI subsidy has two effects, which work in opposite directions (as discussed in the text). The first, embodied in the first term on the right in (A9), is that rising factor costs lead to a reduction in output, and the second, embodied in the second term on the right in (A9), is that the productivity spillover, to the extent it is positive, leads to an expansion of output. Output for a given firm rises if the productivity boost from the spillover more than offsets the rise in marginal cost from the increase in factor prices.

Combining equation (8) in the text with (A3), (A6) and (A9), we obtain the following expression for the change in the wage of skilled labour:

$$dz = ds \frac{\sum_{i \neq 1} \gamma_i \rho_i + D_1}{\sum_i \gamma_i + D_1 (\sum_{i \neq 1} \gamma_i \rho_i + D_1)} \quad (\text{A10})$$

The skilled wage rises unambiguously if productivity spillovers from multinational production are positive. In this event, (A3), (A6), (A9) and (A10) together imply that dY_1 is positive, dy_1 is negative, and dy_i for $i \neq 1$ is of ambiguous sign (though we know from equation (8) in the text that the aggregate change in domestic firm output must be negative).

Finally, combining equation (9) in the text with (A3), (A6), (A9) and (A10), we obtain a more complete expression for the change in host-economy welfare from a small increase in a unit production subsidy to foreign firm 1 (starting from $s=0$):

$$dW = ds \frac{\Delta_1 \sum_i \gamma_i}{\sum_i \gamma_i + D_1 (\sum_{i \neq 1} \gamma_i \rho_i + D_1)} \left[\sum_i \beta_i + \sum_{i \neq 1} \phi_i \gamma_i \rho_i - (\sum_{i \neq 1} \gamma_i \rho_i + D_1) \frac{\sum_{i \neq 1} \phi_i \gamma_i}{\Delta_1 \sum_i \gamma_i} - \frac{Y_1}{\Delta_1} \right] \quad (\text{A11})$$

If productivity spillovers are non-negative, then all individual parameters are non-negative in equation (A11), in which case,

$$\text{sign} \left\{ \frac{dW}{ds} \right\} = \text{sign} \left\{ \sum_i \beta_i + \sum_{i \neq 1} \phi_i \gamma_i \rho_i - (\sum_{i \neq 1} \gamma_i \rho_i + D_1) \frac{\sum_{i \neq 1} \phi_i \gamma_i}{\Delta_1 \sum_i \gamma_i} - \frac{Y_1}{\Delta_1} \right\} \quad (\text{A12})$$

To interpret equation (A12), consider each term inside the brackets on the right. The first term is the direct effect of spillovers on domestic profits. Positive spillovers increase revenues and profits directly, as captured by β_i (see main text and preceding appendix for definitions). The second term is the strategic effect of domestic spillovers on profits. Even if higher factor costs make a domestic firm lower its output, positive spillovers make the firm more aggressive relative to its foreign rival. The firm lowers its output by less than it would have in the absence of spillovers. Spillovers thus moderate the loss in market share a firm experiences from an increase in factor costs (but only for firms that do not compete directly against foreign firm 1). (Of course, the impact of the spillover may be so large that the firm raises its output, even in the face of rising factor costs. Some domestic firms, however, must lower their output (see equation (8).) This effect is the product of three terms: ϕ_i , the impact of the foreign rival firm's output response to a change in the domestic firm's output on the domestic firm's profits; γ_i , the marginal responsiveness of domestic firm profits to changes in domestic firm output; and ρ_i , the responsiveness of domestic firm's output to productivity spillovers from FDI.

The third term on the right in (A12) captures the loss in domestic profits due to rising factor costs. This term depends on the interaction between two effects: the increase in demand for labour at unchanged factor prices, which is the sum of labour demand from foreign firm 1 (D_i) and the extra labour demand from domestic firms induced by productivity spillovers ($\gamma_i\rho_i$, which is the output response of a domestic firm to the spillover); and the strategic effect of higher factor costs on domestic firm profits (the ratio term), which results in domestic firms lowering output and ceding market share to the foreign rival firm. The fourth term on the right captures the cost of the subsidy, which intuitively is proportional to the level of production by the multinational firm.

G-24 Discussion Paper Series*

Research papers for the Intergovernmental Group of Twenty-Four on International Monetary Affairs

No. 1	March 2000	Arvind PANAGARIYA	The Millennium Round and Developing Countries: Negotiating Strategies and Areas of Benefits
No. 2	May 2000	T. Ademola OYEJIDE	Interests and Options of Developing and Least-developed Countries in a New Round of Multilateral Trade Negotiations
No. 3	May 2000	Andrew CORNFORD	The Basle Committee's Proposals for Revised Capital Standards: Rationale, Design and Possible Incidence
No. 4	June 2000	Katharina PISTOR	The Standardization of Law and Its Effect on Developing Economies
No. 5	June 2000	Andrés VELASCO	Exchange-rate Policies for Developing Countries: What Have We Learned? What Do We Still Not Know?
No. 6	August 2000	Devesh KAPUR and Richard WEBB	Governance-related Conditionalities of the International Financial Institutions
No. 7	December 2000	Andrew CORNFORD	Commentary on the Financial Stability Forum's Report of the Working Group on Capital Flows
No. 8	January 2001	Ilan GOLDFAJN and Gino OLIVARES	Can Flexible Exchange Rates Still "Work" in Financially Open Economies?

* **G-24 Discussion Paper Series** are available on the website at: <http://www.unctad.org/en/pub/pubframe.htm>. Copies of **G-24 Discussion Paper Series** may be obtained from c/o Editorial Assistant, Macroeconomic and Development Policies Branch, Division on Globalization and Development Strategies, United Nations Conference on Trade and Development (UNCTAD), Palais des Nations, CH-1211 Geneva 10, Switzerland; Tel. (+41-22) 907.5733; Fax (+41-22) 907.0274; E-mail: nicole.winch@unctad.org