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Financial constraints and international trade patterns

Turkmen Goksel *

Ankara University, Turkey

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ABSTRACT

Growing empirical literature shows that financial constraints reduce the chance of exporting, suggesting that financial constraints are an important determinant of international trade patterns. In this aspect, I develop a model of international trade based on new trade theory with financial constraints and non-homothetic preferences. With these two modified assumptions, the main findings are i) financial constraints act as trade barriers, ii) the largest amount of trade is between countries that have healthier financial systems in terms of access to loans and iii) financial constraints can cause one way or zero trade. As a result, this paper provides a single framework able to account for all possible patterns (two-way, one-way, and no trade) within the same industry. All these findings have important policy implications for countries suffering from relatively poor financial systems.

1. Introduction

Growing empirical literature shows that financial constraints reduce the chance of exporting, suggesting that financial constraints are an important determinant of international trade patterns. Given the empirical observations from various countries and different time horizons, I develop a model of international trade based on the new trade theory (henceforth NTT) with financial constraints. This paper argues that financial constraints act as trade barriers across countries. The second argument of the paper is that all possible trade patterns (two-way, one-way, and no trade) within the same industry can be explained by imperfect capital markets within a unique framework. All these findings have important policy implications for countries suffering from relatively poor financial systems.

This paper modifies the NTT model of Krugman (1980) in two aspects. First, NTT is analyzed under non-homothetic preferences instead of the standard constant elasticity of substitution (CES) assumption in international trade theory. Second, this paper introduces financial constraints to NTT instead of the common perfect capital market approach. In particular, firms have to pay some of the total costs before the revenues are realized. In order to fulfill this duty, they have to borrow at least some portion of the total cost in advance from a lender at an exogeneously determined interest rate. As a result, with these two modified assumptions, the main contributions of the paper are i) to illustrate that financial constraints act as trade barriers, ii) to generate all possible trade patterns (two-way, one-way, and no trade) within the same industry.

More specifically, frictions in capital markets reduce exports, and furthermore sufficiently large frictions lead to no exports at all since the demand for a specific good can drop to zero even with a finite price under the non-homothetic preference assumption. Hence, these features of the presented model provide an alternative explanation for the existence of two-way, one-way, and no trade.

To my knowledge there are only a few previous studies that try to explain all possible patterns with a single framework. Helpman et al. (2008) and Okuba et al. (2011) provide alternative explanations. According to Helpman et al. (2008) firms' export choices are determined by idiosyncratic fixed costs of exporting and productivity. These two features together can explain no trade or one-way trade. Okuba et al. (2011) argue that firms' export choices are dependent on the intensity of competition on export markets, which clarifies the existence of all three patterns by trade costs and the intensity of competition. Alternatively, this paper offers financial constraints as an explanation for accounting for all three patterns and maintains that financial constraints act as trade barriers. Firms in countries that have healthier financial markets – in terms of having relatively more easily accessable loans – are more likely to export. Hence, this result stresses that most of the trade occurs between countries that have healthier financial structures. Moreover, this argument can elucidate one-way trade. In particular, the trade partner that has healthier financial market can export to the partner suffering from financial frictions without importing from this partner. Finally, if both of the partners have sufficiently large financial frictions, there may be no trade at all.

A number of recent empirical studies show that financial constraints are crucial factors in order to determine both macro and micro-level trade flows. At the firm level, Muûls (2008) finds that Belgian firms with lower creditworthiness are less likely to export. Bellone et al. (2010), using the French data, empirically show that new exporters have an ex-ante financial advantage compared to

* Cemal Gursel Cad. Siyasal Bilgiler Fakultesi Cebeci, 06590 Ankara, Turkey. Tel.: +90 312 595 1383; fax: +90 312 319 7736.
E-mail address: tgoksel@ankara.edu.tr.

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domestic firms and report a negative relationship between firms' financial health and exports. Berman and Héricourt (2010) find that firms' access to external finance have a positive effect on exporting probability by using a firm-level database from developing countries. Moreover, they also argue that productivity is a significant determinant of exporting decisions only if the firm has a sufficient access to external finance, indicating the importance of financial constraints.

Using data on Chinese firms, Egger and Kesina (2010) and Jarreau and Poncet (2010) find that credit constraints have a restrictive effect on exports. Minetti and Zhu (2011) and Forlani (2011) have determined (utilizing data from Italian firms) that exporting probability is negatively and significantly affected by financial constraints. In particular, Forlani (2011) states that an increase of 10% in the cash stock of constrained firms raises the entry probability of these firms by an additional 0.17% relative to unconstrained firms.[1]

At the macro level, findings suggest that financial development exerts a significant and positive impact on bilateral trade flows (e.g., Beck, 2002, 2003; Svaleryd and Vlachos, 2005; Do and Levchenko, 2007). Results from these studies also assert that credit constraints are an important determinant of exporting similar to micro-level findings.[2]

From a theoretical standpoint, Chaney (2005) is the first to analyze the effects of financial constraints on exports. He incorporates liquidity constraints into the heterogeneous firm framework of the Melitz (2003) model and demonstrates that these constraints have an impact on firm entry to export markets. Muûls (2008) develops a model which describes that more productive and less credit constrained firms are more likely to export. Manova (2008) provides a model with credit-constrained heterogeneous firms and states that financially developed countries are more likely to export bilaterally and ship greater volumes when they become exporters. More recently, Feenstra et al. (2011) highlight that credit constraints reduce exports on the extensive margin, and Besedes et al. (2012) emphasize that credit constraints play a key role in early stages of exporting, but not in later stages.[3] Most of the theoretical literature focuses on the restricted two-way trade due to financial frictions.[4]

The present paper is not the first to analyze the role of non-homothetic preferences in international trade. Among others Markusen (1986), Bergstrand (1990), and Hummels and Lugovskyy (2005) use non-homothetic preferences in order to understand trade patterns. More recently, Melitz and Ottaviano (2008), Saure (2009), and Okuba et al. (2011) also use non-homothetic preferences in order to examine trade patterns. However, none of these studies examine the effects of financial constraints on trade patterns.

The organization of the paper is as follows: Section 2 presents the model. Section 3 discusses the model results, and Section 4 concludes the paper.

2. Model

In this section, a model of international trade based on Krugman (1980) with two important modifications is presented. First, preferences are assumed to be non-homothetic. Second, capital markets are assumed to be imperfect. Consider there exist N countries. i and j denote exporters and importers, respectively, where $i,j=1,\ldots,N$. Each country j has a population of measure L_j.

2.1. Consumer

A representative consumer in country j has a unit of labor endowment which is inelastically supplied in a competitive labor market. Preferences are defined over a continuum of differentiated varieties indexed by $z\in(0,1)$, and a homogeneous good chosen as a numeriare. All consumers share the same utility function (quasi-linear utility with a quadratic subutility), and the consumer's problem in country j is given by

$$\max_{c_j^0, c_j(z)} c_j^0 + \alpha\int_0^1 c_j(z)dz - \frac{1}{2}\beta\int_0^1 c_j(z)^2 dz,$$

which is subject to the following constraints:

$$p_j^0 c_j^0 + \int_0^1 p_j(z)c_j(z)dz = L_j w_j + \Pi_j$$

$$c_j^0 > 0, \quad c_j(z) \geq 0, \forall z,$$

where c_j^0 is the total consumption level of the homogeneous good that is produced under perfect competition by using labor input.[5] The firms' unit input requirement for the numeriare good is one, and this good is traded freely between countries at no cost. As a result, these standard assumptions in trade literature imply that the price of homogeneous good, p_j^0, and per capita nominal wage income, w_j, are equal to one both within and across countries. More precisely, $p_j^0 = w_j = 1\ \forall j = 1,\ldots,N$. Moreover, Π_j is the total profit earnings in country j, and since the firms are owned by consumers by assumption, profits are the second source of income. $c_j(z)$ and $p_j(z)$ denote the total consumption level and price for a variety z in country j. The parameters α and β are both positive. An increase in α shifts out the demand for the differentiated varieties relative to the numeraire good. The parameter β indexes the degree of product differentiation between varieties. In other words, a higher β implies that varieties are less substitutable.

The solution for the consumer's utility maximization problem yields the total demand for a variety z in country j

$$c_j(z) = \begin{cases} \frac{\alpha - p_j(z)}{\beta} & \text{if } \alpha > p_j(z) \\ 0 & \text{if } \alpha \leq p_j(z) \end{cases}. \tag{1}$$

Hence, the maximum price level that a consumer can afford in country j is given by $p_j^{max} = \alpha$. In other words, if the price level is higher than or equal to α, then the demand for that variety is zero.

2.2. Supply

Labor is the only factor of production and is inelastically supplied in a competitive labor market. In each country, each variety is produced by a single firm, and all of the firms have the same constant returns to scale production technology within a country: $y_i = \varnothing_i l_i$, where y_i is the output, $\varnothing_i$ is the productivity level, and l_i is the labor amount used by a firm in country i.[6] Hence, the productivity of firms are the same within countries but potentially different across countries.[7]

Moreover, capital markets are imperfect, and firms face liquidity constraints in the financing of production and trade costs. Even if a firm in country i can finance some portion of these costs internally, the remaining fraction of the production and trade costs has to be

[1] In contrast to the most of the literature, using data from United Kingdom, Greenaway et al. (2007) finds no evidence that firms with better financial health are more likely to export; however, they obtain evidence that the participation in export markets improves firms' financial health.

[2] Suwantaradon (2008) and Wang (2011), using the World Bank Enterprise Survey, find evidence on the importance of financial constraints for export decisions.

[3] Among others Suwantaradon (2008), Wang (2011), Khon et al. (2012), Gross and Verani (2011) and Brooks and Dovis (2011) investigate the relationship between firm dynamics and financial constraints.

[4] Exceptions are Helpman et al. (2008) and Okuba et al. (2011). Provided models in these papers can generate all three patterns within the same industry.

[5] Parameters are chosen such that the equilibrium production and consumption of the numeriare good are to be positive for each country j. Please see Appendix A for details.

[6] Homogeneous good is also produced under constant returns to scale production.

[7] I assume that productivies are the same within countries for two reasons. First, the main focus of this paper is the aggregate exports for each country rather than the firm specific exports. Second, by assuming identical productivities within the same country, it is much more clear to show the mechanism why all three possible trade patterns can be generated within the same industry.