Industry Diversification and Financial Development*

Alfredo Schclarek† Jose Luis Navarrete‡

September 2016

Abstract

This paper studies industry or sector diversification as a determinant to financial development. The theoretical model predicts that banks lend more, and hold less liquid funds, in a more diversified economy because the aggregate credit risk is lower when a more diversified lending portfolio is possible. Thus, the reduction in the aggregate credit risk given by a higher degree of industrial diversification determines financial development. The empirical results supports this hypothesis by finding both cross-section and panel data evidence that there is a robust relationship between industry (or sector) diversification and financial development. The policy implications are that the government may foster financial development by subsidizing horizontal R&D in order to create new industries or sectors.

JEL classification: E22; E32; E44; O16; O30; 041

Keywords: industry diversification; financial development; bank lending; horizontal innovation.

*We would like to thank Daniel Heymann and Federico Weinschelbaum for comments and discussions; and seminar participants at Economix, Université Paris Ouest (Nanterre, France), Universidad Nacional de Córdoba (Cordoba, Argentina), and XLVIII Reunion Anual Asociación Argentina de Economía Política (Rosario, Argentina). We thank financial assistance from FonCyT, ANPCyT, Argentina.

†Department of Economics, Universidad Nacional de Córdoba, Argentina and CONICET; e-mail: alfredo@eco.unc.edu.ar; www.cbaeconomia.com.

‡Department of Economics, Universidad Nacional de Córdoba and Universidad Nacional de Chilecito, Argentina; e-mail: jlnavarrete@eco.unc.edu.ar; jnavarrete@undec.edu.ar.

1 Introduction

Despite the recent financial crisis, the link between financial development and growth has not been challenged. On the contrary, it has been argued that for a financial system to be conductive to growth it has to be as stable as possible, avoiding instabilities generated by boom/bust credit cycles. This insight is an invitation for new research that deepens the understandings prevalent before the crisis, not only in terms of the finance and growth nexus but also on the determinants of financial development. Evidently, the suggestions made by Levine (2005), regarding the need for more empirical and theoretical work that studies the dynamic interaction between the determinants of the financial system and the growth process, are more relevant than ever.

Regarding the determinants of financial development, the recent literature points out a wide number of determinants, such as legal systems, institutional and political explanations, trade openness, macroeconomic stability, and cultural and geographical factors (see among others La Porta et al. (1997); Rajan and Zingales (2003); Beck et al. (2003); Stulz and Williamson (2003); Levine (2005); Baltagi et al. (2009); Huang and Temple (2005); Huang (2010)). Most of this literature on the determinants of financial development is based on the financial repression literature of McKinnon (1973) and Shaw (1973). However, what is missing in this literature is an analysis of whether the productive sector's characteristics, and especially the degree of industry diversification, affect in any way financial development. Note that we are not arguing that the literature lacks an analysis of how a higher income or GDP affects financial development, but how financial development is affected by the specific characteristics of the productive sector given a certain level of production. Notable exceptions are Acemoglu and Zilibotti (1997), Jaimovich (2011), Ramcharan (2010).

The objective of this paper is to study the role of industry (or sector) diversification as a driver of financial development. The theoretical model presented in this paper puts forward the hypothesis that when an economy has only one or few important productive sectors, and there is a negative shock to any of these sectors, the financial sector also suffers the consequences of the negative shock. In contrast, when the economy has many important sectors, a negative shock to any of these sectors does not affect the financial system as a whole because there is a diversified loan portfolio. In other words, the reduction in the aggregate risk faced by the financial system that is brought about by a greater diversification of the credit risk leads to an increase in bank lending and financial development.

The empirical section confirms the above hypothesis finding that there is a positive relationship between industrial (or sector) diversification and financial development. The empirical investigation uses data from the Financial Development and Structure Dataset, the World Development Indicators

and other sources that covers the period 1990 and 2010 for several industrial and developing countries. Further we construct three different measures of industrial (or sector) diversification using disaggregated export data from the World Integrated Trade Solution (WITS) database of the World Bank. Also, we used the IMF Export Product Diversification index available in http://www.imf.org/external/np/res/dfidimf/diversification.htm. Finally, five different measures of financial development are used following the standard literature. Regarding the estimation strategy, we follow cross-section and panel data methodologies to investigate the relationship between industrial (or sector) diversification and financial development.

Accordingly, the contribution of this paper to the financial development literature is that it presents an explanation based on the importance of the productive sector's characteristics, and especially the degree of industry diversification. As in Acemoglu and Zilibotti (1997) and Jaimovich (2011), our paper also models financial development as a reduction in aggregate credit risk that brings about an increase in lending. Acemoglu and Zilibotti (1997) models the reduction in aggregate credit risk as a consequence of higher availability of capital or liquid funds, which in turn allows to invest in a more diversified portfolio of preexisting projects that require a minimum investment scale. Jaimovich (2011) models the reduction in aggregate credit risk as a consequence of the lower average default rate that is achieved when there is a better match between idiosyncratic entrepreneurial talent and the specific characteristics of the different investment projects, which is possible when there is a higher sectorial diversification. Instead our paper relates the decrease in aggregate credit risk to the possibility of diversifying individual credit risk of risky projects when there are more sectors in the economy. Regarding the empirical results, as in Ramcharan (2010), we find that a higher level of diversification leads to higher lending and financial development. The main differences between these papers are that we not only use cross section data analysis but also panel data analysis and that our diversification variable in constructed using export data instead of manufacturing data.

In section 2 we present a theoretical model that explains and formalizes our hypothesis that more diversified countries have also more developed financial systems. In section 3, we present the dataset and the different variables that we use. The econometric methodology is discussed in section 4. Section 5 presents the estimation results. Finally, the conclusions and policy implications are discussed in section 6.

2 Theoretical model

This section presents a theoretical model that offers a framework to model how the optimal behavior of banks is affected by the degree of sector/industry

diversification. The model shows that when there are more industries/sectors in the economy, banks are better able to spread the risks of lending to firms and therefore their optimal investment portfolio is composed of a higher proportion of bank lending to firms and a smaller proportion of liquid funds holdings. Thus, our model shows that when an economy is more diversified, the financial sector (banks) has a lower aggregate credit risk and is more developed (lends more).

2.1 General framework

The economy is characterized by a simple overlapping generation model of two-period-lived agents. It is populated by two types of agents: firms/entrepreneurs and banks. There is a continuum of firms with unit mass, where each firm is indexed by i, has access to an investment project that belongs to a certain industry j with constant returns to scale, has no endowments of funds, and requires an initial investment in period 0 to generate a variable pay off in period 1.[1] The total number of different industries (or sectors) existing in the economy is J and is exogenously given.[2] In addition, there is a continuum of banks with unit mass, where each bank is endowed with an initial amount of liquid funds in period 0 and no endowments in period 1. Banks maximize their utility by choosing their investment portfolio composed of credit to firms and liquid funds.

2.2 Firms

Each firm i has an investment project that for an initial investment I in period 0 has a stochastic return R_jI in period 1, where R_j is the stochastic gross rate of return of the projects belonging to industry j. Note that for simplicity reasons we assume that all firms belonging to industry j face the same stochastic return. Note also that the economy has J different gross returns, i.e. one specific gross return for each industry j. All the gross returns R_j are independently and identically distributed with finite mean and variance. This assumption imply that all industries/sectors have the same expected gross return $E(R)$ and variance $V(R)$. Further, we assume that $E(R) > 1$. Another assumption of the model is that each firm has no endowment of cash. Thus, in order to implement a project of scale I, the firm must borrow I from banks. The firm uses the project's return in period 1 as collateral to obtain these loans. For simplicity reasons, and without affecting our results, we assume that entrepreneurs are risk neutral and get

[1] The basic model setup is based on bank lending model by Brei and Schclarek (2015), the consumer liquidity demand model by Allen and Gale (1998) and the firm liquidity demand model by Holmstrom and Tirole (1998).

[2] Schclarek (2015) builds a similar model to this one but where the number of sectors/industries are endogenously determined. Further, he explores the relationship between industry diversification and growth and volatility.

no return from the project in period 1, being the banks that get all the proceeds.

2.3 Banks

We assume that banks are risk averse and have initial funds of A. Banks utilize their funds to give credit to the firms and/or hold them liquid. Note that as there are J types of projects, banks lend to a portfolio of projects that is more diversified when the number of existing industries J increases. Note also that while liquid assets are risk-free but have a gross return of 1, the investment in firms' projects are subject to risk but have a positive expected gross return. Furthermore, we assume that banks keep the whole proceeds of the investment projects, and thus this portfolio has a stochastic return R_P, with of and variance.

We assume that the expected utility of banks depends on the mean and the variance of their portfolio returns given by $E(U) = E(R_P) - \frac{\gamma}{2}V(R_P)$, where R_P is the stochastic return of the portfolio, $E(R_P)$ is the expected return, $V(R_P)$ is the variance and γ is a positive risk aversion parameter.[3] If we consider an economy with only one sector, then banks' maximization problem in period 0 is

$$\begin{aligned} &\max_{I} \; E(R)I + S - \frac{\gamma}{2}I^2V(R) \\ &\text{s.t.} \\ &I + S \leq A \end{aligned} \tag{1}$$

where $E(R)I$ is the expected output of the investment project, S are the liquid funds holdings by the bank in period 0, $V(R)$ is the variance of R and $-\frac{\gamma}{2}I^2V(R)$ is the disutility caused by the risk of the investment project. Note that the condition imply that the banks' funds may be lent to entrepreneurs and/or kept liquid to the next period.

Next we consider the maximization problem when banks lend to J sectors. Further, we assume that each sector receives a fraction α_j of total credit given to firms, which is I, and that each sector receives the same fraction of credit (i.e. $\alpha_m = \alpha_n = 1/J$). Then, the expected utility of banks

[3]These mean-variance preferences are used in models where the environment is uncertain, such as in Brei and Schclarek (2015), Mondria (2010), Peress (2010) and Nieuwerburgh and Veldkamp (2010). These preferences lead to the same mean-variance portfolio that obtains under an exponential expected utility function exhibiting constant absolute risk aversion (CARA), so that $E(R_P) - \frac{\gamma}{2}V(R_P)$ may be rewritten as $-\frac{1}{\gamma}lnE(exp(-R_P\gamma)$, where $\gamma = 0$ implies that banks are risk neutral and $\gamma > 0$ that banks are risk averse. For a more detailed discussion of these types of preferences see Epstein and Zin (1989), Kreps and Proteus (1978), Kreps and Proteus (1979), and Weil (1990), among others.

becomes

$$\begin{aligned} E(U) &= E(R_P) - \frac{\gamma}{2}V(R_P) \\ &= \sum_{j=1}^{J} E(R)\alpha_j I + S - \frac{\gamma}{2}\sum_{j=1}^{J} V(R\alpha_j I) \\ &= \sum_{j=1}^{J} E(R)\frac{1}{J} I + S - \frac{\gamma}{2}\sum_{j=1}^{J} V(R\frac{1}{J} I) \\ &= E(R)I + S - \frac{\gamma}{2J} I^2 V(R), \end{aligned}$$

where it is clear that when $J \to \infty$, the term $\frac{\gamma}{2J} I^2 V(R) \to 0$, which means that when there are more sectors in the economy, bank lending is less risky because banks are able to lend to a more diversified portfolio of investment projects. The maximization problem becomes

$$\begin{aligned} &\max_{I} \; E(R)I + S - \frac{\gamma}{2J} I^2 V(R) \qquad (2) \\ &\text{s.t.} \\ &I + S \leq A. \end{aligned}$$

2.4 The optimal behavior

Banks maximize their expected utility given in equation 2 by choosing between the optimal level of lending to firms, I^*, and liquid asset holdings, S^*. In the optimum, banks choose the following asset portfolio composition:

$$\{I^*, S^*\} = \{\frac{(E(R)-1)J}{\gamma V(R)}, A - \frac{(E(R)-1)J}{\gamma V(R)}\}. \qquad (3)$$

Clearly, when there are more sectors in the economy, the optimal portfolio decision of banks is to lend a larger fraction of their initial funds A to firms and hold a smaller fraction of liquid funds. In other words, given a certain amount of initial funds, total bank lending to firms is higher and total liquid funds holdings is lower when the economy is more diversified. Formally, if we compare two economies with the same initial funds A but one with M sectors and the other with N sectors, where $M < N$, we have that $I^*_M < I^*_N$ and $S^*_M > S^*_N$, where the subscripts M and N denote the optimal behavior in the economies with M and N sectors, respectively. Thus, we conclude that an economy that is more diversified has also a financial sector that is more developed (lend more).

3 Data and variables

The data used in this study is drawn from various sources, amongst others the Financial Development and Structure Dataset and the World Develop-

ment Indicators (WDI) from the World Bank, as described in table 1. The time span covers the period 1990 and 2010 for a panel of 91 industrial and developing countries [4]. Regarding the variables used, the degree of financial development of a country can be approximated by different indicators, each of them having advantages and disadvantages. We follow the standard literature and use the following variables: bank liquid liabilities to GDP ($FIN1$), bank credit over bank deposits $FIN2$, private credit lent by banks to GDP ($FIN3$) and private credit granted by banks and other financial institutions to GDP ($FIN4$) (Baltagi et al. (2009), Levine (2005), Rajan and Zingales (2003), Huang and Temple (2005)).

Regarding the degree of sectoral (or industrial) diversification, we also proceed to calculate the Hirschman-Herfindahl index (HHI) at two, three and four-digit SICT (Bailey y Lederman (2011), Heiko Hesse (2008), Samen S. (2010)). We also use the IMF Export Diversification Index. The main source of data to develop the sectoral diversification indicators is based on the export data for each country, obtained from the database developed by World Integrated Trade Solution (WITS) developed by the World Bank. This database on bilateral trade flows covers the period 1990-2010 and is based on two, three and four-digit SICT, revision 2, classification.

The Hirschman-Herfindahl concentration index ranges from zero (low concentration) to one (high concentration) and is calculated by summing the squared share of each industry or export sector. The formula is

$$HHI = \Sigma_{i=1}^{N}(s_i)^2$$

where s_i is the share of exports of good i in total exports of a country.

The closer the index HHI is to 0, the more diversified the economy is. In contrast, a higher value of the index HHI imply a lesser degree of diversification.

Finally, the Export Diversification Index ($ExpIMF$) was obtained from IMF homepage. The Export Diversification measure is calculated through the Theil index for total exports. The IMF also estimated for exports of intensive margin (more balanced mix of existing products) and extensive (new product introduction). The overall Theil is the sum of the intensive

[4]The countries are: Algeria, Argentina, Australia, Austria, Bangladesh, Belgium, Bolivia, Brazil, Cameroon, Canada, Central African Republican, Chile, China, Colombia, Congo Rep., Congo Dem. Rep., Costa Rica, Cote d´Ivoire, Cyprus, Denmark, Dominican Republican, Ecuador, Egypt, El Salvador, Ethiopia, Finland, France, Gambia, Germany, Ghana, Greece, Guatemala, Guyana, Haiti, Honduras, India, Indonesia, Iran, Ireland, Israel, Italy, Jamaica, Japan, Kenya, Korea, Lesotho, Madagascar, Malawi, Malaysia, Mali, Malta, Morocco, Mauritius, Mexico, Mozambique, Myanmar, Nicaragua, Niger, Nigeria, Norway, Netherlands, New Zealand, Pakistan, Panama, Papua New Guinea, Paraguay, Peru, Philippines, Portugal, Rwanda, Senegal, Sierra Leone, Syrian Arab Republic, Sri Lanka, Sudan, South Africa, Spain, Sweden, Switzerland, Tanzania, Thailand, Togo, Trinidad and Tobago, Tunisia, Turkey, Uganda, United Kingdom, United States, Uruguay, Venezuela RB, Zambia, Zimbabwe.

Table 1: Data Sources for the different variables used

Variable	**Definition**	**Source**
Financial Development	Bank liquid liabilities to GDP ($FIN1$) Bank credit over bank deposits ($FIN2$) Private credit lent by banks to GDP ($FIN3$) Private credit granted by banks and other financial institutions to GDP ($FIN4$)	Financial Structure Dataset
GDPcp	Gross domestic product per capita	WDI
Inflation	Percentage change to consumer prices index	WDI
Trade openness	Trade to GDP	WDI
Financial openness	Kaopen Index	Chinn and Ito (2006), and Lane and Milesi-Ferretti (2007)
Institutional quality	Icrg Index	Dahlberg, Stefan (2016) Marshall et al. (2011)
Legal origin	United Kingdom, German French and Socialist Legal Origin	Shleifer (2002)
Exports	Export value	World Integrated Trade Solution (WITS)

and extensive margin index. A lower value of the Theil index signals higher export diversification. For details of calculate see Cadot et al. 2011

Regarding the other determinants of financial development, financial openness is obtained from the Chinn and Ito (2006) dataset that provide an indicator of capital account openness. Regarding the institutional quality variable, we use the International Country Risk Guide Index (ICRG).

In table 2 we present a statistical summary of the financial development and industrial diversification variables used in this study. As shown in this table, the correlation coefficient between these indicators suggest a negative relationship between financial development and industrial diversification. Note that this implies that higher values of the Hirschman-Herfindhal indexes and IMF Theil Index imply a lower degree of diversification. In addition, in figure 1 we present graphically the scatter plot of the average values of the Hirschman-Herfindahl index (two-digits) and the variable defined by bank credit to private sector to GDP ratio on the period 1990-2010 for 91 countries. Clearly, there is a negative correlation between these variables. Similar results are found for the different indices used in this paper, but are not presented due to space considerations.[5]

[5]These results are available from the authors upon request.

Table 2: Financial Development and Industrial Diversification: Correlation Coefficient and Descriptive Statistics

	$FIN1$	$FIN2$	$FIN3$	$FIN4$	$HHI2$	$HHI3$	$HHI4$	$EXPIMF$
$FIN1$	1							
$FIN2$	0.88	1						
$FIN3$	0.88	0.98	1					
$FIN4$	0.22	0.59	0.56	1				
$HHI2$	-0.42	-0.56	-0.56	-0.42	1			
$HHI3$	-0.47	-0.59	-0.59	-0.39	0.95	1		
$HHI4$	-0.46	-0.56	-0.56	-0.37	0.89	0.97	1	
$EXPIMF$	-0.47	-0.58	-0.59	-0.36	0.81	0.83	0.79	1
Stats								
Mean	55.24	48.97	53.95	97.96	0.18	0.13	0.11	3.08
Sd	39.79	44.98	50.19	45.68	0.16	0.15	0.14	1.21
Max	255.28	271.78	271.78	424.14	0.99	0.99	0.99	6.08
Min	3.52	1.68	0.01	15.95	0.03	0.01	0.00	1.15
Notes								
$FIN1$	Bank liquid liabilities to GDP							
$FIN2$	Bank credit over bank deposits							
$FIN3$	Private credit lent by banks to GDP							
$FIN4$	Private credit granted by banks and other financial institutions to GDP							
$HHI2$	Hirschman-Herfindhal indexes two-digits							
$HHI3$	Hirschman-Herfindhal indexes three-digits							
$HHI4$	Hirschman-Herfindhal indexes four-digits							
$EXPIMF$	IMF Export Index							

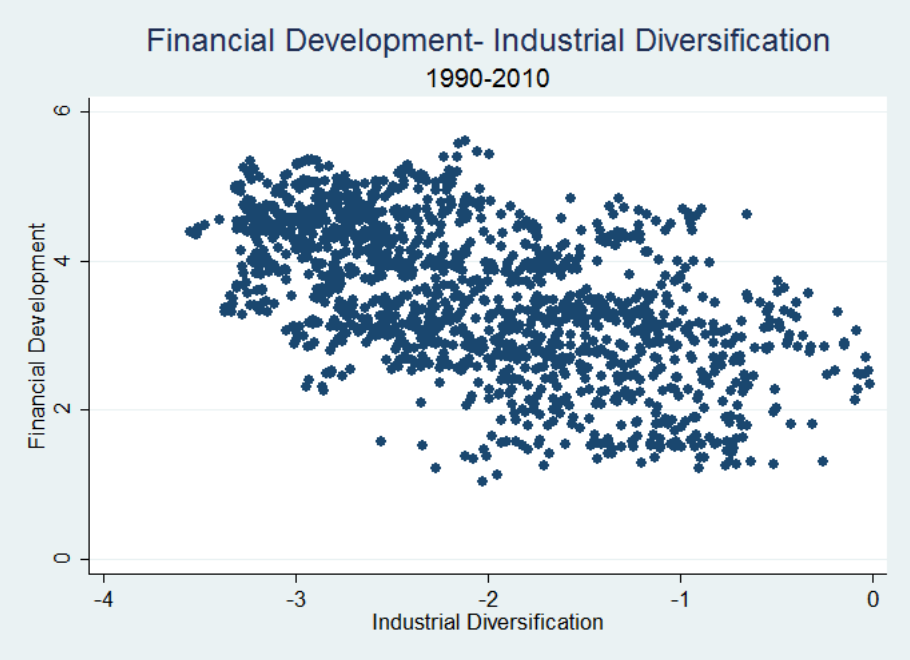

Figure 1: Financial Development and Industrial Diversification: Cross Country 1990-2010

4 Econometric Methodology

In order to deepen the analysis of the relationship between the different measures of financial development and industrial diversification, we investigate this relationship econometrically in order to determine whether this relationship is statistically significant. In other words, we seek to answer whether the degree of sectoral diversification of a country influences its level of financial development. To this end, we use two econometric models that are widely used in the literature. Firstly, we work with a cross section model following the method of ordinary least squares (OLS), where the dependent variable is a measure that approximates the degree of financial development of a country while the independent variables are the degree of trade openness of a country, the inflation rate, GDP per capita, financial openness, institutional variables and the different measures of sectoral diversification. This strategy is used by Huang and Temple (2005). All variables are in logs. To perform this regression, for each country and variable, we take the average value between 1990 and 2010. The equation to estimate is the following

$$lnFin_i = \alpha + \alpha_1 lnDiv_i + \alpha_2 lnTO_i + \alpha_3 lnInf_i + \alpha_4 lnGDPcp_i \quad (4)$$
$$+\alpha_5 Volatility_i + \alpha_6 lnInst_i + \alpha_7 LO_i + \alpha_8 lnKaopen + \alpha_9 TOFO + \mu_i$$

where $lnFin$ is the financial development dependent variable, $lnDiv$ is the logarithm of industrial (or sectorial) diversification, which is the variable we are interested in, $lnTO$ is the logarithm of trade openness, $lnInf$ is the logarithm of the inflation rate, $lnGDPcp$ is the logarithm of the gross domestic product valued at constant prices, $Volatilty$ is the GDP growth rate standard deviation, $lnInst$ is the logarithm of the institutional quality variable $Icrg$, LO is the legal origin variable, $lnKaopen$ is the logarithm of capital openness index. Finally, $TOFO$ is a composite variable product arises between the degree of trade liberalization and the degree of openness of capital of a country. The null hypothesis is that there is a positive relationship between financial development and industrial (or sector) diversification. This means that α_1 takes a negative value when using the Hirschman-Herfindahl index and IMF export product index.[6].

The second model to be estimated employs the technique of dynamic panel data proposed by Arellano and Bond (1991) and used in Baltagi et al. (2009). Here, the degree of financial development of a country in a year t depends on the degree of financial development of the country in the previous period plus the control variables used in the cross-sectional model. To eliminate possible cases of endogeneity of the variables, we used the GMM estimator proposed by Arellano and Bond (1991), Arellano and Bover(1995) and Blundell and Bond (1998). The data spans from 1990 to 2010. The equation to estimate is the following

$$lnFin_{i,t} = \alpha + \alpha 1 lnFin_{i,t-1} + \alpha_2 lnDiv_{i,t-1} + \alpha_3 lnTO_{i,t-1} + \alpha_4 TOFO_{i,t-1} \tag{5}$$

$$+\alpha_5 Kopen_{i,t-1} + +\alpha_6 Volatility_{i,t-1} + \alpha_7 lnInf_{i,t-1} + \alpha_8 lnGDPcp_{i,t-1} + \mu_{it}$$

where $Kopen$ is capital account openness, $TOFO$ is the TO variable times the FO variable as in Baltagi et al. (2009) and the rest of the variable are the same as in equation 4. Again, the null hypothesis states that α_2 takes a negative value when using the different sectoral diversification indices. The legal origin variables are dropped due to collinearity.

5 Estimation results

5.1 Cross Section Estimation

The estimation results for the cross section model are presented in table 3. Table 3 presents the results when the dependent variable is bank credit to the private sector as a percentage of GDP. It also presents four columns where each column represents one of the three different Hirschman-Herfindahl index (HHI) and IMF measures of industry diversification. Note that $HHI2$,

[6]The higher the value of these indexes, the greater the degree of industry concentration.

$HHI3$ and $HHI4$ are the Hirschman-Herfindahl index at two, three and four -digit SICT. The results seem to suggest a significant positive relationship between sectoral diversification and financial development. Note that the coefficients have a negative and statistical significance value because the different diversification indexes assume a higher value when there is less diversification, with the exception of the IMF index ($EXPIMF$) where the coefficient is no significant. When analyzing the results using the other definitions of the dependent variable, similar results are found, with the exception of the Private credit granted by banks and other financial institutions to GDP measure, where no coefficient is significant. These results are presented in the Appendix in tables 7, 8 and 9. The conclusion is that the results strongly support the hypothesis that there is a positive relationship between industrial diversification and financial development.

In terms of the significance of the other independent variables, the econometric estimates indicate that greater capital openness and higher per capita income have a positive effect on the degree of financial development of a country. These results are in line with previous research by Huang (2010) and Baltagi et al. (2009). In addition, higher inflation and GDP volatility have a negative effect on the degree of financial development. These results are confirmed for all the different specifications with the exception of the estimates where bank credit over bank deposit is used as the dependent variable. The legal origin coefficients are positive and significant. Finally, the trade openness coefficient is no significant. It is further noted that the regressions were performed using a robust estimator to avoid potential problems of heterogeneity. Regarding the relevance of the model, we find that the R squared is about 0.98, indicating an adequate level of fit.

5.2 Dynamics Panel Data Estimation

Having obtained cross section econometric evidence on the relationship between industrial diversification and financial development, we now turn to discuss the results from the panel data estimation of equation 5. As was discussed in section 4, we followed the Arrellano-Bond (1991) technique as in Baltagi et al. (2009), for the different estimations presented bellow. In table 4 we present the results when the ratio of private credit lent by banks to GDP is used as a proxy for the degree of financial development of a country[7]. We find that there is a negative and statistically significant relationship between financial development and the three different HHI proxies for the degree of sectoral diversification. The coefficient assumes a value of -0.02 or -0.03 depending on HHI we take as a reference.

In addition, the level of financial development in previous period,the

[7]Time control variable use in estimation are omitted in this paper.

Table 3: Cross Section Estimation - Dependent Variable: Private Credit Lent by Banks to GDP

	$HHI2$	$HHI3$	$HHI4$	$EXPIMF$
$Diversification$	-0.24**	-0.21***	-0.19***	-0.35
$TradeOpenness$	-0.14	-0.13	-0.13	-0.09
$Tofo$	-0.31**	-0.34**	-0.34**	-0.30**
$Kaopen$	1.16*	1.28**	1.29**	1.13*
$Icrg$	0.24	0.20	0.23	0.25
$Volatility$	-0.01	-0.00	-0.01	-0.04
$Inflation$	-0.28***	-0.27***	-0.27***	-0.27***
$GDPpc$	0.42***	0.41***	0.42***	0.48***
$Legor_{uk}$	0.46***	0.42**	0.46***	0.58**
$Legor_{fr}$	0.31**	0.28*	0.34**	0.48**
$Legor_{ge}$	0.52***	0.28***	0.49***	0.63**
R2	0.98	0.98	0.98	0.98

Note:***; **; * imply significance at 1, 5 and 10%, respectively.

Table 4: Dynamic Panel Data Estimation - Dependent Variable: Private Credit Lent by Banks to GDP

	$HHI2$	$HHI3$	$HHI4$
$FinancialDev_{t-1}$	0.89***	0.88***	0.87***
$Diversification_{t-1}$	-0.03**	-0.02*	-0.02*
$TradeOpenness_{t-1}$	0.18	0.17	0.17
$Tofo_{t-1}$	-0.01	-0.01	-0.01
$Kaopen_{t-1}$	-0.01	0.01	0.01
$Volatility_{t-1}$	-0.04***	-0.04***	-0.04***
$Icrg_{t-1}$	0.11***	0.11***	0.13***
$Inflation_{t-1}$	-0.01	-0.01	-0.01
$GDPpc_{t-1}$	0.04***	0.44***	0.05***
A-B Test AR(1)	-2.24 (0.025)	-2.25 (0.025)	-2.25 (0.024)
A-B Test AR(2)	-1.63 (0.104)	-1.64 (0.101)	-1.61 (0.107)
Sargan Test	81.24 (0.006)	79.29 (0.009)	42.94 (0.02)
Hansen Test	58.57 (0.247)	58.08 (0.261)	55.73 (0.34)

Note:***; **; * imply significance at 1, 5 and 10%, respectively.

Table 5: Dynamic Panel Data Estimation - Dependent Variable: Private Credit Lent by Banks to GDP

	EXPIMF	INTENSIVE	EXTENSIVE
$FinancialDev_{t-1}$	0.85***	0.85***	0.88***
$Diversification_{t-1}$	-0.15***	-0.09**	0.02**
$TradeOpenness_{t-1}$	0.10	0.04	0.003
$Tofo_{t-1}$	0.05	0.01	-0.01
$Kaopen_{t-1}$	-0.21	-0.08	-0.01
$Volatility_{t-1}$	-0.03**	-0.03***	-0.03***
$Icrg_{t-1}$	0.11*	0.14**	0.14 **
$Inflation_{t-1}$	-0.02**	-0.02*	-0.02
$GDPpc_{t-1}$	0.05*	0.07**	0.06 *
A-B Test AR(1)	-2.98 (0.003)	-2.88 (0.004)	-1.77 (0.08)
A-B Test AR(2)	-1.58 (0.114)	-1.47 (0.141)	-0.86 (0.392)
Sargan Test	55.95 (0.003)	54.09 (0.012)	-48.81 (0.02)
Hansen Test	43.51 (0.114)	35.39 (0.356)	30.03 (0.464)

Note:***; **; * imply significance at 1, 5 and 10%, respectively.

per capita GDP and institutional quality variable positively affect the level of financial development. However, the inflation rate, the degree of trade openness, the $Tofo$ variable and capital openness of a country are not statistically significant. Finally, the level of volatility of GDP has a negative and statistically significant coefficient. Regarding the serial correlation test (Arellano-Bond test) we can not reject the null hypothesis of second-order serial correlation. Also, the Hansen test does not reject the hypothesis which states that the instruments used in the regression are valid. Both tests tend to validate the estimated models and presented in 4. However, this test does not function properly when there are potential problems of heteroskedasticity in the sample. In order to overcome this potential problem of heteroscedasticity, we proceeded to make estimates with robust estimators, which confirm the significance and sign of the coefficients that measures the impact of the degree of sectoral diversification on financial development (see table 10 of the Appendix).

Further, we obtain similar results when we use the IMF index as a proxy for sectorial diversification (see table 5). The coefficient that measures the impact of sectoral diversification on the degree of financial development is negative and significant , confirming the results presented above . The Arellano - Bond test and Hansen test suggest that the model is adequate. The diversification index prepared by the IMF is composed in turn by two indexes that group exports intensive and extensive margin of a country.

Based on that , we proceeded to see the impact of these rates on the degree of financial development , being a negative and significant coefficient when the Theil index for exports intensive margin is taken, while the coefficient is positive and significant in the case of exports of extensive margin. These results indicate that a more balanced way (intensive margin) to increase exports of existing products has a positive effect on the degree of financial development. The results are presented in 5.

When considering alternative measures the degree of financial development , the results are consistent with those presented above except when used as the dependent variable to Private credit granted by banks and other financial institutions to GDP. the result are presented in Appendix. When we use as a dependent variable the bank liquid liabilities to GDP, the coefficient is -0.01 and significant for $HHI4$ and assume -0.05 for IMF index. However, the model validation tests do not yield results which demonstrate that the estimated model and the instruments used are satisfactory. The sectoral diversification coefficient between -0.05 and -0.24 ranges when used as dependent variable on private bank credit over bank deposit.

5.2.1 Dynamic Panel Data-Developed and Developing Countries

Table 6: Dynamic Panel Data Estimation - Dependent Variable: Private Credit Lent by Banks to GDP-Developing Countries

	HHI2	HHI3	HHI4	EXPFMI
$FinancialDev_{t-1}$	0.91***	0.91***	0.89***	0.85***
$Diversification_{t-1}$	-0.04	-0.03	0.02	-0.19**
$DevelopingDiversification$	-0.08**	-0.06**	-0.05*	0.04
$TradeOpenness_{t-1}$	0.00	0.01	0.01	0.09
$Tofo_{t-1}$	-0.01	-0.01	-0.01	0.04
$Kaopen_{t-1}$	-0.01	0.01	0.03	-0.17
$Volatility_{t-1}$	-0.04***	-0.04***	-0.04***	-0.03**
$Icrg_{t-1}$	0.24***	0.23***	0.23***	0.13**
$Inflation_{t-1}$	-0.01	-0.01	-0.01	-0.02**
$GDPpc_{t-1}$	0.05***	0.06***	0.06***	0.06*
A-B Test AR(1)	-2.21 (0.03)	-2.22 (0.03)	-2.24 (0.03)	-2.98 (0.003)
A-B Test AR(2)	-1.53 (0.13)	-1.55 (0.12)	-1.54 (0.12)	-1.55 (0.12)
Sargan Test	66.75 (0.07)	65.61 (0.08)	65.98 (0.08)	55.29 (0.01)
Hansen Test	53.43 (0.38)	55.26 (0.32)	54.03 (0.36)	42.18 (0.11)

Note:***; **; * imply significance at 1, 5 and 10%, respectively.

Finally, an additional variable is introduced into the main equation in order to investigate whether the degree of sector diversification has dif-

ferent effects depending on the country is developed or developing. The $DevelopingDiversification$ variable is the product between the measure of sector diversification (HHI or $EXPIMF$) and a dummy variable that assumes if the country is developing and 0 if it is developed. In 6 Table 3 shows the results obtained with this new specification are presented . The new variable coefficient is negative and significant (-0.03), noting that there are significant differences by country whether developed or developing . Most sectoral diversification has a greater impact on those developing countries . These results hold in most estimates where alternative definitions of the degree of financial development of a country are taken. Meanwhile , both the test Arellano-Bond and like Hansen suggest the relevance of the estimated models and instruments used in it.

In summary , based on the different result set presented we can note that there is empirical evidence supporting the hypothesis that there is a significant effect on the degree of sector diversification on financial development of a country. This effect is greater in developing countries.

6 Concluding remarks

This paper presents empirical arguments claiming that industry (or sector) diversification is an important determinant of financial development. This relationship is significant for several measures of financial development and sectoral diversification that are used in the estimates. Finally, the results would also suggest that the importance of having a diversified real sector to strengthen the financial sector is higher in developing countries.

A possible explanation for the empirical results could be that when an economy has only one or few important productive sectors, and there is a negative shock to these sectors, the financial sector that mainly lend to these sectors, will also suffer the consequences of the negative shock. In contrast, when the economy has many important sectors, a negative shock to one of these sectors will not affect the financial system as a whole because it has a diversified loan portfolio. The policy implications are that the government should promote the creation of new industrial sectors by subsidizing R&D and horizontal innovation.

7 Annex

7.1 Cross-Section Estimation

Table 7: Cross Section Estimation - Dependent Variable: Bank Liquid Liabilities to GDP

	$HHI2$	$HHI3$	$HHI4$	$EXPIMF$
$Diversification$	-0.09	-0.10*	-0.09*	0.47
$TradeOpenness$	-0.05	-0.05	-0.05	-0.04
$Tofo$	-0.27*	-0.29**	-0.29**	-0.25**
$Kaopen$	0.90	0.97*	0.99**	0.84
$Icrg$	0.17	0.14	0.15	0.30
$Volatility$	-0.03	-0.02	-0.03	-0.06
$Inflation$	-0.13*	-0.13*	-0.13*	-0.13*
$GDPpc$	0.38***	0.38***	0.38***	0.40***
$Legor_{uk}$	0.74***	0.71***	0.72***	0.79***
$Legor_{fr}$	0.51***	0.48***	0.50***	0.58***
$Legor_{ge}$	0.83***	0.79***	0.80***	0.90***
R2	0.98	0.98	0.98	0.98

Note:***; **; * imply significance at 1, 5 and 10%, respectively.

Table 8: Cross Section Estimation - Dependent Variable: Bank Credit Over Bank Deposit

	$HHI2$	$HHI3$	$HHI4$	$EXPIMF$
$Diversification$	-0.26***	-0.22***	-0.19***	-0.41*
$TradeOpenness$	-0.22**	-0.22**	-0.22**	-0.18*
$Tofo$	-0.38**	-0.40***	-0.40***	-0.37***
$Kaopen$	1.39**	1.51**	1.51**	1.37**
$Icrg$	0.19	0.16	0.19	0.18
$Volatility$	-0.03	-0.04	-0.03	-0.00
$Inflation$	-0.32***	-0.31***	-0.31***	-0.32***
$GDPpc$	0.47***	0.47***	0.47***	0.54***
$Legor_{uk}$	0.45***	0.41**	0.45***	0.58***
$Legor_{fr}$	0.22	0.19	0.26	0.41**
$Legor_{ge}$	0.35**	0.29	0.33**	0.48***
R2	0.98	0.98	0.98	0.98

Note:***; **; * imply significance at 1, 5 and 10%, respectively.

Table 9: Cross Section Estimation - Dependent Variable: Private Credit Granted by Banks and Other Financial Institutions to GDP

	$HHI2$	$HHI3$	$HHI4$	$EXPIMF$
$Diversification$	-0.25***	-0.15**	-0.12**	0.68
$TradeOpenness$	0.08	-0.09	0.09	0.11
$Tofo$	0.05	0.05	0.06	0.08
$Kaopen$	-0.36	-0.34	-0.36	-0.49*
$Icrg$	-0.93***	-0.90	-0.86***	-0.63***
$Volatility$	0.09	0.07	0.06	-0.00
$Inflation$	-0.09*	-0.09	-0.09	-0.09**
$GDPpc$	0.37***	0.38***	0.38***	0.42***
$Legor_{uk}$	-0.16	-0.16	-0.12	-0.04
$Legor_{fr}$	-0.27	-0.25	-0.20	-0.07
$Legor_{ge}$	-0.12	-0.12	-0.08	0.05
R2	0.99	0.98	0.98	0.98

Note:***; **; * imply significance at 1, 5 and 10%, respectively.

7.2 Dynamics Panel Data Estimations

Table 10: Dynamic Panel Data Estimation-Dependent Variable: Bank Liquid Liabilities to GDP

	$HHI2$	$HHI3$	$HHI4$	$EXPIMF$
$FinancialDev_{t-1}$	0.89***	0.89***	0.89***	0.95***
$Diversification_{t-1}$	-0.01	-0.01	-0.01*	-0.05*
$TradeOpenness_{t-1}$	0.01	0.01	0.01	0.05
$Tofo_{t-1}$	-0.02	-0.02	-0.02	0.03
$Kaopen_{t-1}$	-0.04	0.04	0.04	-0.11
$Volatility_{t-1}$	-0.01	-0.01	-0.01	-0.01
$Icrg_{t-1}$	0.06**	0.05**	0.06**	0.03
$Inflation_{t-1}$	0.00	0.00	0.00	0.00
$GDPpc_{t-1}$	0.05***	0.04***	0.05***	0.01
A-B Test AR(1)	-2.43 (0.015)	-2.43 (0.015)	-2.46 (0.015)	-2.96 (0.003)
A-B Test AR(2)	-2.46 (0.14)	-2.45 (0.015)	-2.44 (0.014)	-2.12 (0.034)
Sargan Test	47.56 (0.65)	49.46 (0.57)	49.72 (0.56)	39.16 (0.213)
Hansen Test	48.30 (0.62)	52.1 (0.47)	48.85 (0.59)	30.03 (0.616)

Note:***; **; * imply significance at 1, 5 and 10%, respectively.

Table 11: Dynamic Panel Data Estimation-Dependent Variable: Private Bank Credit Over Bank Deposit

	$HHI2$	$HHI3$	$HHI4$	$EXPIMF$
$FinancialDev_{t-1}$	0.89***	0.89***	0.86***	0.72***
$Diversification_{t-1}$	-0.06	-0.05*	-0.04*	-0.24*
$TradeOpenness_{t-1}$	0.01	0.01	0.01	0.14
$Tofo_{t-1}$	-0.01	-0.02	-0.02	0.04
$Kaopen_{t-1}$	-0.01	0.02	0.04	-0.19
$Volatility_{t-1}$	-0.06**	-0.06**	-0.06**	-0.25
$Icrg_{t-1}$	0.10**	0.10**	0.13***	0.22
$Inflation_{t-1}$	-0.01	-0.01	-0.01	0.00
$GDPpc_{t-1}$	0.03*	0.04*	0.05***	0.09*
A-B Test AR(1)	-0.13 (0.90)	-0.12 (0.90)	-0.10 (0.92)	-0.43 (0.67)
A-B Test AR(2)	-1.81 (0.07)	-1.81 (0.07)	-1.80 (0.07)	-1.60 (0.11)
Sargan Test	67.58 (0.07)	66.05 (0.09)	60.69 (0.19)	32.53 (0.49)
Hansen Test	57.67 (0.31)	57.59 (0.28)	59.34 (0.23)	39.47 (0.20)

Note:***; **; * imply significance at 1, 5 and 10%, respectively.

Table 12: Dynamic Panel Data Estimation-Dependent Variable: Private Credit Granted by Banks and Other Financial Institutions to GDP

	$HHI2$	$HHI3$	$HHI4$	$EXPIMF$
$FinancialDev_{t-1}$	0.90***	0.90***	0.90***	0.83***
$Diversification_{t-1}$	0.00	0.00	0.00	-0.02
$TradeOpenness_{t-1}$	0.01	0.01	0.01	0.14*
$Tofo_{t-1}$	0.03***	0.03***	0.03***	0.12*
$Kaopen_{t-1}$	-0.15***	-0.15***	-0.16***	-0.51*
$Volatility_{t-1}$	-0.03***	-0.03***	-0.03***	-0.01
$Icrg_{t-1}$	-0.04**	-0.04**	-0.05**	0.02
$Inflation_{t-1}$	-0.01	-0.01	-0.01	0.02*
$GDPpc_{t-1}$	0.04***	0.05***	0.05***	0.03
A-B Test AR(1)	-3.72 (0.00)	-3.72 (0.00)	-3.70 (0.00)	-4.11 (0.00)
A-B Test AR(2)	0.18 (0.86)	0.17 (0.86)	0.17 (0.87)	-0.94 (0.35)
Sargan Test	91.25 (0.00)	88.57 (0.00)	88.58 (0.00)	66.04 (0.00)
Hansen Test	59.71 (0.22)	58.90 (0.24)	59.37 (0.23)	49.18 (0.04)

Note:***; **; * imply significance at 1, 5 and 10%, respectively.

7.3 Dynamic Panel Data- Developed and Developing Countries

Table 13: Dynamic Panel Data Estimation-Dependent Variable: Bank Liquid Liabilities to GDP-Developing Countries

	$HHI2$	$HHI3$	$HHI4$	$EXPIMF$
$FinancialDev_{t-1}$	0.89***	0.91***	0.90***	0.96***
$Diversification_{t-1}$	0.01	0.01	0.01	-0.14**
$DevelopingDiversification$	-0.03*	-0.02*	0.02*	0.10
$TradeOpenness_{t-1}$	0.01	0.01	0.01	0.02
$Tofo_{t-1}$	-0.02	-0.02	-0.02	0.01
$Kaopen_{t-1}$	0.05	0.05	0.05	-0.02
$Volatility_{t-1}$	-0.01	-0.01	-0.01	-0.01
$Icrg_{t-1}$	0.12***	0.11***	0.11***	0.07
$Inflation_{t-1}$	-0.01	-0.01	-0.01	0.00
$GDPpc_{t-1}$	0.05***	0.04***	0.05***	0.02
A-B Test AR(1)	-2.43 (0.015)	-2.43 (0.015)	-2.48 (0.01)	-2.96 (0.003)
A-B Test AR(2)	-2.43 (0.15)	-2.45 (0.015)	-2.41 (0.02)	-2.10 (0.036)
Sargan Test	43.08 (0.77)	45.40 (0.70)	45.99 (0.67)	32.73 (0.43)
Hansen Test	51.58 (0.44)	57.16 (0.23)	52.43 (0.42)	34.59 (0.35)

Note:***; **; * imply significance at 1, 5 and 10%, respectively.

Table 14: Dynamic Panel Data Estimation-Dependent Variable: Private Bank Credit Over Bank Deposit - Developing Countries

	$HHI2$	$HHI3$	$HHI4$	$EXPIMF$
$FinancialDev_{t-1}$	0.91***	0.91***	0.88***	0.72***
$Diversification_{t-1}$	-0.02	-0.01	0.04	-0.2*
$DevelopingDiversification$	-0.05	-0.05*	-0.05*	-0.05
$TradeOpenness_{t-1}$	0.01	-0.01	-0.01	0.16
$Tofo_{t-1}$	-0.01	-0.01	-0.02	0.05
$Kaopen_{t-1}$	-0.01	0.03	0.05	-0.24
$Volatility_{t-1}$	-0.06***	-0.06**	-0.06**	-0.03
$Icrg_{t-1}$	0.18**	0.19***	0.23***	0.2
$Inflation_{t-1}$	-0.01	-0.01	-0.01	-0.01
$GDPpc_{t-1}$	0.04**	0.05**	0.06***	0.08*
A-B Test AR(1)	-0.14 (0.89)	-0.14 (0.89)	-0.12 (0.90)	-0.43 (0.67)
A-B Test AR(2)	-1.77 (0.08)	-1.75 (0.08)	-1.72 (0.08)	-1.57 (0.12)
Sargan Test	65.86 (0.08)	63.37 (0.12)	57.75 (0.24)	32.28 (0.45)
Hansen Test	55.74 (0.30)	57.59 (0.25)	55.29 (0.32)	37.81 (0.22)

Note:***; **; * imply significance at 1, 5 and 10%, respectively.

Table 15: Dynamic Panel Data Estimation-Dependent Variable: Private Credit Granted by Banks and Other Financial Institutions to GDP - Developing Countries

	$HHI2$	$HHI3$	$HHI4$	$EXPIMF$
$FinancialDev_{t-1}$	0.88***	0.88***	0.88***	0.80***
$Diversification_{t-1}$	0.04	0.04*	0.03	-0.15*
$DevelopingDiversification$	-0.06*	-0.05*	-0.04	0.15*
$TradeOpenness_{t-1}$	-0.01	-0.01	0.01	0.14*
$Tofo_{t-1}$	0.03*	0.03*	0.03**	0.11
$Kaopen_{t-1}$	-0.14*	-0.14*	-0.14*	-0.46*
$Volatility_{t-1}$	-0.03**	-0.03**	-0.03**	-0.01
$Icrg_{t-1}$	0.06	0.06	0.03	0.10*
$Inflation_{t-1}$	-0.01	-0.01	-0.01	-0.01
$GDPpc_{t-1}$	0.07***	0.07***	0.07***	0.05*
A-B Test AR(1)	-3.73 (0.00)	-3.73 (0.00)	-3.73 (0.00)	-4.05 (0.00)
A-B Test AR(2)	0.31 (0.76)	0.31 (0.76)	0.29 (0.77)	-0.88 (0.38)
Sargan Test	86.88 (0.00)	83.19 (0.00)	85.18 (0.00)	60.22 (0.00)
Hansen Test	61.60 (0.15)	60.46 (0.17)	60.19 (0.18)	49.44 (0.03)

Note:***; **; * imply significance at 1, 5 and 10%, respectively.

References

Acemoglu, D. and Zilibotti, F. (1997). Was prometheus unbound by chance? risk, diversification, and growth. *Journal of Political Economy*, 105(4):709–51. 1

Allen, F. and Gale, D. (1998). Optimal financial crises. *The Journal of Finance*, 53(4):1245–1284. 1

Baltagi, B. H., Demetriades, P. O., and Law, S. H. (2009). Financial development, openness and institutions: Evidence from panel data. *Journal of Development Economics*, 89(2):285–296. 1, 3, 4, 4, 5.1, 5.2

Beck, T., Demirguc-Kunt, A., and Levine, R. (2003). Law, endowments, and finance. *Journal of Financial Economics*, 70(2):137–181. 1

Brei, M. and Schclarek, A. (2015). A theoretical model of bank lending: Does ownership matter in times of crisis? *Journal of Banking and Finance*, 50(0):298 – 307. 1, 3

Chinn, M. D. and Ito, H. (2006). What matters for financial development? capital controls, institutions, and interactions. *Journal of Development Economics*, 81(1):163–192. 1, 3

Epstein, L. G. and Zin, S. E. (1989). Substitution, risk aversion, and the temporal behavior of consumption and asset returns: A theoretical framework. *Econometrica*, 57(4):937–69. 3

Holmstrom, B. and Tirole, J. (1998). Private and public supply of liquidity. *Journal of Political Economy*, 106(1):1–40. 1

Huang, Y. (2010). *Determinants of Financial Development*. Palgrave Macmillan. 1, 5.1

Huang, Y. and Temple, J. (2005). Does external trade promote financial development? CEPR Discussion Papers 5150, C.E.P.R. Discussion Papers. 1, 3, 4

Jaimovich, E. (2011). Sectoral differentiation, allocation of talent, and financial development. *Journal of Development Economics*, 96(1):47–60. 1

Kreps, D. M. and Proteus, E. L. (1978). Temporal resolution of uncertainty and dynamic choice theory. *Econometrica*, 46(1):185–200. 3

Kreps, D. M. and Proteus, E. L. (1979). Dynamic choice theory and dynamic programming. *Econometrica*, 47(1):91–100. 3

La Porta, R., de Silanes, F. L., Shleifer, A., and Vishny, R. W. (1997). Legal determinants of external finance. *Journal of Finance*, 52(3):1131–50. 1

Lane, P. R. and Milesi-Ferretti, G. M. (2007). The external wealth of nations mark II: Revised and extended estimates of foreign assets and liabilities, 1970-2004. *Journal of International Economics*, 73(2):223–250. 1

Levine, R. (2005). Finance and growth: Theory and evidence. In Aghion, P. and Durlauf, S., editors, *Handbook of Economic Growth*. North-Holland. 1, 3

Marshall, M. G., Jaggers, K., and Gurr, T. R. (2011). Polity iv project: Dataset usersâ manua. Arlington: Polity IV Project. 1

McKinnon, R. (1973). *Money and Capital in Economic Development*. Washington, DC: Brookings Institution. 1

Mondria, J. (2010). Portfolio choice, attention allocation, and price comovement. *Journal of Economic Theory*, In Press, Corrected Proof. 3

Nieuwerburgh, S. V. and Veldkamp, L. (2010). Information acquisition and under-diversification. *Review of Economic Studies*, 77(2):779–805. 3

Peress, J. (2010). The tradeoff between risk sharing and information production in financial markets. *Journal of Economic Theory*, 145(1):124–155. 3

Rajan, R. and Zingales, L. (2003). The great reversals: The politics of financial development in the 20th century. *Journal of Financial Economics*, 69(1):5–50. 1, 3

Ramcharan, R. (2010). The link between the economic structure and financial development. *B.E. Journal of Macroeconomics*, 10(1). 1

Schclarek, A. (2015). Industry diversification, financial development and growth. working paper, Universsidad Nacional de Cordoba. 2

Shaw, E. (1973). *Financial Deepening in Economic Development*. New York: Oxford University Press. 1

Stulz, R. M. and Williamson, R. (2003). Culture, openness, and finance. *Journal of Financial Economics*, 70(3):313–349. 1

Weil, P. (1990). Nonexpected utility in macroeconomics. *The Quarterly Journal of Economics*, 105(1):29–42. 3