The influence of financial leverage of firms on their international trading activities

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The Influence of Financial Leverage of Firms on Their International Trading Activities

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Abstract

Using the BEEPS dataset from Enterprise Surveys, I study the effect of financial leverage (percentage of assets funded by bank loans) of firms on their decision to participate in various trading activities, such as exporting, importing and two way trading (firms that export and import). I determine that the intensity of financial leverage does not inhibit firms which export only from becoming two way traders, but it does inhibit firms which import only or operate only within the national market to become two way traders. The effect is determined to be stronger for firms that operate only within the national market than firms that import only. Since unobserved factors may influence both trading activities and financial leverage, I instrument for financial leverage using a variable that combines overdue payments to suppliers and the relationship of firms with their lenders. I contribute to the literature as I augment a model that determines the effect of financial leverage on various trading activities by implementing differences between industries due to their level of external dependence and asset tangibility. Hence, the effect of financial leverage is determined to vary between different trading activities within industries that exhibit different levels of external dependence and asset tangibility.

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Introduction

Exporters, importers and two-way traders pay varying up-front fixed costs to participate in their respective trading activities. To pay the large up-front fixed costs associated with each mode of trading activity, firms may have to borrow from banks in order to finance the purchase of their assets, or financially leverage their assets[1,2]. As the costs associated with trading activities can differ significantly between each mode, firms participating in various trading activities can be influenced by the varying intensity of financial leverage. For instance, firms that export their final product and import inputs, two-way traders, can incur greater fixed costs than firms that export only and import only as is discussed by Muuls and Pisu (2008), Haller (2010) and Castellani et al. (2010). Financial leverage can influence the decision of firms to participate in various trading activities as is contended in Greenaway et al(2007), Bellone et al. (2010), Manova (2010a), Manova (2010b) and Chor and Manova (2011).

With each particular trading activity requiring different levels of fixed costs to participate, the effect of financial leverage can vary between firms that either export only, or import only, or participate as two way traders. Firms that have high existing financial leverage can find it difficult to borrow from banks in order to finance the purchases of their assets needed to expand their trading activities. Financial leverage can inhibit firms that either trade in one direction (export only or import only) or operate only within the national market to become two way traders. An increase in financial leverage can negatively impact firms from expanding their trading activities. So far, the papers that have studied this relationship between financial leverage and international trading activities have considered the decision of firms to either export or import rather than be non-traders. In this paper, I contribute to the literature in investigating more specifically the relationship between the extensive and intensive margins of financial leverage of firms and the decision of firms to become two way traders rather than participate as

[1] For the purpose of this paper, firms can import foreign inputs by either importing intermediate materials of foreign origin, or purchasing foreign licensed equipment or obtaining internationally recognized quality certifications such as ISO 9002. A greater detailed discussion on this variable has been undertaken in Nakhoda (2012).

[2] Ahn, Khandewal et al (2011) discuss the issue of exporting through intermediaries, or indirect exporters, which may lower the necessary fixed costs for firms and hence the need for financial leverage. I consider exporters as those firms that export their products directly to foreign markets. Hence, direct exporters pay greater fixed costs than indirect exporters and direct exporters have greater control of their customers in the destination market.

firms that export only, import only, and trade only within the national market.

I employ the World Bank's Business Environment and Enterprise Performance Surveys (BEEPS), which is a firm level panel data set from 27 countries across Central and Eastern Europe and Central Asia. A total of 7,288 small and medium enterprises were surveyed in either 2005 or 2009, with 3,600 firms surveyed in 2005 and 3,688 surveyed in 2009 on an extensive number of topics such as financial leverage, firm size, capacity constraints, sales, and employment characteristics. The survey also provides variables on the decision of firms to participate in a particular trading activity, such as exporting and importing[3]. These variables can be constructed to determine whether firms trade two way, that is export and import concurrently.

I conduct probit estimations of the effect of the extensive and intensive margins of financial leverage on the various dummy variables that account for the different trading activities (export only, import only and trade only within the national market) against two way traders. I determine that the influence of financial leverage between two way traders and firms that participate in other trading activities vary across each trading activity. For instance, firms that either import only or trade only within the national market are likely to be constrained by the financial leverage as they seek to expand their trading activities to become two way traders than firms that export only. As the variable on financial leverage can suffer from potential endogeneity and omitted variable bias, I implement an instrumental variable estimation with the help of an excluded instrument that accounts for a negative liquidity shock through determining whether firms have overdue payments to their suppliers and apply for a loan or a line of credit.

In addition to the instrumental variable estimation, I use an empirical study that bases the demand for external funds on exogenous variations that cannot be controlled by firms but may influence the degree of their financial leverage. For instance, firms may belong to an industry in which they are likely to be externally dependent and are characterized by a high degree of collateralizable tangible assets that makes them attractive to lenders. I augment the model introduced by Gorodnichenko and Schnitzer (2010) as I consider the relation between the external dependence and asset tangibility of the industries and the preference of firms for the internal

[3]Out of the 7,288 observations, 6,628 were unique firms in either 2005 or 2009. The rest of the firms were interviewed in both 2005 and 2009. A total of 3,600 firms were surveyed in 2005 and 3,688 firms were surveyed in 2009. The results perceived inaccurate by the interviewers are dropped.

and external sources of funding. In order to start production, firms need to purchase assets and invest in fixed and sunk costs associated with their trading activities by allocating their internal and external sources of funds. This allocation of funds may vary between industries that exhibit different levels of external dependence or financial vulnerability and asset tangibility. I divide the sample into different subgroups based on industry characteristics such as external dependence and asset tangibility. For example, industry attributes on the dependence of external funds and proportion of assets constituted by tangible assets, such as plant, property and equipment can determine whether firms will seek financial leverage to finance their investments. This is an important contribution of this paper as it determines whether firms that either export only, or import only, or operate only within the national market are likely to be financially leveraged within industries that have an inherent nature to demand greater external funds and possess collateralizable assets. This will help to explain whether the influence of the extensive and the intensive margins of financial leverage on the investment of firms in two way trading activities rather than the other trading activities is either mitigated or magnified for firms that belong to certain industries.

Relevant Literature

Since the seminal paper of Melitz (2003), the fixed costs related to exporting has been examined extensively. Kasahara and Lapham (2008) focus on some of the fixed costs related to importing due to learning and the acquisition of foreign procedures firms may have to undertake[4]. In order to compare the need for complementary assets required by importers that may not be necessary for exporters, Martins and Opromolla (2011) assert that even though wage premiums tend to be higher for firms that participate in international trade than non-traders, the firm and worker characteristics differ between firms that export only and firms that import (import only and trade two way). The former pay higher wages only because they are bigger and can sell more than the non-exporters, while the latter pay higher wages not only because they are bigger in size and can sell more than the non-importers but employ workers that are more productive than the average workers. This exhibits greater 'absorptive' capacity of importers as they need to supplement

[4] Wagner (2011) is an excellent survey of literature on the empirical studies related to international trade, exporting as well as importing, and firm performance.

production with more knowledge-intensive inputs. Furthermore, Altomonte and Bekes (2010) describe the need of importers to use their inputs in the 'right proportion', where firms have to deal with trade complexity between themselves and the suppliers, imperfect substitutability between domestic and foreign inputs and more importantly, the associated sunk costs to search for the right inputs available in the international markets. The influence of financial leverage on the various international trading activities will help to determine whether firms that either import only or export only are likely to be more constrained than two way traders.

Castellani et al (2010) and Kugler and Verhoogen (2009) suggest that importers purchase relevant inputs to produce high quality output, which in turn is likely to be exported. Haller (2010) asserts that firms which import only pay similar average wages to firms that trade two way, while firms that export only do not pay significantly higher wages than firms that do not participate in international trading activities. With investments in complementary assets needed for firms to become importers, this can create a financial wedge that can be estimated by the intensity of the financial leverage.

The relationship between trade activities of firms and their ability to obtain external finance has been a focus of many recent papers, such as Chaney (2005), Greenaway et al (2007), Muuls et al. (2008), Manova (2010), Chor and Manova (2011), Gorodnichenko and Schnitzer (2010) and Bellone et al (2010). International trading activities demand greater financing by banks as there is time lag between disbursement of goods and receipt of payments. Short-term financing by banks is critical for the day to day activities of firms, regardless of the fact whether they participate in international trade or not. However, firms that are involved in international trade activities also need to make substantial investments which involve up-front payments in terms of fixed costs related to international trade and require long-term commitment to international trade. When firms decide to enter production of particular goods, it is necessary to take into account the specifications of the good required by the consumers in the destination markets. Firms build plants and production facilities that are required to meet certain parameters set by the clients in the foreign markets. Such costs require firms to make substantial payments, in many cases up to a few million dollars. Therefore, the aforementioned literature does mention the role of financial leverage and constraints on firms that participate in international trading

activities but does not determine whether firms participating in different trading activities rather than trade two way are influenced by the extensive and intensive margins of financial leverage. With this paper, I aim to fill this void in the literature.

Muuls (2008) determines that fixed costs of trading internationally can be financed by firms through financial markets[5]. Such firms must pledge assets as collateral. Debt is borrowed against fixed assets, which can free up internal funds for investments in activities that cannot be easily collateralizable, such as research and development activities and payment of up-front costs related to international trade as is considered in Himmelberg and Petersen (1994) and Gorodnichenko and Schnitzer (2010). Bustos (2011) discusses the gains in export revenue by exporting firms that allow such firms to purchase inputs embedded with higher technology as they face liberalized trade regimes. In addition, Chaney (2005) considers the reliance of internal liquidity as a method to finance international trading activities as information asymmetries between foreign markets can make it difficult to find potential domestic lenders. The accumulation of debt as firms finance their purchases of assets increases the financial leverage of firms and subsequently reduces their financial health. Although, firms may need to rely on their internal funds to finance the fixed costs associated with international trading activities, they may also be required to borrow extensively in order to purchase the tangible assets associated with such activities. Baggs and Brander (2006) determine the link between reduction in export and import tariffs on the financial leverage of exporting and importing firms respectively. Using data on Canadian firms, they find that reduction in export tariffs reduces the financial leverage of export-oriented firms, while reduction in import tariffs has an opposite effect on the financial leverage of import-competing firms. Export-oriented firms accumulate greater profits, which allows them to reduce their financial leverage, due to easier access to larger markets while import-competing firms earn less profits and may subsequently increase their financial leverage as they are exposed to greater pressure from foreign competitors. Considering the role of financial leverage on the international trading activities of firms, I study whether the percentage of assets financed by bank loans can influence the decision of firms to participate in a relevant international trading activity as it may determine their ability to accumulate revenue and their capacity to borrow

[5] Another method firms can adopt is to seek new equity. As per the hypothesis of the 'pecking order' in Myers (1984) and subsequent literature, bank loans are a preferred source than seeking new equity.

from banks in order to expand their international trading activities.

Rajan and Zingales (1998) introduce the notion that industry level decomposition of dependence of firms on external finance becomes critical to the study relating firm growth and investment opportunities. The degree of financial leverage indicates the solvency of firms and their ability to seek bank loans[6]. Further, Braun (2003) and Braun and Larrain (2005) study the relationship between firm growth and asset tangibility, defined as the percentage of total assets composed by net plant, property and equipment with the latter considering the relationship under economic recessionary conditions. As is explained in Besedes et al. (2011), firms that belong to more tangible industries are also more likely to have lower survival rates as banks will be able to recover a greater amount from such firms in case of default of loans. In countries with poor financial contracts and lower financial development, firms that trade are forced to provide a greater amount of assets as collateral. Industries with lower financial dependence are likely to contain a larger number of firms due to the increasing costs associated with financial vulnerability in such countries.

Production requires purchase of fixed assets. I analyze whether firms that tend to be more leveraged than others are likely to be two way traders as I employ a similar strategy to Gorodnichenko and Schnitzer (2010). However, instead of using a subjective variable based on the opinion of firms on their access to finance and cost of finance as an indicator to financial constraint, I use financial leverage as a proxy for financial constraint, similar to Greenaway et al (2007). Claessens and Tzioumis (2006) discuss the problems of biasness that may arise with subjective questions, as better performing firms are less prone to complain about their financial constraints.

Melitz (2003) documents the relationship between productivity and the decision of firms to export. However, the literature on export hysteresis claims that the decision of firms to export is "history-dependent". Dixit (1989) and Baldwin and Krugman (1989) highlight that firms which have already paid the sunk and fixed costs to export are more likely to do so in the future, even if they face a negative productivity shock and the reaction to exogenous shocks is generally

[6]Firm that are highly financially leveraged have a high percentage of their assets backed by debt or bank loans. Firms are in a risk of being insolvent if their creditors demand repayment of the debt. Therefore, higher the financial leverage greater the risk of bankruptcy. However, if firms face a positive exogenous shock that provides easier access to capital markets, firms are willing to increase their financial leverage.

slow . This explains the existence of exporters with a varying degree of productivity levels. Negative productivity shocks to firms may not influence their decision to participate in trade if the participation of firms is 'history-dependent'. Firms that face negative liquidity shocks which result in delayed payments to suppliers due to decrease in productivity levels may not necessary change their trade status, particularly if their status is 'history-dependent'.

I extend this strand of literature as I examine the influence of the extensive and intensive margins of financial leverage on two way traders relative to firms that are not two way traders. To the best of my knowledge, this is the first study that focuses on the relationship between financial leverage of firms and their decision to trade two ways rather than undertake other trading activities. Furthermore, I consider whether the presence of firms in a low financial vulnerable industry or in an industry characterized by high asset tangibility has a varying impact on the aforementioned effects related to their financial leverage as firms choose to participate in two way trade rather than other international trading activities.

Theoretical Background

The theoretical model is borrowed from Gorodnichenko and Schnitzer (2010) and Muuls (2008). Firms can use internal finance or external finance in order to purchase fixed assets used for production but sunk costs paid related to the exports of the final product and the import of foreign inputs, including raw materials, must be financed from their internal resources. Muuls (2008) mentions the different ways firms may finance the fixed costs to participate in international trading activities. First, it may use internal funds generated by profits from domestic sales to pay for fixed and sunk costs related to trading activities. Second, firms may receive a positive exogenous shock due to gains in productivity levels that may allow them to use the extra funds towards investment activities. This is also similar to the idea suggested by Bustos (2011) as trade liberalization procedures may create incentive for exporting firms to generate greater export revenues and subsequently purchase inputs embedded with higher technology. Third, firms may borrow externally in the financial markets but in order to do so must pledge their assets as collateral.

Supported by the 'pecking order' in Myers and Majluf (1984), the majority of the external financing obtained by firms is debt. I consider the significance of the ratio of debt to assets on the decision of firms to trade internationally. The productivity levels under perfect capital markets may determine whether firms are able to export or import foreign inputs, but their financial leverage ratio under imperfect capital markets will determine whether firms are able to increase debt against their assets and hence borrow to participate in international trade.

As firms can pledge collateral to pay for their fixed costs, they are more likely to borrow externally to fund their purchase of fixed assets and use internal funds to pay for the fixed costs. Depending upon the characteristics of the industry firms belong, such as high external dependence or high collateralizable assets, they can borrow funds to finance their investment projects and subsequently use internal funds to finance international trading activities. I augment the model introduced by Gorodnichenko and Schnitzer (2010) by adding industry level indicators on external dependence and asset tangibility as is considered in Manova (2010a), Manova (2010b) and Chor and Manova(2011).

The following is the sequence of shocks and decision making processes similar to that laid out by Gorodnichenko and Schnitzer (2010) for firms to expand production.

- Stage 0: Firms face an exogenous shock to liquidity (through a decrease in productivity levels) which can influence their needs for financing the purchase of fixed assets through bank loans. Firms that are more sensitive to negative productivity shock are likely to be more financially leveraged.

- Stage 1: Firms will decide whether to export and/or import, or operate only within the national market, based on their financial leverage. Firms that have high percentage of their fixed assets financed by bank loans may prefer to use their internal funds to lower the leverage ratio instead of paying the associated fixed and sunk costs to participate in trade. Hence, such firms are less likely to expand their international trading activities.

- Stage 2: Firms purchase fixed assets in order to expand production and demand financial assistance from banks in terms of loans. Firms that seek financial leverage of fixed assets can use the internal funds to participate in international trading activities. Financial lever-

age indicates the financial health of firms and lower the financial leverage more financially healthier are the firms, as they tie up a lower percentage of assets to their debt. A negative relationship between the intensity of financial leverage and international trading activity determines the importance of financial health to their international trading activities, as firms with lower financial leverage are more likely invest in international trading activities.

Firms face an exogenous shock such as overdue payments to suppliers, which can influence the availability of liquidity. Gorodnichenko and Schnitzer (2010) assert that firms do not have any control over late payments made by suppliers. This shock can be characterized as $\delta_L \in (0, \bar{\delta}_L)$,where δ_L is the likelihood that the firms will face a negative liquidity shock. Firms that receive a negative liquidity shock will likely increase their demand for financial leverage by applying for loans from lenders as they may need to substitute the lack of liquid assets in order to finance their production. Khawaja and Mian (2008) determine that majority of firms in emerging markets exposed to negative liquidity shocks are likely to face financial distress as they may not successfully hedge against the negative liquidity shocks. Such financial distress can have long term effect on the investment strategy of firms as it can impact their financial leverage. I assume the probability that firms will have sufficient internal funds to finance production is q and the probability that firms will not have sufficient funds is $1 - q$. Therefore, accounting for the likelihood that firms receive a liquidity shock, I get $q - \delta_L$ and $1 - q + \delta_L$ respectively. As negative liquidity shocks should affect the cashflow of firms, it will have similar effect on the probability that internal sources are utilized to fund production regardless of the direction of trade.

If firms do not incur any fixed costs related to export of their final products or import of foreign inputs, π_f is the profit where $f = 0$. If firms do undertake international trading activities, the likelihood of having internal funds will decrease by δ_T. π_γ indicates the profits accumulated through externally financing of the assets through bank loans.

If firms do export or import, their profits should be greater than non-exporters or non-importers respectively, in order to make the payment of fixed costs related to international trading activities viable. If they externally finance their production process, the profits should be less than if they trade by utilizing internal sources of finance.

If firms do not export nor import, the profit function can be expressed as:

$$E(\pi) = (q - \delta_L)\pi_0 + (1 - q + \delta_L)\pi_\gamma$$

The probability that firms can use internal cashflow to finance production and their trade activities is reduced by the exogenous shock. Subsequently, their need for financial leverage is increased by the exogenous shock. We also assume $\pi_0 > \pi_\gamma$ due to the presence of information asymmetries between the lenders and the borrowers that entail deadweight losses, which Bernanke and Gertler (1989) define as 'agency costs'.

Suppose that firms are likely to spend the internal funds (δ_T) to participate in international trading activities (T) (pay the fixed costs associated with it) in stage 1. The expected profit will be:

$$E(\pi|T) = (q - \delta_L - \delta_T)\pi_0^T + (1 - q + \delta_L + \delta_T)\pi_\gamma^T - TC_T$$

where TC_T is the fixed cost to participate in international trade. I also assume that $\pi_0^T > \pi_\gamma^T$ due to the presence of agency costs. The equations are similar to that expressed in Gorodnichenko and Schnitzer (2010).

Manova (2010a), Manova (2010b) and Chor and Manova(2011) study the effects of financial tangibility and external dependence at the industry level on the extensive and intensive margins of exports and are the basis for the augmentation of this model. As potential profits for firms vary with their productivity levels, the firms above a certain productivity cutoff will be able to obtain outside financing and produce for the foreign market if they are exporters and purchase from the foreign market if they are importers. This cutoff will be higher within industries that need greater external financing and within industries that have fewer tangible assets (with c_s defined as the fraction of production costs used to purchase tangible or 'hard' assets and d_s defined as the fraction of production costs externally financed to purchase fixed assets)[7]. δ_P captures negative shocks to productivity (along with negative liquidity shocks, δ_P can also include rising production costs, falling profit margins etc), while d_s and c_s capture the exposure

[7] $0 < d_s, c_s < 1$.

of firms to shocks on their financial leverage. Given the amount of debt borrowed from banks and holding financial development constant across countries, firms that belong to more financially vulnerable industries will pay greater financial costs associated with the loan. On the other hand, if tangible assets constitute a larger proportion of total assets, the financial costs will be lower but a counter-argument by Besedes et al. (2011) states the probability of failure of firms will be higher for a given interest rate as more assets can be seized from the borrowers. This indicates higher risk to the borrowers. However, development of financial institutions within a country increases investments in more financially vulnerable industries and industries characterized with lower asset tangibility as development of financial institutions allows to reduce asymmetric information between lenders and borrowers, hence lowering the costs of borrowing.

Introducing external dependence and asset tangibility into the model, the equations can be stated as[8] :

$$E(\pi) = (q - \delta_P)(1 - c_s)(1 - d_s)\pi_0 + (1 - q + \delta_P)(c_s)d_s\pi_\gamma$$

and

$$E(\pi|T) = (q - \delta_P - \delta_T)(1 - c_s)(1 - d_s)\pi_0^T + (1 - q + \delta_P + \delta_T)(c_s)d_s\pi_\gamma^T - TC_T$$

As c_s converges to 1, the supply of financial leverage by the investor is likely to increase. Similar is the case if d_s converges to 1. The greater the proportion of leverage spent on collateral, financial leverage can be obtained at a more favorable price but at higher risks. The greater the external dependence, the larger the need for financial leverage and higher the costs of borrowing. On the other hand, collateral of firms can make financial leverage more favorable, due to lower costs and subsequently increase the profits from financial leverage. Firms with 'soft' assets are predicted to perform worse than firms with more tangible assets as they exhibit lower growth rates. High external dependency can be costly to firms as it increases financial vulnerability to negative liquidity shocks, but it is within these industries that firms are more likely to borrow to finance investment projects. Basically, as Rajan and Zingales (1998), Hur et

[8] Whether firms participate in international trade or not, the fraction of fixed costs externally financed will be similar in both types of industries, high and low.

al (2006), Manova (2010a), Manova (2010b) and Chor and Manova (2011) assert that financial development in countries allows firm growth within industries highly dependent on external financing and characterized by low asset tangibility.

If exporters and importers are similar in their investment patterns, I will observe them to have similar demand for financial leverage within both industries. However, the investment patterns of exporters and importers can be different. Importers rely on greater input quality and demand absorptive capacity related to their inputs, which may expose firms to greater needs of external funds. The following empirical study will determine the pattern of investments undertaken by firms that either export only, or import only or operate only within the national market, as I consider the desire of firms to become two way traders rather than the aforementioned strategies of trading activities.

The testable implication of this model is that the financial leverage influences the international trading activities of firms. As firms undertake certain trading activities due to the variation in their financial leverage, I will test the impact of financial leverage on the decision of firms to expand their international trading activities. The model above states that the external dependence and asset tangibility of industries dictate the demand for financial leverage by firms. I will further determine whether firms that exist within industries characterized by different levels of external dependence and asset tangibility are restricted to particular trading activities dependent upon the extensive and the intensive margins of their financial leverage.

I predict that within externally dependent industries, firms that undertake larger financial leverage and possess a large proportion of intangible assets will less likely obtain additional finance for investments required to become two way traders due to the lack of collateralizable assets. On the other hand, firms that belong to industries where internal cashflow constitutes a large proportion towards the funding of their investments will have their trading activities inhibited by their financial leverage as firms may not be able to obtain sufficient credit from lenders to invest in the expansion of their production process. Furthermore, firms within industries with high asset tangibility may not invest in trading activities if they prefer to limit the exposure of their collateralizable assets to the investors in case of default. Hence, the intensity of financial leverage would lower their likelihood of expanding their trading activities. In addition,

firms belonging to industries characterized by a smaller proportion of collateralizable assets may find it difficult to invest in the expansion of their trading activities through increase of financial leverage as they may own fewer tangible assets and their investments in knowledge intensive intangible assets account for a significant proportion of their total assets.

The Data

The Enterprise Surveys, which provides firm level data, is commonly known as The Business Environment and Enterprise Performance Survey (BEEPS) dataset in the Central and Eastern European and Central Asian countries and is created jointly by the World Bank and the European Bank for Reconstruction and Development [9]. There are 6,628 firms in a panel of 7,288 observations, with many firms only surveyed once. In Appendix A, I define the variables. In Appendix B, I list the names of the countries considered in the sample, with the number of observations for each country. I only consider firms that belong to manufacturing industries, ISIC Revision 3.1 sectors 15 to 37, and eliminate all firms that have been surveyed in years other than 2005 and 2009. The data on domestic credit provided by banking sector is collected from World Development Indicators by the World Bank.

The industry level data on external dependence and asset tangibility has been borrowed from Manova et al (2011).

[Figure 1 about here]

In Figure 1, I show the financial leverage of firms engaging in various trading activities. Two way traders are most likely to be financially leveraged while domestic firms are least likely.

Using domestic credit provided by banking sector (percentage of GDP) as a proxy for the amount of credit available within the country, I graph the relationships between two way traders against various trading activities and the proxy for country level domestic credit in Appendix C. In Appendix D, I graph the relationship between the extensive margin of financial leverage and the intensive margin of financial leverage and domestic credit. I observe a positive relationship

[9] Enterprise surveys are available at http://www.enterprisesurveys.org. As with every survey, some data collected was marked as being doubtful by the interviewers, as the accuracy of the data collected is ranked. I have eliminated any observations that have been marked as doubtful by the interviewers.

across the board indicating that two way traders are likely to be more prominent in countries with greater financial development, where firms are also likely to be more financially leveraged.

Results

Probit Estimation

The purpose of this paper is to analyze whether firms which are financially leveraged are more likely to be two way traders than firms that export only, import only and trade only within the national market. A dummy variable, which is also our dependent variable for each regression, accounts for the decision of firms to trade two way against the other trading activities, international or only within the national market. Two way traders are assigned a value of 1 and firms that either export only, or import only or trade only within the national market are assigned a value of 0. The independent dummy variable accounting for fixed assets financed by bank loans is assigned a value of 1 if firms do have any of their assets purchased via bank loans (not leveraged) and 0 if they have none of their fixed assets financed by bank loans.

The regression equation is:

$$Y^*_{ijet} = \beta_1 EXTFIN_{ijet} + \beta_2 z_{ijet} + \eta_t + \zeta_j + \alpha_e + \varepsilon_{ijet}$$

where Y^*_{ijet} is the dependent variable for firm i, which makes a decision to export, import or undertake both activities at time t, j is the 3 digit ISIC Rev 3.1 industry, and e is the EU membership status. $EXTFIN_{ijet}$ accounts for the decision of firms to seek bank loans to purchase their fixed assets. Y is binary, with two outcomes ,1 or 0. I assume that Y takes the form $\Pr(Y = 1|X) = \Phi(X'\beta)$. The $\varepsilon_{ijet} \sim N(0,1)$, where $Y = 1$ if $Y^* > 0$[10].The standard errors are clustered at the industry level. Depending on the particular regression, $EXTFIN_{ijet}$ either indicates the extensive margin, which determines whether the firms have financed the purchase of their fixed assets from bank loans, or the intensive margin, which is calculated as the percentage of assets financed by bank loans. The intensive margin is only considered for

[10] All results, except under the instrumental variable section, are calculated as the marginal effects at the mean values of the independent variables.

firms that have at least one percent of their assets financed by bank loans. z_{ijet} is a vector of firm characteristics. Productivity, firm size, skill intensity, workforce composition in terms of educated workers and in-house formal training, along with innovative strategies of firms, age of firm and their capacity utilization have been used as control variables. The variable on productivity is calculated as value-added (sales less cost of labor and materials) divided by the number of total production workers. It is considered as a ratio to the average value of productivity for all firms within the industry, in a given country for a given year. Wagner (2002) uses a similar technique for average wage per employee in order to calculate the deviation of firm productivity from the industry average. Productivity effects may be interdependent upon other firms in the industry through spillover effects[11]. α_e accounts for the time-invariant fixed effect dummies at the regional (EU membership) and ζ_j accounts for 3 digit industry level in order to observe industry characteristics that are otherwise not captured, while η_t accounts for time dummies. ε_{ijet} is the error term.

The variable accounting for the intensity of financial leverage is considered as two separate proxies. Proxy 1 considers the intensity of financial leverage as the ratio to the industry level average of financial leverage. Proxy 2 considers the intensity of financial leverage as a variable accounting the distance between the respective firms and the firms with the least financial leverage within their industry[12]. With the existence of asymmetric information between firms and the lenders, a hierarchy of preferences on various sources of financing, internal sources and bank loans, can be established between firms[13]. Firms may seek financial leverage given the amount of financial leverage sought by other firms within the industry in order to counter the costs of asymmetric information.

Joint dependence of other firms regarding financial strategies within the industry can lead to variation in financial structure even after controlling for industry fixed effects. MacKay (2005)

[11] Another reason is that the collection of monetary values in the BEEPS dataset vary across periods as they may have been recorded in local currencies in 2005 and US dollars in 2009. As I do not use country fixed effects, due to the small number of observations, I can run into the problem of reporting wrong monetary values. Using the ratios for the variables with monetary values allows to avoid this issue.

[12] The fixed effect industry dummy is at the 3 digit level as there is a potential problem of very few number of observations within certain 4 digit ISIC industries. As industry averages can still be calculated at the 4 digit industry level, I prefer to implement this level of disaggregation to calculate the various proxies of the intensity of financial leverage.

[13] Kumar (2007) is a critical review of articles that use various measures of financial leverage. Various frameworks are discussed in the paper.

stresses that it is important to note the variation in financial structure of firms that can be as a result of jointly determined financial decisions. One of the characteristics of a proxy suggested by MacKay (2005) is that it incorporates financial leverage adjusted for typical firms within their industry in a given year. In lieu of this strategy, I include a variable that has been adjusted to the average firm within the industry in a given year, and state it as Proxy 1. Proxy 2 accounts for the difference between the respective firms and the firms with the minimum financial leverage recorded within the industry in a given country for a given year. As I control for characteristics of firms such as productivity, capacity utilization and number of full-time employees, the firms with the least financial leverage can be considered more financially healthier firms. If decisions are indeed jointly determined, the optimal amount of leverage for firms will be based on the financial leverage sought by other firms. Assuming that costs of financial leverage increase as greater percentage of assets are financed by bank loans, the firms with the least percentage of their assets financed by bank loans will be paying the lowest cost. A lower value for both proxies will indicate better financial health.

[Table 1 about here]

There are 2,056 two way traders, 311 exporters only, 2,616 importers only and 1,905 firms that trade only within the national market within the sample[14]. In Table 1, I show that two way traders are more likely to be financially leveraged than all other types of firms. The coefficient on the extensive margin of financial leverage is positive and significant at the 1% level for two way traders against firms that import only or trade only within the national market and at the 5% level against firms that export only. The coefficient for domestic firms (foreign ownership less than 10%) is significant and negative across the sample, implying that firms which participate as two way traders are more likely to be foreign firms. Number of full-time employees and the dummy variable on formal training significantly influences two way traders across all the other trading activities, while innovation and age of firm significantly influences two way traders against firms that import only and firms that trade only within the national market. However, two way traders are more likely to be more productive and have less skill intensity than firms that operate only within the national market. The percentage of employees with a university

[14] In the regression tables, a firm that operates only within the national market is labeled as "No Int. Trade".

degree is positive and significant for firms that trade two ways against those firms that trade only within the national market. It is not significant for firms that trade two ways against firms that export only and import only. This implies that the percentage of employees with a university degree is not significantly different for firms that trade internationally, as such firms may require to undertake investments in complementary knowledge-intensive assets.

[Table 2 about here]

In Table 2, I show that Proxy 1 negatively impacts the probability that firms are two way traders rather than firms that import only and trade only within the national market, at the 1% level and at the 5% level of significance respectively. Proxy 2 indicates that two way traders are more likely to be financially healthier than firms that trade only within the national market and the effect is significant at the 5% level. Such firms are more likely to have financial leverage equal to that of the least financially leveraged firms within the industry. There is a lower number of observations than in Table 2 as only those firms that are financially leveraged are considered. The fact that Proxy 1 is significant at the 1% level but Proxy 2 is not significant indicates that firms which import only will be less financially healthier than two way traders in terms of the ratio to the average financial leverage within their industry but their financial leverage itself will not necessarily be significantly greater than the least financially leveraged (most financially healthy) within their industry. Further, the extensive margin positively influences two way trading activities, while the proxies on intensive margins negatively influence two way traders. This implies that although two way traders are likely to have borrowed from banks to finance their assets, the degree of financial leverage amongst firms that have borrowed will be the least intense for two way traders.

In Table 2, I show that firms which export only are not different than two way traders in terms of the intensity of financial leverage as neither the first proxy nor the second proxy significantly influences the decision of such firms to become two way traders. The lack of significance on the impact of the proxies on the intensity of financial leverage for firms that export only can indicate that such firms may have the ability to generate internal funds through export revenues to finance investments as two way traders. I also find that firms which trade only within the national market are likely to face more severe constraints in terms of financial leverage as they

are likely to be less financially healthy in terms of both proxies. Firms that trade only within the national market are likely to have financial leverage greater than the average firm within their industry and are also likely to be significantly more leveraged than the least leveraged firm within their industry.

Furthermore, innovation, formal training and number of employees are positive and significant for two way traders against firms that operate only within the national market. The variable on innovation only influences the firms that trade only within the national market. The significance of the coefficient on formal training influences the decision of firms to become two way traders against their decision to trade only within the national market and import only. An interesting finding in the Tables 1 and 2 is that once firms that export only have access to financial leverage, the variables that remain significant are domestic firm and number of employees. Firms that import only are likely to be domestic firms, younger, have fewer employees and are less likely to provide formal training than two way traders. Apart from being financially leveraged, firms that trade only within the national market are also less likely to innovate, less likely to provide formal training to employees, are more likely to be skill-intensive and employee fewer workers. The level of significance for all the variables that are significant varies between the 5% and 1% level, with majority of the variables at the latter level. The probit estimation has helped us determine the constraints that each firm undertaking a particular trading activity faces, with firms that trade only within the national market generally facing the greatest constraints in terms of the variables used in this paper, followed by firms that import only. This implies that given the distribution of financial leverage, the firms that export only are likely to be more similar to two way traders than firms undertaking other trading activities.

Robustness Check–Instrumental Variable Estimation

One of the major concerns with the results in the probit estimations above is the endogeneity bias. Firms participating in international trading activities are likely to obtain financial leverage and bias the results of the extensive margin of financial leverage upwards. On the other hand, firms participating in international trading activities can earn greater profits and improve their financial health as they reduce their financial leverage. This can bias the results of the intensive

margin downwards. In order to account for the endogeneity bias, I introduce instrumental variable estimation, which can be considered a robustness check to the probit estimation[15].

The excluded instrumental variable is a combination of two variables, overdue payments to suppliers or trade credit, similar to one of the instrumental variables used in Gorodnichenko and Schnitzer (2010), and an indicator on whether firms have started or renewed their relationship with lenders by submitting an application for a loan or a line of credit[16,17]. De Bonis et al. (2010) assert that although activities such as internationalization of firms increases the opaqueness of the banking relationship due to larger payments of sunk costs, rising intangibility ratio and shifting of the collateral abroad, the length of the relationship between the bank and the decision of firms to participate in trade does not have any significant correlation. The relationship between the firms and the banks should define the access to capital by firms and the financial leverage ratio of the firms, which in turn should determine the decision of firms to participate in international trading activities. Furthermore, the decision to trade should not be influenced directly by the excluded instrumental variable. As is mentioned in Cunat (2007), Fabri and Klapper (2009) and Hydman and Serio (2010), firms may be able to seek overdue payments from their suppliers if they have an overall market advantage compared to the suppliers as they can then dictate their terms and conditions. One way to determine that trade credit does not directly affect exports or imports is to test the effect of the changes in the interbank rate on trade weighted credit contraction at the industry level as is done by Levchenko et al. (2010). They find that although various industries are affected differently by credit contractions, the average effect is zero. Therefore, this variable can provide us with an exogenous variation to cash receipts based on the market conditions and the macroeconomic environment. Combining it with an indicator for the establishment of a relationship with lenders allow us to consider

[15] Variables such as the level of employment can face an issue of reverse causality, as the dependent variable can also influence the explanatory variables. However, in this dataset, reverse causality is not a serious issue as such variables do not vary much over a three year period. For instance, the correlation between current level of employment and level of employment three years ago is 0.90.

[16] Ideally I would have separated the two variables when conducting the instrumental variable estimation. Although not reported, the results are very similar to those that I obtain in this section by combining the variables. However, the two variables when separated reject the overidentifications tests through Sargan statistics for some of the regressions.

[17] The correlation between various trading activities and the excluded instrument variable ranges from 5% to 26%, while the correlation between the excluded instrument and the extensive and the intensive margins of financial leverage ranges from 25% to 61%. This shows that the excluded instruments are correlated with the endogenous variables but not necessarily with the dependent variables.

those firms that seek trade credit or a loan. Firms that face negative liquidity shocks and have attempted to establish a relationship with their lenders are more likely to be financially constrained, indicating a positive relationship between the financial leverage of firms and the excluded instrumental variable.

Minetti and Zhu (2011) account for the local supply of banking services available to firms as one of their instrumental variables in order to control for endogeneity issues related to exporting and credit constraints. The local supply of banking services will influence the relationship between firms and their creditors, hence their decision to apply for a loan or a line of credit. Firms that do not seek to establish or renew their relationship with lenders, through a line of credit or applying for loans, will be less likely to influence their financial leverage through negative shocks to their liquidity as they will not face complications of holdup problems and information asymmetries between the borrower and the lender[18]. As per Bolton and Freixas (2000) firms can be segmented as i) riskiest firms which cannot obtain any loans, ii) safer firms which are able to take out bank loans and iii) safest firms which prefer to use their own internal resources and avoid intermediation costs. Furthermore, as Hashi and Toci (2010) consider a variable which affects the decision of firms to participate in the financial market but does not have an impact on the decision of banks to lend, I use a similar technique by employing a variable that accounts for the decision of firms to establish or renew its relationship with a lender[19].

The second stage regression equation is:

$$Y^*_{ijet} = \beta_1 EXTFIN_{ijet} + \beta_2 z_{ijet} + \zeta_j + \alpha_e + \eta_t + \varepsilon_{ijet}$$

and the first stage regression equation is:

$$EXTFIN_{ijet} = \gamma_1 OVERDUE_{ijet} + \gamma_2 z_{ijet} + \zeta_j + \alpha_e + \eta_t + \nu_{ijet}$$

[18] Application for a loan does not necessarily imply that the firms are seeking to leverage their financial assets. As firms can borrow from non-financial institutions, firms can obtain line of credit or a loan from non-financial institutions. Financial leverage is the percentage of assets financed by bank loans. Therefore, this variable accounting for the relationship with the lender does not necessarily have a one to one relationship with the variable on the financial leverage.

[19] Although Hashi and Toci (2010) do assert that firm size does affect the decision of firms to apply for a loan, the effect is more likely to be determined by the amount of financial leverage. Small firms are less likely to apply for a loan because a) they may lack collateral and b) their capacity to borrow is much lower. Highly indebted large firms can face the same challenges.

where $OVERDUE_{ijet}$ accounts for firms owing payments to suppliers and have attempted to establish a relationship with lenders by applying for a loan or a line of credit. z_{ijet} are the other firm level characteristics, ν_{ijet} is the error term, ζ_j and ζ_e are the fixed effects dummies such as EU membership dummy and 3 digit ISIC Rev 3.1 industry code respectively and η_t is the time dummy variable.

[Table 3 about here]

The results in Table 3 are quite similar to the probit estimation results in Table 1. However, the p-value for the Wald test of rho=0 is greater than the 10% level for most of the regressions (except in column 6), which indicates it is statistically insignificant. Therefore, our initial probit estimation is consistent. Even though, I reject exogeneity for firms that trade only within the national market, the results are very similar to that of the probit estimations. Furthermore, the underidentification test and the weak identification tests reject the null hypothesis that the instruments are either underidentified or weakly identified[20]. The larger coefficients recorded in the instrumental variable estimation are a result of the positive effect of the excluded instrument. Firms that are overdue to their suppliers and have applied for a loan are more likely to be financially leveraged. Subsequently, it increases the likelihood that the firms are two way traders.

In Tables 4 and 5, I analyze the influence of the intensive margin of financial leverage on the likelihood that firms are two way traders rather than exporters only, importers only and firms that trade only within the national market. To be consistent with the proxies for the intensive margin, the excluded variables have been calculated as the ratio to industry average of the $OVERDUE$ variable and as a difference to the industry minimum of the $OVERDUE$ variable respectively for Proxy 1 and Proxy 2 on the intensity of financial leverage. The F-statistics indicate that the excluded instruments do not suffer from any weak instrument problems in any of the regression in Tables 3, 4 and 5.

[Table 4 about here]

[Table 5 about here]

[20] The excluded instrument is viable also because firm level characteristics, such as productivity and capacity utilization, included in the regression do not significantly alter the power of these tests. Similar result is obtained by Gorodnichenko and Schnitzer (2010).

Similar to the results for the extensive margin of financial leverage in Table 3, I cannot reject exogeneity in Table 4 and Table 5. Again, the probit estimations can be considered as consistent across all regressions. I obtain similar results for the reported probit estimation on the intensity of financial leverage and its effect on trading activities. As predicted, the coefficients under the instrumental variable estimation are larger and indicate the positive effect of the excluded instrument on the endogenous variable. This implies that the firms will increase the percentage of their assets financed by bank loans as they apply for loans and establish or renew their relationship with lenders. With the assumption that the instruments are not weak and that the exogeneity of the variables on financial leverage cannot be rejected, I can conclude that the probit estimations in the previous are consistent and efficient. I will use the probit estimations in the next section.

External Dependence and Asset Tangibility

In order to control for the endogeneity of the variables on the extensive and intensive margins of financial leverage, I use an industry level indicator that characterizes the financial vulnerability and the asset tangibility of the respective industries. With the assumption that industry level indicators are exogenous to firm characteristics, this is another robustness test for the probit estimations above. This method is similar to that used by Berman and Hericourt (2010), Manova (2010), Chor and Manova (2010), Manova et al. (2011) and Braun and Larrain (2005) as they implement a proxy for financial dependence by Rajan and Zingales (1998). This approach helps to exploit differences in credit availability across industries that may prevent firms from undertaking international trading activities. I divide the industries into two subsamples, industries with low and high external dependence and low and high asset tangibility respectively. The effects of financial leverage on international trading activities will be strongly evident within certain industries. As defined in Rajan and Zingales (1998), external dependence of firms is calculated as the amount of desired investment that cannot be financed through internal funds generated within the business, while asset tangibility is calculated by Braun (2003) as the amount of percentage contributed by net plant, property and equipment over total assets.

Berman and Hericourt (2010) suggest that there is priori no reason for endogeneity bias

between participation in international trade and financial leverage to be distributed across industries with different levels of external dependence or asset tangibility. This can be explained by the fact that financial leverage is firm level and external dependence and asset tangibility are industry level and uncorrelated by design, while the correlation itself between financial leverage and the two industry level indicators are low. The correlation between external dependence and financial leverage (extensive) is 0.06%, while correlation between asset tangibility and financial leverage (extensive) is 7%. The correlation between external dependence and the two measures of the intensity of financial leverage is -3% and -0.04% respectively, while correlation between asset tangibility and the two measures of the intensity of financial leverage is -10% and -0.04% respectively. In addition, financial leverage at the firm level should not be correlated either to the industry level of external dependence and asset tangibility as the data for the industry level is derived from US data and averaged for the period from 1980-1999. The purpose behind using US data on external dependence and asset tangibility from Manova et al (2011) is that it characterizes one of the most advanced and sophisticated financial markets and thus reflects the true demand by firms for external dependence and determines the optimal presence of tangible assets in each industry. Further, it eliminates the possibility of external dependence and asset tangibility to endogenously respond to the level of financial development within a country.

The figures and tables in this section show the relationship between external dependence and asset tangibility within each industry and the percentage of firms that are either exporters only, or importers only or two way traders within high and low external dependent and asset tangibility industries. In Figure 2, I observe a negative relationship (albiet at -3% level) between the medians of external dependence and asset tangibility, as is predicted in Manova (2011). This indicates that in countries which tend to have their median industry more externally dependent are also likely to have their median industry characterized by lower asset tangibility. This is consistent with the prediction that as countries develop their financial markets, investments will tend to flow into industries characterized by higher external dependence and lower asset tangibility. As I consider lesser developed financial markets in this paper, asset tangibility can be positively related to domestic credit, as countries with less domestic credit may exhibit poor business environments with weak legal protections for the lender as well as the borrower,

undermining the ability of tangible assets to reduce informational asymmetries.

[Figure 2 about here]

In Figures 3 and 4, I show a pattern of investments in trading activities within industries characterized by the level of external dependence and asset tangibility. The firms that trade only within the national market are not reported in the figures below.

[Figure 3 about here]

[Figure 4 about here]

Although, the pattern of investments may differ as there are a fewer percentage of firms that trade two way within less externally dependent industries than within the more externally dependent industries, the rankings across trading activities does not change as firms that import only outnumber other international traders within both high and low external dependence and asset tangibility. The percentage of two way traders fall within the low externally dependent and high asset tangibility industries, compared to their counterpart industries. The lower percentage of two way traders within an industry can indicate the preference of trading activities, as firms that have access to external funds and firms that possess lower tangible assets are more likely to be two way traders. Firms can be constrained to expand trading activities within industries where external funds are required to produce and undertake their existing trading activity. On the other hand, firms can also be constrained to expand their trading activities within industries characterized by less tangible assets.

The ranking of the trade activity between the asset tangibility of the industries remains more or less consistent, as I observe all types of international traders to have a smaller percentage of participation within industries characterized by higher asset tangibility. Therefore, this can relate to the discussion that firms which belong to industries characterized by high asset tangibility tend to be more restrictive in expanding their international trading activities. Although these figures show us a certain relationship between trading activities and industry level external dependence and asset tangibility, the analysis in the next section will show whether firms that obtain financial leverage are more likely to participate as two way traders than other international trading activities under varying industry level characteristics.

In Appendix C, I show that two way trading is positively associated with the financial development within a country. Even though the industry level data is derived from the US, one of the most financial developed countries, the ranking of the external dependence and asset tangibility should remain fairly stable across countries. It is unlikely that firms in poorer developed financial markets will reverse the ranking of the industries. In Appendix D, I graph the different financial proxies with respect to the domestic credit, and I observe that countries with greater domestic credit will have firms that are generally more financially leveraged.

In Appendix E, I correlate the country level medians of industry external dependence and asset tangibility with domestic credit provided by the private sector as a percentage of GDP. The positive relationship between external dependence and domestic credit is as predicted because higher domestic credit available in the economy would generate growth within industries that require higher external dependence. However, on the other hand, I observe a positive relationship between domestic credit and asset tangibility. This is different from the pattern observed in many developed countries. One explanation, as provided by Hass and Peeters (2004), is that the poorer business environments as a result of weaker legal rights within many of the transition economies, asset tangibility does not necessarily reduce the negative consequences lenders face due to informational asymmetries between the borrowers and the lenders[21]. On the other hand, as discussed in an earlier section, firms that belong to an industry characterized by high asset tangibility would neither borrow as that would increase the probability that a large proportion of their assets are seized by influential lenders (such as large or state owned banks) in case of a loan default[22]. Although, it is likely that countries with less domestic credit will record a lower median value for asset tangibility across industries, this does not necessarily change the ranking of asset tangibility across the industries.

The following analysis will determine the preference of firms to become two way traders

[21] The positive relationship between the median of asset tangibility and domestic credit is evident for countries that are less developed within the sample(i.e. non-EU countries), while a negative relationship is evident for countries that are more developed (EU countries). The lack of domestic credit in non-EU countries could be lowering the incentive for industries characterized by high asset tangibility to grow. However, we do observe trading patterns within industries to be more consistently distributed between low and high asset tangibility industries. Though, this could be because there are a greater number of surveys conducted in the more developed financial markets.

[22] It is observed that firms are less likely to make investments in trading activities within industries with lower asset tangibility.

against their decision to export only, import only, and operate only within the national market given the different industry level environments of external dependence and asset tangibility. In Appendix F, I list the number of observations per industry level characterization, with a low number of observations in some cases. However, this weakness does not have a significant impact on the quality of results as I do observe a pattern similar to our predictions.

External Dependence

The industries are divided into subsamples according to their level of financial vulnerability or external dependence. Firms that belong to the more externally dependent industries are likely to borrow loans from banks to finance the purchase of their fixed assets and less likely to utilize their internal sources of funds. If the expansion of trading activities requires investments in the purchase of complementary assets, firms are likely to seek external financing for such investments. On the other hand, firms that belong to less externally dependent industries utilize their internal sources of funds to purchase fixed assets and in turn, may have lower amount of internal sources of funds available to expand their international trading activities.

[Table 6 about here]

In Table 6, I observe that the extensive margin of financial leverage does significantly impact the probability, at the 5% level, that firms which export only will rather trade two way within industries characterized by low external dependence. None of the other variables on firm level characteristics are significant. However, within industries characterized by high external dependence, I do not observe a significant impact on the extensive margin of financial leverage. The only variables that are significant are number of employees, formal training and skill intensity, all at the 5% level, implying that within industries where firms are likely to be financially vulnerable or high externally dependent, firms that increase the number of employees, invest in formal training and skill intensity are likely to be two way traders rather exporters only. On the other hand, firms that are financially leveraged will be more likely to be two way traders than firms that import only and operate only within the national market across both types of industries, with level of significance of the probability between the 5% and 1% level.

Kugler and Verhoogen (2009) discuss the exceptional performance of importers, stating that they pay higher prices for inputs as they are more likely to purchase higher quality inputs to complement their higher quality ouputs. Amiti and Koeining (2007) discuss the gains in labor productivity as firms import by purchasing inputs of higher quality. Firms that import are likely to purchase high quality inputs with complementary machinery and equipment which may be priced higher than domestic inputs. In effect, importers are more likely to finance their purchases of assets through bank loans as they demand investments in complementary assets. Variables such as domestic firm, age of firm and number of full-time employees significantly impact the probability that a firms are two way traders rather than importers within both types of industries.

[Table 7 about here]

[Table 8 about here]

Considering firms are financially leveraged, the proxies for the intensity of financial leverage in Tables 7 and 8 suggest that firms which export only are not significantly impacted by the intensity of their financial leverage. Apart from skill intensity and number of full-time employees, no other variable significantly impacts the probability of firms that export only in financially vulnerable industries indicating that their dependence on external funds will allow it to expand their trading activities. However, within low externally dependent industries, variables on innovation and domestic firm are significant at the 5% level, while skill intensity is significant at the 10% level. The intensity of financial leverage negatively impacts the probability of firms that import only to become two way traders within industries with high financial vulnerability and firms that operate only within the national market to become two way traders within industries with low financial vulnerability. The significance of financial leverage is recorded at the 5% level. For firms that undertake importing activities, the access to external funds may require it to finance investments in complementary assets, hence increasing their intensity of financial leverage as they borrow funds against the assets owned. Ahn, Amiti et al (2011) and Haddad et al (2011) suggest that import prices increased as the import values fell in financially vulnerable industries due to a supply contraction faced by the importers, especially during the recent credit crisis of 2008-2009. This theory can suggest that importing firms may be borrowing from banks

to finance the purchase of the more costly inputs or complementary assets in the more financially vulnerable industries, constraining firms that import only from becoming two way traders.

Asset Tangibility

Braun (2003) incorporates asset tangibility of firms into the model of Rajan and Zingales (1998). Asset tangibility indicates the proportion of assets constituted by 'hard assets' such as plant, property and equipment rather than 'soft assets' such as human capital and goodwill invested by the firm. Chor and Manova (2011), Manova (2010a) and Manova (2010b) predict that investment activities of firms should be focused within industries that are externally dependent and have low asset tangibility as countries becomes more financially developed. As firms that import only are more likely to be characterized by a greater intensity of financial leverage within industries that are financially vulnerable, as shown in Tables 7 and 8, the intensity of financial leverage should significantly inhibit such firms from becoming two way traders within industries that require lower asset tangibility. On the other hand, the intensity of financial leverage is significant for firms that operate only within the national market within less financially vulnerable industries, as shown in Tables 7 and 8. This implies that financial leverage should be significantly lower for two way traders rather than firms that operate only within the national market within industries characterized by high asset tangibility. Therefore, as firms belonging to more externally dependent industries invest in expanding their trade activities, it also indicates their ability to invest in expanding their trade activities within industries that require lower asset tangibility and vice versa.

[Table 9 about here]

In Table 9, there is no significant effect on two way trade against firms that export only within either industries. Other variables such as domestic firm and formal training are likely to impact the probability of firms that export only to become two way traders, at the 5% and 1% level, within industries characterized by high asset tangibility. The number of full-time employees is significant at the 10% level within industries characterized by lower asset tangibility. High asset tangibility can also indicate that firms which export only are not able to invest in formal

training of employees that may be required to become two way traders. On the other hand, the impact of the extensive margin of financial leverage is positive for two way traders against firms that import only within industries characterized by low asset tangibility at the 1% level of significance. Two way traders are positively impacted by the extensive margin of financial leverage within both industries against firms that trade only within the national market. It is at the 1% level of significance within industries characterized by high asset tangibility and at the 5% level within industries characterized by low asset tangibility. An interesting aspect is that the percentage of employees with a university degree is positive and significant in industries characterized by high asset tangibility for two way traders against firms that import only and trade only within the national market at the 5% level. This implies that it is only those firms that invest in knowledge intensive complementary assets such as highly educated workers are likely to be two way traders within industries characterized by high asset tangibility. As more variables significantly affect the decision of firms to trade two way against their decision to trade only within the national market within industries characterized by high asset tangibility, firms that are less likely to fail (for instance, those that observe greater productivity-levels) are also more likely to expand their trading activities.

Besedes et al (2011) suggest that firms within industries characterized by high asset tangibility are more likely to risk a greater proportion of their collateralizable assets as they seek to finance their investments through bank loans. Such firms would reduce their probability of undertaking investments that involve large fixed costs as their decision to expand their trading activities may become constrained by their financial health. They may lack the willingness to risk their tangible assets as they invest in expansion of their trading activities. On the other hand, as importers only are likely to possess a greater proportion of knowledge-intensive intangible investments, I observe such firms to be more financially constrained within industries characterized by low asset tangibility. The presence of high asset tangibility within industries can lower the risks of information asymmetry for the lender but can also lead to potentially greater proportion of the assets seized in terms of collateral in terms of default by the borrower.

[Table 10 about here]

[Table 11 about here]

As predicted, in Tables 10 and 11, I show results that are mainly asymmetric to the results in Tables 7 and 8. For instance, in Tables 7 and 8, I observe that financial health is significant for firms that import only within industries characterized by high external dependence. As external dependence and asset tangibility are negatively correlated, I observe a similar pattern for firms within industries characterized by low asset tangibility in Tables 10 and 11. Similarly, the two proxies on financial health are negative and significant at the 1% level for firms that operate within the national market only within industries characterized by high asset tangibility[23].

Information asymmetry between lenders and borrowers suggests that the presence of tangible assets which investors can seize upon failure of repayment of loan provides firms the ability to borrow. Castellani et al (2010) state the significance of the complementary investments in assets required by importers in order to integrate imported inputs into their production process. Knowledge intensive assets can contribute a large proportion of their investments and as the nature of such investments tend to be less tangible, financial leverage within industries that are characterized by lower proportion of tangible assets can significantly affect the probability that firms are two way traders rather than importers only. Within an industry that lacks tangible assets, it may indicate that firms are not able to back up their investments with collateralizable assets, and their decision to become two way traders can be adversely affected with their intensity of financial leverage. The lack of collateralizable assets observed within the industry and the decision of importers to invest in non-collateralizable knowledge intensive intangible assets can make it less attractive for investors to provide firms with external financing. Within industries characterized by high tangibility, age and domestic ownership significantly impacts the probability that firms are likely to be two way traders, indicating that they are likely to be foreign owned and well established firms. Two way traders and firms that import only are mainly similar in firm characteristics within industries characterized by high asset tangibility.

In Table 10, Proxy 1 on the intensity of financial leverage negatively impacts the probability at the 1% level that firms are two way traders rather than exporters only within industries

[23] In Tables, 10 and 11, I do observe one of the proxies on the intensive margin of financial leverage to influence firms that trade only within the national market within industries characterized by low asset tangibility and firms that import only within industries characterized by high asset tangibility, but only at the 10% level of significance. I assume firms to be more sensitive to the intensity of financial leverage within industries where the level of significance of the financial leverage is observed to be greater.

characterized by high asset tangibility. However, in Table 11, I do not see such an effect for Proxy 2. This indicates that firms which export only are likely to be less financially healthier than the average firm but not necessarily more financially leveraged than the firms with the lowest percentage of their assets funded by bank loans within industries characterized by high asset tangibility. Firms that export only are not constrained by any of their firm characteristics within industries that exhibit low asset tangibility.

Conclusion

I determine that firms which participate in various trading activities also face different financial constraints that inhibit their ability to expand their international trading activities, given the financial vulnerability and asset tangibility of their industry. The extensive margin of financial leverage positively influences the probability that firms which have assets funded by bank loans are likely to expand their trading activities from exporting only, importing only and trading only within the national market to two way trading. However, the impact of the extensive margin of financial leverage on the probability that firms which export only are likely to become two way traders is more subtle than for the firms that undertake other trading activities.

The intensive margin of financial leverage does not inhibit firms that export only from becoming two way traders, but it does inhibit firms that import only and operate only within the national market to become two way traders. The effect is stronger for firms that operate only within the national market than firms that import only. Furthermore, the instrumental variable estimation further establishes the results obtained from the probit estimations. The significance of this relationship differs as financial vulnerability and asset tangibility between industries vary. Although, the extensive margin of financial leverage is significant within both industries for firms that import only and firms that operate only within the national market, it is the significance on the intensive margin which differs as financial vulnerability and asset tangibility varies between industries. I determine that within financially vulnerable industries, firms that import only are less likely to become two way traders as their financial leverage rises due to greater borrowing from the banks. Greater the dependence of the firms on external

funds, high financial leverage of firms that import only will lower their ability to expand their trading activities. On the other hand, the impact of financial leverage is similar within industries characterized by low asset tangibility for firms that import only.

Firms that operate only within the national market are less likely to become two way traders as their intensity of financial leverage increases within industries that observe low financial vulnerability. This relation asserts that such firms are inhibited within industries where firms are less likely to borrow from banks to purchase fixed assets and where internal cash resources are likely to contribute to majority of their investments. Firms that operate only within the national market are also less likely to become two way traders as the financial leverage increases within industries that exhibit high levels of asset tangibility. Exposure of greater collateralizable assets can indeed lower the survival rate of firms as their collateralizable assets are seizable.

In this paper, I raise some interesting questions regarding the effects of financial constraints on the decision of firms to participate in a particular direction of trade and in turn the role of capital markets in determining the trade position of countries. Hence, in the macroeconomic sense, the contraction of domestic credit within the economy can limit firms to a particular direction in their trading activity and reduce the ability of economies to expand their international trading activities. In the light of the current global financial crisis, this contributes to the studies on the microeconomic as well the macroeconomic impact of the recent fall in credit availability within several economies. Furthermore, the extension of this empirical study into a detailed theoretical model that explains financial constraints and the investment behavior of firms given the above mentioned industry and country characteristics will contribute further to this study.

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Tables

	(1)	(2)	(3)
Dep Var: Two Way vs	Exp Only	Imp Only	No Int. Trade
Financial Leverage (Extensive)	0.037**	0.151***	0.206***
	(0.018)	(0.021)	(0.027)
Productivity	0.007	0.013*	0.023*
	(0.010)	(0.007)	(0.012)
Percentage of Empl.	0.000	-0.000	0.002**
with Univ. Degrees	(0.001)	(0.001)	(0.001)
Innovation	0.037	0.067*	0.264***
	(0.028)	(0.035)	(0.043)
Domestic Firm	-0.039**	-0.252***	-0.297***
	(0.018)	(0.026)	(0.033)
Number of FT employees	0.0002***	0.0003***	0.001***
	(0.0001)	(0.0001)	(0.0002)
Age of Firm	0.000	0.004***	0.003***
	(0.000)	(0.001)	(0.001)
Capacity Utilization	-0.000	0.001	-0.000
	(0.000)	(0.001)	(0.001)
Formal Training	0.045**	0.047*	0.155***
	(0.018)	(0.025)	(0.032)
Skill Intensity	-0.018	-0.056	-0.205***
	(0.043)	(0.045)	(0.061)
Observations	1,066	2,269	1,821

Robust clustered standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Includes 3 digit industry, EU membership and year dummies

Dependent Variable are dummy variables with two way traders assigned a value of 1.

Table 1: Probit Estimation on the Extensive Margin of Financial Leverage

	(1)	(2)	(3)	(4)	(5)	(6)
Dep Var: Two Way vs	Exp Only	Imp Only	No Int. Trade	Exp Only	Imp Only	No Int. Trade
Financial Leverage	-0.009	-0.037***	-0.033**			
(Ratio to Indus Avg)	(0.008)	(0.013)	(0.013)			
Financial Leverage				-0.0002	-0.001	-0.001**
(Diff from Least Fin Lev)				(0.0003)	(0.001)	(0.001)
Productivity	0.003	0.010	-0.002	0.002	0.011	-0.003
	(0.012)	(0.008)	(0.012)	(0.012)	(0.009)	(0.012)
Percentage of Empl.	-0.000	0.001	0.001	-0.000	0.001	0.001
with Univ. Degrees	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Innovation	0.065	0.063	0.223***	0.065	0.072	0.227***
	(0.056)	(0.076)	(0.082)	(0.057)	(0.075)	(0.084)
Domestic Firm	-0.057***	-0.227***	-0.205***	-0.057***	-0.228***	-0.208***
	(0.019)	(0.048)	(0.036)	(0.020)	(0.049)	(0.036)
Number of FT employees	0.0001**	0.001***	0.001**	0.0001**	0.001***	0.001**
	(0.0001)	(0.0002)	(0.0002)	(0.0001)	(0.0002)	(0.0002)
Age of Firm	-0.000	0.004***	0.001	-0.000	0.004***	0.001
	(0.000)	(0.001)	(0.001)	(0.000)	(0.001)	(0.001)
Capacity Utilization	-0.000	0.001	-0.001	-0.000	0.001	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Formal Training	0.005	0.099**	0.164***	0.005	0.098**	0.164***
	(0.017)	(0.039)	(0.047)	(0.018)	(0.039)	(0.048)
Skill Intensity	-0.036	-0.073	-0.198***	-0.036	-0.076	-0.203***
	(0.037)	(0.075)	(0.064)	(0.038)	(0.075)	(0.064)
Observations	336	825	596	336	825	596

Robust clustered standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Includes 3 digit industry, EU membership and year dummies

Dependent Variable are dummy variables with two way traders assigned a value of 1.

Financial Leverage Proxy 1: Ratio to Industry Average

Financial Leverage Proxy 2: Difference from Least Financially Leveraged

Table 2: Probit Estimation on the Intensive Margin of Financial Leverage

	(1)	(2)	(3)	(4)	(5)	(6)
	Sec Stage	First Stage	Sec Stage	First Stage	Sec Stage	First Stage
Dep Var: Two Way vs	Export Only		Import Only		No Int. Trade	
Financial Leverage (Extensive)	0.185		0.484***		0.857***	
	(0.222)		(0.108)		(0.132)	
Productivity	0.040	0.000	0.031*	-0.018	0.058*	0.002
	(0.062)	(0.046)	(0.017)	(0.022)	(0.031)	(0.037)
Percentage of Empl.	0.001	-0.004*	-0.000	-0.004**	0.006**	-0.003
with Univ. Degrees	(0.003)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Innovation	0.203	0.325***	0.157*	0.156*	0.639***	0.237***
	(0.135)	(0.125)	(0.090)	(0.093)	(0.106)	(0.083)
Domestic Firm	-0.243**	0.160*	-0.650***	0.101	-0.947***	0.048
	(0.116)	(0.095)	(0.071)	(0.080)	(0.112)	(0.097)
Number of FT employees	0.001***	0.000	0.001***	0.000	0.002***	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)
Age of Firm	0.002	-0.004**	0.009***	-0.004***	0.007***	-0.002
	(0.002)	(0.002)	(0.002)	(0.001)	(0.002)	(0.002)
Capacity Utilization	-0.001	0.004*	0.001	0.001	-0.001	0.002
	(0.003)	(0.002)	(0.002)	(0.001)	(0.002)	(0.002)
Formal Training	0.257**	0.242**	0.115*	0.132**	0.399***	0.178*
	(0.100)	(0.108)	(0.062)	(0.065)	(0.089)	(0.093)
Skill Intensity	-0.109	-0.329**	-0.135	-0.111	-0.543***	-0.275**
	(0.257)	(0.167)	(0.113)	(0.114)	(0.167)	(0.129)
Overdue and Relation w/ Lender		1.890***		1.817***		1.929***
		(0.133)		(0.117)		(0.120)
Constant	0.737*	-1.687***	-0.965***	-1.005***	-1.200***	-1.303***
	(0.380)	(0.299)	(0.345)	(0.202)	(0.274)	(0.249)
Underident test (p-value)	0		0		0	
Weak Ident. test (F-stat)	329		400		442	
Wald test of rho=0:	0.843		0.206		0.016	
Observations	1,272	1,272	2,296	2,296	1,890	1,890

Robust clustered standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Includes 3 digit industry, EU membership and year dummies

Dependent Variable are dummy variables with two way traders assigned a value of 1.

Table 3: Bi Probit Estimation on the Extensive Margin of Financial Leverage

	(1)	(2)	(3)	(4)	(5)	(6)
	Sec Stage	First Stage	Sec Stage	First Stage	Sec Stage	First Stage
Dep Var: Two Way Trader vs	Export Only		Import Only		No Int. Trade	
Financial Leverage	-0.025		-0.152		-0.147*	
(Ratio to Indus Avg)	(0.155)		(0.104)		(0.088)	
Productivity	0.032	0.046	0.015	-0.018	0.041	0.063
	(0.108)	(0.063)	(0.018)	(0.047)	(0.087)	(0.059)
Percentage of Empl.	-0.003	0.000	0.002	0.007**	0.004	0.006*
with Univ. Degrees	(0.005)	(0.003)	(0.004)	(0.003)	(0.005)	(0.003)
Innovation	0.495	-0.064	0.070	-0.446**	0.582**	-0.514**
	(0.316)	(0.263)	(0.191)	(0.207)	(0.235)	(0.228)
Domestic Firm	-0.590**	0.264**	-0.613***	0.129	-0.936***	0.092
	(0.273)	(0.131)	(0.149)	(0.108)	(0.188)	(0.137)
Number of FT employees	0.001**	0.000	0.001***	-0.000	0.002*	-0.000
	(0.001)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)
Age of Firm	-0.004	-0.001	0.009**	-0.005***	0.003	-0.005***
	(0.004)	(0.001)	(0.004)	(0.002)	(0.004)	(0.002)
Capacity Utilization	-0.001	0.001	0.001	0.002	-0.002	-0.002
	(0.006)	(0.004)	(0.003)	(0.002)	(0.004)	(0.003)
Formal Training	-0.153	0.017	0.217*	-0.026	0.460***	0.056
	(0.170)	(0.135)	(0.112)	(0.108)	(0.176)	(0.097)
Skill Intensity	-0.491	0.085	-0.056	0.188	-0.617***	0.185
	(0.389)	(0.237)	(0.206)	(0.150)	(0.234)	(0.179)
Overdue and Relation w/		0.471***		0.362***		0.416***
Lender		(0.070)		(0.064)		(0.042)
Constant	6.538***	0.528	-0.524	1.447***	0.117	1.696***
	(0.759)	(0.528)	(0.482)	(0.276)	(0.480)	(0.493)
Underident Test (p-value)	0.001		0		0.006	
Weak Ident (F- stat)	32		28		88	
Wald test of exogeneity (p-value)	0.896		0.442		0.760	
Observations	303	303	736	736	524	524

Robust clustered standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Includes 3 digit industry, EU membership and year dummies

Dependent Variable are dummy variables with two way traders assigned a value of 1.

Financial Leverage Proxy 1: Ratio to Industry Average

Table 4: IV Probit Estimation of the Intensive Margin of Financial Leverage (Ratio to Industry Average as a Proxy)

	(1)	(2)	(3)	(4)	(5)	(6)
	Sec Stage	First Stage	Sec Stage	First Stage	Sec Stage	First Stage
Dep Var: Two Way Trader vs	Export Only		Import Only		No Int. Trade	
Financial Leverage	-0.007		-0.006		-0.005	
(Diff from Least Fin Lev)	(0.011)		(0.005)		(0.006)	
Productivity	0.015	-0.248	0.028	-0.016	-0.014	-0.595
	(0.108)	(1.797)	(0.023)	(0.587)	(0.045)	(1.363)
Percentage of Empl.	-0.001	-0.157*	0.002	0.048	0.005	-0.079
with Univ. Degrees	(0.006)	(0.089)	(0.003)	(0.074)	(0.005)	(0.092)
Innovation	0.384	-9.701	0.145	-9.195*	0.674***	-15.871***
	(0.366)	(8.352)	(0.203)	(4.713)	(0.247)	(5.165)
Domestic Firm	-0.630**	3.660	-0.607***	1.275	-0.975***	-2.624
	(0.270)	(3.450)	(0.140)	(2.687)	(0.184)	(3.558)
Number of FT employees	0.001**	0.001	0.001***	-0.001	0.002**	-0.001
	(0.001)	(0.003)	(0.000)	(0.002)	(0.001)	(0.005)
Age of Firm	-0.001	-0.036	0.010***	-0.036	0.002	-0.068
	(0.003)	(0.047)	(0.003)	(0.045)	(0.004)	(0.048)
Capacity Utilization	-0.002	-0.096	0.001	-0.026	-0.003	-0.111
	(0.005)	(0.103)	(0.003)	(0.060)	(0.004)	(0.070)
Formal Training	0.062	3.676	0.247**	-1.811	0.586***	2.313
	(0.157)	(4.077)	(0.102)	(2.917)	(0.165)	(2.826)
Skill Intensity	-0.321	2.249	-0.157	6.257	-0.735***	6.505
	(0.362)	(6.767)	(0.194)	(4.273)	(0.228)	(4.722)
Overdue and Relation w/		18.729***		19.753***		22.396***
Lender		(4.349)		(2.635)		(3.683)
Constant	6.796***	35.547***	-0.617	37.552***	0.049	53.392***
	(0.431)	(13.689)	(0.506)	(8.413)	(0.503)	(10.967)
Underident Test (p-value)	0		0		0	
Weak Ident (F- stat)	33		56		38	
Wald test of exogeneity (p-value)	0.652		0.452		0.995	
Observations	334	334	823	823	593	593

Robust clustered standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Includes 3 digit industry, EU membership and year dummies

Dependent Variable are dummy variables with two way traders assigned a value of 1.

Financial Leverage Proxy 2: Difference from Least Financially Leveraged

Table 5: IV Probit Estimation on the Intensive Margin of Financial Leverage (Difference From Least Financially Leveraged Firm as a Proxy)

	(1)	(2)	(3)	(4)	(5)	(6)
External Dependence	Low	High	Low	High	Low	High
Dep Var: Two Way vs	Export Only		Import Only		No Int. Trade	
Financial Leverage (Extensive)	0.056**	-0.024	0.076**	0.154***	0.153***	0.114***
	(0.024)	(0.028)	(0.035)	(0.041)	(0.038)	(0.040)
Productivity	0.005	0.001	0.010	0.007	0.019*	0.010
	(0.005)	(0.003)	(0.011)	(0.005)	(0.011)	(0.018)
Percentage of Empl.	0.000	0.000	-0.000	0.000	0.002	0.002*
with Univ. Dergee	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Innovation	0.041	0.005	0.073	0.049	0.246***	0.200***
	(0.053)	(0.031)	(0.062)	(0.065)	(0.064)	(0.065)
Domestic Firm	-0.036	0.015	-0.281***	-0.206***	-0.302***	-0.173***
	(0.022)	(0.025)	(0.045)	(0.045)	(0.065)	(0.039)
Number of FT employees	0.000	0.0001**	0.000	0.001***	0.001**	0.000
	(0.000)	(0.0001)	(0.000)	(0.000)	(0.000)	(0.000)
Age of Firm	0.001	0.000	0.004***	0.004***	0.002**	0.003*
	(0.000)	(0.001)	(0.001)	(0.002)	(0.001)	(0.002)
Capacity Utilization	0.001	-0.000	0.000	0.000	-0.001	0.000
	(0.001)	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)
Formal Training	0.038	0.055**	0.104***	0.056	0.147***	0.088**
	(0.027)	(0.026)	(0.035)	(0.042)	(0.048)	(0.039)
Skill Intensity	-0.021	0.104**	-0.037	0.137	-0.047	-0.055
	(0.048)	(0.047)	(0.058)	(0.118)	(0.086)	(0.113)
Observations	434	383	850	645	642	478

Robust clustered standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Includes EU membership and year dummies

Dependent Variable are dummy variables with two way traders assigned a value of 1.

Table 6: Probit Estimation on the Extensive Margin of Financial Leverage as per External Dependence of Industry

	(1)	(2)	(3)	(4)	(5)	(6)
External Dependence	Low	High	Low	High	Low	High
Dep Var: Two Way vs	Export Only		Import Only		No Int. Trade	
Financial Leverage	-0.004	-0.003	-0.009	-0.059**	-0.058**	-0.018
(Ratio to Indus Avg)	(0.009)	(0.009)	(0.022)	(0.025)	(0.026)	(0.014)
Productivity	0.001	-0.000	0.011	0.010	-0.003	0.010
	(0.005)	(0.003)	(0.021)	(0.006)	(0.012)	(0.015)
Percentage of Empl.	-0.000	-0.000	0.002	-0.001	0.002	-0.000
with Univ. Degree	(0.000)	(0.001)	(0.001)	(0.002)	(0.002)	(0.001)
Innovation	0.299**	-0.017	0.122	0.020	0.195**	0.256
	(0.150)	(0.029)	(0.115)	(0.111)	(0.095)	(0.165)
Domestic Firm	-0.039**	0.007	-0.261***	-0.060	-0.214***	-0.075**
	(0.017)	(0.036)	(0.063)	(0.065)	(0.070)	(0.038)
Number of FT employees	0.000	0.0002***	0.000	0.001***	0.000	0.0003***
	(0.000)	(0.0001)	(0.000)	(0.000)	(0.000)	(0.0001)
Age of Firm	0.000	-0.001	0.004**	0.003	0.001	-0.000
	(0.000)	(0.001)	(0.002)	(0.003)	(0.001)	(0.001)
Capacity Utilization	0.000	-0.001	0.000	0.001	-0.001	-0.000
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Formal Training	-0.001	0.048	0.110*	0.089	0.129**	0.074
	(0.022)	(0.036)	(0.063)	(0.058)	(0.061)	(0.049)
Skill Intensity	-0.054*	0.114*	-0.103	0.168	-0.144*	-0.007
	(0.031)	(0.065)	(0.094)	(0.120)	(0.078)	(0.053)
Observations	193	173	357	251	247	191

Robust clustered standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Includes EU membership and year dummies

Dependent Variable are dummy variables with two way traders assigned a value of 1.

Financial Leverage Proxy 1: Ratio to Industry Average

Table 7: Probit Estimation on the Intensive Margin of Financial Leverage as per External Dependence of Industry (Ratio to Industry Average as a Proxy)

	(1)	(2)	(3)	(4)	(5)	(6)
External Dependence	Low	High	Low	High	Low	High
Dep Var: Two Way vs	Export Only		Import Only		No Int. Trade	
Financial Leverage	-0.0002	-0.0000	-0.001	-0.001**	-0.002**	-0.0007*
(Diff from Least Fin Lev)	(0.0003)	(0.0003)	(0.001)	(0.001)	(0.001)	(0.0004)
Productivity	0.000	-0.001	0.010	0.010*	-0.004	0.008
	(0.005)	(0.003)	(0.022)	(0.005)	(0.012)	(0.016)
Percentage of Empl.	-0.000	-0.000	0.002	-0.001	0.002	-0.000
with Univ. Degrees	(0.000)	(0.001)	(0.001)	(0.002)	(0.002)	(0.001)
Innovation	0.306**	-0.017	0.123	0.028	0.219**	0.278*
	(0.151)	(0.029)	(0.115)	(0.115)	(0.097)	(0.166)
Domestic Firm	-0.038**	0.006	-0.260***	-0.069	-0.218***	-0.076**
	(0.015)	(0.037)	(0.063)	(0.068)	(0.069)	(0.038)
Number of FT employees	0.000	0.0002***	0.000	0.001***	0.000	0.0003***
	(0.000)	(0.0001)	(0.000)	(0.000)	(0.000)	(0.0001)
Age of Firm	0.000	-0.001	0.004**	0.003	0.002	-0.000
	(0.000)	(0.001)	(0.002)	(0.003)	(0.001)	(0.001)
Capacity Utilization	0.000	-0.001	0.000	0.000	-0.000	-0.000
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Formal Training	0.000	0.049	0.109*	0.098*	0.126**	0.073
	(0.023)	(0.034)	(0.062)	(0.059)	(0.061)	(0.049)
Skill Intensity	-0.056*	0.115*	-0.096	0.130	-0.145*	-0.034
	(0.030)	(0.063)	(0.095)	(0.125)	(0.077)	(0.059)
Observations	193	173	357	251	247	191

Robust clustered standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Includes EU membership and year dummies

Dependent Variable are dummy variables with two way traders assigned a value of 1.

Financial Leverage Proxy 2: Difference from Least Financially Leveraged

Table 8: Probit Estimation on the Intensive Margin of Financial Leverage as per External Dependence of Industry (Difference From Least Financially Leveraged Firm as a Proxy)

	(1)	(2)	(3)	(4)	(5)	(6)
Asset Tangibility	Low	High	Low	High	Low	High
Dep Var: Two Way vs	Export Only		Import Only		No Int. Trade	
Financial Leverage (Extensive)	0.014	0.029	0.129***	0.074	0.149***	0.140**
	(0.020)	(0.034)	(0.032)	(0.047)	(0.033)	(0.055)
Productivity	0.003	-0.001	0.005	0.016	0.004	0.069**
	(0.004)	(0.010)	(0.005)	(0.016)	(0.008)	(0.029)
Percentage of Empl.	0.000	0.002	-0.001	0.003**	0.001	0.004**
with Univ. Degrees	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)
Innovation	0.018	0.054	0.092*	0.006	0.228***	0.199***
	(0.033)	(0.069)	(0.055)	(0.070)	(0.061)	(0.062)
Domestic Firm	0.002	-0.059**	-0.220***	-0.295***	-0.203***	-0.322***
	(0.024)	(0.028)	(0.043)	(0.053)	(0.047)	(0.064)
Number of FT employees	0.0001*	0.000	0.001***	0.000	0.001	0.0004*
	(0.0001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.0002)
Age of Firm	0.000	0.000	0.002**	0.007***	0.003***	0.002
	(0.000)	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)
Capacity Utilization	0.001	-0.000	0.000	0.001	0.000	-0.001
	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)
Formal Training	0.010	0.133***	0.085**	0.072	0.094***	0.174***
	(0.019)	(0.041)	(0.037)	(0.045)	(0.035)	(0.057)
Skill Intensity	0.027	0.063	-0.001	0.038	-0.051	-0.092
	(0.039)	(0.054)	(0.085)	(0.086)	(0.083)	(0.091)
Observations	527	290	940	555	712	408

Robust clustered standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Includes EU membership and year dummies

Dependent Variable are dummy variables with two way traders assigned a value of 1.

Table 9: Probit Estimation on the External Margin of Financial Leverage as per Asset Tangibility of Industry

	(1)	(2)	(3)	(4)	(5)	(6)
Asset Tangibility	Low	High	Low	High	Low	High
Dep Var: Two Way vs	Export Only		Import Only		No Int. Trade	
Financial Leverage	0.015	-0.043***	-0.042**	-0.071*	-0.016	-0.122***
(Ratio to Indus Avg)	(0.010)	(0.015)	(0.020)	(0.041)	(0.011)	(0.039)
Productivity	-0.001	-0.003	0.008	0.036	0.001	0.026
	(0.007)	(0.011)	(0.007)	(0.037)	(0.004)	(0.034)
Percentage of Empl.	-0.000	0.000	0.000	0.003*	0.000	0.005**
with Univ. Degrees	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.002)
Innovation	0.076	0.369*	0.072	0.137	0.191	0.448***
	(0.078)	(0.212)	(0.094)	(0.164)	(0.128)	(0.155)
Domestic Firm	-0.033	-0.005	-0.182***	-0.184**	-0.086*	-0.184**
	(0.033)	(0.023)	(0.063)	(0.085)	(0.050)	(0.072)
Number of FT employees	0.000	0.0001*	0.001***	0.000	0.001***	0.000
	(0.000)	(0.0001)	(0.0003)	(0.000)	(0.0001)	(0.000)
Age of Firm	0.000	-0.001	0.002	0.005**	0.001	-0.001
	(0.001)	(0.000)	(0.002)	(0.003)	(0.001)	(0.001)
Capacity Utilization	0.000	-0.002**	0.002	-0.001	0.000	-0.005***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.000)	(0.002)
Formal Training	-0.017	0.047	0.129*	0.081	0.033	0.131**
	(0.022)	(0.043)	(0.067)	(0.063)	(0.030)	(0.066)
Skill Intensity	0.028	0.021	-0.036	0.025	-0.057	-0.074
	(0.033)	(0.039)	(0.105)	(0.123)	(0.051)	(0.085)
Observations	233	133	355	253	273	165

Robust clustered standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Includes EU membership and year dummies

Dependent Variable are dummy variables with two way traders assigned a value of 1.

Financial Leverage Proxy 1: Ratio to Industry Average

Table 10: Probit Estimation on the Intensive Margin of Financial Leverage as per Asset Tangibility of Industry (Ratio to Industry Average as a Proxy)

	(1)	(2)	(3)	(4)	(5)	(6)
Asset Tangibility	Low	High	Low	Hgh	Low	High
Dep Var: Two Way vs	Export Only		Import Only		No Int. Trade	
Financial Leverage	-0.0001	-0.0002	-0.001**	-0.001	-0.001*	-0.002***
(Diff from Least Fin Lev)	(0.0003)	(0.0004)	(0.001)	(0.001)	(0.000)	(0.001)
Productivity	0.000	-0.018	0.008	0.035	-0.001	0.035
	(0.004)	(0.016)	(0.006)	(0.031)	(0.004)	(0.032)
Percentage of Empl.	-0.000	0.000	-0.000	0.003	0.000	0.003*
with Univ. Degrees	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.002)
Innovation	0.081	0.279	0.083	0.122	0.217	0.402**
	(0.076)	(0.218)	(0.097)	(0.163)	(0.133)	(0.158)
Domestic Firm	-0.035	-0.036	-0.180***	-0.195**	-0.084*	-0.207***
	(0.032)	(0.031)	(0.066)	(0.080)	(0.050)	(0.067)
Number of FT employees	0.000	0.0001*	0.001***	0.000	0.001***	0.000
	(0.000)	(0.0000)	(0.000)	(0.000)	(0.000)	(0.000)
Age of Firm	0.000	-0.001	0.002	0.005**	0.001	-0.001
	(0.001)	(0.001)	(0.002)	(0.003)	(0.001)	(0.001)
Capacity Utilization	-0.000	-0.002**	0.002	-0.001	0.000	-0.003*
	(0.001)	(0.001)	(0.001)	(0.001)	(0.000)	(0.002)
Formal Training	-0.017	0.099**	0.136**	0.073	0.030	0.132**
	(0.024)	(0.050)	(0.068)	(0.064)	(0.031)	(0.067)
Skill Intensity	0.025	0.064	-0.049	0.028	-0.066	-0.091
	(0.034)	(0.044)	(0.109)	(0.121)	(0.057)	(0.080)
Observations	233	133	355	253	273	165

Robust clustered standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Includes EU membership and year dummies

Dependent Variable are dummy variables with two way traders assigned a value of 1.

Financial Leverage Proxy 2: Difference from Least Financially Leveraged

Table 11: Probit Estimation on the Intensive Margin of Financial Leverage as per Asset Tangibility of Industry (Difference From Least Financially Leveraged Firm as a Proxy)

Figures

Distribution of Firms as per Trade Activity and Financial Leverage		
	2004	2008
Percentage of Firms Participating in Trade		
Domestic Trade Only	34	21
Exports Only	5	3
Imports Only	32	44
Exports and Imports	28	32
Distribution of Firms as per Financial Leverage		
% of Firms Financially Leveraged	29	39
Financial Leverage		
% of Domestic Traders Only with Financial Leverage	20	27
% of Firms that Export Only with Financial Leverage	34	45
% of Firms that Import Only with Financial Leverage	28	36
% of Two way traders with Financial Leverage	38	47
Intensity of Financial Leverage (Assets financed by Bank Loans)		
% of Domestic Traders Only	57	67
% of Firms that Export Only	61	55
% of Firms that Import Only	54	59
% of Two way traders	57	57

Figure 1: Distribution of Firms as per Trading Activities and Financial Leverage

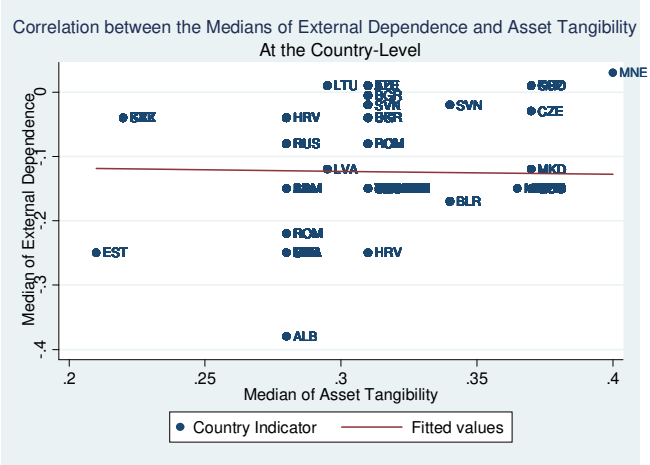


Figure 2: Correlation Between the Medians of External Dependence and Asset Tangibility at the Country Level

Figure 3: Distribution of Trading Activties of Firms per Industry Level External Dependence

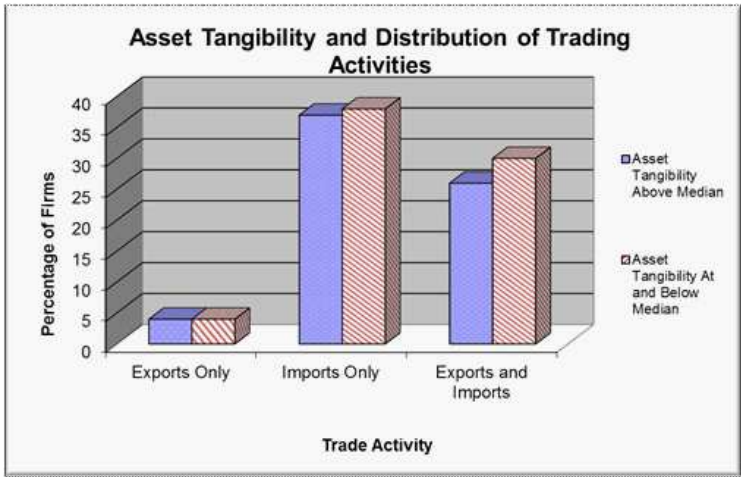


Figure 4: Distribution of Trading Activties of Firms per Industry Level Asset Tangibility

Appendix

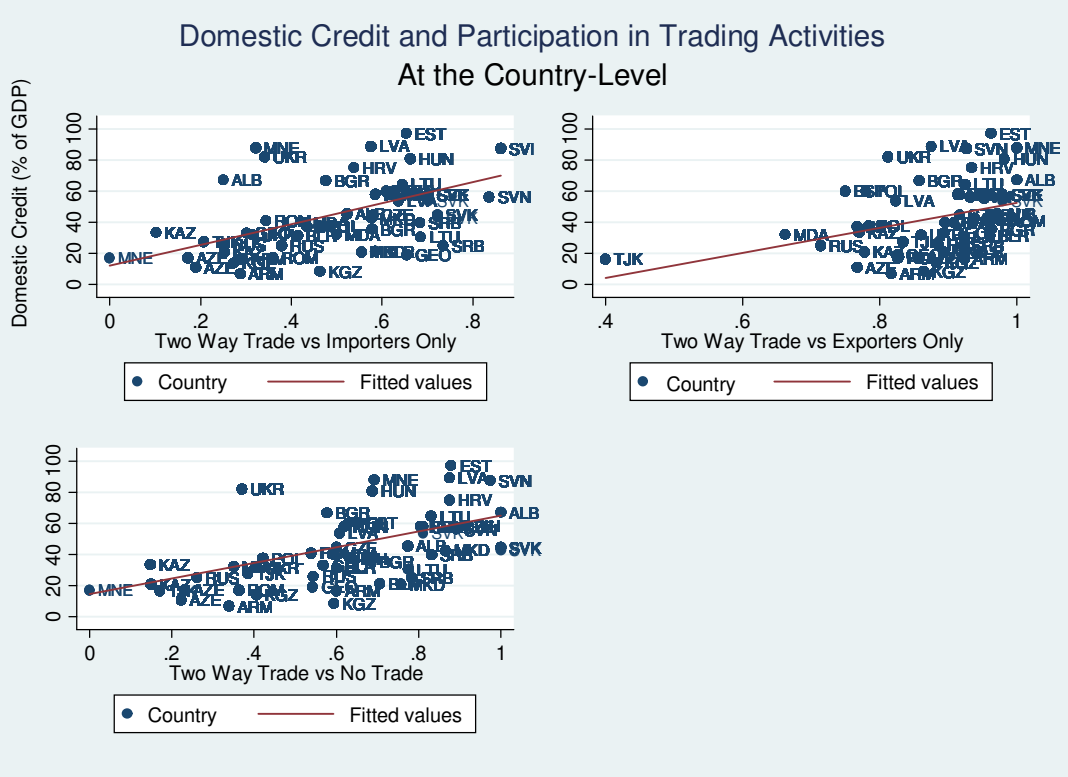
Variable	Description
Financial Leverage (Extensive)	Dummy variable (1 if fixed assets funded by private or state owned banks)
Financial Leverage (Intensive)	% of fixed assets funded by private or state owned banks. *Proxy 1* is the ratio to 4 digit industry average for given country in a given year. *Proxy 2* is the difference between the firm and the least financially leveraged firm within 4 digit industry industry for a given country in a given year.
Percentage of Employees with a University Degree	Self -explanatory
Innovation	Introduced new products or services or upgraded existing product line in last 3 years [Dummy Variable]
Domestic Firm	Less than 10% of the firm owned by a foreign entity [Dummy Variable]
Productivity	Sales less cost of production (sum of material and labor costs) divided by number of full-time production workers. [Value added/ number of full-time production workers]
Capacity Utilization	The percentage of the maximum level of production this firm can attain by fully utilizing the machinery, equipment and its employees
Age of Firm	Number of years the firm has been in operation in the country
# of Full Time Employees	Paid employees that are contracted for a term of one or more fiscal years and work up to 8 or more hours per day
Formal Training	Has structured and defined curriculum. Includes classwork, seminar, audio visual presentations, lectures, workshop and demonstrations. [Dummy Variable]
Skill Intensity	Fraction of workers that have special knowledge or ability (acquired) in work. Excludes workers above the working-supervisor level. Skill worker may have attended college, university or technical school or may have learned the skills on the job.
	Note: Descriptions borrowed from the 'Questionnaire Note' at http://www.enterprisesurveys.org. Source of all variables listed above is Enterprise Surveys (http://www.enterprisesurveys.org), The Word Bank.

Appendix A: Description of Control Variables

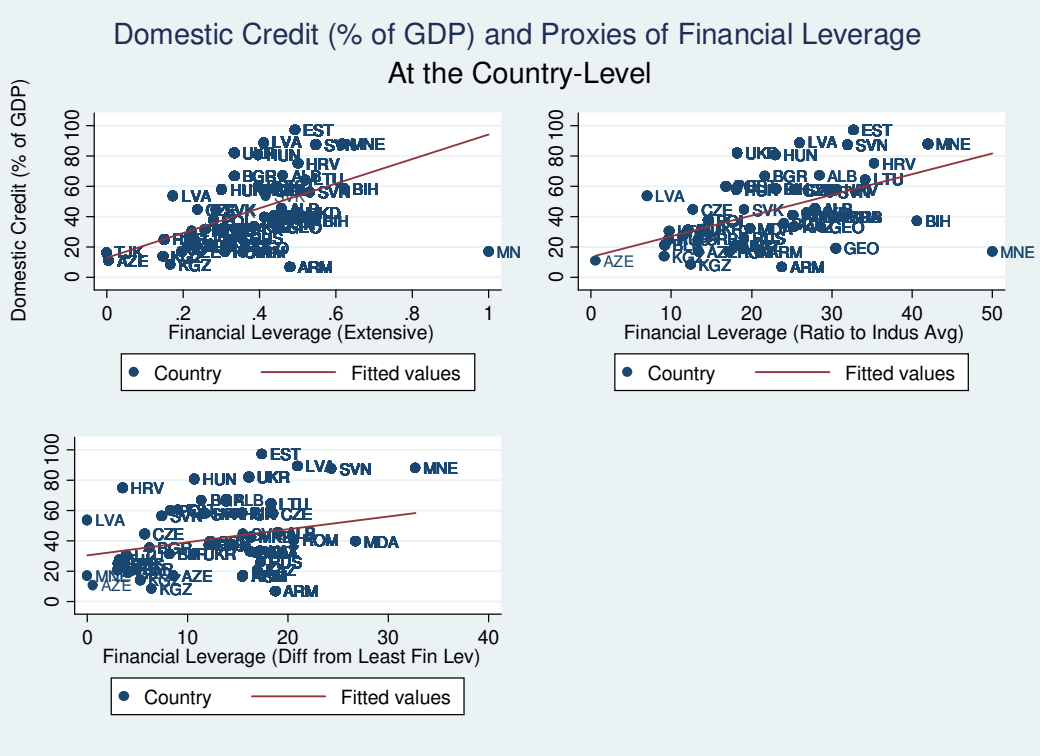
Note: Productivity is listed as ratio to the average of the productivity measure across firms at 4 digit ISIC industry level for a given country at a given year. For instance, the productivity for Firm A in industry code ISIC 1511 in Russia in 2008 is calculated as the productivity of Firm A divided by the average of the productivity of all firms within ISIC 1511 in Russia in 2008.

Country Code	Name of Country	EU Member in 2004	No of Observations
ALB	Albania	No	96
ARM	Armenia	No	329
AZE	Azerbaijan	No	326
BLR	Belarus	No	157
BIH	Bosnia and Herzegovina	No	178
BGR	Bulgaria	No	153
HRV	Croatia	No	103
CZE	Czech Republic	Yes	167
EST	Estonia	Yes	131
GEO	Georgia	No	161
HUN	Hungary	Yes	473
KAZ	Kazakhstan	No	520
KGZ	Kyrgyz Republic	No	141
LTU	Latvia	Yes	124
LVA	Lithuania	Yes	142
MKD	Macedonia, FYR	No	152
MDA	Moldova	No	314
MNE	Montenegro	No	41
POL	Poland	Yes	631
ROM	Romania	No	563
RUS	Russian Federation	No	807
SRB	Serbia	No	213
SVK	Slovak Republic	Yes	121
SVK	Slovenia	Yes	159
TJK	Tajikistan	No	164
UKR	Ukraine	No	732
UZB	Uzbekistan	No	190

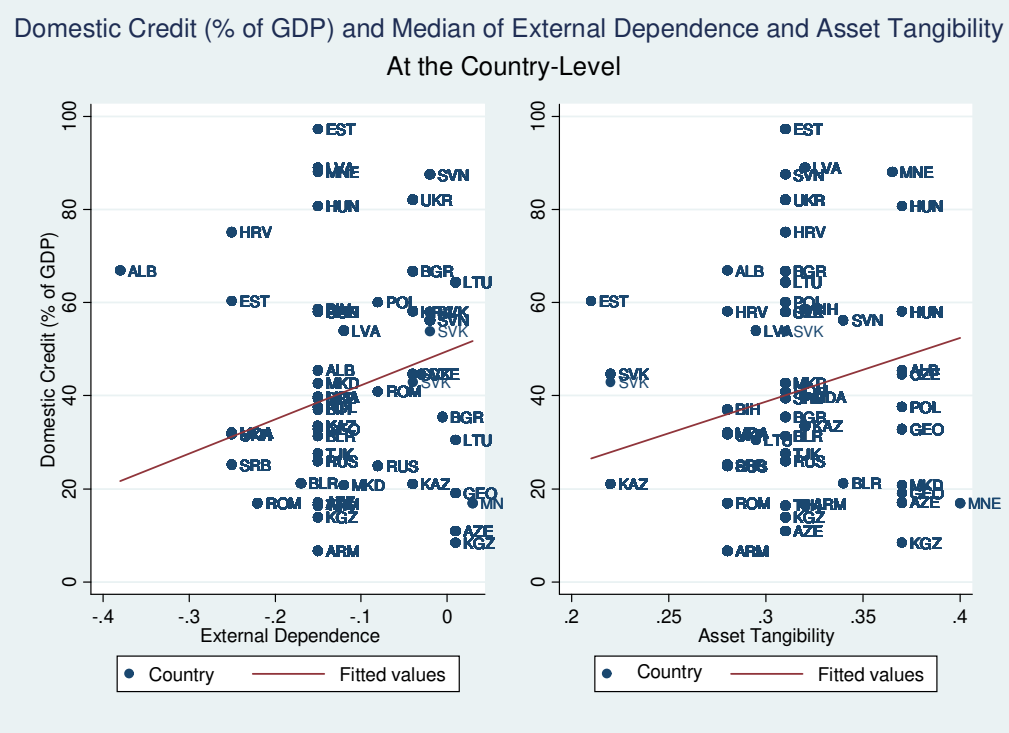
Appendix B: List of Countries, EU Membership Status and Number of Observations.



Appendix C: Domestic Credit and Firm Trading Activities at the Country Level



Appendix D: Correlation of Domestic Credit and Proxies of Financial Leverage at the Country Level.



Appendix E: Correlation of Domestic Credit and Median of External Dependence and Asset Tangibility at the Country Level.

	External Dependence		Asset Tangibility	
	Above Median	Below Median	Above Median	Below Median
Neither	387	678	462	603
Exports Only	87	87	68	106
Imports Only	713	1081	676	1118
Two Way Traders	665	708	485	888

Appendix F: Number of Observations per Industry Characteristics