Comment on “Liquidity Constrained Exporters” by Thomas Chaney

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1 INTRODUCTION

Why do trade volumes react so little to exchange rate fluctuations, while strongly responding to trade liberalization? This paper proposes a novel explanation for this stylized fact, often referred to as the International Elasticity Puzzle (IEP), based on firms’ decision to enter into and exit from foreign markets. In particular, Chaney (2016) argues that, when exporters are potentially credit constrained and face fixed costs denominated in foreign currency, a depreciation may affect the extensive margin of export in two ways: first, by raising sales it induces more entry, as the conventional wisdom suggests; second, by reducing the relative value of self-finance, it may refrain from entry or even induce exit. The latter channel, which is the novelty of the paper, generates a lack of reaction of the extensive margin, which helps explain the puzzle.

I find this idea interesting, and the model neat. The following comments are aimed mainly at addressing the empirical relevance of the proposed mechanism, and partly at reconsidering the way financial constraints have been introduced in models of trade with heterogeneous firms. In Section 2, I address the existing empirical support for the present explanation of the IEP against an alternative model by Ruhl (2008), and provide insights for further tests. Section 3 discusses some of the main assumptions of the model and suggests additional ways to assess the empirical relevance of the model. Section 4 relates the paper to other recent theoretical and empirical contributions on financial constraints and trade, and puts forward an alternative modelling approach. Section 5 concludes.

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2 COMPETING EXPLANATION AND EMPIRICAL TESTS

The paper proposes an extension of the Melitz (2003) and Chaney (2008) model of trade with heterogeneous firms, which builds on a number of key assumptions. First, financial frictions, binding only on potential exporters, impose firms to cover the fixed cost of export with internal funds, which may derive either from domestic profits or other sources of liquidity. This assumption, common to the recent literature on financial development and trade, delivers the result that credit constraints hinder trade by affecting both entry in the export market and the sales of exporters (see, for instance, Manova, 2013). The second key assumption is that there is a currency mismatch between the fixed cost of export (not the variable one) and the internal funds of firms, expressed in terms of foreign and domestic wage, respectively. This implies that an exchange rate depreciation does not only generate a gain in competitiveness of domestic firms in the foreign market, which raises revenues (intensive margin) and induces the entry of new exporters (extensive margin). It also entails a depreciation of internal funds vis-à-vis the fixed cost they have to cover, which makes the liquidity constraint binding for a larger number of incumbent and potential exporters, thereby possibly reducing the mass of exporting firms. Hence, the model predicts a positive reaction of foreign revenues for exporting firms, and an ambiguous (potentially negative) response of the extensive margin, to fluctuations in the exchange rate. In case of trade liberalization, represented by a fall in the variable cost of trade, both the intensive and extensive margins of trade increase, since the only active channel is through improved competitiveness of domestic producers.

An alternative explanation for the International Elasticity Puzzle was proposed by Ruhl (2008), based again on the reaction of the extensive margin of export, but in a dynamic model of trade with heterogeneous firms. In this framework, firms decide to enter in (or exit from) the foreign market if the present discounted value of future profits is (or is not) high enough to cover the fixed cost. Since exchange rate fluctuations usually exhibit low persistence, they do not significantly change expected future profit flows, and hence induce a weak response of the extensive margin of export. On the contrary, tariff reductions are typically permanent (as required by the WTO), and hence can generate changes in expected future profits which are large enough to induce firms to enter the export market.

Both models predict trade to react less to depreciations than to falls in tariffs due to the different response of the extensive margin, which is less sensitive to the exchange rate than to tariffs. Recent empirical evidence by Fitzgerald and Haller (2015) from Irish panel data at firm, product and destination market level, seems to lend support to both theories, since it shows export participation to react less to exchange fluctuations than to changes in tariffs. There is no direct evidence, however, supporting only one of the competing mechanisms. This gap could be filled by performing an empirical test tailored to the specific predictions

of this paper.

A key feature of the theory proposed by Chaney (2016) is that the strength of the reaction of the extensive export margin to the exchange rate depends on the degree of financial frictions and other variables. In particular, the model predicts the response of participation in the export market to be weaker, the more severe the credit constraints on firms (deriving from low financial development at the country level and/or external financial dependence at the sector or firm level), the higher the (destination-specific) fixed cost of export, and the lower the degree of competition (captured by the elasticity of substitution). In the absence of credit constraints, instead, the extensive margin is expected to be equally elastic both to depreciation and to trade liberalization. Hence the mechanism could be empirically tested by means of interaction analysis.

A possible way to implement the suggested approach is using bilateral trade panel data at the sector level to estimate specifications for trade flows and the probability of exporting, as in Manova (2013), with additional interactions. In particular, denoting by ΔER changes in the exchange rate, the following terms may be added to the baseline specifications: (i) ΔER times the level of financial development in the country of origin; (ii) ΔER times an indicator of destination-specific fixed costs of export; and (iii) ΔER times a proxy for market competition, or Rauch's index of good differentiation, at the sector level. Moreover, interactions (i) and (ii) may be further multiplied by the degree of external financial dependence à la Rajan and Zingales (1998) at the sector level.

As an alternative, the exercise in Fitzgerald and Haller (2015) could be replicated, explicitly accounting for external financial dependence and market competition at the sector level and for indicators of fixed export costs at destination.

An additional and complementary explanation for the International Elasticity Puzzle may be based on the effect of exchange rate fluctuations on the price of imported inputs. In particular, a depreciation, by making imported inputs more expensive may affect negatively both the extensive and the intensive margin of export. An increase in the price of imported inputs may affect firms' choices in two ways. First, by directly raising marginal costs for importers, it tends to reduce revenues on both the domestic and the foreign market, thereby refraining entry and/or inducing exit of exporters. Second, higher input prices cause a fall in import, which may reduce productivity (see evidence, among others, in Amiti and Konings, 2007), thereby further increasing marginal costs and reinforcing the previous mechanism. Embedding these elements in Chaney's (2016) model would deliver further insights and empirically testable predictions.

3 FINANCIAL CONSTRAINTS, EXPORTER STATUS AND TRADE VOLUMES: EMPIRICAL RELEVANCE

In the model, firms have to cover the fixed export cost with internal funds accruing from domestic profit and pledgeable assets (or liquidity shock), A . The distribution and correlation of these assets with productivity are left unspecified in most of Section 1. To obtain neat comparative statics for the effects of financial development and exchange rate fluctuations on trade volumes (Propositions 3 and 5), assets are assumed to be uncorrelated with productivity. In this case, financial deepening and widening may have a positive effect on trade volumes not only along the extensive margin, but also along the intensive one because they may allow also very productive, yet constrained firms to become exporters and sell large volumes (Proposition 3). If the parameters capturing financial deepening ($\bar{A}$) and widening (θ) are interpreted as country and/or sector specific, this result may explain the well-known evidence that financial development promotes trade along both margins (see Foley and Manova, 2015 for a survey). In the opposite case of perfect correlation, however, an increase in average liquidity would only affect small potential exporters, whose contribution to trade volumes may be very limited, which would imply that the model is able to only partially explain the evidence.

This suggests that the assumption on the correlation between liquidity and productivity is crucial for the model to quantitatively explain the behaviour of trade volumes. If the correlation is low, the model realistically features the existence of some large firms that do not export, and of some smaller ones that do. More importantly, its mechanism, which hinges on the effect of financial frictions on the extensive margin of trade, may be strong enough to explain both the IES puzzle and the positive correlation between financial development and trade volumes found in the data. However, the empirical evidence suggests that the correlation between firm size and liquidity is substantial (see for instance Berman and Héricourt, 2010). To have a sense of the empirical relevance of the proposed mechanism, one could take realistic numerical values for the distribution of productivity and its correlation with liquidity and quantitatively solve the model under alternative levels of financial development and exchange rate fluctuations.

Since the model is static, it is not perfectly suited to make predictions on exit from the export market. However, if we interpret a reduction in the mass of exporters as exit, the model suggests that the positive effect of an exchange rate appreciation on the volume of trade should be counteracted by the exit of some credit-constrained exporter. In fact, Berman and Héricourt (2010) provide evidence that financial frictions affect entry into but not exit from the exporter status. This result suggests that the model may be able to explain the lack of reaction of trade volumes to depreciations but not to appreciations of the exchange

rate. More empirical work is needed to sort this out.

4 TRADE WITH FINANCIAL CONSTRAINTS: AN ALTERNATIVE APPROACH

The prediction that financial constraints negatively affect both the extensive and the intensive margins of trade, obtained in Section 1, echoes the results in Manova (2013), whose empirical validity has been documented in a series of recent contributions. This literature has provided robust evidence that financial development indeed hinders trade, and that this effect is stronger for sectors with higher external financial dependence and destination countries with higher fixed cost of export. Yet, the theoretical underpinnings remain somewhat unconvincing. In particular, most models extend the Melitz (2003) set-up by assuming that firms may be credit constrained only when they have to cover the fixed cost of export, and not other fixed costs. While this assumption nicely yields the result that bad finance refrains some potential exporters from entering a foreign market, it poses some conceptual concerns. First, it implies that firms serving only the domestic market are not (or are less) credit constrained. Second, if credit frictions affect the fixed export cost for each additional foreign market, even very productive firms, already serving several markets, may end up being more liquidity constrained than small domestic producers. Both implications seem to go against the evidence that the smallest firms are the most financially constrained (e.g., Demirgüç-Kunt, Maksimovic and Beck, 2005).

An alternative approach, recently put forward by Bonfiglioli, Crinò and Gancia (2015 and 2016), is able to deliver the result that financial frictions lower the fraction of exporters by assuming that credit constraints simply affect the entry cost paid by all firm when new products are introduced. This is appealing, because the financing of R&D-intensive projects by means of external credit can be subject to relevant informational frictions and because no asymmetry between firms or markets is required. Suppose then that financial frictions raise the cost of entry. In a framework à la Melitz (2003), this would only lower the productivity cut-off for surviving firms, with no bearings for the fraction of exporters. However, in Bonfiglioli, Crinò and Gancia (2015 and 2016) there is an additional effect, due to endogenous change in the distribution of productivity. In particular, the model generalizes the entry stage by allowing firms to choose how much to invest in innovation projects of unknown quality and this *ex-ante* choice affects the *ex-post* heterogeneity in realized productivity. Intuitively, small innovation projects have low and relatively homogeneous outcomes, while bigger projects yield on average higher but also more dispersed returns.

The new effect is that credit frictions discourage investment in large-scale projects with high upside potential, thereby lowering the equilibrium degree of heterogeneity in a sector and the volume of trade. The intuition for this result is that exit provides insurance and

increases the value of drawing productivity from a more dispersed distribution. By lowering the minimum productivity needed to survive, credit frictions induce firms to invest in smaller projects with less dispersed outcome. As a result, in equilibrium firms are smaller and more homogeneous, fewer firms become exporters and those who do sell lower quantities. The effect is stronger in sectors that are more financially vulnerable.

This picture does not seem far from the reality in many financially underdeveloped countries, and is also consistent with systematic evidence from a very rich and highly-disaggregated dataset. In particular, using US import data of roughly 15,000 products from 119 countries and 365 manufacturing industries between 1989 and 2006, Bonfiglioli, Crinò and Gancia (2016) confirm that the dispersion of (log-)export sales is higher for countries with better financial development and especially in sectors with higher financial vulnerability (captured by high external finance dependence and low asset tangibility). In turn, export sales dispersion is shown to have high explanatory power on trade volumes.

5 CONCLUSIONS

Chaney (2016) provides a novel explanation for the important puzzle of why trade volumes react so little to exchange rate fluctuations. Although the proposed mechanism is theoretically plausible and interesting, the paper does not provide any evidence to assess its validity against competing explanations. These comments contain some suggestions on how to implement such tests. More fundamentally, however, although the literature on trade and finance has identified some strong and robust empirical regularities, existing models explaining this evidence hinge on controversial assumptions on the nature of financial constraints. Hence, why frictions in the credit markets may affect so severely exporters, despite these firms being the largest and most productive ones, remains an open question for the theoretical trade literature.

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