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Subsidies for FDI: Implications from a model with heterogeneous firms ☆

Davin Chor *

School of Economics, Singapore Management University, 90 Stamford Road, 178903, Singapore

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ABSTRACT

This paper analyzes the welfare effects of subsidies to attract multinational corporations when firms are heterogeneous in their productivity levels. I show that the use of a small subsidy raises welfare in the FDI host country, with the consumption gains from attracting more multinationals exceeding the direct cost of funding the subsidy program through a tax on labor income. This welfare gain stems from a selection effect, whereby the subsidy induces only the most productive exporters to switch to servicing the host's market via FDI. I further show that for the same total subsidy bill, a subsidy to variable costs delivers a larger welfare gain than a subsidy to the fixed cost of conducting FDI, since a variable cost subsidy also raises the inefficiently low output levels stemming from each firm's markup pricing power.

1. Introduction

This paper presents an application of the trade models with heterogeneous firms advanced by Melitz (2003) and Helpman et al. (2004) to an analysis of policy interventions related to foreign direct investment (FDI). It examines the welfare implications of subsidies to attract multinational corporations (MNCs) in a setting where firms in the target industry are heterogeneous in their productivity levels.

FDI subsidies have become increasingly common, with many countries now keen to attract MNCs to their shores for a variety of reasons. At a basic level, there is typically a direct consumption gain: The relocation of production lowers the prices that MNCs charge in the host country's market, due to the savings on cross-border transport costs and possibly also labor costs (if the host country features lower wages). In addition, countries often value the foreign capital or employment creation that MNCs bring. The arguments for FDI have further highlighted other benefits for economic growth, such as industry spillovers and technology transfers, although these have been more difficult to identify empirically.[1]

Not surprisingly, countries that hold such positive views towards FDI have used an array of incentive measures to try to attract a larger share of the FDI pie, including tax holidays, job-creation subsidies, and even the construction of industrial facilities. A recent edition of the *World Investment Report* surmised that "[t]he use of locational incentives to attract FDI has considerably expanded in frequency and value" (UNCTAD, 2003, p.124), resulting in an intense competition among countries for FDI projects.[2] That said, it is not immediately apparent that such policies necessarily raise welfare in the host country, even in the absence of strategic competition for FDI. On net, the fiscal costs of such subsidies have to be weighed against the benefits of an increased multinational presence.

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* Tel.: +65 6828 0876; fax: +65 6828 0833.
E-mail address: davinchor@smu.edu.sg.

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[1] For example, Aitken and Harrison (1999) find only small net effects of FDI on domestic firms in Venezuela. On the other hand, Javorcik (2004) presents evidence of positive spillovers in Lithuania on the productivity of local suppliers. Haskel et al. (2007) find positive effects of a greater foreign presence on domestic plant productivity in the UK, although they argue that the value of the gains from these spillovers is smaller than the quantum of subsidies reportedly extended to MNCs. See also Wells et al. (2001) who contend that tax incentives to attract FDI failed to deliver net gains in Indonesia.

[2] For example, there is brewing unease among some Western European countries over the aggressive use of corporate tax cuts by several Central and Eastern European countries, such as Poland and Slovakia, to attract foreign corporations (The Economist, July 24th, 2004). See Hines (1996) and Devereux and Griffith (1998) for evidence that differences in corporate tax rates help to explain the cross-state or cross-country variation in volumes of MNC activity.

In this paper, I assess this tradeoff formally in a two-country model with heterogeneous firms. I consider a Home country where multinationals are headquartered and a Foreign country seeking to attract FDI. Firms differ in their innate productivity levels, which are independent draws from a pre-existing distribution of technological possibilities. The initial industry equilibrium sees only the most productive Home firms conducting horizontal FDI in Foreign to service that market, since only these firms can afford the high fixed costs of operating an overseas plant. I then examine how welfare in the foreign host country is affected when it offers a FDI subsidy: Focusing on the consumption gains from attracting more MNCs, do these gains to the host country outweigh the direct cost of financing the subsidy scheme through a tax on its workers? Of note, the model that I formulate admits a closed-form expression for consumer welfare, making the analysis of these policy interventions tractable.

Previewing the results in Section 3, I establish that a small FDI subsidy indeed delivers a welfare improvement for the host country. This holds both for a subsidy that reduces MNCs' fixed costs of operation (such as the construction of industrial parks and infrastructure) and for a subsidy that is applied to their variable costs of production (such as corporate tax rate cuts or job-creation subsidies). Importantly, this welfare gain stems from a selection effect that arises when firms are heterogeneous: The subsidy attracts only the most productive Home firms that were initially servicing the Foreign market via exports to switch to horizontal FDI instead. Being relatively productive, this margin of firms already sets lower prices in the initial equilibrium. With the switch to FDI, the consumption gains in Foreign from the savings on transport costs are thus large, since the subsequent price reduction is applied over a large volume of consumption. At the same time, to ensure that these consumption gains actually exceed the funding cost of the policy, one also requires that the mass of MNCs be relatively small, in order to cap the size of the subsidy bill. This translates neatly in the model into an analytic condition governing the degree of firm heterogeneity, specifically that the distribution of firm productivities not display too thick a right-tail; reassuringly, this is a condition found to be readily satisfied in the estimates of firm productivity distributions in Helpman et al. (2004).

The key role played by firm heterogeneity and the selection effect for these welfare results is made clear in Section 3.3, where I show that the scope for a net gain from a FDI subsidy is theoretically ambiguous when all firms are instead identical, as in the antecedent model of Krugman (1980). When all firms share the same productivity level, a subsidy that induces one firm to switch from exports to FDI necessarily induces all Home firms to make the same decision. This generates a large subsidy bill, which can more than negate the consumption gains if the fixed cost of conducting FDI is high or if the productivity level of Home firms is low, so that a large per-firm subsidy is needed. In addition to this selection effect, a varieties effect emerges when we take into account how the subsidy raises the ex ante profitability of potential entrants to the Home industry. Section 3.4 shows that this increases the number of Home varieties and amplifies the welfare gain to Foreign in the full industry equilibrium.

I explore quantitatively some properties of the host country welfare function in Section 3.5. In particular, I illustrate how the optimal subsidy varies in response to shifts in the structural parameters of the model, such as the degree of firm heterogeneity and the industry cost parameters. These exercises also highlight a key difference between fixed and variable cost subsidies, namely that the latter have a much larger impact on the host country's welfare. Indeed, I establish formally in Section 3.6 that a variable cost subsidy delivers a greater welfare gain than a fixed cost subsidy that incurs the same total subsidy bill, subject to a mild sufficient condition. Intuitively, a variable cost subsidy further prompts each MNC to raise output levels, delivering an additional kick to consumption by counteracting some of the inefficiency arising from firms' markup pricing power.

This paper contributes to an extensive literature on the welfare effects of FDI subsidies, presenting a first attempt (to the best of my knowledge) at applying a framework with heterogeneous firms to this policy issue. The model has the advantage that it allows us to be very precise in describing the behavior of individual firms in the industry equilibrium, specifically how each firm's productivity draw and the size of the FDI subsidy jointly pin down whether it can profitably enter the Foreign market, and if so, its optimal mode for servicing that market (exports versus FDI). The comparison of fixed versus variable cost subsidies is a natural question to investigate with this model, yet this is a question that has been under-explored despite the observation that FDI subsidies can assume diverse forms.

Separately, this paper speaks to a broader literature on optimal policy towards foreign investment. The early theoretical contributions here, by MacDougall (1960), Kemp (1966) and Jones (1967), focused on analyzing the jointly optimal levels of commodity tariffs and capital flow taxes in a two-factor world where only one factor (capital) is internationally mobile. In this strand of work however, FDI is viewed as synonymous with capital movements, in contrast to the more recent literature on MNCs which treats FDI more concretely as the production activities of overseas affiliates. Along these latter lines, there has been much work exploring economic settings in which FDI subsidies might lead to a welfare improvement. For example, Haaland and Wooton (1999) examine how FDI subsidies can foster agglomeration effects.[3] Pennings (2005) shows that a subsidy is optimal when foreign investors face uncertainty over demand conditions in the host economy. Others have argued that FDI subsidies can help to alleviate the underprovision of public services (Black and Hoyt, 1989), or improve the allocation of firms' production facilities to countries from the standpoint of aggregate efficiency (Fumagalli, 2003).

In this paper, the welfare improvement stems instead from the reduction of barriers to entry into the host country market, specifically for the most productive Home firms that would have serviced the Foreign market via exports in the absence of the FDI subsidy. I focus on the consumption gains accruing to the host country from attracting more MNCs, namely the benefit from accessing MNCs' products more cheaply due to the savings on transport costs. While this puts aside other potential benefits such as technology spillovers, agglomeration effects, or an increased labor demand, the model nevertheless provides a useful benchmark, since such additional effects would intuitively reinforce the gains from attracting FDI. The results I derive are closely related to recent work by Demidova and Rodriguez-Clare (2008), who demonstrate how a simple consumption subsidy, import tariff, or export tax can offset the markup pricing distortion in a Melitz-type model to achieve the first-best welfare level (although there are key differences between their production setting and that in this paper; see Section 4.1 below).

The paper proceeds as follows. Section 2 describes the building blocks of the model. Section 3 establishes the main propositions on the welfare gain from either a fixed or variable cost subsidy to FDI. Section 4 explores two extensions. A parallel analysis shows that there is a similar scope for improving welfare in Foreign through an import subsidy (Section 4.1), and I discuss how this result relates to Demidova and Rodriguez-Clare (2008). I also confirm the robustness of the results under an alternative utility specification that incorporates richer income effects (Section 4.2). Section 5 concludes. Detailed proofs are in a supplementary Appendix available on the author's website, or upon request.

[3] Haufler and Wooten (1999), Ottaviano and van Ypersele (2005), and Baldwin and Okubo (2006) discuss how market size can confer countries with an advantage in attracting firms or mobile capital. Baldwin and Okubo (2006) in particular introduce firm heterogeneity in a two-country new economic geography model with footloose firms who can choose where to base their headquarter operations after observing their productivity draw. In their model, a subsidy from the smaller Southern country might attract some firms to relocate their Northern headquarters, although the question of the net welfare effect on the South remains to be explored.