



Subsidizing firm entry in open economies

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ABSTRACT

We develop a two-country model with monopolistic competition and heterogeneous firms where entrants pay a sunk cost and randomly draw their productivity level. Governments collect lump-sum taxes and subsidize these sunk entry costs for the domestic entrepreneurs. One motive for this policy, valid already in autarky, is to tighten market selection. This selection effect leads to better firms that produce and sell more output at lower prices. In the open economy there is another, strategic motive for entry subsidies as the tightening of market selection leads to a competitive advantage for domestic producers in international trade. Our analysis shows that entry subsidies in the Nash equilibrium are first increasing, then decreasing in the level of trade freeness. Comparing the non-cooperative and the cooperative policies, we furthermore show that there is first too much and then too little entry subsidization in the course of trade integration.

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1. Introduction

Before an entrepreneur can start up a business, she has to face unavoidable sunk costs for research and development of new products. In addition, there is often entry regulation through licenses and permits, as well as other legal barriers to entry which differ vastly across countries (Djankov et al., 2002; Arnold et al., 2008; World Bank, 2011). Yet, at the same time governments typically support entrepreneurship, foundation of new firms, and innovation in young and small enterprises. Such programs are in fact among the most explicit goals of industrial policy (Santarelli and Vivarelli, 2007), and draw on various tools such as start-up grants, innovation funds, guaranteed loans, preferential tax treatments, or other types of subsidies for entrants and newly established firms. An extensive literature addresses the motivations for such policies, which range from fostering productivity growth to increasing competition and to curing market failures in the process of entry.² This literature

has not explored the repercussions that emerge in open economies, however, where countries are exposed to trade liberalization and governments can act strategically in order to give domestic firms a competitive advantage in trade. These are the issues we explore in this paper.

We develop a theoretical framework to analyze the impact of trade liberalization on the governments' incentives to subsidize domestic entrepreneurship. Our analysis builds on a model of intra-industry trade with heterogeneous firms à la Melitz (2003), which is well suited as a starting point because it explicates the key process of firm entry with ex-ante uncertainty in a general equilibrium context. In that model, entrepreneurs pay a sunk cost for research and development (sunk entry costs) and randomly draw their productivity level. Only firms with a sufficiently high productivity draw remain in the market, while firms with too low productivity immediately exit. The level of sunk entry costs, which is crucial for the analysis, is taken as exogenous in Melitz (2003) and in the subsequent vast literature on firm heterogeneity. In this paper, we introduce a government that collects lump-sum taxes in order to finance subsidies which reduce the effective entry costs for domestic entrepreneurs. In autarky such a subsidy quite naturally increases the mass of entrants who decide to start a business. The mass of surviving firms in the market is far less responsive in the autarky equilibrium, however, because the subsidy encourages competition and thereby raises the toughness of firm selection. Indeed, with our model's specification, the subsidy does not lead to *more* but to *better* firms in the market. These more productive firms produce and sell more output at lower prices to the benefit of consumers.

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² Important issues are the motives to ensure that sellers meet minimum quality standards, to address market failures associated with externalities, capital market imperfections, policies to restrain the market power of incumbent firms and the fostering of growth through innovation. See, e.g., Bresnahan and Reiss (1991).

In the open economy, the increased competition and selection induced by the entry subsidies is transmitted to the other country. Export market entry becomes more difficult for foreign enterprises, as the domestic firms are now more competitive on average. This negatively affects expected profits, entry incentives and the quality of foreign firms, and strengthens the market position of domestic firms. Due to these general equilibrium interactions, there is scope for a *strategic* use of those subsidies. This is particularly interesting, because subsidies to market entry and research and development costs for local entrepreneurs are mainly perceived as a purely domestic policy issue, and not as a classical trade policy instrument (such as import tariffs or export subsidies) whose abuse is put under scrutiny, e.g., by the WTO or the European Commission. Our analysis reveals that this type of subsidization does induce cross-country repercussions and, hence, is not innocuous in an open economy context.

In the analysis we solve for the entry subsidies in the Nash equilibrium, which depend in a non-monotonic way on the level of trade freeness: gradual trade liberalization first leads to an increase, then to a decrease of the non-cooperatively chosen entry subsidies. We also study the normative implications of our model. The Nash equilibrium subsidies differ from the level that would be chosen if the two countries coordinated their policies. In fact, our analysis suggests that in the course of trade integration there is first too much and then too little subsidization relative to the optimal level. Hence, there are welfare gains from policy coordination. Yet, when countries seek to coordinate their entry subsidies, it depends on the level of trade freeness whether this involves an increase or a decrease in the scale of this policy. Furthermore, we show that a total removal of entry subsidies in both countries would lead to a welfare loss compared to the Nash equilibrium. This is because entry subsidies induce welfare-enhancing selection effects. In other words, countries should coordinate on the (positive) optimal level that allows internalizing the cross-country externalities identified in our theoretical analysis.

The rest of this paper is structured as follows. In the rest of this section we review some related literature. Section 2 analyzes the closed economy case. Section 3 turns to the open economy and Section 4 considers the case of two identical countries. Section 5 deals with the case of size and technology differences across countries. Section 6 concludes.

1.1. Related literature

Our paper is firstly related to the large literature on strategic trade policy assuming imperfect competition (see Brander, 1995 for a survey). This literature has extensively studied a wide range of policy instruments (such as export or import subsidies, state aid, tariffs, quotas, etc.), and has also made the point that seemingly domestic tax policies can generate cross-country externalities in an open economy context (e.g., Becker, 2010). However, this literature has remained largely silent on entry regulation, with the paper by Reitzes and Grawe (1999) being one exception. In the older literature on trade with monopolistic competition and homogeneous firms there is also an extensive discussion on corrective policies (see Helpman and Krugman, 1989; Flam and Helpman, 1987; Venables, 1987). Our paper differs from that literature because we introduce firm heterogeneity. This gives rise to several new insights which cannot be derived in frameworks with homogeneous firms. In particular, our model allows us to study government subsidies to sunk costs which are paid under ex-ante uncertainty about the productivity level of the recipients. Our analysis then reveals that subsidies to market entry costs do not mainly increase the mass but the average productivity of firms in the market ex-post.

Secondly, a recent literature has started to explore policy issues in the now standard heterogeneous firm frameworks by Melitz (2003) and Melitz and Ottaviano (2008). Demidova and Rodriguez-Clare (2009) conduct a welfare analysis of a small open economy and study

various policy instruments that can be used to improve the allocation. They do not address government subsidies to market entry and research and development costs, however, and they do not analyze a strategic interaction of governments in the setting of a domestic policy like the present paper does. Baldwin (2005) and Dhingra and Morrow (2011) also conduct welfare analyses and show that the market equilibrium in a one-sector Melitz-type model achieves the efficient allocation.³ Our model, in contrast, features a competitive outside sector so that there is under-consumption of manufacturing varieties. We then show that entry subsidies can be used as a second-best corrective policy, although single countries in general fail to set the optimal subsidy level in an open economy context when they decide on their policies independently. Further in the literature on policy issues with heterogeneous firms, Chor (2009) analyzes the case where the domestic government subsidizes the fixed export costs of foreign firms. Though he identifies a similar pro-selective effect of subsidies, he does not consider a strategic policy interaction among governments.

Thirdly, our paper is related to the literature on international tax competition (see Bucovetsky, 2005, or Wilson and Wildasin, 2004 for a recent survey). Several works highlight imperfectly competitive firms and the role of agglomeration rents for locational competition, see e.g. Baldwin and Krugman (2004), Borck and Pflüger (2006), and Kind et al. (2000). That literature ignores firm heterogeneity, however. The most recent works in this tradition consider tax competition with heterogeneous firms, e.g. Hauffer and Stähler (forthcoming), Krauthaim and Schmidt-Eisenlohr (2011), Bauer et al. (2011), Davies and Eckel (2010) and Baldwin and Okubo (2009), but none of these papers considers subsidies to market entry costs.

Finally, a recent literature addresses market entry of heterogeneous firms from an empirical point of view. Das et al. (2007) calibrate the impact of various types of export promoting policies in a multi-country trade model. Di Giovanni and Levchenko (2010) focus on the welfare effects of lower costs of doing business at home and abroad. Our paper differs from that literature in two main respects. First, our analysis is not directly concerned with export promotion policies since those policies are scrutinized by bodies like the WTO or the European Commission. Rather, we focus on the pervasive yet more subtle indirect international effects of subsidies to domestic entry. Second, and even more importantly, our key contribution concerns policy competition, i.e. the endogenous determination of government subsidies and their welfare impacts, whereas the two mentioned works take policies as exogenously given.

2. Closed economy

We first consider the case of a single country in autarky. Labor is the only factor of production, and there are L workers who supply one unit of labor each. There are two industries, A and C . The homogeneous good A is characterized by constant returns to scale and perfect competition. The sector C is the monopolistically competitive manufacturing industry consisting of a continuum of differentiated varieties. Each variety is produced by a single firm under increasing returns, and firms are heterogeneous in their productivity.

2.1. Preferences

Preferences for household h are defined over the homogenous commodity A and the set of differentiated varieties (Θ) according to the following quasi-linear, logarithmic utility function with CES sub-utility:

$$U^h = \beta \ln C^h + A^h \quad C^h = \left(\int_{z \in \Theta} q^h(z)^\rho dz \right)^{1/\rho} \quad (1)$$

³ This result is due to the Dixit–Stiglitz-specification of preferences, as Grossman and Helpman (1991, App A.3.3.) have shown. Also see the supplementary Appendix F of this paper.

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