Bank Competition and Export Diversification

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Abstract

The role of the banking industry in export promotion cannot be over-emphasized as banks provide the necessary financial support for borrowers in various industries to undertake investment activities. With the help of an industry-level dataset on bilateral trade flows between various countries, I consider OLS and IV regressions to determine whether the Lerner Index of the banking industry, an indicator on the degree of competition, influences the number of industries exported. In order to consider the impact of competition in the banking industry on export diversification at different levels of financial development of the exporting countries, I split the countries into OECD member countries, non OECD countries and include a pooled set of countries. As macroeconomic conditions are likely to influence the market structure of the banking industry, I further split the samples of countries on the basis of the median levels of lending and the deposit rate spread, foreign bank participation rate and the ratio of government credit to private credit provided by the domestic banks for the respective groups of countries based on their OECD membership status and find varying results under different macroeconomic conditions and levels of financial development. In the recent years, several studies have determined the role of financial markets on exporting activities to be significant at the country-level as well as at the firm-level. To the best of my knowledge, this is one of the first paper to study the influence of competition within the banking industry on export diversification at the industry-level.

Keywords: International trade; export diversification; financial markets; banking industry; financial intermediation; bank competition; foreign banks; government debt; lending and deposit rate spread; transaction-based and relationship-based lending;

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Non-Technical Summary

Financial intermediation plays an important role in the promotion of export activities within an economy as it provides a source of finance to firms in need of additional funds to expand their international trading activities. The market structure of a banking industry influences the number of industries exported. The competitive nature of the banking industry defines the ease at which borrowers can access credit as banks maximize their revenue at the lowest cost. On the other hand, borrowers seek the best possible rates from banks to maximize their utility from their investments financed by a combination of cash holdings and bank loans. The level of information available across industries can determine the amount of knowledge on the characteristics of the borrowers obtained by the banks. The cost to service an industry is likely to increase with the vagueness of the information available across industries. Information that is relatively easy to obtain by lenders is considered 'hard' and information that is difficult to obtain by lenders is considered 'soft'. The harder industries are likely to have a higher proportion of borrowers with lower rates of default than the softer industries. Industries with hard information are less costly to service than industries with soft information. Borrowers in an industry that provides hard information to their lenders relative to other industries will be offered loans at a lower interest rate. Such borrowers will have a lower utility for every dollar borrowed as credit is likely to be available with relative ease to its competitors as well. The market structure of the banking industry will determine the ability of banks to service the greatest number of borrowers that will not default within a specific range of industries and maximize their profits. This in turn will generate the incentives of the banks to promote export diversification across industries.

Banks incur explicit costs, such as fixed costs to service an industry as well as costs of lending to adversely selected borrowers that are likely to default on loan payments. The banks can be separated into two types, the larger banks and the smaller banks. In addition, the borrowers can be defined as either good borrowers or bad borrowers, with the latter more likely to default on loan payments than the former. The larger banks specialize in the provision of transaction-based lending facilities to borrowers that exhibit a lower risk of default on their payments and do not require to be in a close proximity to their lenders. On the other hand, the smaller banks specialize in relationship-based lending facilities to borrowers that require to be closely monitored by their lenders at an additional cost incurred to the banks in order to prohibit borrowers from undertaking risky investment activities that increases the risk of default. All borrowers will seek finance from the banks that offer the lowest interest rates but only the good borrowers within an industry will obtain funds from the larger banks. The bad borrowers, initially rejected by the larger banks, will be subsequently funded by the smaller banks.

The transaction-based lending facility is available to borrowers that provide easy-to-understand information obtained through their balance sheets, trading activities and government as well as private registries. Larger banks do not have the ability to screen individual borrowers on the basis of soft or undefinable information that require constant face to face meetings and tracking of the financial activities

of the borrowers. The good borrowers satisfy the banks with their ability to pay back the loans and are offered transaction-based lending facilities by the banks, while the bad borrowers require further screening by the lenders and are likely to require monitoring facilities that can only be provided by the smaller banks. The monitoring costs add to the marginal costs incurred by the smaller banks. Industries with a higher level of hard information are likely to have a higher proportion of good borrowers respective to industries with a higher level of soft information.

Banks face a certain level of fixed costs to service an industry in order to accumulate knowledge on the type of borrowers prevalent within an industry. The fixed costs incurred to service an industry are negatively correlated to the level of hard information available within an industry. The average fixed costs incurred by the banks to service an industry are determined by the number of potential borrowers. The larger banks incur lower average fixed costs relative to smaller banks in industries characterized by a higher level of information. As the level of information falls, the average fixed costs per dollar revenue earned by the larger banks is likely to increase as the rise in interest rates charged across industries to generate greater revenue cannot compensate for the rise in fixed costs and the fall in the number of potential borrowers across industries. The number of good borrowers decreases and the number of bad borrowers increases as the level of information falls. The decrease in the quality of borrowers lowers the average fixed costs per borrower for smaller banks but increases the average fixed costs per borrower for the larger banks. Hence, the larger banks define the number of industries serviced by establishing an upper limit and a lower limit on the level of information threshold based on their ability to maximize profits given the number of potential borrowers within an industry. Borrowers in the marginal industry at the upper limit will prefer cash holdings over bank loans as the source of funds for their investments at any positive level of interest rate. Larger banks that service a particular industry and incur significantly greater average fixed costs that do not provide them a cost advantage over the additional costs incurred by the smaller banks are likely to set that particular industry on the margin of the lower level of the information threshold. Further, the development of financial markets is likely to influence the ability of a bank to understand information. Banks in financially developed markets are likely to incur lower fixed costs to service industries and monitoring costs relative to banks in less developed financial markets, while also have a larger proportion of good borrowers across a greater number of industries.

In this paper, with the help of an industry-level dataset for bilateral trade between various countries and the number of industries counted for each exporter and importer pair, I use the OLS and IV regressions to determine the influence of the Lerner Index of the banking industry, a measure of the degree of competition, on the number of industries exported. I split the sample of exporting countries into OECD member countries and non OECD countries. The former constitutes mostly of developed financial markets and the latter of less developed financial markets. I determine a negative relationship between the Lerner Index and the number of industries exported across the sample of countries. This indicates that the competitiveness

of the banking industry is likely to promote export diversification. I use return on assets, cost to income ratios, the concentration of the banking system and the level of credit reporting within a country as my excluded instruments for the IV regressions. The results I obtain for the IV regressions are consistent with the results I obtain for the OLS regressions.

However, the strategy of profit maximization by banks may vary under different macroeconomic conditions. For instance, if the spread between the lending and deposit rate is large, banks may take advantage of their captured borrowers that are unable to switch to other lenders and charge them with higher interest rates in order to compensate for the lower interest rates offered to the new borrowers. This strategy may require larger banks to have significant market power. Hence, the Lerner Index is likely to positively influence the number of industries exported. Similarly, foreign banks may participate in a developing economy for the sole purpose to extract surplus profit available in the banking industry. Therefore, the presence of foreign banks may induce a positive influence for the Lerner Index on the number of the industries exported. In addition, a government that provides banks with an attractive alternative lending option respective to the private sector is likely to crowd out private credit and limit the influence of the Lerner Index on the number of industries exported. I split the sample according to a certain level of the aforementioned exogenously determined variables and regress the Lerner Index on the number of industries exported. I find that macroeconomic conditions influenced by the policymakers at the central bank as well as at the fiscal authority of a country has an impact on the relationship between the competitiveness of the banking industry and export diversification at the industry-level. I believe that I provide an important contribution to the literature that studies the impact of the banking industry on economic growth as I establish an important link between different profit maximization strategies of banks and its impact on the number of industries exported.

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1 Introduction

1.1 Background

Financial intermediation plays an important role in the promotion of export activities. Financial markets with strong fundamentals are likely to provide their new and well-established exporters that intend to increase their investment activities easier access to finance relative to such borrowers in financial markets with weak fundamentals. The seminal paper by Rajan and Zingales (1998) establishes a strong relationship between financial development and economic growth as it emphasizes the role of financial development on the access to finance for industries based on the level of financial dependence. This effect can be interpreted as a crucial link between financial development and the number of industries in which borrowers are financed by banks. Beck (2002) and Chor and Manova (2012) consider the impact of financial development and growth in export activities at the country-level. In addition, Iacovone and Zavacka (2009) consider the detrimental role of financial dependence of industries on its export growth during episodes of banking crisis to reinforce the link between the financial development and export patterns observed within an economy. In addition, Greenaway, Guariglia, and Kneller (2007), Muûls (2008), Bellone, Musso, Nesta, and Schiavo (2010), Berman and Héricourt (2010) and Nakhoda (2012) link credit constraints faced by firms that seek access to finance and its impact on their international trading activities. The aforementioned literature supports the evidence that easier access to finance for firms plays a crucial role in the expansion of their international trading activities. This paper attempts to establish an important connection between the role of the market structure of the banking industry and export diversification at the industry-level observed within an economy.

Hummels and Klenow (2005), Feenstra and Kee (2008) and Romeu and da Costa Neto (2011) link the relationship between export variety and economic growth as well as attenuation of the possibility of a trade collapse as a result of a financial crisis. Aghion, Angeletos, Banerjee, and Manova (2005) investigate whether credit constraints tend to amplify the procyclical nature of long-term investments. They also test whether cross-country differences in financial markets impact the sensitivity of growth and long-term investments as borrowers avail more exporting opportunities. Hesse (2006) and Agosin (2009) establish a strong connection between the diversification of the industries exported and economic growth experienced within a country. An increase in the number of industries exported may be a product of a better allocation of loans from the banks to different industries, which is likely to be a result of an improvement in the level of information available to the lenders. This allocation can be generated by readjusting competition within the banking industry so that banks are compelled to provide loans to a more diversified range of industries.

Easy access to credit is considered an important factor in the promotion of exporting activities. Hence, the role of the banking industry in export promotion cannot be over-emphasized. A banking system that provides easy access to finance for exporters across several industries will likely involve a market structure that is conducive to growth in the exporting activities of firms within a country. An effective banking system based on an appropriate market structure will provide an opportunity for the banks to best use the available information on the borrowers and subsequently provide borrowers with greater financing opportunities[1]. For instance, a competitive banking environment will induce intense price competition amongst banks that will compel them to provide cheaper loans to all its borrowers and subsequently increase their lending facilities to a greater number of industries. On the other hand, a larger bank with greater market power may provide cheaper loans to customers in a greater number of industries at the cost of higher interest rates to its captive borrowers. Therefore, both extremes of the market structure improve access to finance for firms, albeit in different ways. However, the effectiveness of the market structure is dictated by the macroeconomic conditions within a country. The purpose of this paper is to determine whether a certain type of market structure, based on the Lerner Index of the banking industry, plays an effective role in increasing the number of industries exported. As macroeconomic conditions are likely to influence the market structure of the banking industry, I will consider different macroeconomic conditions based on the lending and deposit rate spread, foreign bank participation rate and the ratio of government credit to private credit provided by the domestic banks. Although, several studies have determined the role of financial markets on exporting activities to be significant at the country-level as well as at the firm-level, there is a dearth of studies that consider the impact of the market structure of the banking industry on the number of industries that participate in the export market. To the best of my knowledge, this is one of the first paper to study the impact of the competitiveness of the banking industry on the diversification of the industries that participate in the export market.

Sharpe (1990), Diamond (1991) and Rajan (1992) consider whether asymmetric information between banks and borrowers affects the ability of banks to provide loans to the borrowers. Some banks monitor their borrowers and gather proprietary information that allows them to undertake a more personal banking relationship, or *relationship-based* lending, relative to the other banks that may service their clients at an arm's length relationship, or *transaction-based* lending. However, the banks that require monitoring of the borrowers incur greater costs compared to the latter. Banks that do not monitor their clients will not lend to borrowers they believe will default on their loans. These type of borrowers create a potential market of clients for banks that specialize in monitoring clients and establish a more face-to-face relationship with their borrowers in order to eliminate the risk of default. Rajan and Zingales (2004) defines relationship-based lending as a facility where lenders do not use the legal system to recover their loans

[1]Firms and borrowers are used interchangeably in this paper as all borrowers in the private sector are firms.

but instead threaten and cajole borrowers by using the lever of power they have strengthened through the collection of important information on their borrowers over the years. The relationship-based lending facilities are prominent in systems that lack financial development. Hence, the banks that undertake transaction-based lending can provide loans at a lower interest rate than their counterparts that specialize in a relationship-based lending service but will only lend to the borrowers with a low default rate as they can neither constantly monitor the behavior of the borrowers nor have the ability to threaten and cajole their borrowers through informal means. The difference in the interest rates offered by the banks that provide transaction-based lending makes them a preferred choice of lenders for all borrowers. Bolton, Freixas, Gambacorta, and Mistrulli (2013) consider transaction-based lending facilities to be a more preferred option for the borrowers than the costly relationship-based lending facilities as the former is likely to be offered at a lower interest rate[2]. As information asymmetry can become a major concern for lenders servicing industries with opaque information, such banks will only lend to borrowers in industries with easily obtainable information and that too only to the best borrowers within that industry. Therefore, the problem of adverse selection generated by asymmetric information may lead to the creation of different categories of borrowers, *good* and *bad*, based on the perceived ability of the borrowers to pay back their loans. Strahan (2008) extensively reviews various literature that focuses on the differences between larger banks and smaller banks and suggests that the former lend more to larger and better performing borrowers. The role of banks that undertake transaction-based lending plays an important role in determining the diversification in the number of industries exported.

The next subsection will discuss the differences between the good borrowers and the bad borrowers that either obtain arm's length transaction-based lending facilities or relationship-based lending facilities respectively and the implication of this difference on the diversification of industries that participate in the export market as the banking industry maximizes its profits based on the pool of good and bad borrowers.

1.2 Good Borrowers and Bad Borrowers

Dell'Ariccia, Friedman, and Marquez (1999) present the basis of the theoretical model on the adverse selection of good borrowers and bad borrowers that apply for a loan from banks. The good borrowers have better access to finance relative to the bad borrowers. Some banks are likely to be more informationally challenged than other banks as private information on borrowers is accumulated by banks over years of experience of lending to their borrowers. Although, the model in this paper is similar to that suggested by

[2]Studies suggest that even though relationship-based lending facilities have greater intermediation costs, it is likely to be more profitable in times of crisis as the continuous monitoring by banks dampens the effects of negative shocks. This paper does not consider the effect of a banking crisis on the banking relationships.

Dell'Ariccia et al. (1999), I assume that the larger banks and the smaller banks provide different products to the borrowers, transaction-based lending and relationship-based lending respectively. Dell'Ariccia and Marquez (2004) mention the benefits better information may provide to lenders when asymmetrical information on borrowers is likely to exist. Asymmetrical information between the lenders and the borrowers may increase the probability that the bad borrowers obtain finance from banks instead of the good borrowers but lenders with additional advantage through investments that accumulate knowledge on borrowers may gain market power in the banking industry. Larger banks may enjoy the benefits of market power exerted on their captive borrowers in industries with hard information. Consequently, larger banks are likely to offer loans to such borrowers at a higher interest rate[3]. The market structure of the banking industry will play an important role to determine whether borrowers in industries differentiated by the ability of banks to gather information obtain finance. Cetorelli and Gambera (2001) determine the detrimental role of market concentration in the banking industry on the reduction of growth prospects of firms within an economy but also suggests that market concentration that facilitates lending relationships can be beneficial for borrowers in financially dependent industries as concentrated banking industries can increase the availability of finance to credit-constrained firms. In the context of this paper, banking concentration can promote diversification in the industries exported if the larger banks that are not dependent upon long-term relationships can charge higher interest rates to their captive borrowers in order to compensate for the costs of increasing the number of industries financed[4]. In addition, Presbitero and Zazzaro (2011) determine that competition between larger banks where they are predominant in economies can be detrimental to smaller banks that specialize in relationship-based lending facilities as larger banks may service a wider number of industries and reduce the number of borrowers available to the smaller banks. This may consequently influence the number of industries that participate in the export market as larger banks proliferate the banking industry by offering relatively cheaper loans to the borrowers of smaller banks and promote investments such as exporting activities.

Petersen and Rajan (2002) and Berger, Miller, Petersen, Rajan, and Stein (2005) consider the role of geographical distance between borrowers and lenders. They determine that larger banks are geographically dispersed and have clients located across the country as their banking relationships are independent of the distance between the borrowers and lenders. On the other hand, the smaller banks are geographically concentrated and focus on clients in a specific region. As a result the borrowers of smaller banks are at a closer proximity relative to the borrowers of the larger banks. Degryse and Van Cayseele (2000) show

[3]Banks can also enjoy market power in industries where informational asymmetries may be limited due to regulatory control or conditions in the macroeconomic environment that inhibits competition and the supply of bank loans. In this paper, I will show how large interest rate spreads promote the link between market power of larger banks and the diversification in the industries exported.

[4]Borrowers in the externally dependent sectors with higher level of information are most likely to be the captive borrowers.

that the lock-in effect of relationship-based lending leads to higher interest rate on loans, allowing smaller banks to charge their borrowers higher interest rates. Hauswald and Marquez (2006) differentiate between informed banks and uninformed banks, where the the former are likely to undertake relationship-based lending and the latter undertake transaction based-lending. Informed banks screen borrowers in order to acquire proprietary information, for instance through regular face-to-face meetings with the client and specialize in relationship-based lending facilities[5]. Informed banks are able to mitigate the problems related with adverse-selection of borrowers that are likely to default but doing so incurs additional monitoring costs. Transaction-based lending facilities do not require constant monitoring of the clients. As it incurs lower marginal costs, it will be offered at a lower interest rate. Borrowers prefer transaction-based lending facilities and apply for a loan to the larger banks that specialize in transaction-based lending facilities if such banks service their industry. Good borrowers will obtain loans from the larger banks. Rejected borrowers will subsequently apply to the smaller banks for a loan and the smaller banks with its ability to monitor it clients will lower the probability of default to zero. Further, in my model, the banks undergo a fixed cost to obtain information on borrowers within an industry and this cost is an increasing function of the opaqueness of the level of information within an industry. The fixed costs incurred by the larger banks to service an industry creates a wedge between the optimal interest rates asked by the borrowers and offered by the lenders. Therefore, the reduction in the level of information across industries increases the average fixed costs for the larger banks, lowering their ability to provide transaction-based lending facilities to borrowers in industries with opaque information. Smaller banks will exclusively finance borrowers in industries with relatively opaque information.

Information that is easily obtainable by banks either through the balance sheets and income statements of banks or its trading activities is considered as 'hard' information. On the other hand, relatively opaque information that is unobtainable information by banks is considered 'soft' information. Petersen (2004) differentiates between hard and soft information, defining the former as quantitative, easy to store and transmittable data that can easily be ranked and categorized by the borrower. On the other hand, Petersen (2004) classifies soft information as qualitative information that is likely to be based on ideas, economic projection, rumors and collected in person by lending agents rather than based on impersonal credit reports. Iyer, Khwaja, Luttmer, and Shue (2013) emphasize the role of soft information on lending decisions as lenders tend to rely on additional information that cannot be obtained from credit reports to screen borrowers to be of lower quality. Improvements in the level of information will readjust the market structure of the banking industry as it will make the banks more efficient. This improvement in the level of

[5]Hauswald and Marquez (2006) consider each bank to provide two different facilities. I assume that a larger bank provides only the transaction-based lending facilities and the smaller banks provide only relationship-based lending facilities. The informed bank has undertaken informational investment that requires a close relationship with a client, which is more useful to service bad borrowers rather than good borrowers.

information will increase the number of industries financed by the larger banks and subsequently lower the cost of finance available to firms in industries not previously financed by the larger banks. In essence, the larger banks will finance a greater number of industries and diversify the industries exported from a country.

Braun (2003) ranks industries according to its level of asset tangibility. Larger banks are likely to have a comparative advantage lending to firms that belong to industries which provide hard information and smaller banks are likely to specialize their lending activities towards firms belonging to industries that exhibit soft information. In addition, lending practices of banks are also likely to differentiate between the good borrowers and the bad borrowers. Importantly, the percentage of good borrowers is likely to decrease as the level of hard information falls across industries. Pre-determined threshold levels, set as either upper bound or as lower bound, is based on the hardness of information of industries prevalent in the country. Firms belonging to industries above the upper bound will not borrow from banks as they believe that all lenders have set higher interest rates than they are willing to incur on their loan payments. Firms above the industry-level information upper bound threshold will use internal funds to finance their investments as they demand a lower interest rate than can be profitably set by the lenders due to the level of information offered by their industry. Firms below the industry-level lower bound threshold will borrow from smaller banks as larger banks are not able to service industries with high levels of opaqueness of information as the level of average fixed costs to service the industry may be substantially high. As smaller banks are likely to be geographically constrained to their own region and specialize in relationship-based lending facilities designed specifically for individual clients within their region, it is competition amongst larger banks that is likely to influence the number of industries financed. The increase in the number of larger banks is likely to lower the proportion of borrowers that seek the more expensive relationship-based lending facilities as larger banks offer a cheaper option across multiple industries.

The good borrowers are less likely to default on their loans relative to bad borrowers. Although, the larger banks can determine the level of information available on the firms across industries which allows them to set a lower level threshold on the level of information provided across industries, banks have no knowledge *ex-ante* of the type of borrowers that apply for loans within each industry. Their vetting process of the loan application allows to separate the good borrowers from the bad borrowers. Both the good borrowers and the bad borrowers within an industry are likely to apply for loans to banks that provide the lowest possible interest rates. However, the loan application of the good borrowers will be accepted as they show better firm characteristics and financial soundness. Banks can vary interest rates according to the level of information available within an industry but a more competitive banking industry with a greater mass of larger banks that service various industries will set lower interest rates across all industries. Although, larger banks are likely to set low interest rates for industries with hard information, their ability

to maximize their profits in extracting surplus from captive borrowers will be limited by the presence of competition in the banking industry. However, borrowers are likely to cap their interest payments and as a result are willing to accept an interest rate below a certain ceiling. Therefore, larger banks will need to manipulate their interest rates in order to maximize their profits as they offer loans to borrowers in industries above and below the upper and lower levels of information threshold respectively. The following section discusses the impact of the market structure of the banking industry on the number of industries exported.

1.3 Market Structure of the Banking Industry and the Number of Industries Exported

Boot and Thakor (2000) combine the ability of a bank to undertake both, transaction-based and relationship-based lending facilities, and consider the impact of competition on the strategy of such a bank. Boot and Thakor (2000) suggest that an increase in competition between banks is likely to shift the preference of banks towards relationship-based lending facilities as transaction-based lending is likely to be susceptible to price competition[6]. As industries that rely on relationship-based lending require greater investments in industry and location specific knowledge of the borrowers, banks prevalent in industries with soft information incur larger fixed costs in order to understand borrower characteristics to service such industries. The provision of relationship-based lending by smaller banks is likely to be insulated from competitive pressures. Similar to Boot and Thakor (2000), the larger banks are more susceptible to competitive pressure from other larger banks as the profits of the larger banks diminish with the increase in the number of larger banks. In addition, the number of banks that can match the interest rates offered by each lender increases. Hence, the larger banks will be compelled to set the lowest interest rate possible. In a perfectly competitive environment, this interest rate is likely to equal the marginal costs of offering transaction-based lending facilities to the borrowers. On the other hand, smaller banks that undertake relationship-based lending will be geographically concentrated and provide more specialized lending facilities that can insulate them from being exposed to intense price competition. However, the interest rates set by the smaller banks will take into account the additional monitoring costs incurred for providing relationship-based lending facilities.

The *franchise value* of a bank can be defined as the present value of its stream of expected future profits. A lower franchise value, usually observed within a competitive environment, implies greater fragility within the banking system. However, the opinion whether competition increases fragility of the banking industry is divided amongst researchers. Keeley (1990) and Demsetz, Saidenberg, and Strahan (1996)

[6]Unlike Boot and Thakor (2000), I consider banks to provide only one form of a lending facility. Therefore, larger banks cannot shift from transaction-based lending facilities to relationship-based lending facilities.

suggest competition reduces the franchise value of a bank and in turn induces riskier behavior from banks. Ratnovski (2013) suggests competition can increase stability by lowering interest rates as a larger number of banks compete for the same pool of borrowers but may also lead to destability as it can induce riskier lending patterns. In addition, Fungáčová and Weill (2013) and Jiménez, Lopez, and Saurina (2010) support the franchise value paradigm as they determine that competition increases fragility within the banking industry. On the other hand, Boyd and De Nicolo (2005) and Schaeck, Cihak, and Wolfe (2009) counter the claims of the aforementioned paradigm and suggest that competition may instead increase stability within the banking industry. In the perspective of this paper, the good borrowers are likely to respond to a monopolistic setting within a banking industry by undertaking riskier investments with greater payoffs as borrowers may be constrained by their belief that a monopolistic bank will set higher interest rates and provide less opportunities to switch away from those lenders[7]. I consider whether competition amongst banks induces riskier behavior as they undertake greater fixed costs to service a larger array of industries with lower level of information and a higher proportion of bad borrowers. I find that the prevalent macroeconomic conditions play an important role in defining the relationship between market power in the banking industry and the number of industries exported.

Broecker (1990) determines a negative relationship between credit worthiness of borrowers and an increase in competition between banks as those that charge higher interest rates are likely to get the worst borrowers. Broecker (1990) defines this paradigm as the 'winner's curse.' Any improvement in the level of information that increases the competition within the banking industry is likely to reduce the market power of larger banks and its ability to charge high interest rates to its captured borrowers. Larger banks may compete for borrowers amongst themselves but cumulatively are likely to dominate smaller banks and may compel the latter to seek borrowers in industries with more opaque information. The ability of smaller banks to provide specialized lending product counters the informational asymmetries that would otherwise hamper transaction-based lending facilities. Although, competition amongst the larger banks is likely to reduce residual demand of loans from borrowers in industries financed by the larger banks, the smaller banks will be insulated from competition in industries that are not conducive to transaction-based lending.

Competitive pressure on larger banks will force them to service industries with softer information but the larger banks in these industries will incur a greater cost in terms of fixed costs as well as face a smaller pool of good borrowers. On the other hand, larger banks with market power will be able to charge

[7]The ability of a borrower to switch lenders allows them to negotiate for a lower interest rate as lenders seek to retain their best borrowers. Higher interest rates increase the possibility of moral hazards and adverse selection. Therefore, the good borrowers may prefer to undertake riskier investments as they become captive as well as pay higher interest rates relative to a more competitive setting.

higher interest rates to their captive borrowers that find transaction-based lending facilities cheaper than relationship based lending facilities and service the best borrowers in industries that provide them with substantial returns. This reduces the number of borrowers for smaller banks and once again compelling them to service other industries. It is important to note that the conditions in the macroeconomic environment such as ability of the larger banks to maneuver interest rate spreads is likely to be influential in determining the lending patterns of larger banks.

1.4 The Lending and Deposit Rate Spread

Although, banks may set different interest rates for different industries based on their strategies to maximize profits and increase the number of borrowers, the lending and deposit rate spread at the country-level is likely to be influenced by a regulatory authority, the central bank, which determines the discount rate at which the banks borrow to meet their own short-term liquidity needs. This provides the central bank power to dictate the interest rates at which banks may lend to the private sector. The desire of the central bank to adjust the discount rate may have little to do with the level of competition in the banking industry but rather to control the inflationary pressures within an economy. The lending and deposit rate spread will have an impact on the competitive nature of the banking system but it is unlikely to be endogenous. For instance, a monopolistic banking industry with one larger bank may have a similar lending and deposit rate spread as a highly competitive banking industry with several larger banks. In addition, the ability of commercial banks to adjust lending and deposit rates may differ under different macroeconomic environment, for instance monetary tightening and loosening policies, as is suggested by Gambacorta and Iannotti (2007). Beck, De Jonghe, and Schepens (2012) determine the impact of an increase in competition on the risk taking activities of banks across countries under different economic environments and find that competition tends to have a larger impact on risk taking incentives of banks in countries where information between banks is shared more effectively. The purpose of the study in this paper is to determine the influence of the interest rate spread between the lending and deposit rates on the impact of the market structure of the banking industry on the number of industries exported.

Saunders and Schumacher (2000), in a cross-country analysis of the determinants of bank margins suggest that greater the number of restrictions on the banks in terms of regulatory and geographical constraints, the larger the increase in the monopoly power within the banking industry and the interest rate spreads. This signifies that market power in the banking system tends to complement high interest rate spreads. In this paper, I find empirically that market power of the larger banks increases the number of industries exported when interest rate spread is high and decreases the number of industries exported when interest rate spread is low.

1.5 The Role of Foreign Banks

Claessens and Laeven (2004) emphasize the importance of the presence of foreign banks on the competitiveness nature of the banking system. The development of financial markets is often accompanied by a greater presence of foreign banks within an economy. Clarke, Cull, Peria, and Sanchez (2003) discuss the various sizes and nature of foreign banks that participate in developed and developing financial economies by reviewing several studies focused on the role of foreign banks. More importantly and pertinent to the study undertaken in this paper, the authors suggest that foreign banks hosted in developed economies are likely to be smaller and less efficient than the larger domestic banks. On the other hand, foreign banks hosted in developing economies are likely to be larger and more efficient than the larger domestic banks. Goldberg, Dages, and Kinney (2000), Iacoviello and Minetti (2008) and Claessens and van Horen (2013) find that the significance of the role of foreign banks in developing countries is more prominent than domestic banks as the foreign banks tend to outperform their domestic competitors and contribute more towards an increase in the average productivity of the borrowers.

Detragiache, Tressel, and Gupta (2008) suggest that foreign banks are likely to 'cherry-pick' the best borrowers and have a relatively safer portfolio than their competitors. Further, Sengupta (2007) suggests that foreign banks may be more effective in providing loans to low-risk borrowers. Foreign banks tend to make loans in their host country based on hard information, which they are likely to obtain more easily relative to soft information. Foreign banks may also prefer to have a clientele consisting mainly of multinational firms, particularly those firms headquartered in their source country as well as larger exporting firms. Mian (2006) and Beck, Ioannidou, and Schäfer (2012) find that foreign banks offer different products to their borrowers than domestic bank as foreign banks rely heavily on hard information in order to assess firms and provide them with more efficient lending facilities with access to foreign financial markets. This strategy of lending to the better performing borrowers in industries with hard information limits the provision of finance from foreign banks to certain sectors within the economy.

The reliance of foreign banks on hard information is more common in developing economies where adverse selection is more prevalent than in developed economies. Claessens, Demirgüç-Kunt, and Huizinga (2001) consider the differences between foreign banks and domestic banks in developed and developing economies and find that the foreign banks tend to have lower profitability, lower interest margins and lower tax profitability than domestic banks in the developed economies. DeYoung and Nolle (1996) find that foreign banks in the U.S. were more input inefficient and generated lower profit efficiency than their domestic counterparts. In developed economies, foreign banks may face competition from the more efficient larger

domestic banks, which may require the foreign banks to adopt strategies that compete with relatively smaller domestic banks. In a financially developed economy where the banking system is dominated by the presence of foreign banks, it is likely that diversification of the portfolio of industries exported occurs where larger banks are competitive rather than possess a higher degree of market power. With the inability to set higher interest rates, the domestic larger banks that enjoy market power will service a few selected industries with the highest level of information but will not necessarily be able to charge higher interest rates to their captured borrowers to diversify their portfolio. On the other hand, a competitive banking industry will compel the larger banks to diversify their portfolio as their profits are limited if they serve a smaller range of industries. As foreign banks do not finance industries serviced by the larger domestic banks in developed economies, the larger banks will seek to service the maximum number of industries in order to retain the maximum profits[8]. An improvement in the level of information will allow the larger domestic banks to service additional industries. In addition, as the foreign banks service softer industries, they may be compelled to service the best borrowers in a wider range of such industries as competition and development of the financial market limits their ability to set higher interest rates to borrowers that need access to foreign markets. In developing economies, the market power in the banking industry will promote foreign banks to 'cherry-pick' the best borrowers in additional industries as the level of information improves. Berger (2007) conducts an extensive literature review on topic of the relative differences in the efficiency frontier of foreign and domestic banks in the developing and developed economies and the various advantages and disadvantages of foreign bank entry in the respective economies. This paper attempts to determine whether the role of competition within the banking industry is likely to influence the number of industries exported in countries with different levels of foreign bank participation.

1.6 Credit to the Government from Domestic Banks

The level of borrowing by a government from its domestic financial institutions, particularly the commercial banks, can influence the market structure of the banking system and in turn dictate the number of industries exported. Fischer and Easterly (1990) and Abbas and Christensen (2009) discuss the implications of the accumulation of bank debt by governments on the crowding out of private debt by financial institutions in shallow financial markets as banks seek to finance a safer asset that promises risk-free returns[9].

[8]The larger domestic banks cannot set high interest rates even if the foreign banks do not service their industry. As the development of the financial markets reduces the distortions in costs to service an industry, a higher interest rate set by the larger domestic banks may increase the incentive of a large mass of foreign banks to service an industry financed by the larger domestic banks and earn greater profits even if it risks funding their bad borrowers. Foreign banks may provide their borrowers with greater incentives in an economy with high interest rates than the larger domestic banks and the smaller domestic banks.

[9]In this paper, I use credit and debt interchangeably to define the borrowings of the government and private sectors from the domestic banks.

Christensen (2004) suggests that expansion in domestic debt can have extensive repercussions to the economy as it can lead to higher domestic interest rates and the effect is likely to be stronger in countries with a narrower investor base. The private sector is likely to suffer not only from the shrinking of the financial resources available but also from the increase in costs created by the demand for government credit from the banks. Further, Aghion and Marinescu (2008) determine the positive effect of counter-cyclical budget deficits on economic growth and suggest that the effect is greater in less financially developed countries. Kumhof and Tanner (2005) accounts for the poorly developed institutions and legal systems that may compel banks to lend to the government in order to compensate for the lack of provision of collateral offered by the private sector. Therefore, it is likely that in countries where the ratio of government credit to private credit is high, the government tends to substitute the private sector in providing resources to its citizens and the impact of the competition within the banking industry on the diversification in the industries exported is likely to be minimal. This effect is further amplified in less developed financial markets. In addition, Krueger (1991) emphasizes the highly distortive policies of governments in developing countries that may lead to lower investments in the improvement of the infrastructure to support the private sector and instead promotes higher spending on government payments for the agricultural sector, public sector enterprises, retail shops and in some cases, luxury hotels.

Rodrik (1996) signifies the external risk experienced by a country that is relatively open to trade and suffers from terms of trade risk. An important role of the government is to mitigate the external risks and reduce income volatility within such economies. In addition, the government will consume as well as seek to provide products and services to residents that are otherwise not produced for domestic consumption by the private sector. The demand for the debt by the government will play an important role to crowd out investments in the private sector. Basically, the government that borrows from financial institutions to strengthen public institutions and public sector corporations may crowd out private credit directed towards investment across the manufacturing industries. In order to reduce this impact, it may be necessary to increase the level of competition within the banking system as each individual lender will only obtain a smaller pool of the total revenue from government credit and consequently compel it to finance a larger number of industries within the private sector. However, the effectiveness of this policy will reduce for countries in which credit to the government is an attractive alternative for the lenders. On the other hand, crowding out of credit to private sector by government credit is less of a risk in developed economies as the development of the financial markets does not discourage banks to substitute away from providing credit to the private sector. Hence, in countries where governments focus on provision of social services rather than compete against the private businesses in the manufacturing industries, banks are willing to provide funds to the private sector and increase the number of industries exported as the banking industry becomes more competitive. An increase in the competitiveness of the banking industry will have as much

a role to influence the diversification of the number of industries exported in countries in which the ratio of government credit to private credit is high as it does for countries in which the ratio of government credit to private credit is low. I consider whether the relationship between the Lerner Index of the banking industry and the number of industries that participate in the export market varies within countries with different levels of financial development and varying levels of the ratio of government debt to private debt.

2 Theoretical Model

2.1 Setup

The assumptions put forward by Bolton et al. (2013), Hauswald and Marquez (2006), Dell'Ariccia and Marquez (2004), Rajan (1992), Diamond (1991), Sharpe (1990) contribute to the model discussed in this section[10].

In order to define the characteristics of the trading patterns, I assume that the exporting country has a single large trading partner and there is frictionless trade between the trading partners. The demand for goods will be determined by the characteristics of the exporting country, which competes with several other exporting countries, rather than the characteristics of the importing country. I assume m banks in an economy and $m \geq 2$. The Lerner Index in the banking industry is defined as $\frac{P-MC}{P}$, where P, price, is calculated as total bank revenue over assets. MC is marginal cost and is calculated as the tanslog cost function with respect to output. Beck, De Jonghe, and Schepens (2012) adopts the Lerner Index as the choice variable to measure competition within the banking industry and explain the impact of pricing on the supply side based on the marginal cost as well as the impact of pricing on the assets owned by banks[11]. Assuming there are m banks, m_L larger banks and $m - m_L$ smaller banks, the banking industry is monopolistic when $m_L = 1$ and the market power diminishes within the banking industry as $m_L \to \infty$[12]. The industries serviced by the larger banks are characterized with the level of information, θ_L. The larger banks charge an interest rate $r^L_{\theta_L}$ to their borrowers. The smaller banks charge an interest rate $r^S_{\theta_L}$ when

[10] A detail mathematical working is provided in the technical supplement available at http://sites.google.com/site/aadilnakhoda/ or by request from the author at aadilnakhoda@gmail.com.

[11] The Lerner Index measures the pricing power of the banks within the banking industry and is not biased by geographical concentrations of banks that may reveal greater competitive powers when in contrast larger banks have monopoly power. For instance, an industry dominated by one larger bank and many geographically concentrated smaller banks will have a lower concentration ratio than an industry with many larger as well as smaller banks.

[12] I define competition in the banking industry on the basis of the number of larger banks. As smaller banks are geographically concentrated and provide their services to a specific region, competition amongst smaller banks is likely to be region-specific rather than at the national level. On the other hand, competition within larger banks is likely to be influenced by the presence of larger banks spread across the country.

servicing industry with information level, θ_L and $r^S_{\theta_S}$ when servicing industry with information level, θ_S, where $r^S_{\theta_S}, r^S_{\theta_L} \geq r^L_{\theta_L}$ and $\theta_L > \theta_S$. The smaller banks undertake relationship-based lending facilities that require regular monitoring of their borrowers. The monitoring costs, $(1-\phi)\gamma_S(\theta_L)$ and $(1-\phi)\gamma_S(\theta_S)$ in industries θ_L and θ_S respectively, result in a higher interest rate charged to their borrowers relative to the interest rates charged by the larger banks that offer transaction-based lending facilities to their borrowers.

The information threshold determines the ability of large banks to finance good borrowers that belong to industries within the upper and lower limits of the threshold. Setting, θ^l_L as the lower bound and θ^u_L as the upper bound of the information threshold respectively for the larger banks, I assume that $\theta^l_L \leq \theta_L \leq \theta^u_L$. The level of development of the financial market, ϕ, determines the ability of banks to understand information. A higher ϕ will increase the level of the upper bound and decrease the level of the lower bound, allowing more industries to be financed by larger banks. This is consistent with the exposition in Rajan and Zingales (1998) that promotes the link of financial development and economic growth. Therefore, $\theta^l_L = (1-\phi)\theta_L \leq \theta_L \leq (1+\phi)\theta_L = \theta^u_L$, where the country with the least developed financial market will have $\phi = 0$, the country with the most developed financial market will have $\phi = \infty$ and all other countries will have $0 \leq \phi \leq \infty$[13]. As ϕ determines the level of development of the financial markets, it also indicates the ease at which finance can be accessed by the borrowers. Borrowers that belong to industries with a higher level of information in financially developed markets are likely to have a lower demand for bank loans relative to borrowers in either industries with a lower level of information or less developed financial markets[14]. Therefore, the interest rate on bank loans will fall with the increase in either the level of development of the financial markets or in the level of information available on an industry to the lenders [15].

Firms in the industry with information θ_L will be the only ones to receive financing from larger banks. Firms above this information threshold will not seek external sources of finance as cash holdings are preferable at the interest rate offered by the larger banks [16]. Firms in industries below this threshold will not be financed by the larger banks and will have to seek funds from smaller banks that are able to monitor loan repayments unless an improvement in the level of information level makes such industries viable to service for the larger banks.

[13] Although, it is mathematically possible to have $\phi = \infty$, I assume ϕ to lie between 0 and 1 in order to simplify the calculations.

[14] Developed financial markets also have a greater supply of credit relative to less developed financial markets as well as greater demand for loans due to higher investment needs of the borrowers.

[15] In this paper, I consider the former to be exogenously determined by the OECD membership status of the exporting country. The reallocation in the market structure will be a result of an improvement in the level of information transmitted to the banks.

[16] Concessions in terms of lower interest rates will have to be offered by the larger banks to borrowers in such industries.

I assume a Stackelberg leadership model where the larger banks are the market leaders and the smaller banks are the followers. The larger banks send a signal to all borrowers that it will lend at interest rate, r_{θ_L}, to the good borrowers within a range of industries it services. The interest rates offered are sorted according to the level of information provided by each industry and by the level of development of the financial market. The larger banks have a first mover advantage and they determine the information threshold, upper and lower, given the quality of information on borrowers within each industry and their ability to pay fixed costs related to the provision of services to an industry[17]. The industries above the upper threshold may have the lowest fixed costs to service an industry but the borrowers within the industries are likely to be reluctant to borrow as they assign a lower value to every dollar of bank loan[18].

2.2 Discussion

I assume that all larger banks charge the same interest rate to the borrowers as they provide similar transaction-based lending facilities and that the demand for credit within the economy satisfies profitable return to all larger banks. As larger banks can only offer loans to the good borrowers within an industry, it is necessary for the larger banks to *ex-ante* screen out the borrowers based on their perceived ability to payback their loans. Banks pay a substantial amount of fixed costs to analyze an industry and understand the type of borrowers present within that industry. The average fixed costs per borrower undertaken by the larger bank decreases as the number of good borrowers and in turn, revenue earned, increases across industries[19]. The average fixed costs influence the difference in interest rates that a cost minimizing borrower is willing to pay and the profit-maximizing larger bank is willing to set at a given level of information[20]. The greater the wedge, the less efficient is the market interest rate on loans. On the other hand, borrowers that apply for the first time will always prefer the larger banks as their source of funding as it is the cheapest source.

Firms that are not able to obtain financing from larger banks will seek funds from smaller banks. Borrowers applying for loans cannot *ex-ante* determine whether their loan application will be accepted by

[17]Borrowers that concurrently need bank loans to increase their investments are likely to be the most in need of external funds within their industry to expand their production facilities. If such borrowers apply for a loan from a larger bank, it will compel the other borrowers, due to their competitive nature, to apply for a loan as greater funds increases business opportunities for a firm. The good borrowers are determined by borrower characteristics such as balance sheet and more importantly for the purpose of this paper, by their participation in the export market.

[18]Smaller banks cannot lend in industries above the upper threshold as the smaller banks will charge interest rates higher than the already prohibitive interest rates set by the larger banks due to their additional monitoring costs.

[19]The average fixed costs per borrower can be considered in terms of average fixed costs per dollar revenue earned by the borrower.

[20]The banks are the only source of external funds for the borrowers apart from the internal source of funding, their cash holdings.

the bank. Larger banks that finance good borrowers within an industry will attract loan applications from all other borrowers present in the industry as well. Bad borrowers are likely to get their loan application rejected by larger banks but can reapply to smaller banks[21]. On the other hand, smaller banks are likely to fund all the borrowers below the lower threshold of information. Although, larger banks are likely to lend to the best borrowers in industries they are willing to finance, smaller banks only receive a residual demand in industries financed by the larger banks and will get all the borrowers in industries not serviced by the larger banks below the lower bound information threshold.

A decrease in the number of borrowers will increase the average fixed costs incurred by the larger bank and lead to a magnification in the level of interest rates charged to its borrowers, particularly if the number of good borrowers decreases at a faster rate than the increase in the interest rates charged to each borrower by the larger bank[22]. On the other hand, the softness of the information may increase the number of bad borrowers, the potential clients of the smaller banks, and in turn decrease the average fixed costs incurred by the smaller banks. Therefore, the larger banks are likely to increase in prominence within industries with harder information.

Improvements in the level of information can be generated by the introduction of a credit-reporting agency, implementation of better technology to determine the quality of borrowers and greater access to finance that lowers the distance between the lenders and the borrowers. These improvements are likely to generate changes in cost to income ratio and return on assets of the banks, which in turn, impact the market structure of the banking industry. The Lerner Index suggests the level of competition within the banking industry and is influenced by the ability of banks to generate profit. For instance, an increase in the credit information index may lower the Lerner Index as it may promote entry of additional larger banks into the banking system. On the other hand, if the improvement in the level of information increases the concentration ratio of the banking industry, the market power within the banking industry is likely to increase as well. Certain macroeconomic conditions along with the nature of the banking industry enable banks to charge higher interest rates to their captured borrowers and service additional industries by offering lower rates to their new borrowers. However, an increase in the cost to income ratio or a decrease in the return on assets is likely to indicate a more competitive banking industry. Improvements in the level

[21] Once a bad borrower is rejected by larger banks, it is considered to have poor firm characteristics and requires relationship-based lending facilities from smaller banks rather than the transaction-based lending facilities provided by the larger banks. This assumption will increase the role of smaller banks in promoting diversification of the industries exported, particularly across industries in which the level of information is likely to be low.

[22] I assume that the size of the loan provided to a borrower is independent from the level of information within an industry. However, the larger banks can earn more revenue by financing industries with a greater level of information as the number of good borrowers is likely to be larger. The aggregate value of loans for the larger banks is likely to be larger in industries with a greater level of information.

of information that promote banks to service a diversified number of industries should induce a specific degrees of competitiveness in the banking industry within an economy and be accompanied by certain macroeconomic conditions to increase the number of industries exported. In the following paragraphs, I introduce a model that defines the banking relationships and the role of the larger and the smaller banks in the expansion of the number of industries that participate in the export market.

2.3 The Lending and Deposit Rate Spread

The conditions of the macroeconomic environment that either enhances or inhibits the ability of banks to maneuver their interest rates and attract new borrowers plays a crucial role to determine the profits of a bank. The ability of banks to take advantage of the conditions reduces the adverse-selection problem and is likely to increase the number of good borrowers relative to bad borrowers within an industry. Dell'Ariccia et al. (1999) suggest that as the proportion of good borrowers increases, the proportion of bad borrowers falls and in turn lowers the negative effects of adverse selection. Therefore, as the level of information improves, larger and smaller banks set their interest rates closer to parity[23].

When the interest rate spread is large, borrowers in one industry can be offered lower interest rates compensated by the higher interest rates charged to the captive borrowers. The larger banks can offer low interest rates to attract good borrowers in industries above the upper bound of the threshold level of information and below the lower bound of the information threshold in order to gain the extensive margin. On the other hand, when the spread is small, the larger banks will not have the ability to set higher interest rates to their captive borrowers in order to compensate the loss of servicing a diversified number of industries. However, in a competitive environment, a smaller interest rate spread will compel the larger banks with relatively lower franchise value to seek borrowers in a larger number of industries as they aim to increase the volume of loan in order to maximize their profits.

Borrowers that have successfully obtained a loan from one bank may have to undertake a certain amount of fixed cost to switch lenders. This may eliminate their willingness to switch from a smaller bank to a larger bank for a marginal benefit in interest rate payments. Kim, Kliger, and Vale (2003) determine that the switching costs can indeed be substantial and constitute a large proportion of the marginal value to a borrower. Therefore, borrowers that switch do so only if the lower interest rates offered by the larger banks compensate the costs of switching. However, when interest rate spreads are large, larger banks may

[23]In my model, this assumption will hold only if we consider a fully developed financial market in which all borrowers will be good borrowers and none of the borrowers will be rejected by the larger banks. As larger banks are also likely to service all industries, the role of smaller banks may be completely eliminated from such an economy.

offer lower interest rates to attract good borrowers in industries marginally below the lower bound of information threshold and marginally above the upper bound of information threshold in order to increase their pool of borrowers. Therefore, larger banks can play a role in increasing the number of industries that participate in exporting activities. On the other hand, greater competition within the smaller banks is likely to increase the pool of borrowers as funding opportunities will be provided to a greater number of borrowers.

2.4 The Role of Foreign Banks

Foreign banks enter the domestic banking industry and introduce additional sources of finance for borrowers. Their presence can change the dynamics of the banking system. Foreign banks may exploit weak fundamentals in the banking industry to increase their own market penetration and reduce the market share of the domestic banks. In developed financial markets, where larger domestic banks may have strong fundamentals, foreign banks may exhibit similar behavior to the smaller banks. With the assumption that specialized foreign banks are likely to lend to specific firms in industries with a possible objective of supporting international trading activities for those firms, competition within the banking industry is likely to increase the number of exporting industries. On the other hand, in less developed financial markets, it is likely that foreign banks that have relatively greater amount of assets than larger domestic banks may establish themselves as direct competitors of the larger banks. In less developed financial markets, if the foreign banks are similar to the larger banks and they control a large percentage of the share of total banks, an increase in their market power will diversify the number of industries exported as they will maximize their profits by seeking exporters from various industries and in turn increase their stream of expected profits. In addition, the smaller borrowing capacity of firms in developing countries that lowers the franchise value can force the foreign banks to seek borrowers in multiple industries.

Foreign banks may not fully understand the local conditions and are unable to perceive the quality of information within their host economy as the larger domestic banks. It is likely that foreign banks will incur a cost, $(1-\phi)\gamma_F(\theta_L)$, for every dollar lent out in the host country in industry θ_L. The foreign bank will also incur a cost, $(1-\phi)\gamma_F(\theta_S)$, for every dollar lent out in industry θ_S. Other implicit costs associated with operating in a volatile developing country increase the costs of lending and are included. As the costs incurred for every dollar lent out by foreign banks is larger than that of the larger domestic banks, I assume $r^L_{\theta_L} \leq r^F_{\theta_L}$, where $r^F_{\theta_L}$ is the interest rate charged by the foreign bank. The cost for information faced by foreign banks is less than the monitoring costs incurred by the smaller banks, hence $(1-\phi)\gamma_F(\theta_L) < (1-\phi)\gamma_S(\theta_L)$ and $(1-\phi)\gamma_F(\theta_S) < (1-\phi)\gamma_S(\theta_S)$ but foreign banks will not be able to provide relationship-based lending facilities that are available from the smaller banks. Therefore, $r^S_{\theta_L} \geq r^F_{\theta_L}$ and $r^S_{\theta_S} \geq r^F_{\theta_S}$ as smaller banks will charge a higher interest rate to their customers than foreign banks.

There are advantages foreign banks can provide to borrowers with vested interest abroad, such as provide assistance to promote export participation of a firm, particularly if the export destination is the source country of the foreign bank. Foreign banks can enter the domestic industry with either the purpose of 'cherry picking' their best borrowers and compete against the larger domestic banks or setup specialized lending facilities that concentrate towards facilitation of firms in industries that would otherwise not obtain any funding. In developed financial markets where market conditions are likely to be predictable, foreign banks are less likely to 'cherry-pick' the best borrowers in industries with hard information and compete against larger domestic banks. They will rather provide specialized lending facilities for exporters in industries with soft information and compete against smaller banks as the foreign banks may lack the efficiency to compete against the well established domestic larger banks. However, in less developed financial markets, where market conditions are less predictable, foreign banks will prefer to lend to the best borrowers in industries with hard information as not only the quality of information is likely to be poor to make informed decisions on firm characteristics necessary for specialized lending, the surplus extracted from financing the best borrowers can be significantly larger. The preference of foreign banks to either 'cherry pick' or set up as specialized lending facilities can be stated as $\kappa\zeta_{FL}(\theta_L)$, $0 \leq \kappa \leq 1$, where $\zeta_{FL}(\theta_L)$ is the net benefit of borrowing from a foreign bank. The benefits of the specialized foreign lenders to their borrowers can be stated as $(1-\kappa)\zeta_{FS}(\theta_S)$. $\kappa = 1$ is the value set for the foreign banks that 'cherry pick' and $\kappa = 0$ is the value set for the foreign banks that lend as specialized lenders[24].

The foreign banks will service the same industries as the larger domestic banks only if they setup operations to compete against the larger domestic banks in order to extract surplus profits. Foreign banks that enter the host country to provide specialized lending facilities will not service the same industries in which borrowers are financed by the larger banks as they will avoid lending to the rejected bad borrowers. They will only service industries that are otherwise exclusively serviced by the smaller banks. As the larger domestic banks are the first movers, it is likely that the larger banks will determine their information level thresholds and the smaller foreign banks will lend on the basis of the established threshold. Therefore, in a country with a larger number of smaller foreign banks, the larger domestic banks will need to be competitive in order to choose the most number of industries as large presence of the smaller foreign banks will lower the ability of the larger banks to increase the number of industries serviced through exercising market power with the improvement in the level of information. If the larger domestic banks set high interest rates, the smaller foreign banks may have an incentive to service the industries financed by the larger domestic banks even at the risk of funding the bad borrowers in order to increase their profits. An increase in the market power will reduce the number of industries financed by the larger domestic banks

[24]The κ is revealed *ex-ante* participation in the host market of the foreign bank as I assume bank types to be pre-determined.

and the foreign banks, particularly if the larger banks are unable to manipulate the interest rates offered to different borrowers. The banking industry, in both developed and less developed financial markets, is regulated to limit foreign bank participation and eliminate any endogenous relationship between the Lerner Index and foreign bank participation across countries.

2.5 Credit to the Government from Domestic Banks

Domestic banks also have an option of lending risk free to their own government. The government sets the demand for its debt *ex-ante* in accordance with the need to fund public projects, such as provision of social services to its population, and its public sector corporations. A larger government with greater fiscal spending requirements is likely to have a higher ratio of government debt to private debt. The larger banks are likely to exercise this option as governments may desire significant volume of loans that can only be provided with banks that have the capacity to meet the demand. Larger banks in developing financial markets that are characterized by asymmetrical information may prefer to lend to the government that promises risk free return rather than the private sector. Therefore, if the government has a large demand for funds, the larger banks will crowd out their lending to the private sector in favor of the government debt[25]. However, as the number of larger banks increases and the banking industry becomes more competitive, the profit per bank is likely to diminish and the franchise value fall. This may compel banks to lend to the private sector. On the other hand, if the larger banks have monopolistic power, they are likely to continue lending to the government[26].

The ratio of government credit to private credit will influence the impact of the market structure of the banking industry to increase the number of industries exported. An economy with a competitive banking industry is likely to compel banks to lend to the private sector. An improvement in the competitiveness of the banking industry will have a positive impact on the diversification of the industries exported. However, the development of the financial markets will also play a role as a less developed financial market will bias the preference of lending towards the government rather than the private sector. A government that has a large appetite in terms of debt borrowing can demand a sufficient amount of loan from the domestic banks and the private sector will be crowded out in favor of government credit regardless of the

[25]Banks that have the option of lending to the government will always prefer the risk free investments in a developing financial market. Any likelihood that the government will borrow will reduce the willingness of the larger banks to lend to the private sector.

[26]I assume that the demand for funds by the government is larger than the funds supplied by a single bank within the economy. A monopolistic bank will always be able to earn enough profits by lending to the government but if the number of lenders increases and the profits per bank approaches zero, larger banks will need to diversify their portfolio and lend to the private sector in order to increase the profits.

degree of competition within the banking industry. The demand for loans by the government may have an undesirable effect on the domestic interest rates and in turn reduce lending opportunities to the best borrowers in industries with hard information. Therefore, the incentives of lending to the private sector may further diminish as banks crowd out their best borrowers in the private sector.

3 Empirics

3.1 Data

The data on the number of industries exported and the sum of export flow is borrowed from de Sousa, Mayer, and Zignago (2012)[27]. The years considered are from 1997 to 2006. The dataset lists industry-level bilateral export flow using ISIC Revision 2 at the 3 digit-level for a total of 26 industries[28]. The dataset includes a total of 226 countries of which 29 countries are listed as OECD member countries[29]. Positive export flow between an exporting country and its trading partner is counted at the industry-level to determine the number of industries exported by each pair of trading partners[30]. For the purpose of this paper, the industry-level bilateral export flow data is aggregated into country-level bilateral export flow. The bilateral export flow at the industry-level is aggregated to calculate the total sum of exports, which is converted to a constant value using the CPI of the average consumer based at the year *2005*. The Lerner Index, bank Z-score, percentage of foreign banks out of total banks, and lending-deposit rate spread, credit to government and state owned enterprises by domestic banks as a percentage of GDP and private credit by domestic banks as a percentage of GDP are borrowed from Global Financial Development Database, The World Bank (2013a). The last two indicators are converted into the ratio that accounts for the debt of government relative to the credit to the private sector provided by the domestic banks.

Data on the median asset tangibility is borrowed from Manova (2008)[31]. The control for the median level of asset tangibility allows to isolate the effect of the proportion of tangible assets to total assets within an economy on the level of information collected by lenders on borrowers and consider other borrower

[27]Dataset is available at http://www.cepii.fr

[28]Industries are considered at the sub-division of 'Major Groups' as defined by the United Nations Statistics Division

[29]List of OECD member countries is available at http://www.oecd.org/general/listofoecdmembercountries-ratificationoftheconventionontheoecd.htm.

[30]I consider exports at the bilateral-level in order to get more variation in the data as several countries may export all industries to the world but not necessarily to all countries. As I assume trade to be frictionless, variable costs of trade induce zero bias on trading patterns. Importer-level fixed effects will sweep away any omitted variable bias resulting from importer characteristics.

[31]The data set on the asset tangibility at the industry-level is available at http://www.stanford.edu/∼manova/research.html. Asset tangibility is calculated as the proportion of net propery, plant and equipment to total assets and is a viable indicator of the level of hardness of assets in an industry, which may influence the export pattern of countries.

characteristics, such as exporting activities, that may influence the relationship between market structure of the banking industry and export diversification. In addition, the median of asset tangibility is likely to be higher in countries in which collateralizable assets as a ratio of total assets is more prominent due to the composition of the level of fixed capital investments relative to human capital available in a country. Therefore, it controls for the level of information which could be biased due to the level of collateralizable resources available in a country. Domestic credit provided by banking sector, GDP per capita, percentage change in the real effective exchange rate and percentage of merchandize exports to high income countries are borrowed from World Development Indicators, The World Bank (2013b). In Appendix B, I list the names of all countries considered in the dataset and their OECD membership status.

3.2 Econometric Specification

The equation used to estimate the results of the OLS regressions in Table 2, 6, 7 and 8 is:

$$NumIndusExp_{ijt} = \beta_{0ijt} + \beta_1 LIndex_{it} + \beta_2 Z_{it} + \alpha_j + \mu_t + \epsilon_{ijt} \tag{1}$$

where i indicates exporter, j indicates importer, and t indicates year. $NumIndusExp_{ijt}$ accounts for the number of industries that export to a trading partner within the manufacturing sector, $LIndex_{it}$ is the Lerner Index within the banking industry of the exporting country and Z_{it} lists the independent variables that account for the banking characteristics, economic indicators and international trading activities of the exporting country. The details on the variables is presented in Appendix A. Although, several studies have incorporated the Lerner Index, Beck, De Jonghe, and Schepens (2012) is a more recent paper to incorporate this variable into their study. The choice of the variable is based on the fact that the Lerner Index captures the asset side as well as the funding costs associated with the banking industry. The asset side relates to the revenue generated on the loan and the funding costs relate to the marginal costs associated with an additional dollar lent out. In essence, the Lerner Index considers the price of the loan and is influenced by the interest rate elasticity on the number of borrowers, therefore making it a useful indicator for competition. The more sensitive the number of borrowers to the changes in the interest rate, more elastic is the interest rate elasticity and more competitive is the banking industry. This is true for a banking industry with a greater number of larger banks that induces price competition[32]. α_j and μ_t are the importing partner fixed effects and year fixed effects respectively. The importing fixed effects control for the importing country characteristics of the importing partner and the year fixed effects control for the impact of technological changes within the banking industry. ϵ_{ijt} is error term distributed as $N \sim (0, 1)$. As the sum of bilateral export flow is calculated in a nominal monetary value, it is converted into real

[32]Other indicators such as the concentration ratios do not take into consideration price elasticities to determine market structure, while the Global Financial Development does not have an extensive time-series data on the H-statistics.

terms using the average consumer price index based on the year *2005* borrowed from the Global Financial Development database.

As the OLS estimations can suffer from omitted variable bias and endogeneity, the OLS estimations are likely to be plagued by inconsistent results. The omitted variable bias can be problematic as some explanatory variables that are difficult to measure are inadvertently left out. The endogeneity bias is likely to occur as the relationship between the Lerner Index and the diversification of export industries may be endogenous. An increase in the demand of bank loans due to an increase in the number of industries participating in the export industry may create a more competitive banking environment as a greater number of larger banks are setup. The additional larger banks may lead to a lower Lerner Index within the banking industry. The fixed effects included in the OLS can control for the omitted variable bias and the instrumental variable estimation is introduced to control for the omitted variable bias as well as the endogeneity bias.

Beck, Demirgüç-Kunt, and Levine (2010) lists some potential variables that account for efficiency and profitability of the banking industry. A viable excluded instrument will be correlated with the Lerner Index but will not influence the number of industries exported. Therefore, variables such as cost to income ratio and return on assets within the banking industry are suitable candidates for the excluded instruments as they indicate the cost effectiveness and the level of profitability of the banking industry respectively. The variables do not necessarily have a direct influence on the number of industries exported but an indirect effect through the Lerner Index[33]. For instance, an improvement in the level of information for a banking industry with a high cost to income ratio and a low return to asset ratio in a highly competitive banking industry may lead to an increase in the number of industries exported. The same effect may happen in a banking industry with a high cost to income ratio and a high return to asset ratio as well as a low return to asset ratio and a low cost to income ratio. On the other hand, an improvement in the level of information for a banking industry in a low cost to income ratio and high return to asset ratio, characteristics of larger banks in a monopolistic setting, will lead to an increase the number of industries serviced in a macroeconomic environment that favors market power within the banking industry[34]. Therefore, the Lerner Index can be constructed using the two variables and in turn determine the influence of the market structure of the banking industry on the number of industries exported.

High cost to income ratio and low return on assets may be a sign of a competitive banking environment, an increase in the former is likely to have a negative effect on the Lerner Index and an increase

[33]Cost to income ratio and return on assets of banks can be regulated by a central banking authority and in such conditions, the variables can be treated as exogenous.

[34]Both the variables are rather intuitive as they are determinants of the Lerner Index.

in the latter is likely to have a positive effect on the Lerner Index. The variables determine the viability of a banking industry and changes in these variables are influenced by the shocks in the level of information perceived by the banking industry. For instance, shocks experienced by the banking industry, such as availability of better technology to determine borrowers, introduction of a credit reporting agency, and greater cooperation between larger banks that leads to an effective mechanism to select the best borrowers within an industry can influence the costs to income ratio and the return on assets of banks. They may incur fixed costs to service new industries and expand their asset base in order to increase the number of industries financed. A direct measure to determine the impact of better technology or greater cooperation between banks is almost impossible, therefore return on assets and cost to income ratio substitute as viable proxies. In turn, the lower cost to income ratio and higher return on assets will alter the market structure favorably to promote an increase in the number of industries exported. The second-stage and the first-stage instrumental variable estimations are expressed in Equation 2 and Equation 3 respectively below for the regressions in Table 4 and Table 5.

The equation used to estimate the second-stage results of the IV regression in Table 4 is:

$$NumIndusExp_{ijt} = \beta_{0ijt} + \beta_1 \widehat{LIndex}_{ijt} + \beta_2 Z_{ijt} + \alpha_j + \mu_t + \epsilon_{ijt} \tag{2}$$

where $\widehat{LIndex}_{ijt}$ is the predicted value of the Lerner Index obtained from the estimates of the first stage regression:

$$\widehat{LIndex}_{ijt} = \gamma_{0ijt} + \gamma_1 W_{ijt} + \gamma_2 Z_{ijt} + \alpha_j + \mu_t + \epsilon_{ijt} \tag{3}$$

where W_{ijt}, the excluded instrument, is either cost to income ratio or return on assets as listed in Table 5.

In order to further test the relationship between the competitiveness of the banking industry and the number of industries exported, I introduce exogenous variations into the model. The variations include the lending and deposit rate spread, the participation rate of foreign banks to total banks, and the amount of credit given to the government as a ratio of private credit by the domestic banks. All the variations can be considered exogenous to the banking structure and the number of industries exported as the values are either likely to be determined by the central bank or are a result of policy changes that are not influenced by the structure of the banking system or the number of industries that export their products. For instance, the lending and deposit rate spread are likely to be set by a central bank that considers the optimal monetary policies to control inflation, while the amount of government debt is a result of the fiscal policy of the government. The participation of foreign banks may be as prohibitive in a competitive banking industry as it is in a monopolistic setting. In Appendix C, I consider the correlation between the exoge-

nous variables and the number of industries exported and the Lerner Index respectively. I observe that the value is low across all sets of correlation. The low biasness in the estimates allows to split the samples in accordance with the median of the exogenous variables. In Tables 6, 7 and 8, I analyze the impact of the market structure of the banking industry on the number of industries exported by splitting the three country groups (pooled, OECD members and non OECD countries) into two groups based on their levels above and below the median of the following variables, lending and deposit rates spread, participation rate of foreign banks and the ratio of government credit to private sector credit by domestic banks, for each of the respective country groups.

3.3 Results

3.3.1 Discussion on Figures

In Figure 1, the number of industries exported by OECD member countries is greater than the number of industries exported by non OECD countries. This is as expected as OECD member countries are more industrialized as well as financially developed than their counterparts. In Appendix D, I observe a negative relationship between the number of industries exported and the average Lerner Index for the pooled set of countries and the non OECD countries but a slightly positive relationship for the OECD member countries. Stronger financial regulations in the more industrialized nations within the developed economies, such as Japan and South Korea, may have limited the role of competition in the banking industry. In Figure 2, the average Lerner Index for OECD member countries and non OECD countries slopes upwards. However, the curve for the former lies below the curve for the latter as OECD member countries have a more competitive banking industry. The trough in the Lerner Index curve for the OECD member countries can be attributed to the increase in financial inflows as well as greater financial integration between the developed economies in the early 2000s, as suggested in OECD (2011). The increase in financial integration made the banking system within the OECD member countries more competitive. In addition, the upward slope for the non OECD countries can be linked to the increase in financial regulation in several countries that followed the Asian Crisis in 1998.

In Figure 3, the number of industries exported is higher for countries in which the lending and deposit rate spread is below the median level relative to the countries in which the lending and deposit rate spread is above the median level across all set of countries. This pattern is as expected as a lower lending and deposit rate spread is likely to promote financing activities that subsequently increase the number of industries exported. In Figure 4, the Lerner Index for countries above the median level is higher than the Lerner Index for countries below the median level within the pooled set of countries. This pattern for the

Lerner Index switches direction within the OECD member countries. As the Lerner Index is the difference between the return on assets and the costs of funds for the bank, a higher spread between the lending rate and the deposit rate may imply lower returns within OECD member countries as external financing from banks by borrowers becomes less desirable than other competing sources of financing, such as cash holdings. Given the level of interest rates, borrowers in OECD member countries obtain a lower utility from the substitution of cash holdings for bank loans than borrowers in non OECD countries. A higher spread will further discourage borrowers to seek bank loans across the economy. Therefore, the OECD member countries are likely to have a competitive banking system as borrowers in each industry lower their demand for credit during periods of high interest rate spread. On the other hand, there is no observed difference in the degree of the Lerner Index between the two levels of the lending and deposit rate spread within the non OECD countries.

In Figure 5, the number of industries exported tends to be greater in countries less exposed to the participation of foreign banks within their banking industry. As foreign banks are likely to choose the best borrowers and are more risk-averse, the number of industries financed will be lower in a country where the foreign banks own a larger percentage of the total assets. In Figure 6, the Lerner Index is lower in countries with higher participation of foreign banks within the pooled set of countries and OECD member countries. As suggested earlier in this paper, foreign banks within the OECD countries are likely to be smaller in size than the larger banks and a large presence is likely to increase the level of competition within the banking system. If the larger domestic banks set high interest rates, they are likely to be crowded out by the foreign banks that may seek to service industries even at the cost of funding bad borrowers. On the other hand, foreign banks within non OECD countries are likely to cherry-pick the best borrowers and extract consumer surplus. Such strategy requires market power within the banking industry.

In Figure 7, the number of industries exported is greater in countries within the pooled set of countries and non OECD countries in which ratio of government credit to private credit by domestic banks is lower the median level. The relationship between the number of industries and the ratio of government credit to private credit by domestic banks switches for the OECD member countries. In developed financial markets, the role of the government is likely to be focused towards the provision of social services rather than competition against the private sector. In addition, the government may subsidize investments in industries that would otherwise not obtain finance in order to increase their participation within the economy. On the other hand, credit to the government may crowd out credit to the private sector in less developed financial markets and reduce the number of industries exported as banks prefer to lend to the safe borrowers, the government. The public sector corporations may be focused on a few industries as their purpose is not to diversify the industrial base but rather provide goods in selected industries deemed crucial to the needs of

the country.

In Figure 8, the Lerner Index is greater when the ratio of the government credit to private credit is above the median within the pooled set of countries and non OECD countries. On the other hand, the Lerner Index is smaller when the ratio of government credit to private credit is above the median within OECD member countries. When the government is the preferred borrower and provides banks with attractive profit margins, the competitiveness of the banking industry can become limited in countries with high levels of ratio of government credit to private credit as the larger banks lend to the government and substitute credit away from the private sector. As the government may have an insatiable appetite for borrowing, it is likely that banks will benefit as it increases its return on assets relative to its cost to income ratio in non OECD countries. However, within OECD member countries, the government credit can be for the provision of social services and goods that are not manufactured by the industries. The government will provide public and merit goods as well as subsidies to the private sector to promote export diversification. On the other hand, in countries where the ratio of government credit to private credit is low, the private sector rather than the government may instead provide public and merit goods and services to the population and in turn the number of industries exported may not increase as much as when the ratio of government credit to private credit is high. Due to the complementary nature of government credit and private credit in a developed financial market, the increase in government credit may also increase the demand of loans from private credit. Therefore, this may increase the competitiveness of the banking system as banks seek the best borrowers in a larger number of industries. Further, the demand for credit, by the private as well as the government sectors, may lead to the establishment of a larger number of banks.

3.3.2 Discussion on Tables

In Table 1, I report the averages of the variables used in the regressions. I observe higher values for all the variables reported for OECD member countries than for non OECD countries except for the Lerner Index. The pattern suggests that the extent of market power within the banking industry is likely to be higher in non OECD countries. As the Lerner Index determines the market power within the larger banks, a higher Lerner Index implies that it is likely a smaller number of larger banks which specialize in transaction-based lending dominate the amount of assets in the banking industry. Although, the t-stat is not reported, the differences between the means of OECD member countries and non OECD countries for all variables are significant at 1% level. In addition to the fact that OECD member countries observe greater economic development than non OECD countries, the financial markets in the OECD member countries are stronger and exhibit greater competition within their banking industry as is indicated by the Lerner Index. Further, the OECD member countries export larger volumes and also record exports in a

greater number of industries within the manufacturing sector to each of their trading partners relative to the non OECD countries. As expected, the values of lending and deposit rate spread, participation rate of foreign banks and the ratio of government credit to private credit are larger in non OECD countries than OECD member countries. Due to the development of the financial markets, OECD member countries are likely to face fewer distortions in their financial markets relative to the non OECD countries.

In Table 2, I observe that the Lerner Index negatively and significantly influences the number of industries exported at 1% level across the sample of countries. An increase in the market power of banks is likely to reduce the number of industries exported. Ceteris paribus, if the franchise value of a bank is associated with higher market power, a bank that has a relatively low franchise value is likely to undertake riskier lending behavior. Domestic credit provided by the banking sector as a percentage of GDP, bank Z score, percentage change in REER, GDP per capita, percentage of merchandize exported to high income countries and the sum of export flow are all positive and significantly influence the number of industries exported at 1% level. The correlation of the aforementioned variables with the number of industries exported is as predicted as these variables suggest that development of the financial market increases the economic activity within a country as well as increases the demand for a larger range of products produced domestically. A positive sign for the percentage change in REER indicates that an appreciation of the exchange rate is likely to increase the number of industries exported. Although, the appreciation of the home currency may increase the relative prices of the product but it also reduces the fixed costs in terms of foreign currency to participate in the export market for firms. As fixed costs may become relatively lower, we may expect an increase in the number of industries exported. As predicted, the median asset tangibility has a negative influence on the number of industries exported. For instance, using a scale of 1 to 10 with 10 being the most tangible, if the median asset tangibility in Country A is 8 and median asset tangibility in Country B is 2, lenders in Country A are likely to have a larger pool of their borrowers located in industries with greater asset tangibility relative to country B. Borrowers with greater asset tangibility may have a lower utility for bank loans and demand lower interest rates. Therefore, the reduction in the median of asset tangibility will increase the number of industries exported. On the other hand, a larger pool of borrowers are present within industries with a greater proportion of collateralizable assets to total assets that provides a safer return to the lenders. Hence, larger banks will be less willing to finance multiple industries.

In Table 3, I report standardized beta coefficients and observe that a change in one standard deviation of the Lerner Index has a larger impact on the number of industries exported within OECD member countries than within non OECD countries. Competition in the banking industry is likely to be more important in promoting an increase in the number of industries exported within OECD member countries rather than within non OECD countries. The coefficients of the median asset tangibility, bank efficiency in

terms of Z-score and the provision of domestic credit are larger (in absolute terms) than the coefficient for the Lerner Index in non OECD countries. This suggests that an increase in the supply of banking credit will play a bigger role in increasing the number of industries exported than competition within the banking industry in countries which exhibit lower levels of financial development. On the other hand, domestic credit provided by the banking sector and competition within the banking sector are equally important in the diversification of the industries that participate in the export market in OECD member countries. This is consistent with the model discussed in the paper as well. Financial development increases the range of the industries that larger banks will finance and therefore the lack of financial development, regardless of the degree of competition in the banking industry, will inhibit lenders from lending to majority of the industries within the economy. In summary, a decrease in one standard deviation of the Lerner Index will increase the standard deviation of the number of industries exported by a larger amount within OECD member countries than non OECD member countries, implying that the role of competition in the banking industry in promoting export diversification is likely to vary with the level of economic development observed across the countries and that it is crucial that financial development accompanies any attempt to increase competition in the banking sector, particularly in the non OECD countries.

In Table 4, the Lerner index is negative and significant at 1% level across the pooled set of countries, OECD member countries and non OECD countries for both the excluded instruments, cost to income ratio and return on assets. The influence of the Lerner Index determined by the IV regressions is similar to the influence of the Lerner Index observed using the OLS regressions. The underidentification test suggests that the excluded instruments are relevant as I reject the null hypothesis that the excluded instruments are underidentified. The weak identification tests suggest that the correlation between the excluded instrument and the endogenous regressor is not likely to be weak. The excluded instruments are not likely to be directly correlated to the number of industries exported as it is the competitive nature of the banking industry that promotes diversification of the borrowers rather than the profits earned by the larger banks[35].

In Table 5, the cost to income ratio negatively influences the Lerner Index and the return on assets positively influences the Lerner Index. This pattern is as predicted as cost to income ratio increases the competitiveness of the banking industry and return on assets increases the monopoly power of banks in the banking industry. As larger banks constitute a greater proportion of the activity in the banking industry relative to the smaller banks, they play a greater role to determine its cost to income ratio as well as the return on assets. The effect of cost to income ratio and the return on assets on the Lerner Index is

[35]Profitability ratios of the banks may not determine the diversification of the industries financed as profits can be earned by financing larger volumes in a fewer industries as well as smaller volumes in several industries if the costs to service the industries are low. It is the combination of the return on assets and the cost to income ratio that determines the ability of larger banks to maneuver their interest rates offered to borrowers in order to finance multiple industries.

likely to indicate the degree of market power amongst the larger banks. There may be some concern that the excluded instruments may not be exogenous as low depth of financial markets and inefficient banking industry may result in higher cost to income ratio and lower return on assets. The excluded instruments can be considered exogenous as the inclusion of controls such as domestic credit provided by the banking sector and the bank Z score that consider the fragility of the banking industry do not invalidate the power of the tests and the excluded instruments. The rejection of the null hypothesis that tests the exogeneity of the Lerner Index suggests that the instrumental variable estimations are both consistent and efficient. As the sign of the Lerner Index in the IV regression follow an identical direction as observed in the OLS regressions in Table 2, I continue using the OLS regressions in this paper.

As the excluded instruments in Table 4 are themselves strong determinants of the Lerner Index, it is possible that the exclusion restrictions from the second-stage regressions maybe overstated. I complement the IV regressions in Table 4 with the IV regressions based on the 5-bank concentration ratio and the credit depth of information index in Appendix E.1 and Appendix E.2 respectively[36]. The 5-bank concentration ratio is likely to be higher in countries in which the larger banks dominate smaller banks. The 5-bank concentration ratio will influence the market structure of the banking industry but not directly affect the number of industries exported as the level of concentration does not necessarily suggest the pricing strategy within the banking industry that would increase the number of industries exported. However, it does have a positive effect on the Lerner Index and consequently, the predicted value of the Lerner Index has a positive influence on the number of industries exported within the pooled set of countries and OECD member countries but a negative effect within the non OECD countries. The market power generated by the larger banks as a result of higher concentration increases the number of industries exported within the pooled set of countries and OECD member countries. However, the negative effect suggests that competition within the banking industry is likely to increase the number of industries exported even if the banking industry is highly concentrated within the developing economies. The credit depth of information index measures the degree of information available on the borrowers within an economy and a higher index value indicates greater information. As credit information reports allow larger banks to determine whether industries require monitoring at a much lower cost to the bank, it increases the contestability of larger banks and provides them with an opportunity to to compete for the best borrowers in a wider range of industries. Therefore, the Lerner Index will be negatively associated with the credit depth. In turn, as the credit depth improves competitiveness within a banking system and promotes larger banks to diversify its portfolio, the predicted value of the Lerner Index will have a negative effect on the number of the industries

[36]The 5-bank concentration ratio considers the five largest banks within the economy. A country that has several larger banks may have its concentration ratio understated. The credit depth of information index is included in the appendix because I only have data available for the years 2004-2006.

exported.

In Table 6, the influence of Lerner Index on the number of industries exported is positive and significant at 1% level within all set of countries with relatively higher levels of lending and deposit rate spread. Although, the franchise value paradigm suggests that competition is likely to induce greater risk taking behavior from banks, appropriate macroeconomic conditions that allow larger banks to maximize their profits from their captive borrowers may promote diversification in number of industries exported[37]. The Lerner Index is negative and significant at 1% level within the pooled set of countries and non OECD countries with low levels of lending and deposit rate spread. I assume that the larger banks will set the lowest possible interest rates on the loans provided to borrowers in industries that provide the greatest information. The spread between the deposit and lending interest rates allows banks room to maneuver their interest rates. When interest rate spreads are large, the captured good borrowers in industries financed by the larger banks are likely to be charged higher interest rates in order to compensate the fixed costs incurred to service additional borrowers in multiple industries as lenders seek to increase the number of industries financed. In essence, good borrowers in other industries that are otherwise not financed by the larger banks will be offered loans at a lower interest rates in order to increase the extensive margin of industries financed. This will allow the larger banks with greater monopoly power that have an ability to charge higher interest rates to diversify the number of industries that participate in the export market. Therefore, when the interest rate spread is large, the larger banks with greater market power are likely to play an important role in increasing the number of industries exported, similar to the assumption Dell'Ariccia et al. (1999) expresses as they define 'flight to captivity'. Diamond (1991) determines the increase in the importance of credit ratings during periods of higher interest rates as lenders are less likely to provide loans to borrowers that require monitoring. This proposition is consistent with the results obtained in Table 6, as larger banks gain market power due to their ability to charge higher interest rates to their captured borrowers but charge lower interest rates to the new borrowers in additional industries.

On the other hand, when the interest rate spread is small, larger banks will not be able to charge their captured borrowers higher interest rates in order to compensate for the fixed costs incurred to service additional borrowers in other industries and charge new borrowers a lower interest rate. The gap between the interest rates charged by the larger banks and the smaller banks will be small as the former lack the ability to maneuver their interest rates necessary to cover their fixed costs. The larger banks will finance the good borrowers in the industries that remain profitable. The competitive nature of the banking in-

[37]The franchise value takes into account expected future profits, while the current fragility of the banking industry is controlled for by the variable, Bank Z score.

dustry is likely to play a crucial role in increasing the number of industries exported as an increase in the larger banks will leave a smaller pool for each larger bank. The presence of a greater number of larger banks will compel them to finance borrowers in additional industries with softer level of information. Interestingly, in a financially developed market, the Lerner Index does not significantly influence the number of industries exported. In financially developed markets with low interest rate spreads, the low costs to service additional industries insignifies the role of competition within the banking industry on the number of industries exported.

The median asset tangibility negatively and significantly affects the number of industries exported at 1% level in industries with lower lending and deposit spread across the sample of countries but affects the number of industries exported positively and significantly at 1% level within OECD member countries with higher spread rate. A higher level of the median of asset tangibility across financially developed markets suggests that countries with industries that have a greater proportion of net plant, property and equipment to total assets are likely to increase the number of industries exported when the interest rate spread is high. Chor and Manova (2012) considers the importance of adverse shocks to credit conditions on the reduction of international trading activities and suggests that countries with a higher interest rate spread exported less to the US in sectors with fewer collateralizable assets. In addition, Iacovone and Zavacka (2009) suggest that collateralizable assets become crucial during times of banking crisis as it lowers the probability of adversely selected borrowers. Collateralizable assets also reduce the probability that a lender faces the 'winner's curse' paradigm as suggested by Broecker (1990). This is consistent with the results reported in this paper as is suggested by the positive effect of the median of asset tangibility on the number of industries exported. The industries with a higher level of collateralizable assets provide an opportunity for lenders to capture borrowers and charge them higher interest rates. However, higher interest rates charged to borrowers also increases the possibility that bad borrowers which are likely to default are captured instead. On the other hand, a negative relationship within non OECD countries between the diversification of the industries exported and the median of asset tangibility suggests that the number of industries exported is likely to be higher in countries that lack hard collateralizable assets. In less developed financial markets, borrowers are less likely to be constrained by higher interest rates as access to finance provides them investment opportunities otherwise not possible with cash holdings as the sole source of finance. Hence, such borrowers will accept higher interest rates than that offered to similar borrowers in developed countries and larger banks will use the surplus revenue generated to finance services to industries with softer levels of information. Larger banks are less prone to the negative effects of adversely selected borrowers.

Interestingly, the influence of bank Z score is negative and significant at 1% level on the number

of industries exported within OECD member countries with relatively higher lending and deposit interest rate. A negative relationship between financial soundness and the number of industries exported indicates that insolvent banks are likely to diversify their portfolio in order to generate greater interest earnings when the lending and deposit rate spread is high. This relationship between bank Z score and the number of industries exported reinforces the fact that interest rates may be lowered to increase the number of good borrowers at the risk of reducing the efficiency within the banking system and increase the possibility of bank runs. Similarly, the percentage of merchandize exported to high income countries negatively and significantly influences the number of industries exported in OECD countries. As Beck (2002), Do and Levchenko (2004), and Chor and Manova (2012) suggest the role of financial dependence of borrowers across industries on the trading patterns. Developed financial markets are likely to export more from financially dependent industries and higher costs of finance will reduce the ability of firms in financially dependent industries to export as their competitiveness in the world market will decrease. Higher costs of borrowing has an adverse effect on exporting activities as firms may be less willing to borrow from financial institutions in order to fund the costs of trading with more developed countries that require a larger level of investments in terms of product quality of output and inputs required for such markets[38]. GDP per capita is positive and significant at 1% level for higher lending and deposit spread within all set of countries but negative and significant at 5% level and 1% level within pooled countries and non OECD countries respectively with lower lending and deposit interest spread as it may spur export activities in poorer countries that need cheaper sources of external finance and provide incentive to a large number of firms to fund production necessary to participate in exporting activities. The positive relationship between GDP per capita and the number of industries exported in countries with higher levels of lending and deposit rate spread suggests that extraction of greater rent from captured borrowers to finance borrowers in other industries is more likely in richer countries.

In Table 7, the influence of the Lerner Index on the number of industries exported is not significant across countries with either higher levels or lower levels of participation of foreign banks for the pooled set of countries. I observe a negative and significant effect of the Lerner Index on the number of industries exported at 1% level within OECD member countries with relatively higher levels of foreign participation and a positive but insignificant effect within OECD member countries with relatively lower levels of foreign bank participation. Within non OECD countries, the signs of the coefficients switches, as countries with higher levels of foreign participation observe a positive and significant effect at 1% level and countries with lower levels of foreign participation observe a negative but insignificant effect. Within OECD member

[38]If fixed costs to export to poorer countries are less than the fixed costs to export to richer countries, it is likely that with greater financing costs, countries that have exporters trading with poorer countries to diversify the number of industries exported.

countries with relatively higher participation of foreign banks, a competitive banking industry is likely to positively impact the number of industries exported. The foreign banks in OECD member countries will not directly compete against the larger domestic banks as they do not service their industries. If the domestic banks were to exercise their market power and charge higher interest rates, the foreign banks with their greater density in the banking industry would seek to service industries where they can offer their services to the best borrowers in industries serviced by the larger banks at a lower interest rate. Therefore, the larger banks in an economy with a large presence of foreign banks would not charge higher interest rates to their borrowers but rather the increase in competition amongst larger domestic banks will compel them to service additional industries. However, within non OECD countries, the participation of foreign banks induces a positive effect of market power in the banking industry on the number of industries exported. Foreign banks with the desire to extract surplus profit may only service additional industries if they can generate substantial profit by capturing the best borrowers in a few selected industries.

The influence of domestic credit on the number of industries exported is positive and significant at 1% level for all group of countries except for in OECD countries with lower participation rates. The influence of median asset tangibility is positive and significant at 1% level within OECD member countries with high foreign bank participation. Foreign banks that have access to a larger proportion of collateralizable assets will be able to put greater pressure on the larger domestic banks as the prevalence of such hard information will reduce any uncertainty in the host country, even if it is minimal given its level of development, that hampers their growth and allows them to service a greater number of industries. Hence, in OECD member countries where the level of the median of asset tangibility is higher, it will positively influence the number of industries exported. On the other hand, in non OECD countries, the foreign banks are directly competing against the larger domestic banks and the competitive pressure in countries with lower asset tangibility will likely result in the increase in the number of industries exported. A negative correlation between GDP per capita and the number of industries exported in countries with low participation of foreign banks suggests that domestic banks in richer countries may not focus their lending activities towards exporting firms unlike the foreign banks that may focus on multinational firms and exporting firms.

In Table 8, the Lerner Index negatively influences the number of industries exported at the 1% level of significance within both high and low ratio of government credit to private credit by domestic banks in pooled set of countries and OECD member countries. However, this effect is significant at the 5% level within non OECD countries with a low ratio of government credit to private credit by domestic banks. In less developed financial markets, the government is likely to be a preferred customer for commercial banks as it guarantees safe return. Therefore, the high demand generated by the government as indicated by a high ratio of government credit to private credit by domestic banks is likely to eliminate any significance

of the competitive of the banking industry on the number of industries exported in non OECD countries. This is consistent with the explanations in Christensen (2004) as credit to the government may crowd out credit to the private sector, particularly in less developed financial economies.

In Table 8, the domestic credit provided by the banking sector negatively influences the number of industries exported at 1% level of significance within countries with a high ratio of government credit to private credit in OECD member countries. The opposite sign is observed for all the other samples. An explanation for this pattern can be linked to the fact that the government in OECD member countries with high levels of government credit to private credit from domestic banks is likely to incur expenditures on social service programs. Therefore, an increase in credit is likely to be directed towards program that do not necessarily contribute to an expansion in the number of industries exported. On the other hand, in non OECD countries, governments are likely to own large public sector corporations that contribute to the output in the manufacturing sector and the private investments in the manufacturing sector are likely to be crowded out. Although, such corporations may compete directly with the private sector, an increase in domestic credit can spur investments in public corporations that may cater to several industries. Therefore, an increase in domestic credit may lead to an increase in the number of industries exported in non OECD countries with a high ratio of government credit to private credit. The median asset tangibility positively influences the number of industries exported at 1% level of significance within countries with low ratio of government credit to private credit in the pooled set of countries. This relationship emphasizes that the dynamics within the private sector instead of the government sector play a major role in increasing the number of industries exported particularly in countries characterized by a higher level of median of asset tangibility. As observed in Table 1, the countries with low ratio are most likely to be OECD member countries and as seen in the previous tables, the asset tangibility has a positive relationship with the number of industries exported in OECD member countries. The negative relationship between the median asset tangibility for both samples in non OECD countries can emphasize the fact that relationship between the asset tangibility and the number of industries exported does not change with the level of the ratio of government credit to private credit. In addition, residents are likely to demand services from the private sector rather than the non-existent government sector in countries with a low ratio of government credit to private credit. If the private sector focuses less on the manufacturing sector and more on the social sector, it may reduce its potential to diversify the industries exported, particularly in countries with higher income levels. I observe a similar pattern for GDP per capita between samples of high and low ratios of government credit to private credit in financially developed as well as less financially developed markets.

The major implication from the results in Table 8 suggest that the market structure of the banking industry does not influence the diversification of the industries exported within non OECD countries

with high levels of government credit to private credit. In countries where the government may dictate the pattern of investments in manufacturing industries, it is unlikely that competition amongst banks will increase the number of industries exported as preferential government support may be directed towards certain industries through its public corporations. Although, I have suggested an important sequence that may occur when the government influences the pattern of credit provided by the banking sector, further research is required on this topic as this relationship can be an important determinant to trade policies, particularly in countries where credit to government has increased exponentially over the years.

4 Conclusion

In conclusion, this paper establishes a relationship between competition in the banking industry and export diversification within an economy as borrowers in various industries obtain finance to participate in as well as expand their international trading activities. As larger banks rely on the transaction-based lending facilities that are sensitive to interest rate changes, competition within the banking industry is likely to be impacted by the provision of services by the larger banks. The level of financial development also influences the relationship between competition in the banking industry and export diversification as it improves the ability of banks to allocate credit more efficiently.

The direction and the impact of competition on export diversification varies with the macroeconomic conditions prevailing within the economy. For instance, market power in the banking industry promotes export diversification within countries with lending and deposit rate spread above the median across OECD member and non OECD countries, but the effect changes directions within countries with lending and deposit rate spread below the median level. In addition, competition in the banking industry increases the number of industries exported within OECD member countries with a higher level of foreign bank participation relative to other OECD member countries but has the opposite impact on the number of industries within non OECD countries with a higher level of foreign bank participation relative to other non OECD countries. A competitive market structure is needed to promote export diversification in OECD member countries with a large participation of foreign banks as they may put competitive pressure on the larger domestic banks to service multiple industries. The foreign banks may take advantage of higher interest rates set by the larger domestics banks if they exercise market power by offering better opportunites to the borrowers of larger domestic banks and in turn reduce the number of industries financed by both, the foreign banks and the larger domestic banks. On the other hand, foreign banks in the less developed financial markets of non OECD countries use their market power to promote export diversification as foreign banks in developing economies are established with a purpose to extract surplus profits and cherry-pick the best

borrowers due to their ability to effectively compete with the largest domestic banks. Similarly, competition within the banking industry promotes export diversification in OECD member countries regardless of the level of the ratio of government credit to private credit by domestic banks, above or below the median. However, the impact of competition is positive and significant on the number of industries exported in non OECD countries only when the ratio of the government credit to private credit by domestic banks is low. Therefore, financial development as well as the prevailing macroeconomic conditions play an important role on determining the impact of competition in the banking industry on export diversification.

The ability of larger banks to generate profits is based upon the number of good borrowers within an industry that do not require to be monitored for firm behavior and this pattern is dependent upon the level of hard information available on the borrowers. This level of hard information is determined by industry characteristics, which influences the number of good borrowers and bad borrowers within an industry. Any change in the level of information across industries that increases the number of good borrowers is likely to provide a greater pool of potential borrowers for the larger banks and consequently increase their profits. In addition, both larger as well as smaller banks incur substantial fixed costs to obtain relevant information that is necessary to service an industry. Improvement in the level of information will subsequently reduce the fixed costs to service an industry. However, as discussed in the previous paragraph, the incentives of the larger banks to service a larger number of industries is also influenced by the prevailing macroeconomic environment and the level of development of the financial market. For instance, larger banks that rely on charging exorbitant interest rates to their captured borrowers to generate profit require greater market power than larger banks that are prohibited from charging high interest rates to their lenders due to lower lending and deposit rate spread. The presence of foreign banks and the ratio of government sector debt to private sector debt by the domestic banks can also influence the relationship between bank competition and export diversification. Therefore, this paper is useful to researchers and policy-makers, particularly regulators of the banking industry, as it is an important contribution to the literature that links financial markets with international trade. This paper determines the role of market structure of the banking industry on export diversification under various macroeconomic conditions and level of development of financial markets.

5 Figures and Tables

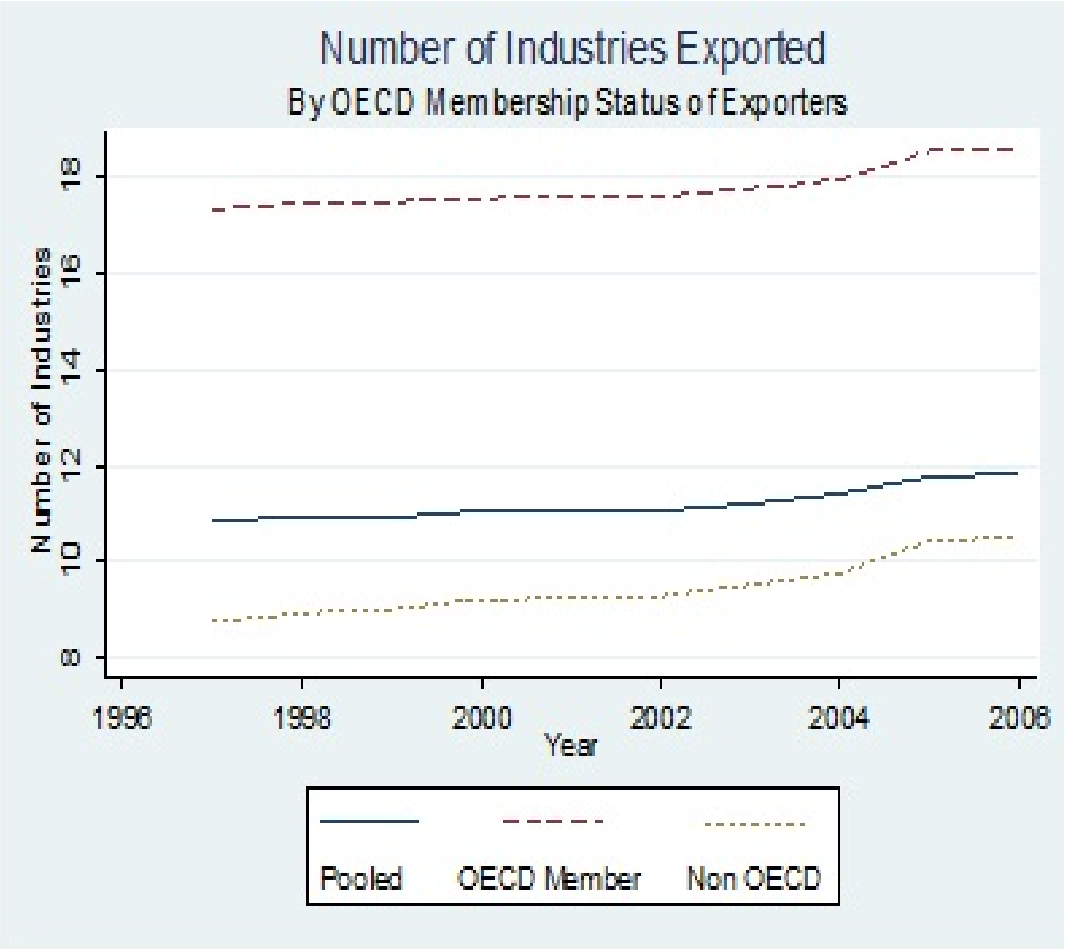


Figure 1: Number of Industries Exported By OECD Membership Status

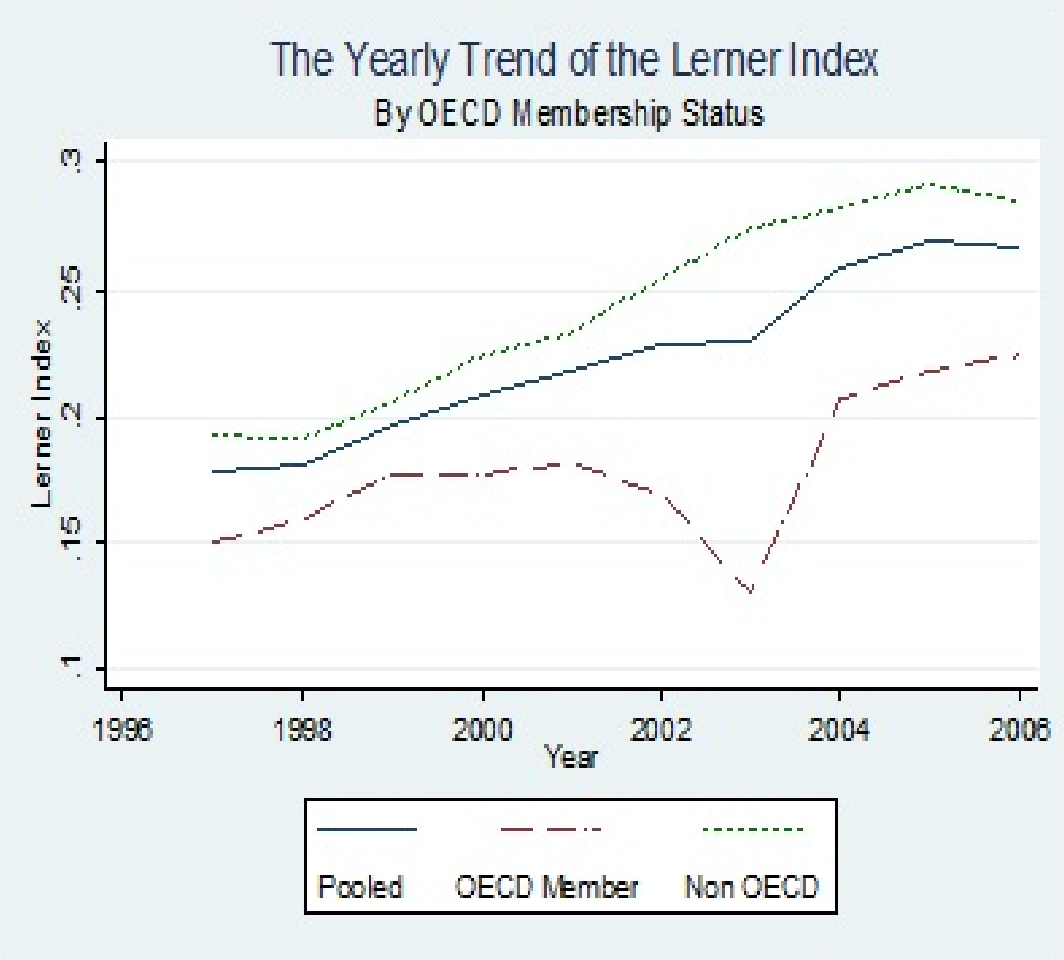


Figure 2: The Yearly Trend of the Lerner Index By OECD Membership Status

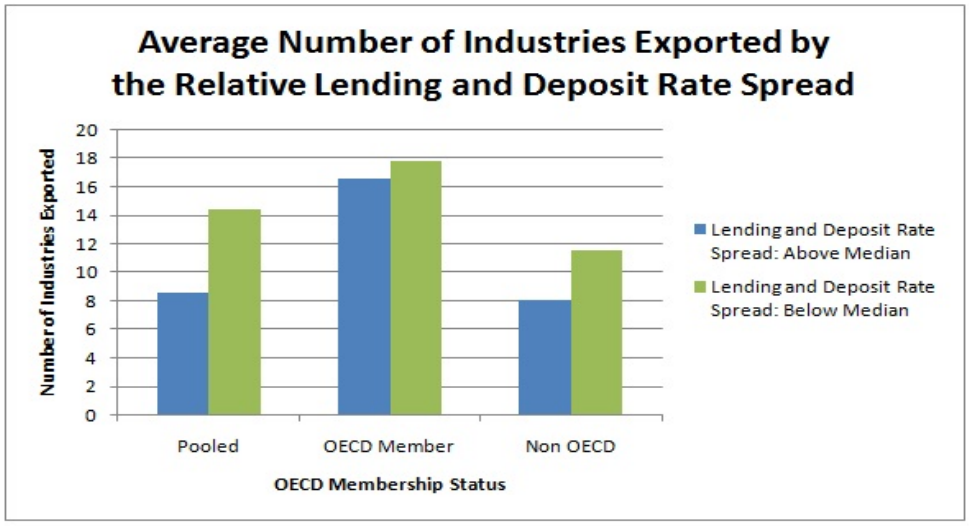


Figure 3: Average Number of Industries Exported Distributed by the Relative Lending and Deposit Rate Spread

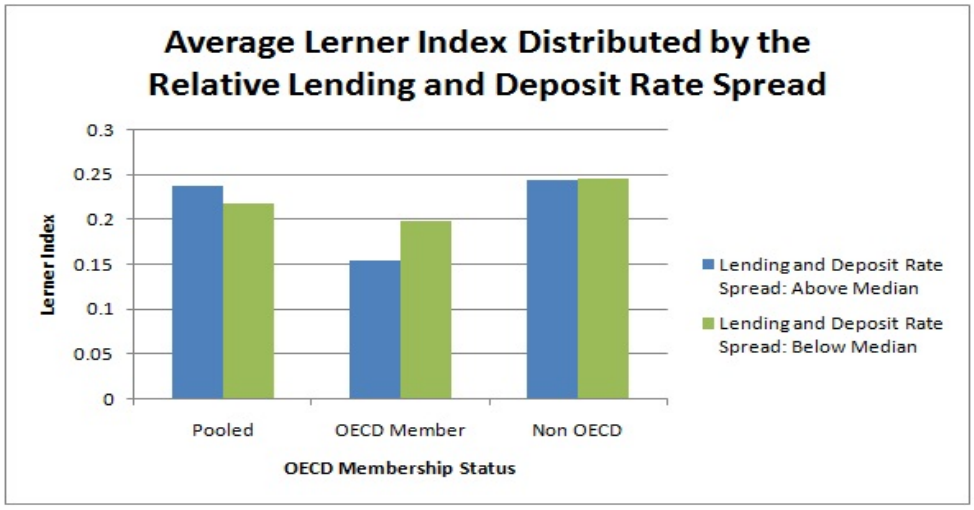


Figure 4: Average Lerner Index Distributed by the Relative Lending and Deposit Rate Spread

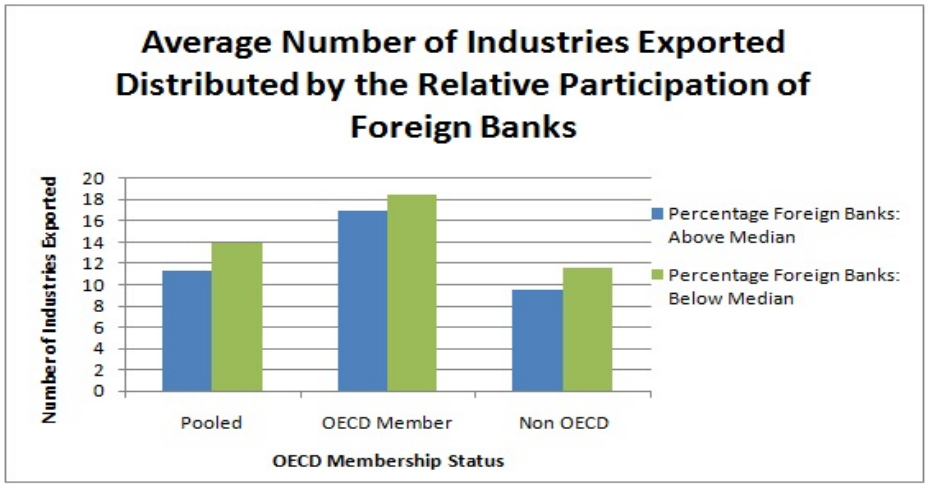


Figure 5: Average Number of Industries Exported Distributed by the Relative Participation of Foreign Banks

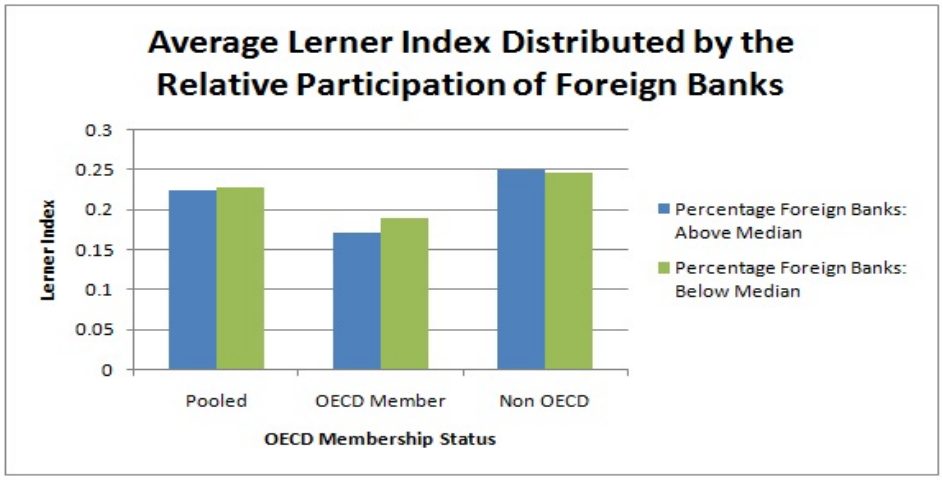


Figure 6: Average Lerner Index Distributed by the Relative Participation of Foreign Banks

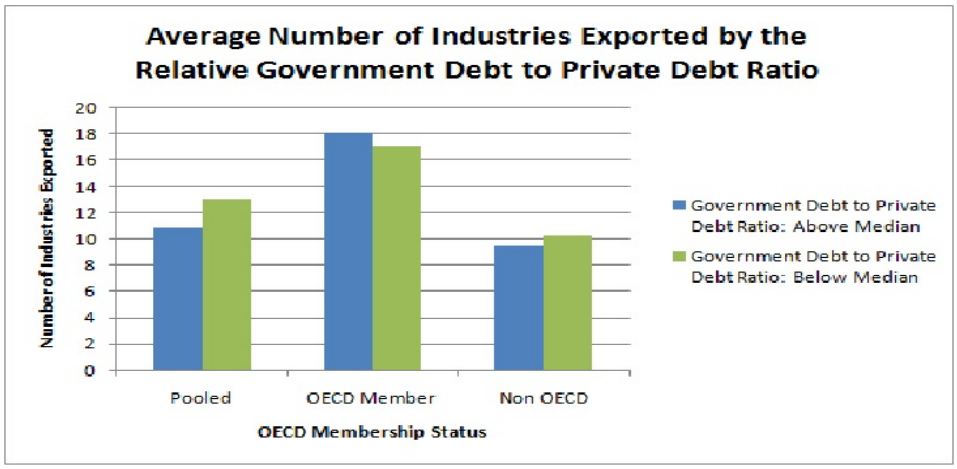


Figure 7: Average Number of Industries Exported Distributed by the Relative Government Debt to Private Debt Ratio

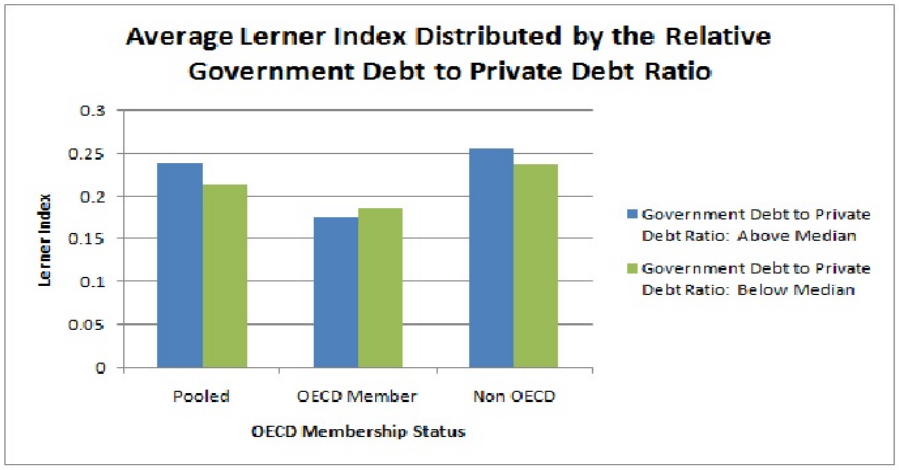


Figure 8: Average Lerner Index Distributed by the Relative Government Debt to Private Debt Ratio

Table 1: Averages of the Variables

	(1) Pooled	(2) OECD Member	(3) Non OECD
Number of Industries Exported	11.22	17.8	9.15
Lerner Index	0.23	0.18	0.25
Domestic Credit	68.21	115.56	51.83
Mean Asset Tangibility	0.292	0.296	0.291
Bank Z-score	19.42	21.3	18.74
Percentage Change in REER	0.27	0.90	-0.196
GDP Per Capita (Constant at 2005 US Dollars)	13463.41	26920.33	8750.784
Perc. of Merc. Exports to High Income Countries	70.04	83.55	65.57
Sum of Export Flow (Constant at 2005 US Dollars)	977737.8	2729847	336744
Lending and Deposit Rate Spread	8.138	3.747	9.476
Participation Rate of Foreign Banks (%)	32.31	29.13	33.64
Government Credit to Private Credit from Domestic Banks (%)	41.83	25.71	47.94

Note: Sum of Export Flow in Thousands of Dollars

Table 2: OLS Regression of Lerner Index on Number of Industries Exported

	(1)	(2)	(3)
	Pooled	OECD Member	Non OECD
Dep. Variable: Number of Industries Exported			
Lerner Index	-0.21***	-0.27***	-0.08***
	(0.02)	(0.05)	(0.03)
Domestic credit provided by banking sector (% of GDP)	0.08***	0.04***	0.10***
	(0.00)	(0.01)	(0.00)
Median Asset Tangibility	-1.58***	-0.65**	-2.33***
	(0.20)	(0.26)	(0.26)
Bank Z-score	0.04***	0.04***	0.04***
	(0.00)	(0.00)	(0.00)
Percentage Change in REER	0.00***	0.00***	0.00***
	(0.00)	(0.00)	(0.00)
GDP Per Capita (Constant at 2005 US Dollars)	0.03***	0.05***	0.01***
	(0.00)	(0.01)	(0.00)
Perc. of Merc. Exports to High Income Countries	0.18***	0.27***	0.13***
	(0.01)	(0.02)	(0.01)
Sum of Export Flow (Constant at 2005 US Dollars)	0.22***	0.20***	0.23***
	(0.00)	(0.00)	(0.00)
Constant	-0.52***	-1.00***	-0.21*
	(0.08)	(0.17)	(0.11)
Observations	87,606	40,988	46,618
R-squared	0.68	0.71	0.66

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Lerner Index is calculated as Log of (1 + Lerner Index)
All variables except percentage change in REER are transformed using natural logs.

Table 3: Standardized Beta Coefficients of the Independent Variables

Dep. Variable: Number of Industries Exported	(1) Pooled	(2) OECD Member	(3) Non OECD
Lerner Index	-0.02	-0.02	-0.01
Domestic credit provided by banking sector (% of GDP)	0.07	0.02	0.08
Median Asset Tangibility	-0.02	-0.01	-0.03
Bank Z-score	0.03	0.03	0.02
Percentage Change in REER	0.01	0.01	0.01
GDP Per Capita (Constant at 2005 US Dollars)	0.03	0.02	0.01
Perc. of Merc. Exports to High Income Countries	0.05	0.04	0.04
Sum of Export Flow (Constant at 2005 US Dollars)	0.79	0.87	0.78

Beta coefficients are reported
Lerner Index is calculated as Log of (1 + Lerner Index)
All variables except percentage change in REER are transformed using natural logs.

Table 4: Instrument Variable GMM Regression (Second Stage) of Lerner Index on Number of Industries Exported

	(1)	(2)	(3)	(4)	(5)	(6)
Excluded Instrument:	Cost to Income Ratio			Return on Assets		
Membership Status of Exporting Country	Pooled	OECD Member	Non OECD	Pooled	OECD Member	Non OECD
Dep. Variable: Number of Industries Exported						
Lerner Index	-0.89***	-6.59***	-0.35***	-0.90***	-1.30***	-0.51***
	(0.05)	(0.41)	(0.05)	(0.12)	(0.40)	(0.15)
Domestic credit provided by banking sector (% of GDP)	0.08***	0.40***	0.10***	0.09***	0.12***	0.11***
	(0.00)	(0.02)	(0.00)	(0.00)	(0.02)	(0.00)
Median Asset Tangibility	-0.93***	-0.18	-2.00***	-0.93***	-0.26	-1.97***
	(0.21)	(0.30)	(0.27)	(0.24)	(0.27)	(0.33)
Bank Z-score	0.06***	0.20***	0.04***	0.06***	0.06***	0.04***
	(0.00)	(0.01)	(0.00)	(0.00)	(0.01)	(0.01)
Percentage Change in REER	0.00***	-0.00***	0.00**	0.00***	-0.00	0.00**
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
GDP Per Capita (Constant at 2005 US Dollars)	0.01***	-0.03**	0.01***	0.01**	0.01	0.01*
	(0.00)	(0.01)	(0.00)	(0.00)	(0.01)	(0.00)
Perc. of Merc. Exports to High Income Countries	0.19***	0.59***	0.14***	0.16***	0.31***	0.13***
	(0.01)	(0.04)	(0.01)	(0.01)	(0.03)	(0.01)
Sum of Export Flow (Constant at 2005 US Dollars)	0.21***	0.18***	0.23***	0.21***	0.20***	0.23***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Constant	-0.36***	-2.52***	-0.01	-0.22***	-1.18***	0.12
	(0.08)	(0.24)	(0.11)	(0.08)	(0.19)	(0.12)
Observations	87,062	40,988	46,074	80,955	38,003	42,952
R-squared	0.68	0.55	0.66	0.68	0.71	0.66
Underidentification test (p-value)	0	0	0	0	0	0
Weak identification test (KP rkWlad F-stat)	7701.68	606.9	2000	2456.22	252.09	1659.62
Endogeneity test (p-value)	0	0	0	0	0	0.01

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Estimates efficient for arbitrary heteroskedasticity
Lerner Index is calculated as Log of (1 + Lerner Index)
All variables except percentage change in REER are transformed using natural logs.
The endogeneity test is conducted with non robust standard errors

Table 5: First Stage OLS Regression of Excluded Instruments on Lerner Index

	(1)	(2)	(3)	(4)	(5)	(6)
Membership Status of Exporting Country	Pooled	OECD Member	Non OECD	Pooled	OECD Member	Non OECD
Dep. Variable: Lerner Index						
Cost to Income Ratio	-0.13***	-0.02***	-0.22***			
	(0.00)	(0.00)	(0.00)			
Return on Assets				0.02***	0.01***	0.02***
				(0.00)	(0.00)	(0.00)
Domestic Credit	-0.00	0.06***	-0.01***	0.01***	0.05***	0.00***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Median Asset Tangibility	0.87***	0.19***	0.52***	0.93***	0.03	1.30***
	(0.02)	(0.03)	(0.03)	(0.03)	(0.03)	(0.04)
Bank Z-score	0.03***	0.03***	0.02***	0.03***	0.03***	0.03***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Percentage Change in REER	-0.00***	-0.00***	0.00***	-0.00***	-0.00***	-0.00***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
GDP Per Capita (Constant at 2005 US Dollars)	-0.02***	-0.02***	-0.02***	-0.02***	-0.01***	-0.00***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Perc. of Merc. Exports to High Income Countries	0.01***	0.05***	0.02***	0.02***	0.05***	0.05***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Sum of Export Flow (Constant at 2005 US Dollars)	-0.00***	-0.00***	-0.00***	-0.00***	-0.00***	-0.00***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Constant	0.56***	-0.14***	0.97***	-0.10***	-0.26***	-0.42***
	(0.01)	(0.03)	(0.02)	(0.01)	(0.03)	(0.02)
Observations	87,062	40,988	46,074	80,955	38,003	42,952
R-squared	0.32	0.34	0.44	0.19	0.32	0.13

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Lerner Index is calculated as Log of (1 + Lerner Index)
All variables except percentage change in REER are transformed using natural logs

Table 6: OLS Regression Distributed Relative to the Median of the Lending and Deposit Rate Spread

	(1)	(2)	(3)	(4)	(5)	(6)
Membership Status of Exporting Country	Pooled		OECD Member		Non OECD	
Relative to the Median Lending and Deposit Rate Spread	Higher	Lower	Higher	Lower	Higher	Lower
Dep. Variable: Number of Industries Exported						
Lerner Index	0.46***	-0.81***	0.44***	-0.13	0.53***	-0.60***
	(0.04)	(0.04)	(0.07)	(0.13)	(0.04)	(0.05)
Domestic Credit	0.10***	0.07***	0.03*	0.08***	0.04***	0.12***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Median Asset Tangibility	-0.37	-1.20***	3.21***	-3.65***	0.13	-5.07***
	(0.43)	(0.28)	(0.45)	(0.52)	(0.48)	(0.50)
Bank Z-score	0.01	0.03***	-0.08***	0.04***	0.00	0.03***
	(0.01)	(0.00)	(0.01)	(0.01)	(0.01)	(0.01)
Percentage Change in REER	0.00	0.00***	-0.00	-0.00**	-0.00	0.00**
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
GDP Per Capita (Constant at 2005 US Dollars)	0.08***	-0.01**	0.17***	-0.01	0.10***	-0.05***
	(0.01)	(0.00)	(0.02)	(0.02)	(0.01)	(0.00)
Perc. of Merc. Exports to High Income Countries	0.13***	0.10***	-0.27***	0.72***	0.12***	-0.02
	(0.01)	(0.02)	(0.04)	(0.06)	(0.01)	(0.02)
Sum of Export Flow (Constant at 2005 US Dollars)	0.23***	0.22***	0.21***	0.21***	0.23***	0.24***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Constant	-1.17***	0.25**	-0.67**	-1.83***	-1.45***	1.97***
	(0.15)	(0.12)	(0.30)	(0.31)	(0.19)	(0.18)
Observations	26,496	43,381	13,587	15,432	20,004	20,854
R-squared	0.67	0.70	0.72	0.74	0.67	0.69

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Lerner Index is calculated as Log of (1 + Lerner Index)
All variables except percentage change in REER are transformed using natural logs.

Table 7: OLS Regression Distributed Relative to the Median of the Participation of Foreign Banks

	(1)	(2)	(3)	(4)	(5)	(6)
Membership Status of Exporting Country	Pooled		OECD Member		Non OECD	
Relative to the Median Participation of Foreign Banks	Higher	Lower	Higher	Lower	Higher	Lower
Dep. Variable: Number of Industries Exported						
Lerner Index	0.06	-0.01	-0.63***	0.12	0.25***	-0.06
	(0.07)	(0.06)	(0.11)	(0.08)	(0.08)	(0.08)
Domestic credit provided by banking sector (% of GDP)	0.05***	0.11***	0.12***	0.00	0.07***	0.16***
	(0.01)	(0.01)	(0.02)	(0.01)	(0.01)	(0.01)
Median Asset Tangibility	-0.32	-2.23***	2.61***	-0.27	-1.60**	-2.54***
	(0.54)	(0.44)	(0.65)	(0.48)	(0.67)	(0.76)
Bank Z-score	0.00	0.06***	0.03***	0.04***	0.00	0.05***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Percentage Change in REER	0.00***	0.00***	0.00	-0.00	0.00***	0.00***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
GDP Per Capita (Constant at 2005 US Dollars)	0.11***	-0.02***	-0.00	-0.15***	0.10***	-0.02**
	(0.01)	(0.01)	(0.03)	(0.04)	(0.01)	(0.01)
Perc. of Merc. Exports to High Income Countries	0.19***	0.13***	0.16*	0.40***	0.18***	-0.02
	(0.03)	(0.03)	(0.08)	(0.08)	(0.03)	(0.03)
Sum of Export Flow (Constant at 2005 US Dollars)	0.22***	0.20***	0.21***	0.19***	0.23***	0.22***
	(0.01)	(0.00)	(0.01)	(0.01)	(0.01)	(0.00)
Constant	-1.85***	0.52**	-1.52**	0.76*	-1.47***	0.98***
	(0.24)	(0.20)	(0.59)	(0.39)	(0.26)	(0.26)
Observations	39,504	45,041	20,776	20,212	21,542	22,015
R-squared	0.68	0.69	0.71	0.74	0.65	0.69

Robust standard errors in parentheses

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

Lerner Index is calculated as Log of (1 + Lerner Index)

All variables except percentage change in REER are transformed using natural logs.

Table 8: OLS Regression Distributed Relative to the Median of the Government Debt to Private Debt Ratio

	(1)	(2)	(3)	(4)	(5)	(6)
Membership Status of Exporting Country	Pooled		OECD Member		Non OECD	
Relative to the Median Government Debt to Private Debt Ratio	Higher	Lower	Higher	Lower	Higher	Lower
Dep. Variable: Number of Industries Exported						
Lerner Index	-0.16***	-0.33***	-0.22***	-0.30***	-0.05	-0.10**
	(0.03)	(0.04)	(0.07)	(0.07)	(0.04)	(0.05)
Domestic credit provided by banking sector (% of GDP)	0.04***	0.09***	-0.08***	0.06***	0.07***	0.11***
	(0.01)	(0.00)	(0.01)	(0.01)	(0.01)	(0.01)
Median Asset Tangibility	-2.11***	1.22***	0.17	-0.59	-1.41***	-1.77***
	(0.30)	(0.28)	(0.34)	(0.48)	(0.42)	(0.40)
Bank Z-score	0.08***	0.03***	0.04***	0.00	0.09***	0.03***
	(0.01)	(0.00)	(0.01)	(0.01)	(0.01)	(0.01)
Percentage Change in REER	0.00***	0.00***	0.00***	-0.00	0.00	0.00***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
GDP Per Capita (Constant at 2005 US Dollars)	0.07***	-0.03***	0.32***	-0.15***	0.06***	-0.03***
	(0.00)	(0.00)	(0.02)	(0.02)	(0.01)	(0.01)
Perc. of Merc. Exports to High Income Countries	0.21***	0.20***	0.09**	0.32***	0.19***	0.12***
	(0.02)	(0.01)	(0.05)	(0.03)	(0.02)	(0.01)
Sum of Export Flow (Constant at 2005 US Dollars)	0.22***	0.21***	0.18***	0.22***	0.23***	0.23***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Constant	-0.75***	-0.84***	-2.54***	0.58**	-1.13***	0.12
	(0.14)	(0.10)	(0.25)	(0.26)	(0.21)	(0.15)
Observations	34,177	49,695	18,995	21,572	19,019	24,286
R-squared	0.67	0.70	0.71	0.72	0.64	0.69

Robust standard errors in parentheses

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

Lerner Index is calculated as Log of (1 + Lerner Index)

All variables except percentage change in REER are transformed using natural logs.

6 Appendix

Appendix A: Definition of the Variables

Variable	Definition	Source
Number of industries exported	The sum of the number of ISIC Rev. 2 industries exported from the exporting country to its trading partner	de Sousa et al. (2012)
The Lerner Index	A measure of the market power in the banking industry calculated as markup over over price	The World Bank (2013a)
Domestic credit	Domestic credit provided by banking sector as a percentage of GDP includes all credit to sectors on gross basis	The World Bank (2013b)
Median asset tangibility	Asset Tangibility is calculated as the percentage of net plant, property and equipment over total assets	Manova (2008)
Bank Z-score	Probability of default of the banking system and calculated as a weighted average of the country's individual banks	The World Bank (2013a)
Percentage change in REER	Real effective exchange rate is the nominal effective exchange rate divided by the price deflator	The World Bank (2013b)
GDP per capita (Constant at 2005 US Dollars)	Self-descriptive	The World Bank (2013b)
Percentage of merchandize exports to high income countries	Self-descriptive	The World Bank (2013b)
Sum of export flow (Constant at 2005 US Dollars)	Cumulative sum of exports between exporters and its trading partner	de Sousa et al. (2012)
Average consumer price index (Base year = 2005)	Reflects the costs to the average consumer of acquiring baskets of goods and services	The World Bank (2013a)
Lending and deposit rate spread (%)	Difference between the lending rate and the deposit rate	The World Bank (2013a)
Percentage of foreign banks	Percentage of foreign owned banks (50% or more shares owned by foreigners) to total banks	The World Bank (2013a)
Ratio of credit to government to private credit by domestic banks	Calculated as a ratio of credit to government and state-owned enterprises to private credit by domestic banks	The World Bank (2013a)

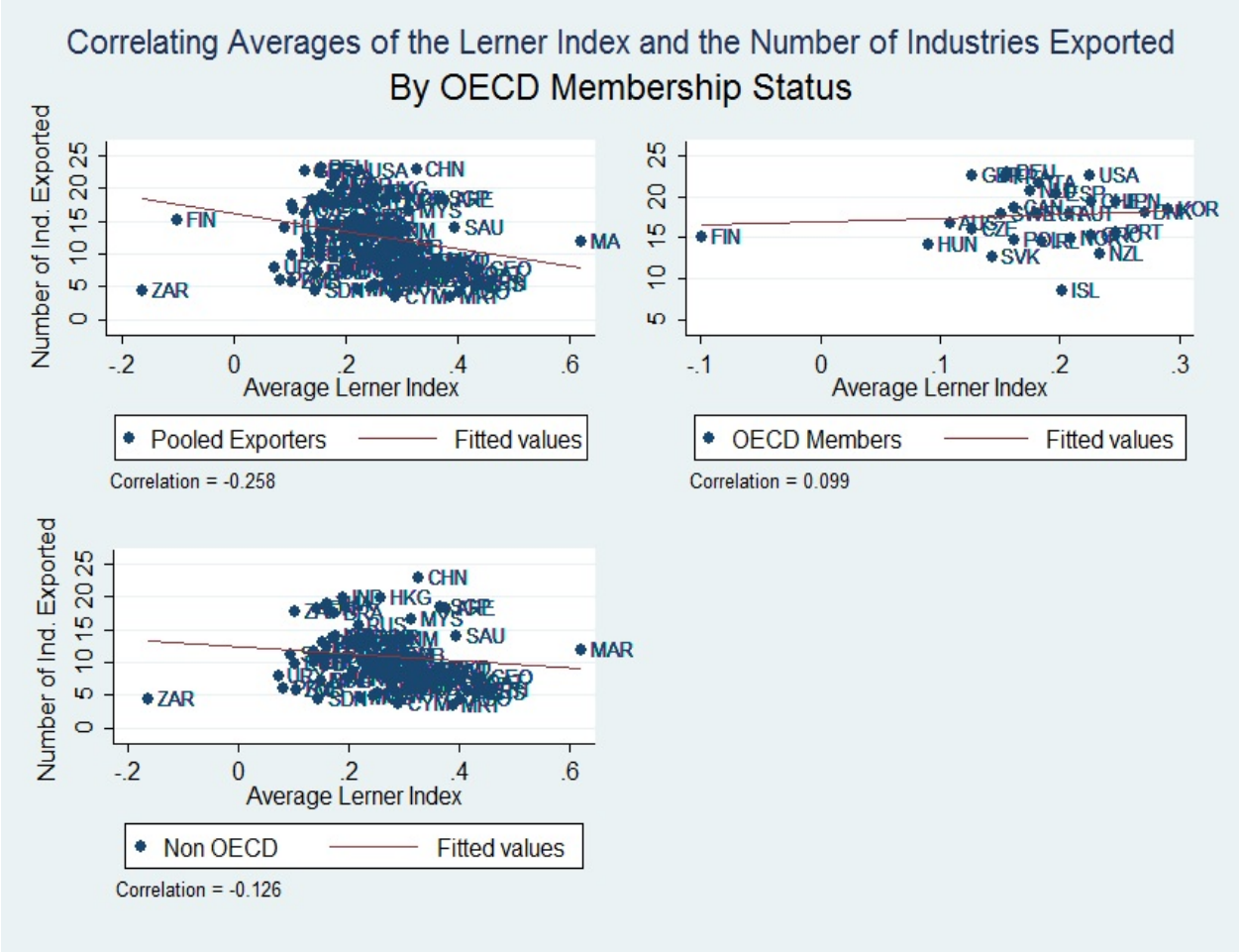
Appendix B: List of Countries

Afghanistan , Albania, Algeria, American Samoa, Andorra, Angola, Anguilla, Antarctica, Antigua and Barbuda, Argentina, Armenia, Aruba, ***Australia***, ***Austria***, Azerbaijan, Bahamas, Bahrain, Bangladesh, Barbados, Belarus, Belize, Benin, Bermuda, Bhutan, Bolivia, Bosnia and Herzegovina, Bouvet Island, Brazil, British Indian Ocean Territory, Brunei Darussalam, Bulgaria, Burkina Faso, Burundi, Cambodia, Cameroon, ***Canada***, Cape Verde, Cayman Islands, Central African Republic, Chad, Chile, China, Christmas Island, Cocos (Keeling) Islands, Colombia, Comoros, Congo, Cook Islands, Costa Rica, Croatia, Cuba, Cyprus, ***Czech Republic***, Coite d'Ivoire, ***Denmark***, Djibouti, Dominica, Dominican Republic, Ecuador, Egypt, El Salvador, Equatorial Guinea, Eritrea, Estonia, Ethiopia, Falkland Islands (Malvinas), Fiji, Finland, ***France***, French Polynesia, French Southern Territories, Gabon, Gambia, Georgia, ***Germany***, Ghana, Gibraltar, ***Greece***, Greenland, Grenada, Guam, Guatemala, Guinea, Guinea-Bissau, Guyana, Haiti, Heard Island and McDonald Islands, Holy See (Vatican City State), Honduras, Hong Kong, ***Hungary***, ***Iceland***, India, Indonesia, Iran, Iraq, ***Ireland***, Israel, ***Italy***, Jamaica, ***Japan***, Jordan, Kazakhstan, Kenya, Kiribati, Democratic People's Republic of Korea, ***Republic of Korea***, Kuwait, Kyrgyzstan, Lao People's Democratic Republic, Latvia, Lebanon, Liberia, Libya, Lithuania, Macao, Macedonia, Madagascar, Malawi, Malaysia, Maldives, Mali, Malta, Marshall Islands, Mauritania, Mauritius, ***Mexico***, Federated States of Micronesia, Moldova, Monaco, Mongolia, Montenegro, Montserrat, Morocco, Mozambique, Myanmar, Nauru, Nepal, ***Netherlands***, New Caledonia, ***New Zealand***, Nicaragua, Niger, Nigeria, Niue, Norfolk Island, Northern Mariana Islands, ***Norway***, Oman, Pakistan, Palau, Panama, Papua New Guinea, Paraguay, Peru, Philippines, Pitcairn, Poland, ***Portugal***, Qatar, Russian Federation, Rwanda, Saint Helena, Saint Kitts and Nevis, Saint Lucia, Saint Pierre and Miquelon, Saint Vincent and the Grenadines, Samoa, San Marino, Sao Tome and Principe, Saudi Arabia, Senegal, Serbia, Seychelles, Sierra Leone, Singapore, ***Slovakia***, Slovenia, Solomon Islands, Somalia, South Africa, South Georgia and the South Sandwich Islands, Spain, Sri Lanka, Sudan, Suriname, ***Sweden***, ***Switzerland***, Syrian Arab Republic, Taiwan, Tajikistan, Tanzania, Thailand, Togo, Tokelau, Tonga, Trinidad and Tobago, Tunisia, Turkey, Turkmenistan, Turks and Caicos Islands, Tuvalu, Uganda, Ukraine, United Arab Emirates, ***United Kingdom***, ***United States***, United States Minor Outlying Islands, Uruguay, Uzbekistan, Vanuatu, Venezuela, Viet Nam, British Virgin Islands, Wallis and Futuna, Western Sahara, Yemen, Zambia, Zimbabwe

Note: OECD member countries are ***bold and italicized***.

Appendix C: Correlation Between the Exogenous Variables and (i) Number of Industries Exported and (ii) Lerner Index

Exogenous Variables:	Lending less Deposit Rate	Percentage of Foreign Banks	Government Credit to Private Debt
Pooled Countries:			
Number of Industries Exported:	-0.19	-0.13	-0.1
Lerner Index:	-0.0004	-0.03	0.04
OECD Members:			
Number of Industries Exported:	-0.11	-0.13	-0.04
Lerner Index:	-0.31	-0.11	-0.02
Non OECD Countries:			
Number of Industries Exported:	-0.1	-0.1	-0.05
Lerner Index:	-0.08	-0.01	0.01



Appendix D: Correlation Between Averages of Lerner Index and Number of Industries Exported

Appendix E.1: Instrument Variable GMM Regression of Lerner Index on Number of Industries Exported
With Bank Concentration as Excluded Instrument

	(1)	(2)	(3)	(4)	(5)	(6)
Membership Status of Exporting Country	Pooled	OECD Member	Non OECD	Pooled	OECD Member	Non OECD
Dep. Variable:	Second Stage Number of Industries Exported			First Stage Lerner Index		
Lerner Index	4.73***	7.82***	-1.24***			
	(0.80)	(1.29)	(0.27)			
Domestic Credit	0.07***	-0.40***	0.09***	0.00***	0.06***	-0.01***
	(0.00)	(0.07)	(0.00)	(0.00)	(0.00)	(0.00)
Median Asset Tangibility	-6.49***	-2.74***	-0.17	1.12***	0.35***	1.51***
	(0.89)	(0.47)	(0.46)	(0.03)	(0.03)	(0.04)
Bank Z-score	-0.12***	-0.15***	0.08***	0.03***	0.02***	0.04***
	(0.03)	(0.03)	(0.01)	(0.00)	(0.00)	(0.00)
Percentage Change in REER	0.01***	0.01***	-0.00	-0.00***	-0.00***	-0.00***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
GDP Per Capita (Constant at 2005 US Dollars)	0.12***	0.08***	0.01***	-0.02***	-0.00	-0.00
	(0.01)	(0.01)	(0.00)	(0.00)	(0.00)	(0.00)
Perc. of Merc. Exports to High Income Countries	0.07***	-0.16*	0.20***	0.02***	0.05***	0.06***
	(0.02)	(0.09)	(0.02)	(0.00)	(0.00)	(0.00)
Sum of Export Flow (Constant at 2005 US Dollars)	0.23***	0.23***	0.23***	-0.00***	-0.00***	-0.00***
	(0.00)	(0.01)	(0.00)	(0.00)	(0.00)	(0.00)
Five Bank Concentration				0.01***	0.01***	0.05***
				(0.00)	(0.00)	(0.00)
Constant	-0.00	2.06***	-0.61***	-0.22***	-0.49***	-0.73***
	(0.13)	(0.59)	(0.17)	(0.01)	(0.02)	(0.02)
Underidentification test (p-value)	0	0	0			
Weak identification test (KP rkWlad F-stat)	142.67	109.21	755.25			
Endogeneity test (p-value)	0	0	0			
Observations	84,146	39,405	44,741	84,146	39,405	44,741
R-squared	0.51	0.52	0.65	0.16	0.41	0.17

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Lerner Index is calculated as Log of (1 + Lerner Index)
All variables except percentage change in REER are transformed using natural logs.
The endogeneity test is conducted with non robust standard errors

Appendix E.2: Instrument Variable GMM Regression of Lerner Index on Number of Industries Exported
With Credit Depth of Information Index as Excluded Instrument

	(1)	(2)	(3)	(4)	(5)	(6)
Membership Status of Exporting Country	Pooled	OECD Member	Non OECD	Pooled	OECD Member	Non OECD
Dep. Variable:	Second Stage Number of Industries Exported			First Stage Lerner Index		
Lerner Index	-0.55***	-0.63***	-0.32*			
	(0.14)	(0.22)	(0.17)			
Domestic credit provided by banking sector (% of GDP)	0.07***	0.06***	0.10***	0.00	0.07***	-0.01***
	(0.01)	(0.01)	(0.01)	(0.00)	(0.00)	(0.00)
Median Asset Tangibility	-0.99***	0.27	-2.60***	0.37***	0.72***	0.07
	(0.37)	(0.40)	(0.51)	(0.05)	(0.04)	(0.07)
Bank Z-score	0.07***	0.07***	0.03***	0.02***	0.02***	0.02***
	(0.01)	(0.01)	(0.01)	(0.00)	(0.00)	(0.00)
Percentage Change in REER	0.00***	0.00**	0.00	-0.00***	-0.00***	-0.00***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
GDP Per Capita (Constant at 2005 US Dollars)	0.02***	0.03	0.03***	0.00*	-0.02***	0.02***
	(0.00)	(0.02)	(0.01)	(0.00)	(0.00)	(0.00)
Perc. of Merc. Exports to High Income Countries	0.19***	0.27***	0.18***	0.04***	0.13***	0.05***
	(0.02)	(0.05)	(0.02)	(0.00)	(0.00)	(0.00)
Sum of Export Flow (Constant at 2005 US Dollars)	0.19***	0.18***	0.21***	-0.00***	-0.00***	0.00***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Credit Depth of Information Index				-0.02***	-0.02***	-0.02***
				(0.00)	(0.00)	(0.00)
Constant	-0.29**	-1.06***	-0.03	-0.05***	-0.63***	-0.12***
	(0.14)	(0.29)	(0.20)	(0.02)	(0.03)	(0.03)
Underidentification test (p-value)	0	0	0			
Weak identification test (KP rkWlad F-stat)	2444.74	4290.78	1294.22			
Endogeneity test (p-value)	0	0.58	0.06			
Observations	29,828	14,522	15,306	29,828	14,522	15,306
R-squared	0.68	0.71	0.67	0.20	0.49	0.20

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Lerner Index is calculated as Log of (1 + Lerner Index)
All variables except percentage change in REER are transformed using natural logs.
The endogeneity test is conducted with non robust standard errors for OECD member and non OECD countries
Credit Depth of Information Index is a ranking from 0=lowest to 6=highest.

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