



# Exports and foreign direct investments in an endogenous-entry model with real and nominal uncertainty

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## ABSTRACT

Drawing on a tractable DSGE model with nominal rigidity, this paper studies the implications of firms' entry in domestic and foreign markets for the international business cycle. The paper shows that the decision to enter a new market as well as the choice whether to invest at home or abroad depend on global monetary and productivity conditions. I find that a domestic monetary expansion might favor or deter start-up investments, depending on whether the potential entrant is a national or a multinational firm. Moreover, a structural policy change, as an increase in the degree of monetary stabilization, has a positive impact on trend investments in all sectors. Firms' dynamics, in turn, amplifies consumption and employment spillovers in the world economy. I stress that this may have non-negligible consequences for welfare.

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## 1. Introduction

The tremendous growth in trade and FDI flows that has occurred in the past two decades has changed the structure of macroeconomic interdependence in the global economy, especially among similar, industrialized countries and between these and newly emerging economies (see UNCTAD, 2007). Consequently, a growing interest has been devoted to studies of the international business cycle where macroeconomic interdependence is endogenous.<sup>1</sup> Most contributions, however, focus on trade relations, overlooking international linkages through FDI flows.<sup>2</sup> This paper aims to fill the gap and investigate both dimensions of macroeconomic interdependence by focusing on the role of producers' entry in domestic and foreign markets for the transmission of monetary policy and productivity shocks around the world. For this purpose, it proposes a tractable DSGE model with nominal rigidity that incorporates the endogenous determination of the number of firms that decide to enter a new market at home or abroad. Firms are allowed to choose whether to serve foreign markets through exports or engage in direct investments overseas.<sup>3</sup>

The paper contributes to a recent strand of research analyzing the implications of firms' entry and product creation for monetary policy and the business cycle dynamics.<sup>4</sup> A general finding in this literature is that sticky prices can distort entry

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<sup>1</sup> Open economy models with endogenous entry include, among others, Ghironi and Melitz (2005), Corsetti et al. (2007), Bergin et al. (2006) and Bergin and Glick (2003, 2005, 2007).

<sup>2</sup> Russ (2007) and Cavallari (2007) provide notable exceptions. In a framework with a fixed number of firms, see also Cavallari (2008).

<sup>3</sup> Helpman et al. (2004), have pioneered a fast-growing literature that investigates the general equilibrium consequences of alternative modes of foreign market access. Helpman (2006), provides a comprehensive survey of contributions in this area.

<sup>4</sup> A non-exhaustive list of contributions in this area includes Bilbiie et al. (2007), Bergin and Corsetti (2008), Lewis (2006), Elkouri and Mancini Griffoli (2006), Barentsen and Waller (2007). These studies refer to closed economies.

behavior in a number of ways, thereby creating a new role for monetary policy in welfare maximization. It is argued that well-designed monetary rules can eliminate the incentive on the part of firms to (excessively) contract extensive margins in cyclical downturns and help replicate the business cycle dynamics that would prevail with flexible prices. Moreover, entry and exit of firms can affect monetary transmission through a variety of channels. Bilbiie et al. (2007) stress the relevance of asset pricing in spreading the effects of monetary policy. The financing of start-up investments turns out to be negatively associated with a monetary expansion in their model. Others, as Bergin and Corsetti (2008) and Lewis (2006), focus on the real cost of new product creation, suggesting that monetary policy would rather boost entry (as it appears to be the case in the data). These contributions, as most models in this area, refer to closed economies.

Russ (2007) and Cavallari (2007) develop open economy models with endogenous entry that are closest to the one studied here. Russ focuses on foreign investments by multinational corporations in a setting with heterogeneous firms à la Méltitz (2003). Cavallari considers a representative-firm model with endogenous trade and foreign investments. These contributions point to different motives behind why monetary policy might in principle attract or deter foreign investments. The former stresses whether monetary uncertainty originates at home or abroad as a key determinant of the perception of exchange rate risk on the part of potential investors contemplating to engage in investments overseas. The latter focuses on the degree of monetary stabilization, showing that investments might be sub-optimally low when stabilization is not complete.

Different from previous contributions, this paper nests within a unified framework both the decision of firms whether to enter a market at home or abroad (as in Russ, 2007) and whether to serve foreign customers through trade or by engaging in direct investments overseas (as in Cavallari, 2007). To this end, the model in Cavallari (2007) is extended so as to encompass firms that operate on domestic markets only, endogenizing the size of the non-tradable sector. This in turn allows domestic demand to play a role (along with foreign demand) in the decision whether to serve foreign markets in the first place. In addition, the model can account for movements of firms between the traded and the non-traded sector as those stressed in the literature showing that a relevant fraction of the growth in trade volumes occurs at the extensive margin, with exports of new products and previously non-traded goods (see Kehoe and Ruhl, 2003).<sup>5</sup> The paper proposes a way of exploring the mechanisms behind such observations in a simple macro model where firms are identical in all respects except for the market demand they face. It provides an illustration of how the dynamics of firms across and within sectors can help improve our understanding of macroeconomic interdependence.

Remarkably, I find that firms' entry in domestic and foreign markets depends on current monetary and productivity conditions at home and abroad. The major role of external shocks is a novelty in the literature and a consequence of strictly interdependent investment decisions within and across sectors. A rise in home productivity, for instance, is shown to affect firms' investments well beyond the domestic borders, by discouraging overseas investments of home multinational firms in favor of domestic investments in the foreign country.

I further argue that a monetary expansion might have contrasting effects on domestic and foreign investments as a result of their different degree of exposure to exchange rate risk. In my setup with pre-determined prices and flexible entry costs, a monetary easing is associated with higher entry costs and a boosting demand, with clearly opposing effects on the attractiveness of new investments. An expansion at home is found to favor domestic investments at the expense of direct investments by foreign multinationals whenever exchange rate pass-through is not complete. The finding is a consequence of movements in the exchange rate that reduce the foreign-currency revenues of investments below entry costs, thereby discouraging foreign investments. Exit of foreign multinationals from home markets, in turn, improves the prospective profits of home investors, crowding-in domestic investments.

Monetary policy can affect entry decisions also by changing the perception of macroeconomic risks on the part of potential investors. An increase in monetary activism, as captured by a rise in monetary volatility worldwide or in the covariance with productivity shocks, is found to stimulate trend investments in all sectors of the economy. By stabilizing marginal costs, a counter-cyclical policy, in fact, helps reduce the risks associated with pre-set prices.

Accounting for firms' dynamics allows to emphasize a new propagation mechanism in the international business cycle arising from cross-country differences in firms' integration strategies. When the number of producers is endogenous, high-productivity economies tend to attract domestic and foreign investments, supplying the widest range of product varieties. Firms in low-productivity economies, on the contrary, will find it convenient to invest abroad, serving foreign customers mainly through local affiliates of multinational corporations. As a consequence of massive entry in home markets, the relative price of home products will fall, i.e. the home country experiences a deterioration in its terms of trade. The finding is reminiscent of the well-known "immiserizing growth" by Bhagwati, 1958, showing that a sharp deterioration in the terms of trade of a growing economy might reduce welfare. Yet, in my model falling terms of trade are the result of asymmetries in firms' integration strategies over the business cycle. A caveat to my findings is that the tendency towards falling prices might be attenuated in sectors characterized by high dispersion of productivity across firms. The rise in the number of producers would then come with a drop in average productivity. The question provides an interesting ground for further research.

Finally, I compare consumption and employment spillovers with and without entry effects in a number of numerical exercises. The intuition that endogenous entry amplifies the propagation of monetary and productivity shocks is confirmed in all calibrations. Take, for instance, a global monetary expansion. The monetary easing, wherever it is originated, is associated

<sup>5</sup> See also Bernard and Jensen (2001). Based on a panel of US manufacturing firms between 1987 and 1997, they show that on average 13.9% of non-exporting firms begin to export in any given year in the sample and 12.6% of exporters stop to trade.

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