

**Financial technology adoption and the dynamics of capital market development:  
A cross-country examination**

By  
Naina Garg

A Thesis Submitted to  
Saint Mary's University, Halifax, Nova Scotia  
in Partial Fulfillment of the Requirements for  
the Degree of Bachelor of Commerce (Economics).

April 2017, Halifax, Nova Scotia

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# **Financial Technology Adoption and the Dynamics of Capital Market Development: A Cross-Country Examination**

By

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## **Abstract**

What role, if any, can financial technology adoption play in determining the capital structure and growth of financial markets? This thesis analyzes the dynamics of cross-country capital market development by examining financial technology adoption as the primary agent of growth and expansion in capital markets. In a systematic econometric study of 192 countries from 1960 to 2014, we find that the adoption of financial technology as the driver of capital market development can explain the growing paradigm shift in the expansion of equity markets and shrinkage of credit markets. Amongst others, our control variables include demand for finance, legal origin, trade openness, external financing constraints and protection of minority investor rights. Based on multiple sets of pooled OLS regression analyses and in absence of establishing a causality relationship, our estimation results conclude that financial technology innovation is not only strongly associated with capital market development, it also affects private-equity-stock markets disproportionately more than private-bank-credit markets.

**April 2017**

## 1. Introduction

Countries greatly differ in terms of how they organize their financial resources so that the investment opportunities created by entrepreneurs are uniformly matched with the capital supplied by investors. Our knowledge about why some countries have financial systems that are predominantly market-based while others have financial systems that are predominantly bank-based is rather limited. Academic literature on whether the composition of financial markets determine the path of their economic growth and resilience in the face of financial crisis is also somewhat limited. The question whether market-based financial systems are inherently superior to bank-based financial systems also remains unanswered.

Levine (2005) claims that nations with more efficient and better developed bank and equity markets grow faster, but the degree to which a country is bank-based or market-based does not matter much. Illuminating the additional research that “needs to be conducted on the determinants of financial development”, he argues that “to the extent that financial systems exert a first-order impact on economic growth, we need a fuller understanding of what determines financial development.” (The rationale and process for measuring financial development in our study is described in section 3.3.)

This paper is a first attempt to systematically analyze the determinants that might account for differences in capital market development across a sample of 192 countries since 1960. It focuses only on the domestic equity and private

bank credit markets because these two forms of capital markets are the most common forms across the sample countries. It employs the popular quantitative method of pooled Ordinary Least Squares (OLS) Regression in unconditional univariate and conditional multivariate regression analyses to quantify the influence of a wide selection of determinants of financial development. In pursuing this thesis, the analysis will place special emphasis on financial technology adoption as a driver of growth and development in capital markets.

As Huang (2005) suggests, we also account for contributions that legal and political institutional structures and regulations may have in developing financial markets. This is because in order to understand the sources of heterogeneity at the cross-country level, it is imperative to understand the level of financial development and the consequent evolution of financial systems. La-Porta et al. (1997, 2002) argue that legal system differences are the fundamental source of international differences in financial development. On the other hand, Rajan and Zingales (2003) assert that different financial systems emerge out of the political interest group conflicts and differences in social capital, geographical and cultural endowments. Therefore, in our economic framework of analysis, we include both political and institutional endowments (*vis-à-vis* external financing constraints, supply side impediments, political openness and trade openness) of a country as exogenously given.

In addition, in recognition of Herger et al. (2008), we take into account other factors such as protection of minority shareholders' rights index,

enforcement of contracts and legal origin. As substantiated by La-Porta et al (1997, 2002), countries with common law origins (made by judges) as opposed to civil law origins (made by scholars and legislators) have better minority investor protection, and thus, larger equity markets. Moreover, Modigliani and Perotti (1998) argue that not only the legal structure to protect the investor but also the enforcement of the legal regime is crucial in understanding the structure of the capital market because under a weak enforcement regime debt takes over equity as the means of financing, which then dictates the financial architecture of the economy. Therefore, we include legal origin as well as enforcement of contracts as the two other exogenously given control variables in our estimation.

Using a cross-country data set, we show that capital market development, irrespective of form, is primarily financial technology adoption and demand for finance driven. As the reader would note from the ensuing discussion and analyses in this paper, another informative source of heterogeneity in the growth of the two segments of the capital market is, we assert, the relative strength of enforcement of the spelled-out rights in the investors' protection regime. In sum, and as the results in forthcoming sections would demonstrate, the prominence of the market-based (equity-markets) over the bank-based (credit markets) financial system in recent years can be argued to be attributable through the strength of adoption of financial technology, demand for finance and enforcement of contracts.

By presenting estimation results, amongst others, for financial technology adoption variables, this thesis contributes to the existing body of research literature by providing a preliminary understanding of why some countries have better developed financial markets while others do not. Furthermore, it graphically illustrates how the determinants of financial development can affect one form of capital disproportionately more than the other.

The paper proceeds with Section 2 that discusses the dynamics of capital market development and results of our graphical analysis. Section 3 describes the data set and the construction of various dependent and independent variables. Section 4 further describes the empirical framework of analysis. Section 5 presents the econometric results and summary statistics. Section 6 discusses the analysis around various determinants of financial development and limitations of this thesis. Section 7 concludes the paper.

## **2. Framework of Analysis**

In this section, we highlight the relationship between financial technology adoption and the dynamics of capital market development followed by some preliminary graphical analysis.

### **2.1. Dynamics of Financial Development**

Academics often view banks and capital markets as competing sources of financing (Jacklin, 1987; Jacklin and Bhattacharya, 1988; Diamond, 1997; Allen



and Gale, 1997; Boot and Thakor, 1997; and Dewatripont and Maskin 1995). Diamond (1997) explains this by arguing that “banks lower the cost of giving investors rapid access to their capital and improve the liquidity of markets by diverting demand for liquidity from markets”, however, “increased participation in markets causes the banking sector to shrink.” In view of this, we seek to fill the gap in the literature by analyzing the differing effect of financial technology adoption on the various segments of capital markets. Financial technological progress, as the reader would agree, is an indispensable contributor to the rising efficiency of our financial system and the way our financial systems affect economic growth (Tallo, 2001).

## **2.2. Preliminary Graphical Analysis**

Asserting the growing influence and expansion of stock markets over small increases in credit markets, in recent years domestic equity markets have impressively kept their towering stance over domestic credit markets across countries. Figure 1 shows that beginning in 2003, equity market to bank market ratio first rises, then falls again starting in 2008, only to rise again in the aftermath of the global financial crisis. As it further demonstrates, while both domestic equity and bank markets are clearly growing across countries and over time, stock markets are growing at a disproportionately higher rate than credit markets. For example, in 2014, bank-based markets were only two-third of the size of stock markets. While the size of equity markets more than doubled

between 1989 and 2014, the size of credit markets has grown no more than 50% since 1988. On comparing recent developments with the trend in the 1990's, when credit markets were roughly larger than or at least equal to equity markets, it is easy to argue that a major chunk of growth and development in capital markets today is stemming from the growth of equity markets.

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Figure 1 is about here  
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Illustrating the heterogeneity between equity and credit market across countries, Figure 2 further shows the shape of the distributional structure of capital market development over time, along with its central values and variability. Clearly the relative variability is much greater in degree across countries and over time for equity markets than it is for credit markets. This demonstrates that countries are more similar in terms of their credit markets than equity markets which, over recent years, have been growing at a disproportionately higher rate than credit markets (as Figure 1 illustrates).

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Figure 2 is about here  
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Figure 3 shows that the ratio of equity market to credit market was greater than 1 especially between 2003 and 2008. This implies that until the global financial crisis of 2008 hit the markets, market investors were putting greater faith in equity markets than in bank markets. While the figure clearly illustrates the validity of our previous observation that both equity and credit markets have

been growing over the last three decades, it further illustrates that growth has disproportionately been biased in favour of equity markets. Beginning in 1988, it shows that equity markets have been religiously following a pattern of growth (minus the temporary hiccup in the period between 2008 and 2012).

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Figure 3 is about here  
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### **3. Data and Variables**

#### **3.1. Sample Construction**

We construct a cross-country dataset from multiple data sources. The dataset spans between 1960 and 2014, with the main financial technology variables largely spanning the years between 1988 and 2008. Based on data availability, we restrict our empirical analysis to 192 countries comprised of both developed and developing nations. The differences in countries in our dataset are also based upon financial development, political and legal structure, trade openness and investor protection regimes. The definitions and sources of all variables are listed in Table 1.

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Table 1 is about here  
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#### **3.2. Dependent Variables**

Financial development itself arises from the significant role played by efficient financial markets – stock markets and credit markets – that allocate funds to

their “highest valued use in the economic system” (Greenwood and Smith, 1997). As Arestis and Demetriades (1997) suggest, most of the “evidence on the relationship between finance and growth utilises bank-based measures of financial development such as the ratio of bank deposits to nominal GDP.” Therefore, we use the relative size of various segments of financial markets as an empirical proxy for financial development.

We establish three measures for the relative size of capital markets that we denote as the three measures of financial development ( $Y$ ). We segregate capital markets into domestic equity market and domestic credit market<sup>1</sup>. We then normalize the size of both stock and credit markets using the Gross Domestic Product (GDP) of the country. First, stock market capitalization normalized by GDP provides one dependent variable; this is a measure of the size of domestic equity market (STM/GDP). Second, aggregate private deposit bank credits normalized by GDP provides another dependent variable; this is a measure of the size of domestic private credit market (PCM/GDP). Both the stock market capitalization and private credit by deposit banks were adjusted for deflation at source. Finally, domestic equity market normalized relative to the domestic private credit market provides the third dependent variable; this is a measure of

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<sup>1</sup> We omit bond market for this segregation as most countries in our sample dataset are devoid of a private bond market (which on account of its variability could have offered the most insight, if it existed). Public bond markets, on the other hand, though they widely exist for countries in our dataset, are subject to close government regulation. Hence, the scope of finding sufficient variability in public bond markets is extremely limited. Therefore, we completely exclude bond market from inclusion in our datasets, statistical analyses and discussion in this paper.

the size of equity markets relative to credit markets (STM/PCM). All the dependent variables were obtained from the Financial Structure Database 2016, available on the World Bank website.

### **3.3. Independent Variables**

To comply with the extant research literature on financial market development and economic framework, we construct 14 independent variables. The main explanatory variables are the five financial technology adoption variables that were obtained from the Historical Cross-Country Technology Adoption Dataset 2009, available through NBER. These five indicators measure the number of electromechanical devices that permit authorized users, typically using machine-readable plastic cards, to withdraw cash from their accounts and/or access other services (ATM); or the number of payments (in millions) by cheque (Cheque Payments); or payments (in millions) by credit and debit cards (Credit-debit); or the number of transactions using payment cards at points of service (Payment Card Transactions); or number of retail locations at which payment cards can be used (Payment Card Locations). Each of these five indicators were transformed into pre- and post- adoption periods as explained in Section 4.1.2. Finally, using principal components analysis, we construct the 6<sup>th</sup> main explanatory variable called Financial Technology Index (FinTECH) which provides a continuous measure of the five financial innovation indicators.

The eight other independent variables are the control variables. As a proxy for demand for finance, we use the log of per capita real GDP of the country, a standard measure popularly found in research literature. The data for constructing this variable is obtained from the Pen World Table 2015.

To account for the factors that may hinder the supply of finance to rise up to its demand, we construct a supply side impediments variable. First, we collect the number of political and civil conflicts in the country in a given year and then multiply it with the mean intensity of those conflicts to obtain the measure for supply side impediments to financial development. All this data is obtained from the International Peace Research Institute of Oslo, Norway and The Uppsala University, Sweden 2015.

As a proxy for political openness of the country, we use total factor productivity that provides trade volume in terms of the value for export and import normalized by GDP. The data for this variable was obtained from Pen World Table 2015.

Though Rajan and Zingales (2003) discount the significance of legal structure as a factor in financial development, given the potential influence of legal and political structure on financial dynamics in capital markets, we use civil or common law origins to account for legal origins which are the outcomes of the institution and not the institution itself. The legal origin variable in our dataset is a binary variable. The data for this variable was obtained from La-Porta et al. (2004).

Using the US capital market as a benchmark case, we construct the external financial constraint variable to measure the gap between internal and external financing costs of a country. Here, we calculate the difference between the log of per capita GDP for US and the log of per capita real GDP of the country to size up the state of the country's financial development compared to the US's. If this difference is greater than 0, i.e. positive, it indicates that the country in question suffers from greater external financing constraints than US. If the distance is high, it signals high constraints in the country; and if it is low, it signals relatively low constraints in the country. The data for this variable was obtained from Pen World Table 2015.

Finally, we use two measures from the Doing Business Database 2016 available on the World Bank website. The Minority Investor Protection Index has three components that measures the principal component information disclosure requirements by firms, the liability standards that allow the investors to recover the loss, and the strength of anti-director rights. The Enforcement of Contracts Index is an aggregated creditors' rights index that accounts for the effectiveness of enforceable rights. Both these indices were taken directly from the data source.

### **3.4. Summary Statistics**

Figure 1 shows that the evolution of the two segments of the capital market development between 1988 and 2014. The dependent variables are averaged across the sample countries. The figure demonstrates that relative to GDP, both

equity and private credit markets have been expanding over the course of the last three decades. However, equity markets seem to be developing at a disproportionately higher rate than private credit markets. In other words, equity markets are crowding out the private bank credit market over the sample years.

Substantiating these aggregate trends in the two segments of the capital markets, Table 2 displays that there is a wide range of heterogeneity across our sample countries. This disparity exists in terms of both dependent as well as independent variables. From Figure 1 and Table 2, we notice that despite the vast differences in their determinants of financial development in our empirical framework, there seems to be a systematic pattern in the aggregate capital market development for the sample countries.

Clearly, equity market is increasingly becoming the dominant form of capital market structure in most countries in our dataset. STM/GDP is considerably greater than PCM/GDP in countries where financial technology innovation has taken place. This particular observation is central to the empirical investigation in this paper. Does the capital market structure depend upon financial technology and innovation? If so, do equity markets predominantly become stronger than private credit markets during the process of financial development?

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Table 2 is about here  
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#### 4. Empirical Framework of Analysis

In closely following the academic literature on the issues of financial development and capital market innovation, we determine the pooled ordinary least squares methodology as the most efficient gateway to begin our empirical investigation into this subject matter. The basic regression model we use is defined as follows:

$$\begin{aligned} Y = & \alpha + \beta_1. \text{ ATM} \\ & + \beta_2. \text{ Cheque Payments} \\ & + \beta_3. \text{ Credit-Debit Card Payments} \\ & + \beta_4. \text{ Payment Card Transactions} \\ & + \beta_5. \text{ Payment Card Locations} \\ & + \beta_6. \text{ FinTECH} \\ & + \beta_7. \text{ Demand for Finance} \\ & + \beta_8. \text{ Supply Side Impediments} \\ & + \beta_9. \text{ Trade Openness} \\ & + \beta_{10}. \text{ Political Openness} \\ & + \beta_{11}. \text{ External Financing Constraints} \\ & + \beta_{12}. \text{ Minority Investor Protection} \\ & + \beta_{13}. \text{ Enforcement of Contracts} \\ & + \beta_{14}. \text{ Legal Origin} \\ & + e \end{aligned}$$

where  $Y$  is our measure of the relative size of various segments of capital market. All right-hand side variables are self-explanatory.

All estimation results have standardized errors (same number of observations) and standardized regression coefficients. Standardizing errors helps to compare coefficients across models which have the same set of independent variables. Standardizing regression coefficients helps in comparing the relative strength of the various predictors within the models since beta coefficients are measured in standard deviations.

#### **4.1. Distributional Structure of Variables**

##### *4.1.1. Dependent Variables*

One of the crucial assumptions of our data analysis is based on the normality of our data. In order to achieve normality, after conducting some initial graphical tests that are not reported here in the interest of space, we establish that winsorization of our dependent variables would be crucial to eliminate any outliers in our dependent variable dataset. Hence, after decimalizing the three dependent variables, we winsorize them. For the reader's convenience, it is essential to note that all tests and analyses that we report from this point onward are performed on decimalized and winsorized sets of our three dependent variables - STM/PCM, STM/ GDP and PCM/GDP.

After winsorization, in order to demonstrate the normality of our dependent variable dataset, we conduct diagnostic distributional plots using

dependent variables in their winsorized raw form. Figures 4.1, 4.2 and 4.3 contain the distributional diagnostic plots for raw variables. As one can see, normality can be achieved only through square-root transformation and log transformation. In the course of these analyses, we find that the regression results for both log and square-root transformations are largely the same. For the reader's convenience, we report both sets of estimation results with the A set of tables indicating results from log transformed dependent variables and the B set of tables indicating results from square-root transformed dependent variables.

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Figures 4.1, 4.2, 4.3 are about here  
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After we establish log transformation and square-root transformation as the appropriate tools to ensure normality of dependent variables in our dataset, we conduct further graphical tests to establish that, given the transformations, the assumptions of OLS are satisfied such that our regression parameters are Best Linear Unbiased Estimators (BLUE). In the following series of six figures (Figures 5A, 5B; 6A, 6B; 7A, 7B), the first two illustrate the normality of our dependent variables through histogram distributional diagnostic plots, the second two illustrate the normality of our dependent variables through univariate kernel density distributional diagnostic plots and the third set of two illustrate the normality of our dependent variables through standardized normal probability distributional diagnostic plots.

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Figures 5A, 5B; 6A, 6B; 7A, 7B are about here  
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Further, Table 3 shows that the disparity between the dependent variables is quite large. PCM/GDP is relatively uniformly distributed over observations indicating that bank market development across countries and over time is quite consistent and symmetrical. However, the differences between the mean, maximum and minimum for STM/GDP are quite substantial. This indicates that the systematic differences in stock market development across countries and over time is neither consistent and nor uniform.

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Table 3 is about here  
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#### 4.1.2. *Independent Variables – Financial Technology Variables*

Amongst our explanatory variables, the most important ones that form the focus of this study are the five financial innovation adoption indicators and their index, FinTECH. We combine the five explanatory variables into one index using the principal components analysis method on Stata using the *pca* command. FinTECH is an inclusive and comprehensive single variable that measures on a continuous scale the use of financial technology across our sample of 192 countries and over time.

Since the mainstay of our focus in this thesis is to determine the relationship between financial technology adoption and capital market

development, our interest is in pre and post adoption of financial technology innovation. A thorough preliminary examination of the financial technology variables suggests that financial innovation largely made its entry into the world in the form of cheque payments which were first introduced in 1987. In the years that followed, different countries began adopting more advanced methods of making payments via using credit and debit cards or withdrawing cash using automatic teller machines (ATM).

In order to segregate financial technology adoption into pre and post adoption periods, we simply transform our five main financial innovation variables into binary variables with 0 denoting the pre-adoption years and 1 denoting the post-adoption years. Therefore, in our dataset we don't observe these five financial technology variables themselves, but only if they existed in a country. We also impute the data in cases where a financial technology variable was introduced in a certain year but the original dataset does not report any observations in the following years. Once a financial innovation technique is adopted in a country, we mark that year and the following years as 1 indicating the entire period as the post-adoption era for that form of financial technology. It is important to inform the reader here that we construct FinTECH by using the raw financial technology variables because constructing the Financial technology index, FinTECH, on dummy variables would have offered no additional informative insight.

Table 3 shows that amongst the main financial technology variables, the number of payment card transactions using credit or debit cards was widely popular. As the summary statistics illustrate, the number of retail locations where payment cards can be used has the second largest mean with its minimum (45) being extremely small compared to the mean (181,477) indicating that in some countries this form of financial technology is still in its very nascent stages, while in others the number of retail locations accepting electronic cards is relatively high. The same argument stands for ATM, Cheque Payments and Credit and Debit Payments, indicating wide disparity in financial technology adoption amongst countries of the world.

#### *4.1.3. Control Variables*

Recognizing that capital dynamics can be driven by a lot of other factors, we include various other control variables that have already been discussed along with their proxies in Section 3.3. An additional point to note in this section is that we use yearly averages for minority investor protection and enforcement of contracts variables. This is in simple recognition of the fact that institutional structures in a country are extremely rigid and very hard to transform. Hence, in cases where the original dataset reports no observations for these two variables, we replace the missing blanks with the yearly averages in order to develop a sample that can provide meaningful estimation insights.

Table 3 shows that in contrast to the main financial technology adoption indicators, the disparity between the control variables is not huge. Observations for many control variables are closely distributed indicating that the systematic differences across countries and over time are not very large.

## **5. Estimation**

The set of Tables 5A to 9A provide the results from multiple sets of pooled OLS regression analyses which we conduct on the log transformed dependent variables. The set of Tables 5B to 9B provide the results from multiple sets of pooled OLS regression analyses which we conduct on our squareroot transformed dependent variables. We do not test for heteroscedasticity in any of our models as heteroscedasticity and clustering problems are not an issue in a dataset of this size.

### **5.1. Unconditional Univariate Regression & Pairwise Correlations**

In our first set of regressions, we impose no conditions, and simply regress our five main explanatory variables and FinTECH individually on our three dependent variables which were normalized either using log transformation (“A” letter tables) or squareroot transformation (“B” letter tables). As the results in Tables 5A and 5B show, each of the five main explanatory variables are statistically significant at the 1% level in each of the 15 sets of regressions that we carry out on log transformed and squareroot transformed variables (with the

exception of four insignificant univariate regressions on square-root transformed STM/PCM).

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Table 5A and 5B are about here  
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The basic regression model we use is defined as follows:

$$Y = \alpha + \beta_1 X_1 + u$$

where  $Y$  is one of the three measures of the relative size of various segments of capital market and  $X_1$  is one of the five indicators of financial technology adoption or FinTECH.

In order to further strengthen our argument about the positive and strong association between financial development and financial innovation, we conduct pairwise correlations between the regressors and the regressands. In Table 4, we document positive correlations between our three constructed measures of financial market development and a variety of financial technology innovation and other control variables. It is particularly replete with evidence indicating strong relationships between financial technology and our three main measures of financial development in capital markets, illustrating the importance of financial innovation indicators for examining capital market structure and growth. All pairwise correlations are significant, attesting to the statistical significance of including these explanatory variables in the second phase of econometric analyses.



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Table 4 is about here  
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## 5.2. Conditional Multivariate Regression<sup>2</sup>

In order to determine which variable is driving which, in this phase of our econometric analyses, we run various multivariate models that sometimes include all our five main indicators of financial innovation, plus FinTECH and the other eight control variables. They are regressed in different combinations on each of the three dependent variables separately to arrive at the results documented in Tables 6A to 9A for log transformed dependent variables and in Tables 6B to 9B for square-root transformed dependent variables. As we estimate the regression model in a variety of ways, each table pertains to a particular specification of analysis.

### 5.2.1. Multivariate Regression (Excluding FinTECH)

In this set of regression analyses we include all our five main indicators of financial innovation and regress them in a cluster on each of three dependent variables separately to arrive at the results documented in Table 6A for log transformed dependent variables and Table 6B for square-root transformed dependent variables.

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<sup>2</sup> As one can see in some tables for the estimation results for analyses with FinTECH, the number of observations drastically drops from several thousands to a few hundreds. This is owing to the fact that FinTECH is a continuous single measure of all five financial technology variables that combines them and transforms itself into a single variable standing for five different variables.

With the number of observations being particularly large in each of the three regression sets, we note that the coefficients for all financial technology adoption variables (particularly Cheque Payments) are highly significant at 1% or 5% levels in all the three models for log transformed and square-root transformed models. However, adjusted R<sup>2</sup> is still quite low for all models.

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Table 6A and 6B is about here  
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The basic regression model we use here is defined as follows:

$$\begin{aligned} Y = & \alpha + \beta_1. \textit{ATM} \\ & + \beta_2. \textit{Cheque Payments} \\ & + \beta_3. \textit{Credit-Debit Card Payments} \\ & + \beta_4. \textit{Payment Card Transactions} \\ & + \beta_5. \textit{Payment Card Locations} \\ & + u \end{aligned}$$

where  $Y$  is one of our three measures of the relative size of various segments of capital market. All right-hand side variables are self-explanatory.

### 5.2.2. *Multivariate Regression with Financial Technology Variables and FinTECH*

In order to diagnose the model further, we now estimate the model in a series of 18 regressions each of which uses FinTECH, all the eight control variables and only one of out of our main explanatory variables for financial innovation

adoption. Each of the tables 7.1, 7.2 and 7.3 pertains to a specification of analysis on a single regressand, namely STM/PCM or STM/GDP or PCM/GDP.

The evidence for the statistical significance of each regressand is abundantly clear on examination of the tables. While minority investor protection index does not appear to be a significant predictor of STM/PCM, supply side impediments does not appear to a significant contributor in predicting PCM/GDP. However, adjusted R<sup>2</sup> is notably 66% for the log-transformed model (or 67% for square-root transformation model) that predicts PCM/GDP using FinTECH and other control variables. All the regressors in each of the 18 regression sets are highly significant, most of them at 1% significance level.

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Figures 7.1A, 7.2A, 7.3A; 7.1B, 7.2B, 7.3B are about here  
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The basic regression model we use here is defined as follows:

$$Y = \alpha + \beta_1 \cdot X_1 \\ + Z' \cdot \delta \\ + u$$

where  $Y$  is one of the three measures of the relative size of various segments of capital market;  $X_1$  is one of the five indicators of financial technology adoption or FinTECH;  $\delta$  stands for all the control variables that include Demand for Finance, Supply Side Impediments, Trade Openness, Political Openness, External Financing Constraints, Minority Investor Protection, Enforcement of Contracts

and Legal Origin.  $Z'$ , of course, denotes all the coefficients of all the control variables in the model.

### 5.2.3. Multivariate Regression with Financial Technology Variables (Excluding FinTECH)

In this set of regression analyses, we put all the five main independent variables and eight control variables together, and estimate the regression model on each of our three dependent variables in 3 different sets of analyses. As Tables 8A and 8B demonstrate, the results are especially significant across all dependent variables for explanatory variables such as demand for finance, trade openness, political openness and legal origin. PCM/GDP, in particular, is strongly associated with all the financial technology adoption variables and the demand for finance variable. Adjusted  $R^2$ 's are notably around 43% and 51% for the log transformed model (around 44% and 51.5% for the square-root transformed model) that predicts STM/GDP and PCM/GDP respectively. This illustrates that a very high percentage of variation in the dependent variables STM/GDP and PCM/GDP can be explained by our model.

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Table 8A and 8B are about here  
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The basic regression model we use here is defined as follows:

$$\begin{aligned} Y = & \alpha + \beta_1. \textit{ATM} \\ & + \beta_2. \textit{Cheque Payments} \\ & + \beta_3. \textit{Credit-Debit Card Payments} \end{aligned}$$

$$\begin{aligned}
& + \beta_4. \textit{Payment Card Transactions} \\
& + \beta_5. \textit{Payment Card Locations} \\
& + Z'. \delta \\
& + u
\end{aligned}$$

where  $Y$  is one of the three measures of the relative size of various segments of capital market;  $\delta$  stands for all the control variables that include Demand for Finance, Supply Side Impediments, Trade Openness, Political Openness, External Financing Constraints, Minority Investor Protection, Enforcement of Contracts and Legal Origin. Note that this model contains all explanatory variables except FinTECH.  $Z'$ , of course, denotes the coefficients of all the control variables in the model.

#### 5.2.4. *Multivariate Regression with FinTECH and All the Control Variables*

To conclude our regression analyses, we use FinTECH along with the eight control variables to estimate the model in a set of 3 regressions for each of our three dependent variables. The results are highly significant for some predictors including legal origin and external financing constraints with adjusted  $R^2$  hovering around 54% and 66% in both log transformed and square-root models for STM/GDP and PCM/GDP respectively. Demand for Finance, in particular, has emerged as a strong positive predictor for STM/PCM and STM/GDP.

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Table 9A and 9B are about here

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The basic regression model we use here is defined as follows:

$$Y = \alpha + \beta \cdot \text{FinTECH} \\ + Z' \cdot \delta \\ + u$$

where  $Y$  is one of the three measures of the relative size of various segments of capital market;  $\delta$  stands for all the control variables that include Demand for Finance, Supply Side Impediments, Trade Openness, Political Openness, External Financing Constraints, Minority Investor Protection, Enforcement of Contracts and Legal Origin. Note that this model contains none of the five financial technology adoption indicators but only FinTECH.

## 6. Limitations

In this study, we do not account for omitted variable bias nor for issues of robustness and multi-collinearity. There is also a high likelihood that there are country-specific fixed effects that our pooled OLS regression models are simply not capable of capturing. Within-country fixed effects models were not used in our dataset because our panel is short in nature (that is the number of countries is much greater than the numbers of years in each panel). Some of the explanatory variables in our dataset have little or no variation within country. This implies

that most of those variables will be dropped out when we estimate the full model with fixed effects. Moreover, fixed effect models are much worse in terms of efficiency if there is little variation within cross section, i.e., within country, which is the case with most of our independent variables. In view of this, we need to determine compelling reasons to argue why moving from ordinary least squares to fixed effects models would provide us with more efficient estimates.

The reader also must note that by virtue of our regression analyses, we have simply captured the correlation between the variables of financial innovation and financial development, and have in no way, shape, or form established a causality relationship between them. We, however, acknowledge that correlation versus causality is another issue that can inspire the curiosity of our readers. Therefore, in order to further enhance the complexity of our analyses and the reliability of our results, in the next phase of our research study, we would use either an instrumental variables method or natural experiments to isolate causality and establish the direction of relationship between financial technology and capital market development.

## **7. Conclusion**

The purpose of this study was to understand the association between financial technology and the dynamics of capital market development. We began with the question of what factors fundamentally drive financial development and if financial technology, in particular, plays a significant role in capital market

development. Highlighting the confusion surrounding the advantages of bank-based financial systems against the benefits of market-based financial systems, Levine (2005) argues that “financial systems may influence saving rates, investment decisions, technological innovation, and hence long-run growth rates.” Therefore, the intent of this thesis was to add another crucial piece of information to the jigsaw puzzle that academics are trying to solve.

We collected data from multiple data sources, filled in the missing blanks using linear interpolation and data imputation, created pre and post adoption dummy variables for our financial technology indicators, transformed our dependent variables into a normal distribution and then implemented unconditional univariate and conditional multivariate regressions to ascertain the nature and significance of the relationship between financial technology adoption and capital market development. Given the limitation of our analyses, we are clearly not certain if there exists a causal relationship between these two. In light of our estimation results, what we can, however, conclude with near certainty is that financial technology innovation affects capital market development and financial innovation affects stock markets disproportionately more than credit markets.



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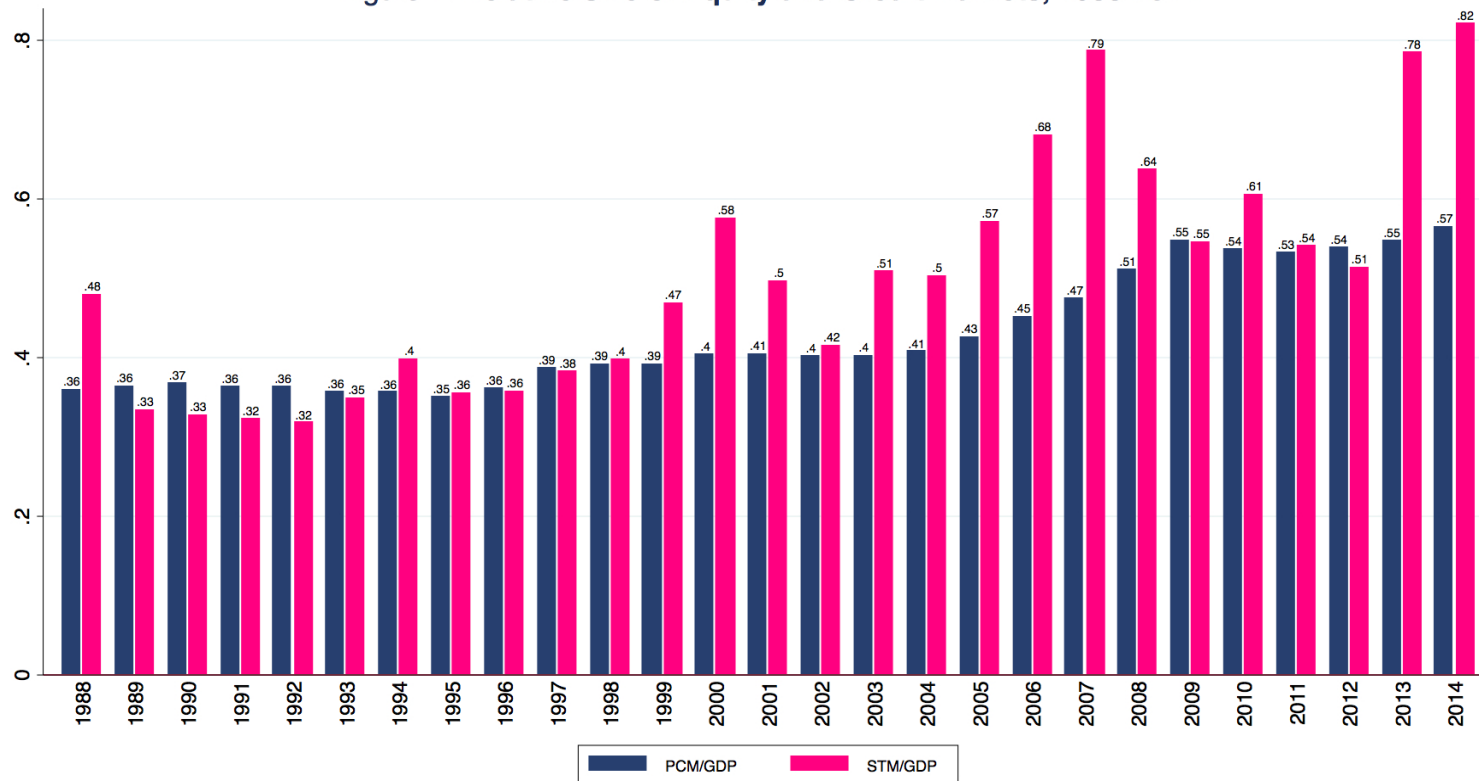
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Figure 1: Evolution of Capital Market Development Over Time

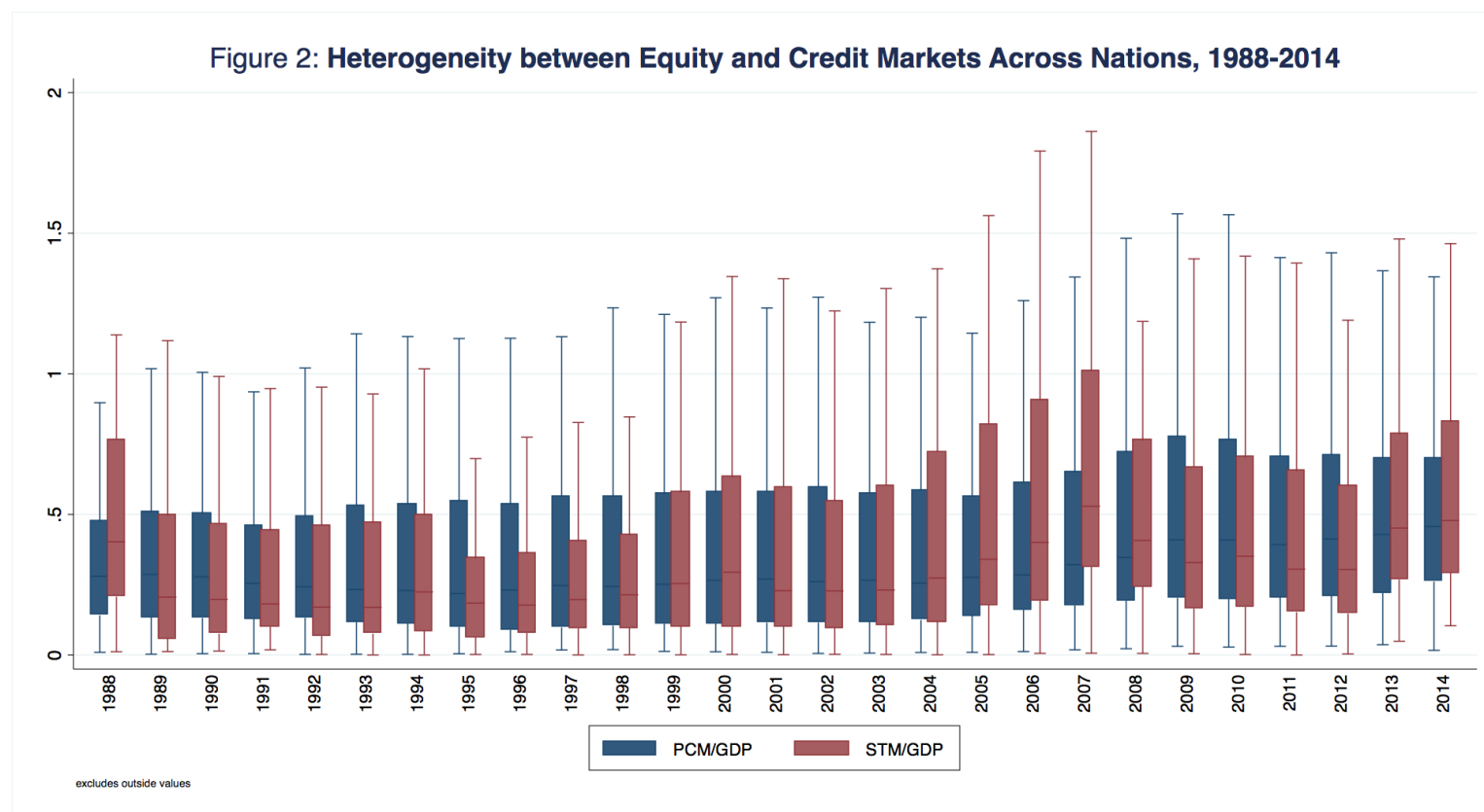
This figure shows the development of equity market and private credit market over time across the sample countries. The dependent variable STM/GDP is the size of domestic equity market normalized by GDP; PCM/GDP is the size of domestic private credit market normalized by GDP. It shows that relative to GDP both equity and private credit markets have been expanding. Equity markets across the sample countries, however, are growing disproportionately more than the private credit market, effectively crowding out the latter.

Figure 1: Relative Size of Equity and Credit Markets, 1988-2014



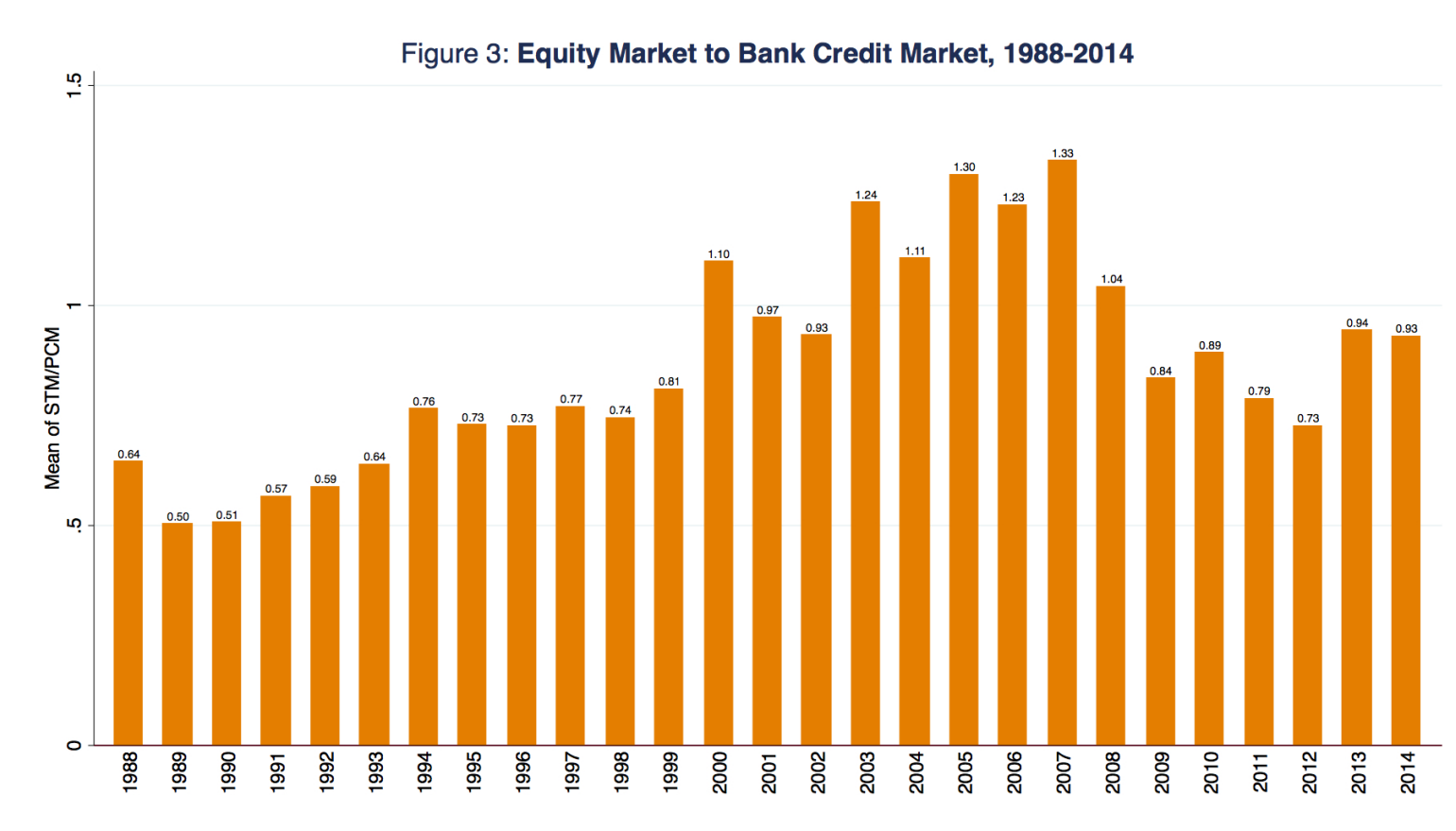
## Figure 2: Evolution of Capital Market Development Over Time

This figure shows the heterogeneity between equity and private credit markets over time across the sample countries. The dependent variable STM/GDP is the size of domestic equity market normalized by GDP; PCM/GDP is the size of domestic private credit market normalized by GDP. It shows that differences in equity market development across nations are decreasing even as stock markets are increasingly expanding into more countries. This box plot is a standardized way of displaying the distribution of capital market development data based on the five number summary: minimum (bottom tip of the whisker), first quartile (bottom of the box), median (middle line in the box), third quartile (top of the box), and maximum (top tip of the whisker).



### Figure 3: Evolution of Capital Market Development Over Time

This figure shows the development of equity market and private credit market over time across the sample countries. The dependent variable STM/PCM is the domestic equity market normalized relative to the domestic private credit market. It shows that relative to GDP both equity and private credit markets have been expanding. Equity markets across the sample countries, however, are growing disproportionately more than the private credit markets, effectively crowding out the latter.



## Figure 4.1: Distributional Diagnostic Histograms for Equity Market to Credit Market Ratio

These figures show distributional diagnostic histograms plots. The dependent variable STM/PCM is the domestic equity market normalized relative to the domestic private credit market. It shows that both logarithmic and squareroot transformations can provide a good approximation to a normal distribution of the dependent variable.

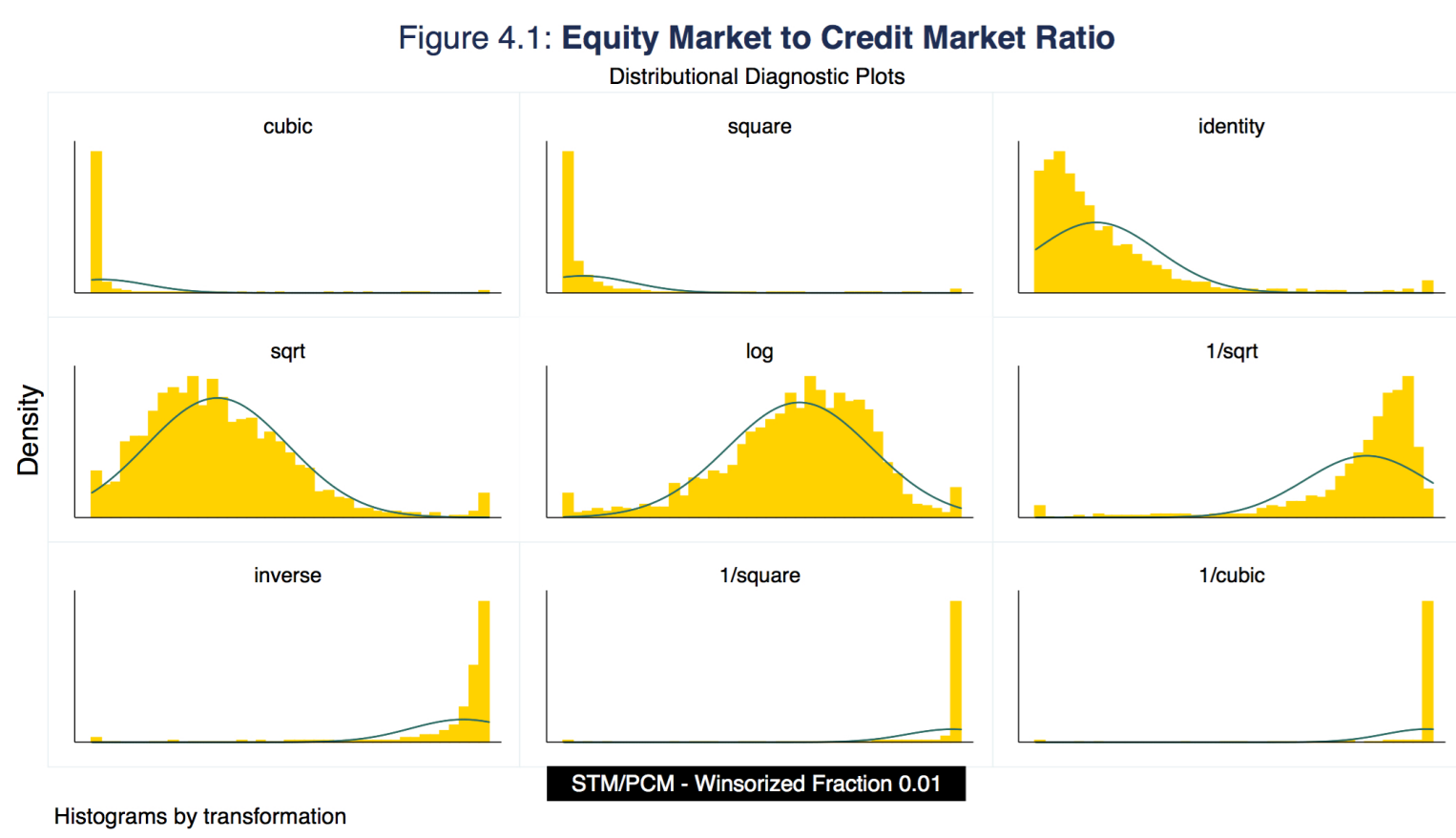


Figure 4.2: **Distributional Diagnostic Histograms for Equity Market to GDP Ratio**

These figures show distributional diagnostic histograms plots. The dependent variable STM/GDP is the size of domestic equity market normalized by GDP. It shows that both logarithmic and squareroot transformations can provide a good approximation to a normal distribution of the dependent variable.

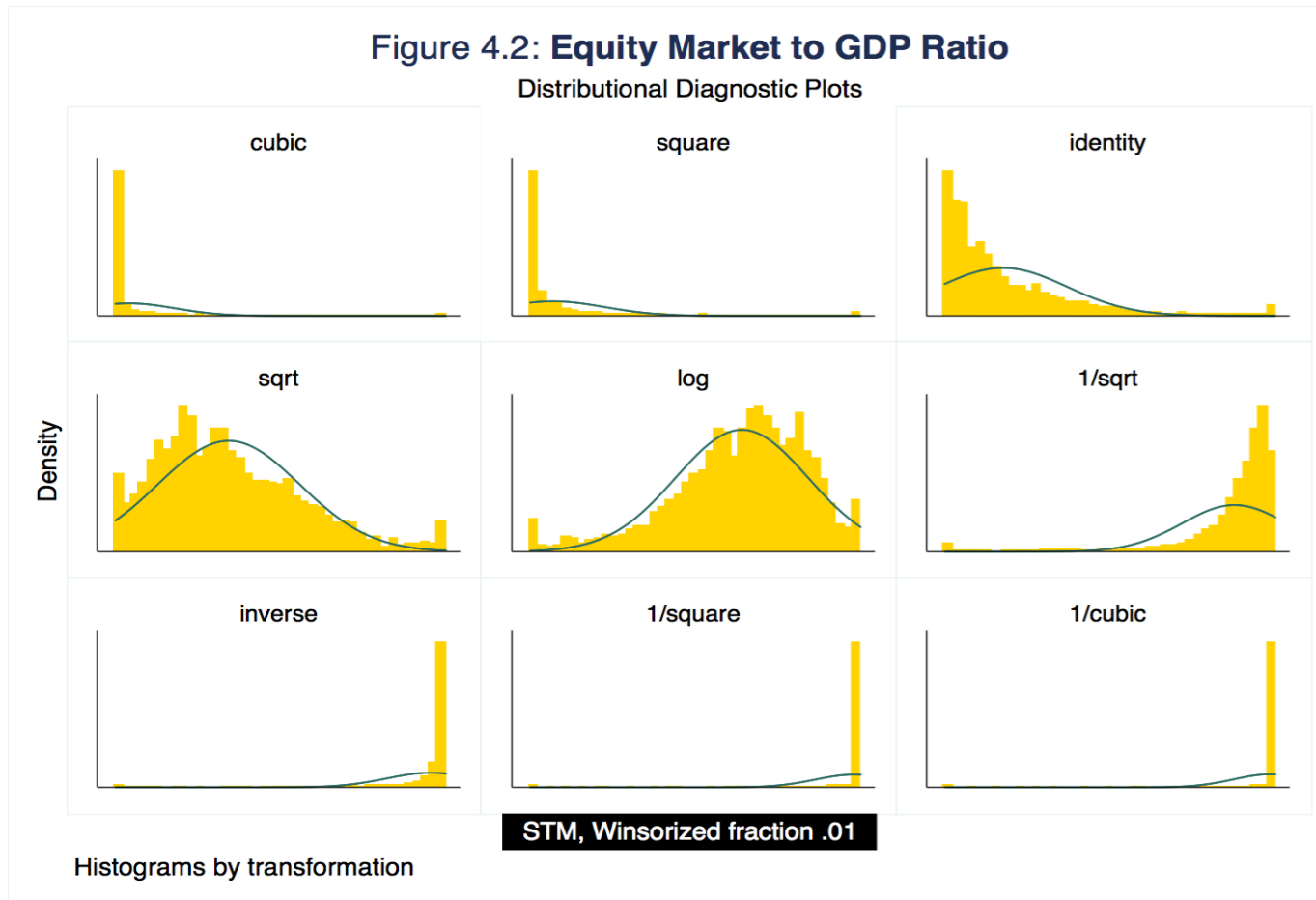
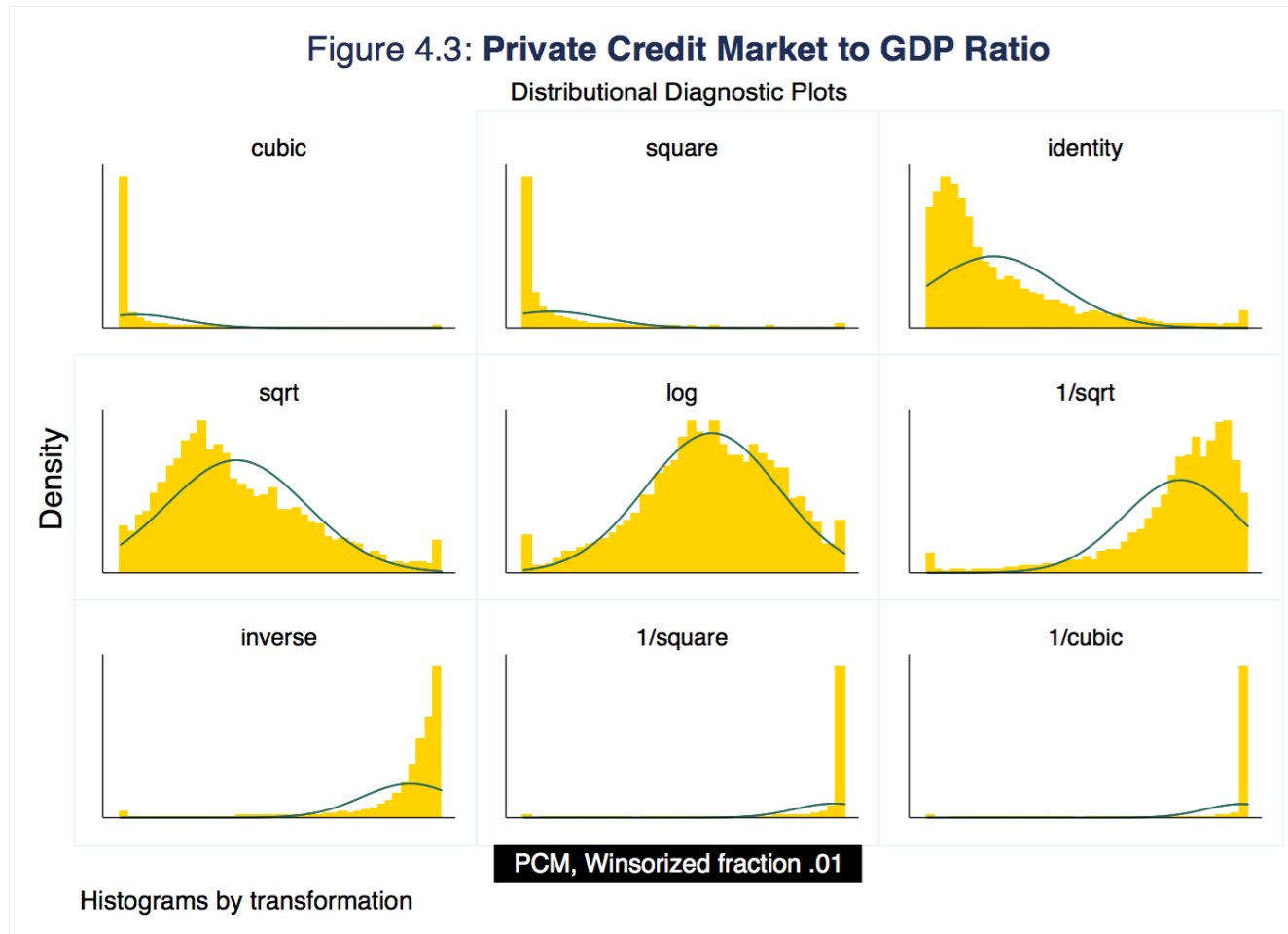


Figure 4.3: **Distributional Diagnostic Histograms for Private Credit Market to GDP Ratio**

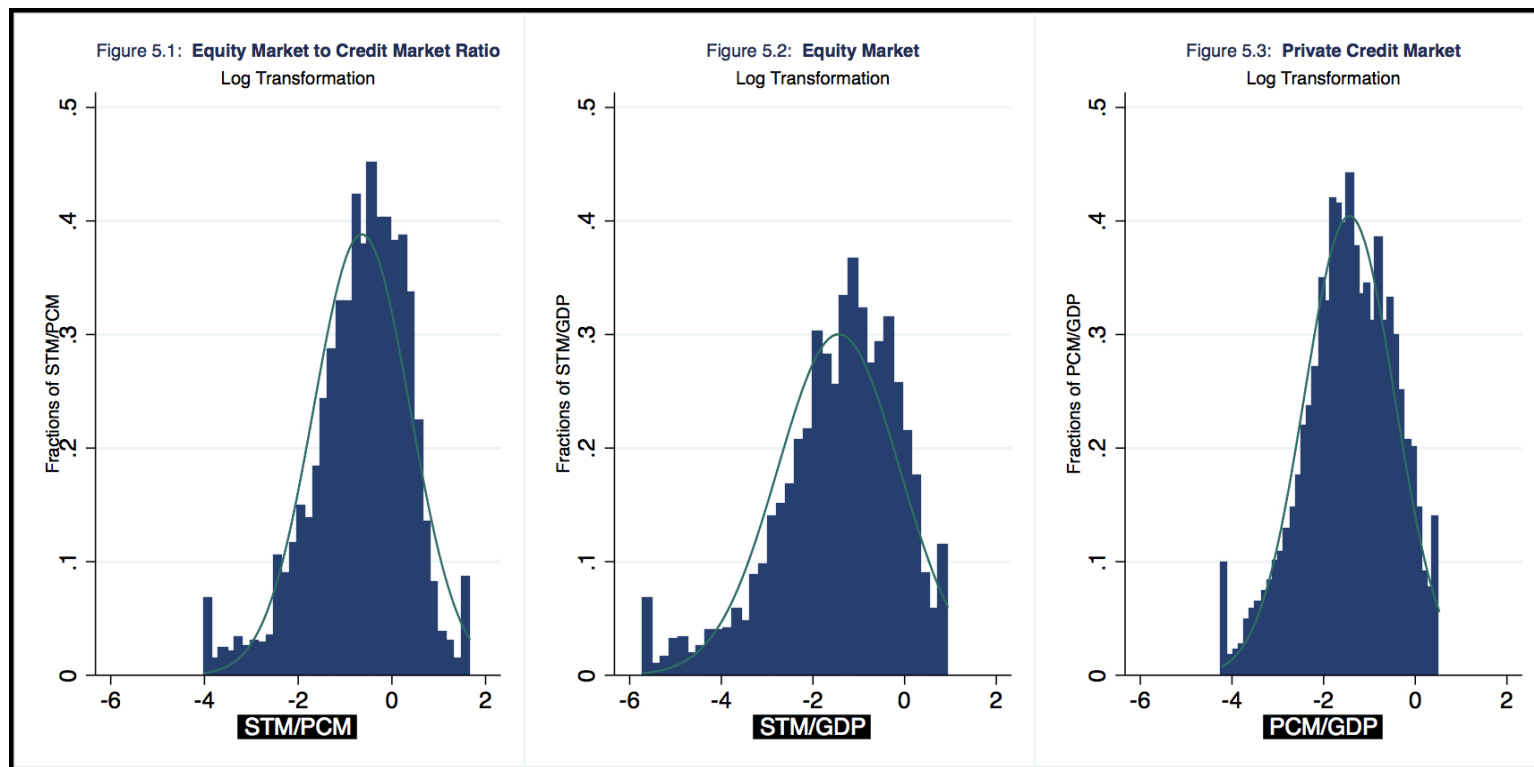
These figures show distributional diagnostic histograms plots. The dependent variable PCM/GDP is the size of domestic private credit market normalized by GDP. It shows that both logarithmic and square root transformations can provide a good approximation to a normal distribution of the dependent variable.





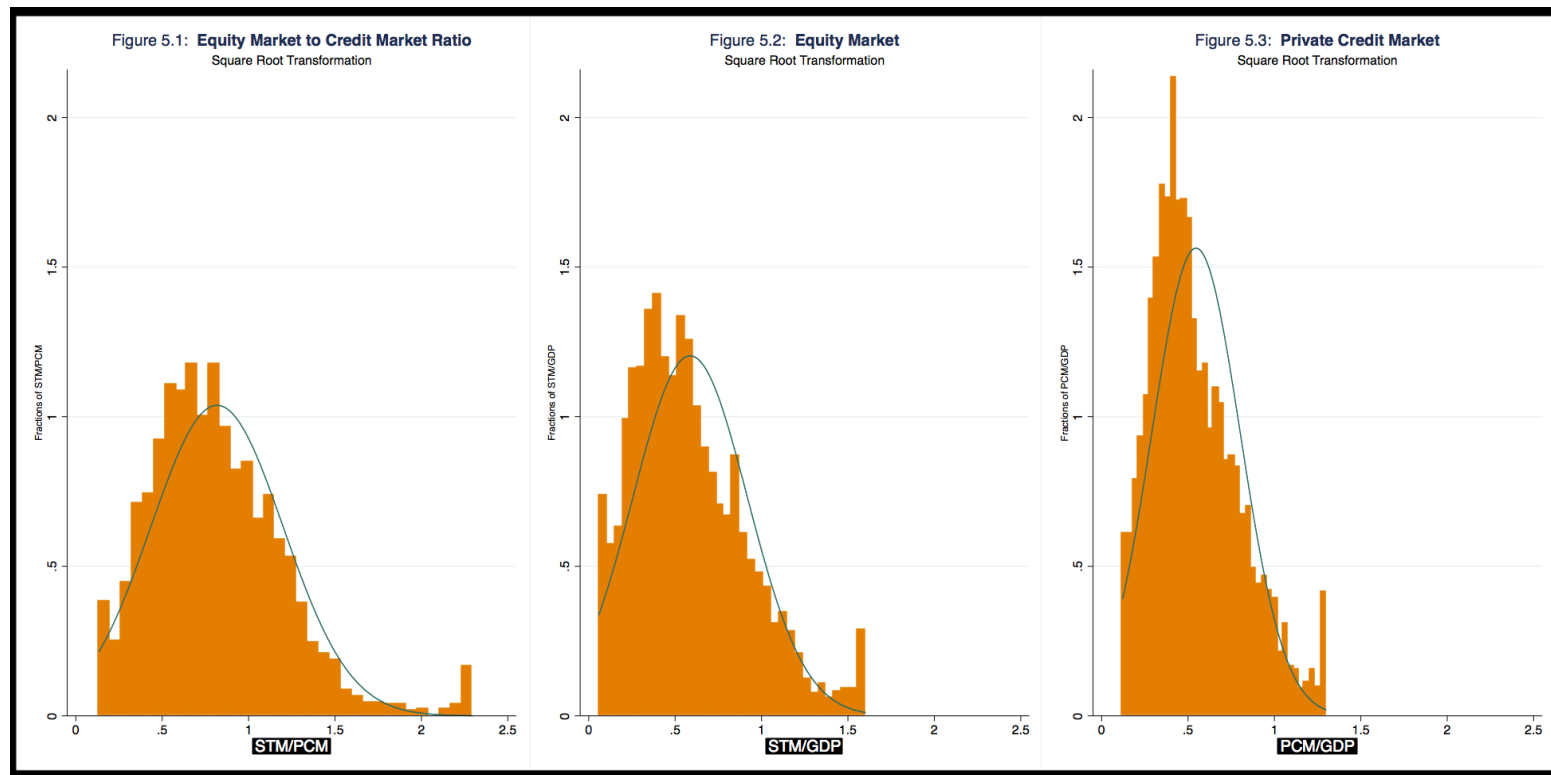
## Figure 5A: Distributional Diagnostic Histograms for Log Normalized Dependent Variables

These figures show distributional histograms for the three winsorized dependent variables which were normalized using log transformation. The dependent variable STM/PCM is the domestic equity market normalized relative to the domestic private credit market; STM/GDP is the size of domestic equity market normalized by GDP; PCM/GDP is the size of domestic private credit market normalized by GDP. This figure reaffirms that log transformation provides a good approximation to a normal distribution for all the dependent variables.



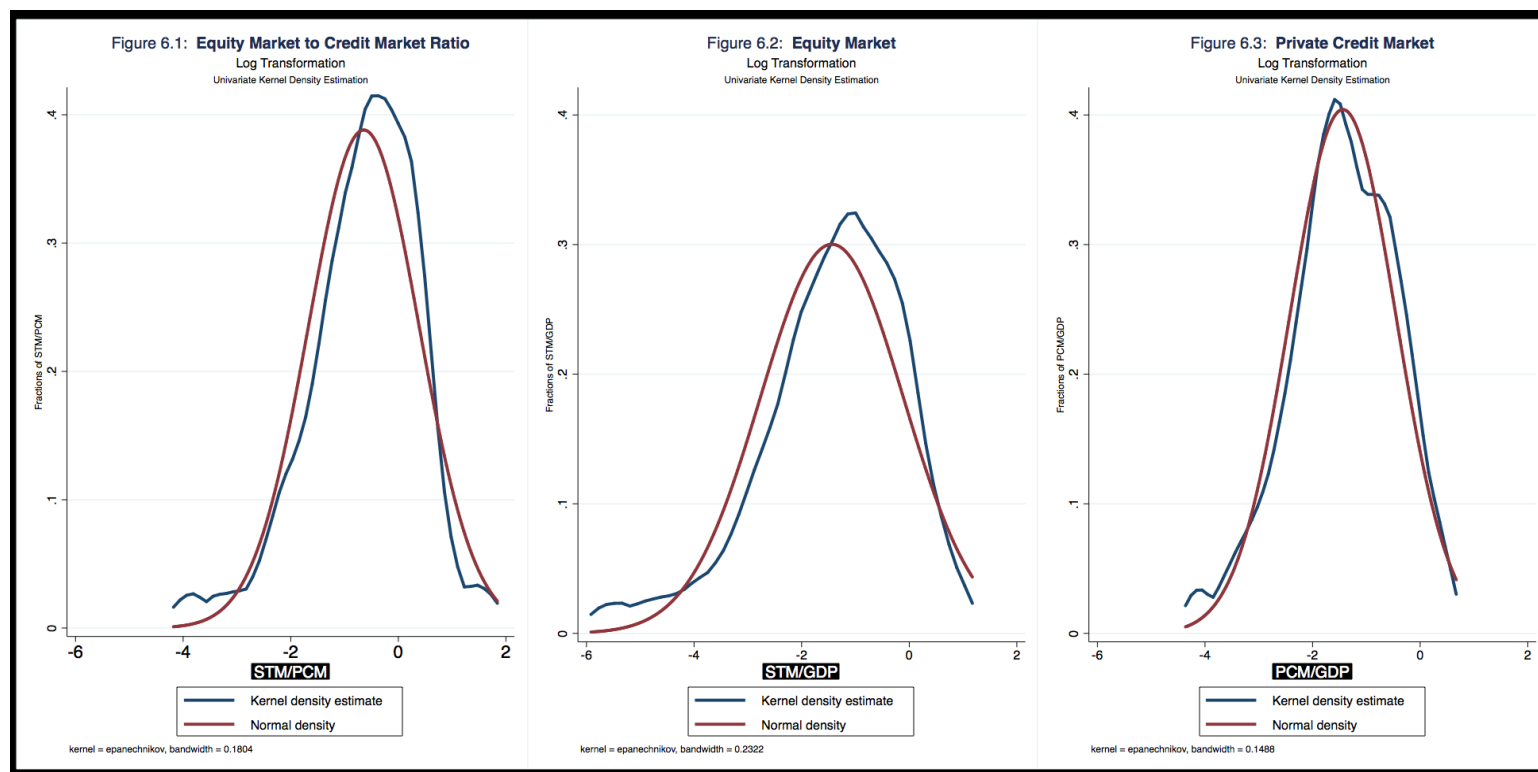
## Figure 5B: Distributional Diagnostic Histograms for Square Root Normalized Dependent Variables

These figures show distributional histograms for the three winsorized dependent variables which were normalized using square root transformation. The dependent variable  $STM/PCM$  is the domestic equity market normalized relative to the domestic private credit market;  $STM/GDP$  is the size of domestic equity market normalized by GDP;  $PCM/GDP$  is the size of domestic private credit market normalized by GDP. This figure reaffirms that **square root transformation** provides a good approximation to a normal distribution for all the dependent variables.



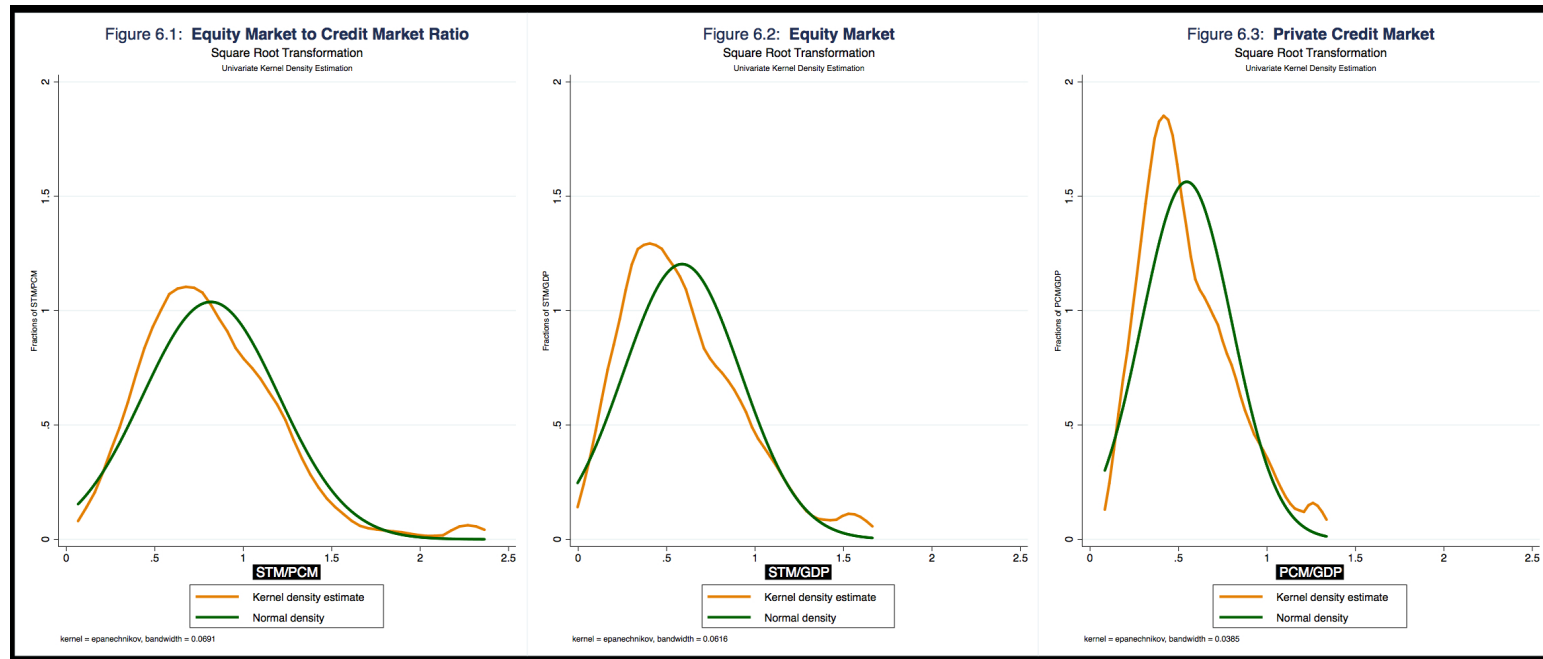
## Figure 6A: Univariate Kernel Density Estimation Plots for Log Normalized Dependent Variables

These figures show kernel density plots for the three winsorized dependent variables which were normalized using log transformation. The dependent variable STM/PCM is the domestic equity market normalized relative to the domestic private credit market; STM/GDP is the size of domestic equity market normalized by GDP; PCM/GDP is the size of domestic private credit market normalized by GDP. This figure reaffirms that **log transformation** provides a good approximation to a normal distribution for all the dependent variables.



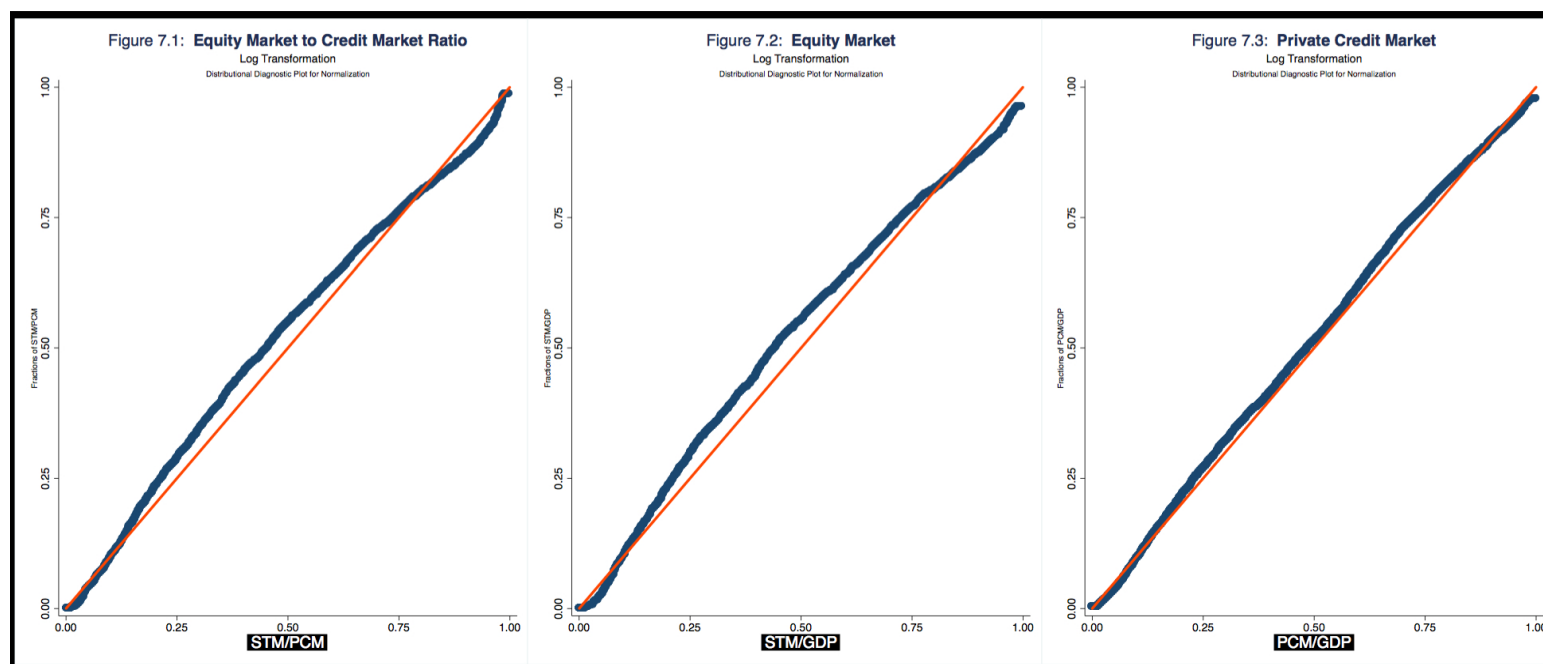
## Figure 6B: Univariate Kernel Density Estimation Plots for Square Root Normalized Dependent Variables

These figures show distributional diagnostic kernel density plots for the three winsorized dependent variables which were normalized using square root transformation. The dependent variable STM/PCM is the domestic equity market normalized relative to the domestic private credit market; STM/GDP is the size of domestic equity market normalized by GDP; PCM/GDP is the size of domestic private credit market normalized by GDP. This figure reaffirms that square root transformation provides a good approximation to a normal distribution for all the dependent variables.



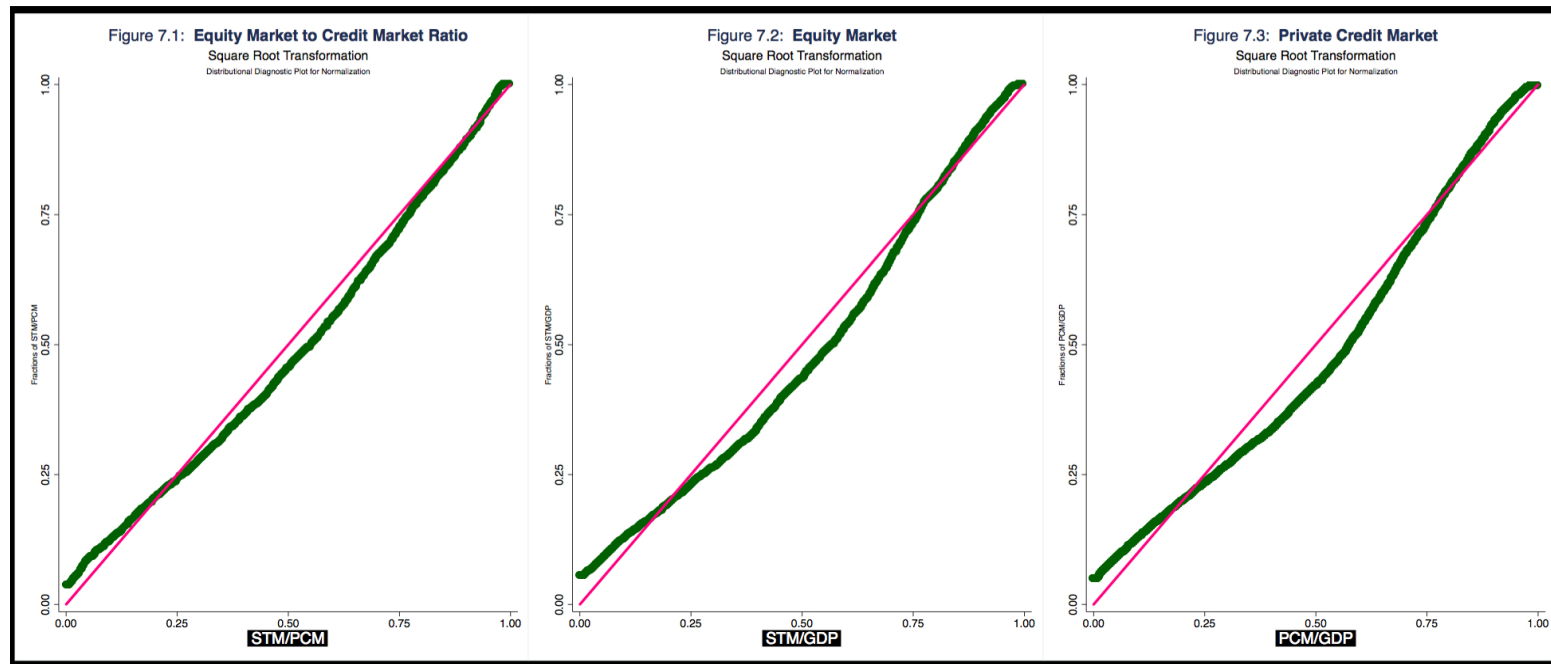
## Figure 7A: Standardized Normal Probability Plots for Log Normalized Dependent Variables

These figures show distributional diagnostic probability plots for the three winsorized dependent variables which were normalized using log transformation. The dependent variable STM/PCM is the domestic equity market normalized relative to the domestic private credit market; STM/GDP is the size of domestic equity market normalized by GDP; PCM/GDP is the size of domestic private credit market normalized by GDP. This figure reaffirms that **log transformation** provides a good approximation to a normal distribution for all the dependent variables.



## Figure 7B: Standardized Normal Probability Plots for Square Root Normalized Dependent Variables

These figures show distributional diagnostic probability plots for the three winsorized dependent variables which were normalized using square root transformation. The dependent variable STM/PCM is the domestic equity market normalized relative to the domestic private credit market; STM/GDP is the size of domestic equity market normalized by GDP; PCM/GDP is the size of domestic private credit market normalized by GDP. This figure reaffirms that square root transformation provides a good approximation to a normal distribution for all the dependent variables.



## Table 1: Variable Definitions and Data Sources

This table reports the definitions of various dependent and explanatory variables. It also provides the sources from which each of them were collected.

Variables	Empirical Proxy	Definition and Source
<b>Dependant Variables:</b>		
STM/PCM	Size of the Domestic Stock Market Relative to the Private Credit Market	Value of listed shares to private credit by deposit money banks. Source: Financial Structure Database, World Bank, 2016
STM/GDP	Size of the Domestic Stock Market Relative to GDP	Value of listed shares to GDP adjusted for deflation. Source: Financial Structure Database, World Bank, 2016
PCM/GDP	Size of the Domestic Bank Credit Market Relative to GDP	Value of private credit by deposit money banks and other financial institutions to GDP adjusted for deflation. Source: Financial Structure Database, World Bank, 2016
<b>Independent Variables:</b>		
ATM	Number of electromechanical devices that permit users to withdraw cash	0= Not Adopted, 1= Adopted. Source: Historical Cross-Country Technology Adoption (HCCTA) Dataset, NBER, 2009
Cheque	Number of payments by cheque (in millions)	0= Not Adopted, 1= Adopted. Source: Historical Cross-Country Technology Adoption (HCCTA) Dataset, NBER, 2009
Credit & Debit Payments	Payments by credit and debit cards (in millions)	0= Not Adopted, 1= Adopted. Source: Historical Cross-Country Technology Adoption (HCCTA) Dataset, NBER, 2009
Payment Card Transactions	Number of transactions using payment cards at points of service (retail locations)	0= Not Adopted, 1= Adopted. Source: Historical Cross-Country Technology Adoption (HCCTA) Dataset, NBER, 2009
Payment Card Locations	Number of retail locations payment cards can be used	0= Not Adopted, 1= Adopted. Source: Historical Cross-Country Technology Adoption (HCCTA) Dataset, NBER, 2009
FinTECH	Constructed by author	Continuous measure of the five financial innovation indicators, using PCA. Source: Historical Cross-Country Technology Adoption (HCCTA) Dataset, NBER, 2009
Demand for Finance	GDP Per Capita	Gross domestic product over population. Source: Pen World Table, 2015
Supply Side Impediments	Constructed by author	Number of political and civil conflicts in the country in a given year times the mean intensity of those conflicts. Source: International Peace Research Institute of Oslo, Norway and The Uppsala University, Sweden, 2015
Trade Openness	Constructed by author	Share of merchandise of exports added to that of imports, subtracted from total amount of foreign trade. Source: Pen World Table, 2011.
Political Openness	Total Factor Productivity	Values of export and import divided by the GDP. TFP at constant national prices (2005 = 1). Source: Pen World Table, 2015.
External Financing Constraint	Per Capita GDP relative to USA	Per Capita GDP divided by the per capita GDP of the USA. Source: Pen World Table, 2015.
Minority Investor Protection	Investors' Protection Index	Principal component of disclosure, liability standards, and Anti-director rights. Scale from 0 to 1. Source: Doing Business Database, World Bank, 2016
Enforcement of Contracts	Creditors' Protection Index	An aggregated creditors' right index is created by adding one with the initial 0 if (1) the country imposes restriction, Source: Doing Business Database, World Bank, 2016
Legal Origin	English Origin Dummy	English or French or Nordic or German origin. Source: La-Porta, Lopez, Shlifer and Vishny (2004)

**Table 2: Summary Statistics of the Dependent and Explanatory Variables**

This table reports the mean of various dependent and independent variables for all the countries in the dataset. The dependent variables are the three measures of capital market development, while the independent variables are the five indicators of financial innovation, its index and other control variables. The dependent variable STM/PCM is the domestic equity market normalized relative to the domestic private credit market; STM/GDP is the size of domestic equity market normalized by GDP; PCM/GDP is the size of domestic private credit market normalized by GDP. The definitions of all predictor variables are provided in Table 1.

Country Code	Country Name	ATM	Cheque	Credit & Debit Payments	Payment Card Transactions	Payment Card Locations	Fin-TECH	Demand for Finance	Supply Side Impediments	Trade Openness	Political Openness	External Financing Constraints	Minority Investor Protection	Enforcement of Contracts	Legal Origin	STM/PCM	STM/GDP	PCM/GDP
ABW	Aruba	.	.	.	.	.	.	.	0.00	.	.	.	.	.	0.00	.	.	0.49
AFG	Afghanistan	.	.	.	.	.	.	.	1.29	.	.	.	10.00	30.35	0.00	.	.	0.04
AGO	Angola	.	.	.	.	.	.	7.93	1.25	0.22	.	2.41	53.33	29.13	0.00	.	.	0.08
ALB	Albania	.	.	.	.	.	.	8.36	0.00	-0.08	.	1.99	49.70	59.32	0.00	.	.	0.17
ARE	United Arab Emirates	.	.	.	.	.	.	.	0.00	.	.	.	40.91	51.76	0.00	0.74	0.39	0.41
ARG	Argentina	.	.	.	.	.	.	8.51	0.09	0.03	0.98	1.72	50.00	65.18	0.00	0.70	0.09	0.14
ARM	Armenia	.	.	.	.	.	.	8.12	0.00	-0.10	0.71	2.42	52.42	56.68	0.00	0.07	0.01	0.16
ATG	Antigua & Barbuda	.	.	.	.	.	.	9.08	0.00	-0.55	.	1.26	63.33	60.91	0.00	.	.	0.54
AUS	Australia	.	936.886	854.4429	260000000	69813.3	.	10.02	0.04	0.00	0.86	0.22	56.67	77.07	1.00	1.05	0.73	0.55
AUT	Austria	3987	23.1	71.3	65400000	32986.9	-0.694	9.87	0.00	-0.07	0.90	0.37	50.00	81.70	0.00	0.18	0.16	0.71
AZE	Azerbaijan	.	.	.	.	.	.	8.26	0.27	0.09	.	2.28	56.06	69.64	0.00	0.02	0.00	0.09
BDI	Burundi	.	.	.	.	.	.	6.41	0.36	-0.07	1.30	3.83	41.52	44.01	0.00	.	.	0.12
BEL	Belgium	3860.8	131.171	270.5529	258000000	75214.3	-0.597	9.91	0.00	-0.05	0.90	0.33	70.00	76.73	0.00	0.79	0.41	0.38
BEN	Benin	.	.	.	.	.	.	7.03	0.00	-0.09	0.97	3.21	33.33	34.86	0.00	.	.	0.17
BFA	Burkina Faso	.	.	.	.	.	.	6.65	0.04	-0.07	.	3.59	36.67	42.34	0.00	.	.	0.13
BGD	Bangladesh	.	.	.	.	.	.	7.13	0.35	-0.04	.	3.11	66.67	20.82	0.00	0.31	0.09	0.20
BGR	Bulgaria	465.73	.	1.033333	719302.9	1466.99	.	8.76	0.00	-0.04	1.00	1.59	60.00	61.84	0.00	0.20	0.09	0.44
BHR	Bahrain	.	.	.	.	.	.	9.75	0.00	-0.12	1.08	0.60	46.67	52.33	0.00	1.34	0.88	0.56
BHS	Bahamas	.	.	.	.	.	.	9.72	0.00	0.09	.	0.63	46.67	52.69	0.00	.	.	0.56
BIH	Bosnia-Herzegovina	.	.	.	.	.	.	8.16	0.25	-0.19	.	2.39	46.67	56.81	0.00	0.50	0.24	0.46
BLR	Belarus	.	.	.	.	.	.	9.07	0.00	-0.05	.	1.48	43.94	80.73	0.00	.	.	0.16
BLZ	Belize	.	.	.	.	.	.	8.47	0.00	-0.18	.	1.88	43.33	37.09	0.00	.	.	0.45
BMU	Bermuda	.	.	.	.	.	.	10.20	0.00	-0.89	.	0.15	.	.	0.00	.	0.43	.
BOL	Bolivia	.	.	.	.	.	.	7.65	0.02	0.04	1.15	2.59	40.00	54.93	0.00	0.30	0.13	0.24
BRA	Brazil	.	.	.	.	.	.	8.49	0.00	-0.01	1.13	1.75	53.33	52.03	0.00	0.82	0.34	0.30
BRB	Barbados	.	.	.	.	.	.	9.52	0.00	-0.31	1.09	0.71	30.00	41.61	0.00	1.16	0.69	0.46
BRN	Brunei Darussalam	.	.	.	.	.	.	10.91	0.02	0.41	.	-0.56	50.42	47.76	0.00	.	.	0.45
BTN	Bhutan	.	.	.	.	.	.	7.73	0.00	-0.07	.	2.62	46.67	60.34	0.00	1.15	0.10	0.17
BWA	Botswana	.	.	.	.	.	.	7.95	0.00	-0.05	0.95	2.29	52.42	57.72	1.00	1.21	0.22	0.16
CAF	Central African Republi	.	.	.	.	.	.	6.78	0.15	0.00	0.97	3.46	40.00	31.62	0.00	.	.	0.10
CAN	Canada	21579	1897.52	1880.041	912000000	231955	0.565	10.04	0.00	0.02	1.01	0.19	83.94	63.76	1.00	1.01	0.98	0.77
CHE	Switzerland	3791.1	12.7667	131.3824	89400000	35054.4	-0.701	10.28	0.00	-0.01	0.97	-0.04	30.00	72.14	0.00	0.97	1.41	1.26
CHL	Chile	.	.	.	.	.	.	8.91	0.02	-0.01	0.96	1.33	64.55	63.85	0.00	1.29	0.90	0.45
CHN	China	.	450.8	276.72	.	.	.	7.67	0.31	0.01	0.62	2.57	50.00	68.21	0.00	0.31	0.34	0.95
CIV	Ivory Coast	.	.	.	.	.	.	7.61	0.07	0.03	1.11	2.63	.	.	0.00	0.92	0.15	0.24
CMR	Cameroon	.	.	.	.	.	.	7.45	0.09	-0.01	1.14	2.79	43.33	41.26	0.00	.	.	0.16
COG	Congo (Brazzaville)	.	.	.	.	.	.	7.40	0.13	0.25	.	2.84	33.33	44.11	0.00	.	.	0.13



Country Code	Country Name	ATM	Cheque	Credit & Debit Payments	Payment Card Transactions	Payment Card Locations	Fin-TECH	Demand for Finance	Supply Side Impediments	Trade Openness	Political Openness	External Financing Constraints	Minority Investor Protection	Enforcement of Contracts	Legal Origin	STM/PCM	STM/GDP	PCM/GDP
COL	Colombia	.	.	.	.	.	.	8.63	1.07	0.00	1.08	1.61	70.91	36.09	0.00	0.81	0.26	0.27
COM	Comoros	.	.	.	.	.	.	7.23	0.04	-0.16	.	3.01	40.00	33.20	0.00	.	.	0.13
CPV	Cape Verde Islands	.	.	.	.	.	.	7.35	0.00	-0.28	.	2.89	40.00	67.11	0.00	.	.	0.25
CRI	Costa Rica	.	.	.	.	.	.	8.77	0.00	-0.08	1.01	1.46	30.00	50.76	0.00	0.33	0.07	0.25
CUB	Cuba	.	.	.	.	.	.	.	0.02	.	.	.	.	.	0.00	.	.	.
CYM	Cayman Islands	.	.	.	.	.	.	.	0.00	.	.	.	.	.	0.00	.	0.05	.
CYP	Cyprus	.	.	.	.	.	.	9.35	0.04	-0.28	0.72	0.89	56.67	54.17	0.00	0.21	0.34	1.03
CZE	Czech Republic	1722.2	6.25455	21.28571	21000000	15122.6	-0.808	9.84	0.00	-0.03	0.96	0.71	50.00	67.10	0.00	0.42	0.18	0.48
DEU	Germany	34353	631.218	743.9294	487000000	215436	0.432	9.85	0.00	0.00	1.04	0.39	50.00	76.69	0.00	0.30	0.29	0.83
DJI	Djibouti	.	.	.	.	.	.	8.04	0.11	-0.16	.	2.31	23.33	37.31	0.00	.	.	0.36
DMA	Dominica	.	.	.	.	.	.	8.65	0.00	-0.26	.	1.70	63.33	44.82	0.00	.	.	0.43
DNK	Denmark	1612.4	75.77	332.45	240000000	49116.8	-0.655	9.98	0.00	-0.02	0.84	0.26	63.33	69.32	0.00	0.58	0.36	0.68
DOM	Dominican Republic	.	.	.	.	.	.	8.30	0.02	-0.05	1.06	1.93	45.76	60.98	0.00	0.03	0.01	0.20
DZA	Algeria	.	.	.	.	.	.	.	0.67	.	.	.	30.00	51.76	0.00	.	.	0.27
ECU	Ecuador	.	.	.	.	.	.	8.23	0.02	0.01	0.92	2.00	40.00	58.30	0.00	0.30	0.07	0.20
EGY	Egypt	.	.	.	.	.	.	7.44	0.24	-0.07	1.09	2.80	35.15	44.02	0.00	0.77	0.30	0.26
ERI	Eritrea	.	.	.	.	.	.	.	0.18	.	.	.	46.67	64.34	0.00	.	.	0.24
ESP	Spain	31672	203.63	443	296000000	757676	1.268	9.56	0.16	-0.07	1.05	0.68	53.33	61.94	0.00	0.72	0.67	0.95
EST	Estonia	496.59	0	17.175	16700000	4379.67	-0.847	9.40	0.00	-0.07	0.84	1.14	56.67	70.45	0.00	0.49	0.23	0.50
ETH	Ethiopia	.	.	.	.	.	.	6.35	2.84	-0.04	.	3.88	20.00	62.48	0.00	.	.	0.15
FIN	Finland	2359	2.9	314.16	203000000	50996.8	-0.661	9.81	0.00	0.01	0.76	0.43	56.67	76.23	0.00	1.08	0.66	0.57
FJI	Fiji	.	.	.	.	.	.	8.28	0.00	-0.15	0.95	1.95	56.67	64.34	0.00	0.24	0.11	0.31
FRA	France	24675	4639.49	2359	2050000000	527678	1.546	9.87	0.11	-0.02	0.94	0.37	56.67	77.79	0.00	0.50	0.41	0.64
FSM	Micronesia	.	.	.	.	.	.	.	0.00	.	.	.	26.67	40.85	0.00	.	.	0.23
GAB	Gabon	.	.	.	.	.	.	8.93	0.02	0.32	1.03	1.31	33.33	43.51	0.00	.	.	0.13
GBR	United Kingdom	24848	2816.06	2314.824	1810000000	456335	1.199	9.83	0.45	-0.04	0.82	0.41	80.00	68.05	1.00	0.99	0.89	0.78
GEO	Georgia	.	.	.	.	.	.	8.17	0.16	-0.09	.	2.38	59.39	67.15	0.00	0.31	0.05	0.17
GHA	Ghana	.	.	.	.	.	.	7.63	0.05	-0.03	.	2.60	63.33	63.99	0.00	1.35	0.10	0.07
GIN	Guinea	.	.	.	.	.	.	7.39	0.04	-0.01	.	2.84	26.67	49.74	0.00	.	.	0.04
GMB	Gambia	.	.	.	.	.	.	7.28	0.02	-0.09	.	2.96	26.67	63.45	0.00	.	.	0.14
GNB	Guinea-Bissau	.	.	.	.	.	.	7.11	0.24	-0.30	.	3.13	40.00	36.96	0.00	.	.	0.04
GNQ	Equatorial Guinea	.	.	.	.	.	.	7.17	0.00	0.01	.	3.07	36.67	63.57	0.00	.	.	0.09
GRC	Greece	2146.5	11.975	32.8375	1463033	89356	-0.634	9.43	0.00	-0.13	0.94	0.81	34.85	53.02	0.00	0.72	0.37	0.42
GRD	Grenada	.	.	.	.	.	.	8.27	0.02	-0.49	.	2.08	63.33	45.48	0.00	.	.	0.53
GTM	Guatemala	.	.	.	.	.	.	8.03	0.58	-0.09	1.04	2.20	33.33	46.35	0.00	0.05	0.01	0.17
GUY	Guyana	.	.	.	.	.	.	.	0.00	.	.	.	53.33	62.16	0.00	0.38	0.15	0.27
HKG	Hong Kong	.	135.863	.	.	.	.	9.66	0.00	0.00	0.84	0.58	90.00	81.99	1.00	3.31	3.61	1.54
HND	Honduras	.	.	.	.	.	.	7.77	0.04	-0.10	1.15	2.47	30.00	39.71	0.00	9.53	3.13	0.30
HRV	Croatia	.	.	.	.	.	.	9.42	0.05	-0.16	0.91	1.13	43.03	64.85	0.00	0.57	0.29	0.48
HTI	Haiti	.	.	.	.	.	.	.	0.05	.	.	.	30.00	58.56	0.00	.	.	0.10
HUN	Hungary	2209.5	0.41667	26.95556	111000000	18134.1	-0.799	9.24	0.00	-0.02	0.87	1.10	43.33	74.25	0.00	0.51	0.18	0.37
IDN	Indonesia	.	.	42.2	.	.	.	7.57	0.95	0.11	0.98	2.67	60.00	37.28	0.00	0.89	0.25	0.28
IND	India	.	.	.	.	.	.	7.24	3.42	-0.01	0.80	2.99	60.00	25.81	0.00	1.33	0.45	0.24
IRL	Ireland	1011.2	143.13	56.05	27700000	23630.2	-0.78	9.61	0.00	0.03	0.82	0.63	86.67	77.68	1.00	0.56	0.52	0.62
IRN	Iran	.	.	.	.	.	.	8.37	1.13	0.11	1.54	1.87	31.21	63.09	0.00	0.39	0.13	0.30
IRQ	Iraq	.	.	.	.	.	.	8.17	1.44	0.10	0.85	2.17	43.33	46.53	0.00	.	.	0.08
ISL	Iceland	.	.	.	.	.	.	10.03	0.00	-0.06	0.83	0.21	57.67	82.91	0.00	0.45	0.62	0.68
ISR	Israel	1051.7	213.167	.	175000000	25171.1	.	9.69	1.38	-0.10	0.94	0.55	83.33	54.51	1.00	0.67	0.45	0.50

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ITA	Italy	22395	639.647	298.3706	191000000	300219	0.173	9.75	0.00	-0.01	0.96	0.48	60.00	39.49	0.00	0.45	0.31	0.64
JAM	Jamaica	.	.	.	.	.	.	8.40	0.00	-0.20	1.17	1.84	53.33	55.33	1.00	2.37	0.48	0.22
JOR	Jordan	.	.	.	.	.	.	8.14	0.04	-0.35	1.37	2.09	30.00	54.04	0.00	1.34	0.98	0.56
JPN	Japan	115784	284.177	1823.263	541284.2	18615.4	1.683	9.77	0.00	0.01	0.93	0.47	70.00	73.25	1.00	0.39	0.65	1.41
KAZ	Kazakhstan	.	.	.	.	.	.	8.98	0.00	0.09	0.85	1.56	50.00	67.04	0.00	0.61	0.15	0.24
KEN	Kenya	.	.	.	.	.	.	7.33	0.02	-0.09	1.08	2.91	50.00	55.02	0.00	0.81	0.20	0.21
KGZ	Kyrgyzstan	.	.	.	.	.	.	7.78	0.00	-0.06	1.01	2.77	60.61	62.49	0.00	0.17	0.01	0.09
KHM	Cambodia	.	.	.	.	.	.	6.98	0.80	-0.01	.	3.37	63.03	34.29	0.00	.	.	0.14
KIR	Kiribati	.	.	.	.	.	.	.	0.00	.	.	.	60.00	64.15	0.00	.	.	.
KNA	St Christopher & Nevis	.	.	.	.	.	.	8.86	0.00	-0.34	.	1.49	63.33	53.45	0.00	1.12	0.65	0.55
KOR	South Korea	.	.	.	.	.	.	8.81	0.00	-0.01	0.80	1.43	61.21	80.20	1.00	0.56	0.42	0.56
KWT	Kuwait	.	.	.	.	.	.	10.37	0.07	0.36	1.76	-0.02	50.30	52.28	0.00	1.47	0.78	0.45
LAO	Laos	.	.	.	.	.	.	7.11	0.56	-0.03	.	3.24	16.67	56.13	0.00	.	.	0.07
LBN	Lebanon	.	8.76	0.666667	.	.	.	8.55	0.22	-0.33	.	1.80	50.00	55.40	0.00	0.28	0.20	0.72
LBR	Liberia	.	.	.	.	.	.	6.78	0.15	-0.13	.	3.50	36.67	34.65	0.00	.	.	0.09
LBY	Libya	.	.	.	.	.	.	.	0.09	.	.	.	16.67	51.42	0.00	.	.	0.10
LCA	Saint Lucia	.	.	.	.	.	.	8.67	0.00	-0.60	.	1.67	63.33	45.59	0.00	.	.	0.64
LKA	Sri Lanka	.	.	.	.	.	.	7.94	0.80	-0.02	0.76	2.30	55.15	38.96	1.00	0.81	0.17	0.18
LSO	Lesotho	.	.	.	.	.	.	6.94	0.02	-0.42	0.96	3.30	39.09	48.13	0.00	.	.	0.12
LTU	Lithuania	475.65	0.1	6.611111	8234000	6500.95	-0.832	9.29	0.00	-0.12	0.87	1.26	51.82	76.15	0.00	0.68	0.15	0.28
LUX	Luxembourg	220.04	0.96667	26	11400000	5580.25	-0.85	10.43	0.00	-0.27	0.81	-0.20	43.33	85.83	0.00	1.14	1.03	0.83
LVA	Latvia	484.05	0.06364	6.781818	12700000	5943.67	-0.844	9.23	0.00	-0.11	0.84	1.32	56.67	80.29	0.00	0.24	0.07	0.41
MAC	Macau	.	.	.	.	.	.	9.90	0.00	-0.02	0.92	0.45	.	.	0.00	.	.	0.62
MAR	Morocco	.	.	.	.	.	.	7.94	0.35	-0.09	1.03	2.30	32.42	60.14	0.00	0.70	0.36	0.28
MDA	Moldova	.	.	.	.	.	.	7.79	0.02	-0.12	0.96	2.75	54.55	75.66	0.00	0.36	0.03	0.19
MDG	Madagascar	.	.	.	.	.	.	6.89	0.02	-0.08	.	3.35	56.67	45.91	0.00	.	.	0.14
MDV	Maldives	.	.	.	.	.	.	8.26	0.00	-0.17	.	2.09	53.33	58.13	0.00	.	.	0.22
MEX	Mexico	.	.	.	.	.	.	9.08	0.04	-0.02	1.16	1.16	56.67	64.61	0.00	0.89	0.18	0.21
MHL	Marshall Islands	.	.	.	.	.	.	.	0.00	.	.	.	33.33	64.41	0.00	.	.	.
MKD	Macedonia	.	.	.	.	.	.	8.66	0.02	-0.12	.	1.88	50.00	57.21	0.00	0.23	0.07	0.30
MLI	Mali	.	.	.	.	.	.	6.39	0.22	-0.08	.	3.84	33.33	48.19	0.00	.	.	0.15
MLT	Malta	.	.	.	.	.	.	9.16	0.00	-0.44	0.76	1.08	56.67	56.27	0.00	0.37	0.39	0.64
MMR	Myanmar	.	.	.	.	.	.	.	4.62	.	.	.	23.33	27.31	0.00	.	.	0.06
MNE	Montenegro	.	.	.	.	.	.	8.90	0.00	-0.20	.	1.65	63.33	49.62	0.00	1.33	0.75	0.45
MNG	Mongolia	.	.	.	.	.	.	7.53	0.00	-0.02	0.97	2.82	63.94	71.66	0.00	0.28	0.05	0.22
MOZ	Mozambique	.	.	.	.	.	.	6.22	0.75	-0.18	0.76	4.02	55.15	33.02	0.00	.	.	0.14
MRT	Mauritania	.	.	.	.	.	.	7.51	0.11	-0.13	1.12	2.73	36.67	57.71	0.00	.	.	0.19
MUS	Mauritius	.	.	.	.	.	.	8.80	0.00	-0.07	0.86	1.44	76.67	61.89	0.00	0.66	0.43	0.40
MWI	Malawi	.	.	.	.	.	.	6.59	0.00	-0.05	.	3.65	53.33	36.57	0.00	2.11	0.18	0.10
MYS	Malaysia	.	130.6	67.9	.	.	.	8.78	0.16	0.07	0.91	1.45	86.67	68.57	1.00	1.25	1.27	0.70
NAM	Mayotte	.	.	.	.	.	.	8.50	0.00	-0.07	0.99	1.73	53.33	63.83	1.00	0.11	0.05	0.42
NER	Niger	.	.	.	.	.	.	6.79	0.13	0.00	1.17	3.45	33.33	47.57	0.00	.	.	0.10
NGA	Nigeria	.	.	.	.	.	.	6.93	0.36	0.13	.	3.30	53.33	47.71	0.00	1.23	0.16	0.11
NIC	Nicaragua	.	.	.	.	.	.	.	0.36	.	.	.	40.00	62.43	0.00	.	.	0.23
NLD	Netherlands	5145.1	135.8	470.14	418000000	84166.1	-0.499	9.93	0.02	0.01	0.89	0.31	43.94	74.97	0.00	0.62	0.62	0.70
NOR	Norway	.	.	.	88700000	30540.2	.	10.05	0.00	0.00	0.85	0.19	66.67	77.97	0.00	0.40	0.35	0.64
NPL	Nepal	.	.	.	.	.	.	6.76	0.33	-0.03	.	3.48	53.33	47.37	0.00	0.47	0.16	0.16
NZL	New Zealand	.	302	493.4	.	.	.	9.80	0.00	-0.02	0.93	0.44	96.67	79.40	1.00	0.60	0.38	0.53

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OMN	Oman	.	.	.	.	.	.	9.27	0.13	0.23	.	1.07	50.00	50.67	0.00	0.94	0.33	0.25
PAK	Pakistan	.	.	.	.	.	.	7.45	1.00	-0.03	.	2.79	63.33	41.53	0.00	0.81	0.19	0.21
PAN	Panama	.	.	.	.	.	.	8.65	0.04	-0.20	1.01	1.59	50.30	56.00	0.00	0.32	0.24	0.52
PER	Peru	.	.	.	.	.	.	8.28	0.56	0.00	1.15	1.96	61.21	55.92	0.00	1.34	0.28	0.17
PHL	Philippines	.	115.06	.	.	.	.	7.94	1.78	-0.04	1.17	2.30	43.33	53.45	1.00	1.52	0.49	0.30
PLW	Palau	.	.	.	.	.	.	.	0.00	.	.	.	26.67	50.34	0.00	.	.	.
PNG	Papua New Guinea	.	.	.	.	.	.	.	0.11	.	.	.	56.67	31.35	0.00	6.07	1.15	0.20
POL	Poland	4304.3	5.51818	42.59091	40800000	42302.8	-0.696	9.00	0.00	-0.03	0.78	1.35	59.09	56.72	0.00	0.58	0.20	0.35
PRI	Puerto Rico	.	.	.	.	.	.	.	0.00	.	.	.	70.00	58.03	1.00	.	.	.
PRT	Portugal	5582.5	266	318.56	1.62E+10	65810.4	-0.325	9.27	0.00	-0.11	0.96	0.97	60.00	67.18	0.00	0.30	0.30	0.77
PRY	Paraguay	.	.	.	.	.	.	7.90	0.02	-0.06	1.35	2.33	56.67	58.21	0.00	0.14	0.03	0.18
PYF	French Polynesia	.	.	.	.	.	.	.	0.00	.	.	.	.	.	0.00	.	.	.
QAT	Qatar	.	.	.	.	.	.	10.80	0.00	0.30	0.96	-0.46	43.33	56.73	0.00	2.89	0.96	0.24
RUS	Russia	3527.9	1.05	13.66	.	16437.5	.	9.38	0.58	0.09	0.91	1.17	46.67	75.25	0.00	1.47	0.36	0.24
RWA	Rwanda	.	.	.	.	.	.	6.77	0.38	-0.02	1.06	3.47	43.64	62.09	0.00	.	.	0.05
SAU	Saudi Arabia	1953.9	7.98	15.18	16400000	16735.2	-0.804	9.88	0.02	0.23	1.41	0.47	62.12	53.12	0.00	1.15	0.58	0.45
SDN	Sudan	.	.	.	.	.	.	7.32	1.45	-0.05	.	3.03	33.33	40.43	0.00	.	.	0.08
SEN	Senegal	.	.	.	.	.	.	7.43	0.18	-0.07	0.89	2.81	30.00	48.08	0.00	.	.	0.23
SGP	Singapore	1761.5	89.0625	84.0625	50900000	14670.5	-0.787	9.55	0.00	-0.26	0.82	0.69	93.33	91.28	1.00	1.64	1.55	0.81
SLB	Solomon Islands	.	.	.	.	.	.	.	0.00	.	.	.	57.58	44.63	0.00	.	.	0.23
SLE	Sierra Leone	.	.	.	.	.	.	6.96	0.25	-0.07	1.18	3.29	61.21	38.05	0.00	.	.	0.04
SLV	El Salvador	.	.	.	.	.	.	6.71	0.45	-0.98	.	3.52	27.58	62.33	0.00	0.20	0.17	0.48
SMR	San Marino	.	.	.	.	.	.	.	0.00	.	.	.	60.00	68.85	0.00	.	.	1.18
SRB	Serbia	.	.	.	.	.	.	8.74	0.13	-0.14	0.90	1.80	46.67	56.39	0.00	0.84	0.26	0.31
SSD	South Sudan	.	.	.	.	.	.	.	0.11	.	.	.	23.33	57.71	0.00	.	.	0.02
STP	Sao Tome & Principe	.	.	.	.	.	.	7.48	0.00	-0.20	.	2.87	.	.	0.00	.	.	0.22
SUR	Suriname	.	.	.	.	.	.	8.56	0.02	0.01	.	1.79	20.00	28.84	0.00	.	.	0.22
SVK	Slovakia	1095.9	0.14545	6.109091	9314943	7236.91	-0.836	9.55	0.00	-0.06	0.91	1.00	46.67	64.89	0.00	1.61	0.57	0.42
SVN	Slovenia	814.04	23.3	45.4	16800000	20583.1	-0.806	9.90	0.00	-0.08	0.92	0.64	66.36	49.87	0.00	0.38	0.19	0.46
SWE	Sweden	2336.2	60.5438	197.6294	169000000	52121.8	-0.703	9.94	0.00	-0.01	0.83	0.30	55.45	69.69	0.00	0.62	0.59	0.86
SWZ	Swaziland	.	.	.	.	.	.	8.17	0.00	-0.11	0.96	2.18	30.37	36.03	0.00	0.73	0.11	0.18
SYC	Seychelles	.	.	.	.	.	.	.	0.00	.	.	.	56.67	59.66	0.00	.	.	0.19
SYR	Syria	.	.	.	.	.	.	7.59	0.31	-0.06	.	2.65	44.55	35.17	0.00	.	.	0.10
TCD	Chad	.	.	.	.	.	.	7.12	0.84	0.02	.	3.12	33.33	45.05	0.00	.	.	0.08
TGO	Togo	.	.	.	.	.	.	7.05	0.02	-0.08	1.29	3.19	36.67	48.70	0.00	.	.	0.19
THA	Thailand	.	77.92	.	.	.	.	8.17	0.51	-0.03	0.82	2.06	69.09	69.17	1.00	0.50	0.56	0.74
TJK	Tajikistan	.	.	.	.	.	.	7.59	0.24	-0.03	0.91	2.96	41.85	67.42	0.00	.	.	0.14
TKM	Turkmenistan	.	.	.	.	.	.	8.86	0.00	0.05	.	1.68	.	.	0.00	.	.	.
TON	Tonga	.	.	.	.	.	.	.	0.00	.	.	.	46.67	64.06	0.00	.	.	0.31
TTO	Trinidad & Tobago	.	.	.	.	.	.	9.34	0.02	0.12	0.88	0.90	66.67	32.27	0.00	1.38	0.48	0.30
TUN	Tunisia	.	.	.	.	.	.	8.29	0.04	-0.08	0.84	1.95	44.24	60.96	0.00	0.19	0.12	0.49
TUR	Turkey	4986.8	23.02	.	38200000	29629.8	.	8.94	0.80	-0.03	0.96	1.30	56.06	65.63	0.00	0.99	0.21	0.21
TWN	Taiwan	.	.	.	.	.	.	9.34	0.00	0.03	0.87	0.90	55.15	57.75	0.00	.	.	.
TZA	Tanzania	.	.	.	.	.	.	6.91	0.02	-0.05	0.84	3.33	51.52	66.17	0.00	0.54	0.04	0.07
UGA	Uganda	.	.	.	.	.	.	6.76	0.91	0.00	.	3.48	46.67	55.13	0.00	0.76	0.10	0.07
UKR	Ukraine	.	.	.	.	.	.	8.63	0.11	-0.01	0.97	1.92	36.36	67.45	0.00	0.54	0.17	0.31
URY	Uruguay	.	.	.	.	.	.	9.01	0.02	-0.03	1.00	1.23	50.00	56.71	0.00	0.05	0.01	0.24
USA	United States	173755	41766	18678.5	840000000	1354655	14.79	10.24	0.33	-0.02	0.83	0.00	82.00	67.26	1.00	0.61	0.85	1.19

Country Code	Country Name	ATM	Cheque	Credit & Debit Payments	Payment Card Transactions	Payment Card Locations	Fin-TECH	Demand for Finance	Supply Side Impediments	Trade Openness	Political Openness	External Financing Constraints	Minority Investor Protection	Enforcement of Contracts	Legal Origin	STM/PCM	STM/GDP	PCM/GDP
UZB	Uzbekistan	.	.	.	.	.	.	8.21	0.05	-0.01	.	2.34	36.67	67.41	0.00	.	0.01	.
VCT	St Vincent & Grenadine	.	.	.	.	.	.	8.45	0.00	-0.26	.	1.90	63.33	56.88	0.00	.	.	0.43
VEN	Venezuela	.	.	.	.	.	.	8.96	0.05	0.14	1.17	1.27	23.33	63.25	0.00	0.52	0.07	0.27
VNM	Vietnam	.	.	.	.	.	.	7.18	0.58	-0.02	.	3.17	27.58	65.23	0.00	0.16	0.14	0.52
VUT	Vanuatu	.	.	.	.	.	.	.	0.00	.	.	.	53.33	61.20	0.00	.	.	0.41
WSM	Samoa	.	.	.	.	.	.	.	0.00	.	.	.	63.33	59.54	0.00	.	.	0.29
YEM	Yemen	.	.	.	.	.	.	7.03	0.56	0.02	.	3.51	40.00	62.93	0.00	.	.	0.05
ZAF	South Africa	.	.	.	.	.	.	8.88	0.69	-0.01	1.26	1.36	80.00	65.48	1.00	1.41	1.41	0.86
ZAR	Congo (Kinshasa)	.	.	.	.	.	.	.	0.62	.	.	.	20.30	29.47	0.00	.	.	0.01
ZMB	Zambia	.	.	.	.	.	.	7.47	0.00	-0.17	.	2.77	56.67	59.27	0.00	1.65	0.12	0.08
ZWE	Zimbabwe	.	.	.	.	.	.	7.94	0.24	0.00	1.64	2.30	46.67	54.84	0.00	8.35	1.84	0.19
Total		18099	1266.03	1268.8	694000000	181478	-2E-09	8.39	0.22	-0.07	0.99	1.89	49.50	56.46	0.10	0.86	0.49	0.37

**Table 3: Summary Statistics for Dependent and Independent Variables**

This table reports the summary statistics for various dependent and explanatory variables. The dependent variables are the three measures of capital market development, while the independent variables are the index of financial innovation and other control variables. The dependent variable STM/PCM is the domestic equity market normalized relative to the domestic private credit market; STM/GDP is the size of domestic equity market normalized by GDP; PCM/GDP is the size of domestic private credit market normalized by GDP. The definitions of all predictor variables are provided in Table 1.

<b>STATISTICS</b>	<b>Mean</b>	<b>25th Percentile</b>	<b>75th Percentile</b>	<b>Minimum</b>	<b>Maximum</b>
<b>ATM</b>	18,099.02	1,200.06	16,914.02	22.61	370,782.80
Dummy ATM	0.07	-	-	-	1.00
<b>Cheque Payments</b>	1,266.03	7.40	438.30	-	46,569.40
Dummy Cheque	0.08	-	-	-	1.00
<b>Credit &amp; Debit Payments</b>	1,268.80	23.00	637.10	-	36,755.80
Dummy Credit & Debit Payments	0.07	-	-	-	1.00
<b>Payment Card Transactions</b>	694,000,000.00	13,700,000.00	354,000,000.00	-	60,800,000,000.00
Dummy Payment Card Transactions	0.07	-	-	-	1.00
<b>Payment Card Locations</b>	181,477.50	11,504.92	114,840.60	45.11	3,886,676.00
Dummy Payment Card Locations	0.07	-	-	-	1.00
<b>FinTECH</b>	(0.00)	(0.79)	0.18	(0.87)	16.77
<b>Demand for Finance</b>	8.39	7.38	9.36	5.21	11.77
<b>Supply Side Impediments</b>	0.22	-	-	-	9.00
<b>Trade Openness</b>	(0.07)	(0.11)	0.01	(14.00)	17.55
<b>Political Openness</b>	0.99	0.85	1.05	0.24	5.32
<b>External Financing Constraints</b>	1.89	0.92	2.82	(1.48)	5.24
<b>Minority Investor Protection</b>	49.50	39.09	60.00	10.00	96.67
<b>Enforcement of Contracts</b>	56.46	47.37	65.23	20.82	93.36
<b>Legal Origin</b>	0.10	-	-	-	1.00
<b>STM/PCM</b>	0.86	0.30	1.08	0.00	41.84
<b>STM/GDP</b>	48.96	11.63	62.72	0.01	1,086.48
<b>PCM/GDP</b>	36.59	12.91	49.56	-	262.46

**Table 4: Pairwise Correlation Between the Dependent and Independent Variables**

This table shows the estimated pairwise correlation values. The dependent variables are the three measures of capital market development, while the independent variables are the index of financial innovation and other control variables. The dependent variable STM/PCM is the domestic equity market normalized relative to the domestic private credit market; STM/GDP is the size of domestic equity market normalized by GDP; PCM/GDP is the size of domestic private credit market normalized by GDP. The definitions of all predictor variables are provided in Table 1. The p-value statistics are below the correlation values.

	ATM	Cheque Payments	Credit & Debit Payments	Payment Card Transactions	Payment Card Locations	FinTECH	Demand for Finance	Supply Side Impediments	Trade Openness	Political Openness	External Financing Constraints	Minority Investor Protection	Enforcement of Contracts	Legal Origin	STM/PCM	STM/GDP	PCM/GDP
ATM	1.000																
Cheque Payments	0.842	1.000															
Credit & Debit Payments	0.863	0.886	1.000														
Payment Card Transactions	0.901	0.821	0.828	1.000													
Payment Card Locations	0.921	0.836	0.847	0.982	1.000												
FinTECH	.	.	.	.	.	1.000											
Demand for Finance	0.423	0.434	0.416	0.440	0.438	0.256	1.000										
Supply Side Impediments	-0.034	-0.022	-0.058	-0.044	-0.035	0.088	-0.194	1.000									
Trade Openness	0.034	0.035	0.037	0.045	0.047	-0.014	0.057	0.041	1.000								
Political Openness	-0.032	-0.033	-0.036	-0.030	-0.030	0.119	-0.037	-0.012	0.115	1.000							
External Financing Constraints	-0.362	-0.365	-0.351	-0.379	-0.376	-0.224	-0.968	0.206	-0.066	0.038	1.000						
Minority Investor Protection	0.181	0.226	0.198	0.199	0.194	0.276	0.393	-0.108	0.021	-0.197	-0.412	1.000					
Enforcement of Contracts	0.257	0.284	0.261	0.270	0.275	-0.050	0.492	-0.237	-0.005	-0.174	-0.503	0.329	1.000				
Legal Origin	0.107	0.212	0.133	0.141	0.139	0.368	0.239	0.039	0.028	-0.102	-0.262	0.507	0.273	1.000			
STM/PCM	-0.027	0.006	-0.037	-0.034	-0.023	0.041	0.003	0.032	0.034	0.083	0.020	0.040	-0.080	0.074	1.000		
STM/GDP	0.110	0.248	0.118	0.128	0.128	0.242	0.321	-0.046	0.025	0.067	-0.290	0.261	0.191	0.299	0.608	1.000	
PCM/GDP	0.436	0.524	0.473	0.475	0.466	0.380	0.654	-0.126	-0.075	-0.090	-0.599	0.368	0.422	0.323	-0.058	0.430	1.000

**Table 5A: Determinants of Capital Market Development Using Financial Innovation Indicators: Unconditional Univariate OLS Regressions**

This table shows the estimated coefficients from 18 unconditional univariate ordinary least squares regressions. The dependent variables are the three measures of capital market development, while the independent variables are the five indicators of financial innovation and other control variables. The dependent variable STM/PCM is the domestic equity market normalized relative to the domestic private credit market; STM/GDP is the size of domestic equity market normalized by GDP; PCM/GDP is the size of domestic private credit market normalized by GDP. The three winsorized dependent variables were normalized using **log transformation**. The definitions of all predictor variables are provided in Table 1. In the present table, "\*\*\*\*" indicates significance measured at the 1% level, "\*\*\*" the 5% level and "\*" the 10% level. The t-statistics are in square brackets.

Independent Variables in the Regression						
<u>STM/PCM</u>	<u>ATM</u>	<u>Cheque Payments</u>	<u>Credit &amp; Debit Payments</u>	<u>Payment Card Transactions</u>	<u>Payment Card Locations</u>	<u>FinTECH</u>
Coefficient	0.182*** [4.05]	0.270*** [6.32]	0.133*** [3.03]	0.190*** [4.23]	0.232*** [5.20]	0.039 [1.64]
Constant	-0.693*** [-29.16]	-0.730*** [-29.83]	-0.682*** [-28.26]	-0.695*** [-29.24]	-0.708*** [-29.73]	-0.433*** [-9.66]
Observations	2584	2584	2584	2584	2584	249
R <sup>2</sup>	0.006	0.015	0.004	0.007	0.01	0.011
Adj. R <sup>2</sup>	0.006	0.015	0.003	0.006	0.01	0.007
<u>STM/GDP</u>	<u>ATM</u>	<u>Cheque Payments</u>	<u>Credit &amp; Debit Payments</u>	<u>Payment Card Transactions</u>	<u>Payment Card Locations</u>	<u>FinTECH</u>
Coefficient	0.758*** [13.64]	0.979*** [18.98]	0.781*** [14.40]	0.876*** [16.03]	0.878*** [16.16]	0.144*** [4.34]
Constant	-1.649*** [-56.26]	-1.758*** [-59.67]	-1.672*** [-56.41]	-1.686*** [-58.05]	-1.690*** [-58.06]	-0.834*** [-13.59]
Observations	2662	2662	2662	2662	2662	259
R <sup>2</sup>	0.065	0.119	0.072	0.088	0.089	0.068
Adj. R <sup>2</sup>	0.065	0.119	0.072	0.088	0.089	0.065
<u>PCM/GDP</u>	<u>ATM</u>	<u>Cheque Payments</u>	<u>Credit &amp; Debit Payments</u>	<u>Payment Card Transactions</u>	<u>Payment Card Locations</u>	<u>FinTECH</u>
Coefficient	1.152*** [32.40]	1.251*** [38.81]	1.195*** [35.16]	1.238*** [35.12]	1.206*** [34.38]	0.108*** [5.32]
Constant	-1.551*** [-138.60]	-1.583*** [-143.72]	-1.565*** [-140.72]	-1.559*** [-140.83]	-1.558*** [-140.19]	-0.415*** [-10.91]
Observations	7589	7589	7589	7589	7589	250
R <sup>2</sup>	0.122	0.166	0.14	0.14	0.135	0.102
Adj. R <sup>2</sup>	0.121	0.166	0.14	0.14	0.135	0.099

**Table 6A: Determinants of Capital Market Development Using Financial Innovation Indicators: Multivariate OLS Regressions**

This table shows the estimated coefficients from 3 multivariate ordinary least squares regressions. The dependent variables are the three measures of capital market development, while the independent variables are the five indicators of financial innovation and other control variables. The dependent variable STM/PCM is the domestic equity market normalized relative to the domestic private credit market; STM/GDP is the size of domestic equity market normalized by GDP; PCM/GDP is the size of domestic private credit market normalized by GDP. The three winsorized dependent variables were normalized using **log transformation**. The definitions of all predictor variables are provided in Table 1. In the present table, "\*\*\*\*" indicates significance measured at the 1% level, "\*\*\*" the 5% level and "\*\*" the 10% level. The t-statistics are in square brackets. All errors (to achieve the sample size) and beta coefficients were standardized.

	Dependent Variables in the Regression		
	(1)	(2)	(3)
	<u>STM/PCM</u>	<u>STM/GDP</u>	<u>PCM/GDP</u>
ATM	-0.194* [-1.71]	-0.604*** [-4.42]	-0.426*** [-5.19]
Cheque Payments	0.516*** [6.03]	1.123*** [10.90]	0.688*** [11.12]
Credit & Debit Payments	-0.412*** [-4.46]	-0.256** [-2.30]	0.114* [1.70]
Payment Card Transactions	-0.802*** [-4.07]	0.214 [0.90]	1.004*** [7.04]
Payment Card Locations	1.094*** [4.91]	0.485* [1.81]	-0.622*** [-3.86]
Constant	-0.721*** [-29.43]	-1.764*** [-59.80]	-1.046*** [-59.13]
Observations	2584	2584	2584
R <sup>2</sup>	0.031	0.136	0.199
Adj. R <sup>2</sup>	0.029	0.134	0.198



**Table 7.1A: Determinants of Capital Market Development Using Financial Innovation Indicators and FinTECH: Multivariate OLS Regressions**

This table shows the estimated coefficients from 6 multivariate ordinary least squares regressions. The dependent variables are the three measures of capital market development, while the independent variables are the five indicators of financial innovation, its index and other control variables. The dependent variable STM/PCM is the domestic equity market normalized relative to the domestic private credit market. The winsorized dependent variable was normalized using **log transformation**. The definitions of all predictor variables are provided in Table 1. In the present table, "\*\*\*\*" indicates significance measured at the 1% level, "\*\*\*" the 5% level and "\*" the 10% level. The t-statistics are in square brackets. All beta coefficients were standardized.

	Dependent Variables in the Regression					
	(1)	(2)	(3)	(4)	(5)	(6)
	<u>STM/PCM</u>					
ATM	-0.03 [-0.55]					
Cheque Payments		-0.032 [-0.59]				
Credit & Debit Payments			-0.093* [-1.76]			
Payment Card Transactions				-0.109** [-1.97]		
Payment Card Locations					-0.043 [-0.77]	
FinTECH						-0.032 [-1.36]
Demand for Finance	1.884*** [14.16]	1.894*** [13.68]	1.953*** [14.54]	1.964*** [14.64]	1.901*** [14.02]	3.025*** [6.53]
Supply Side Impediments	0.208*** [7.10]	0.208*** [7.10]	0.208*** [7.15]	0.212*** [7.27]	0.209*** [7.13]	0.018 [0.08]
Trade Openness	0.362** [2.37]	0.367** [2.41]	0.381** [2.49]	0.378** [2.48]	0.371** [2.43]	0.369 [0.76]
Political Openness	0.385** [2.31]	0.387** [2.32]	0.381** [2.28]	0.386** [2.32]	0.386** [2.31]	-1.584*** [-2.61]
External Financing Constraints	1.604*** [12.48]	1.614*** [12.10]	1.662*** [12.74]	1.663*** [12.89]	1.617*** [12.41]	2.484*** [5.83]
Minority Investor Protection	0 [-0.20]	0 [-0.21]	0 [-0.07]	0 [-0.11]	0 [-0.20]	-0.004 [-0.98]
Enforcement of Contracts	-0.008*** [-3.81]	-0.007*** [-3.70]	-0.007*** [-3.64]	-0.007*** [-3.62]	-0.007*** [-3.73]	-0.002 [-0.58]
Legal Origin	0.519*** [8.66]	0.525*** [8.90]	0.512*** [8.61]	0.513*** [8.64]	0.520*** [8.76]	0.544*** [3.07]
Constant	-20.164*** [-14.30]	-20.269*** [-13.78]	-20.880*** [-14.65]	-20.986*** [-14.76]	-20.335*** [-14.14]	-30.096*** [-6.33]
Observations	2044	2044	2044	2044	2044	243
R <sup>2</sup>	0.199	0.199	0.2	0.2	0.199	0.23
Adj. R <sup>2</sup>	0.195	0.195	0.196	0.196	0.195	0.2

**Table 7.2A: Determinants of Capital Market Development Using Financial Innovation Indicators and FinTECH: Multivariate OLS Regressions**

This table shows the estimated coefficients from 6 multivariate ordinary least squares regressions. The dependent variables are the three measures of capital market development, while the independent variables are the five indicators of financial innovation, its index and other control variables. The dependent variable STM/GDP is the size of domestic equity market normalized by GDP. The winsorized dependent variable was normalized using **log transformation**. The definitions of all predictor variables are provided in Table 1. In the present table, "\*\*\*\*" indicates significance measured at the 1% level, "\*\*\*" the 5% level and "\*\*" the 10% level. The t-statistics are in square brackets. All beta coefficients were standardized.

	Dependent Variables in the Regression					
	(1)	(2)	(3)	(4)	(5)	(6)
	<u>STM/GDP</u>					
ATM	-0.06 [-1.02]					
Cheque Payments		0.105* [1.81]				
Credit & Debit Payments			0.022 [0.38]			
Payment Card Transactions				-0.053 [-0.88]		
Payment Card Locations					-0.035 [-0.58]	
FinTECH						0.01 [0.45]
Demand for Finance	2.594*** [18.07]	2.411*** [16.14]	2.514*** [17.31]	2.590*** [17.81]	2.574*** [17.52]	2.683*** [5.84]
Supply Side Impediments	0.212*** [6.63]	0.199*** [6.19]	0.207*** [6.53]	0.211*** [6.61]	0.211*** [6.56]	0.154 [0.70]
Trade Openness	-0.566*** [-3.42]	-0.574*** [-3.47]	-0.565*** [-3.42]	-0.554*** [-3.35]	-0.555*** [-3.35]	0.697 [1.49]
Political Openness	0.903*** [4.98]	0.896*** [4.94]	0.904*** [4.98]	0.904*** [4.98]	0.904*** [4.98]	-0.54 [-0.89]
External Financing Constraints	1.776*** [12.77]	1.631*** [11.30]	1.715*** [12.14]	1.773*** [12.66]	1.762*** [12.46]	1.402*** [3.29]
Minority Investor Protection	0.004** [2.12]	0.004** [1.99]	0.004** [2.02]	0.004** [2.11]	0.004** [2.09]	-0.020*** [-4.61]
Enforcement of Contracts	-0.005** [-2.19]	-0.006*** [-2.68]	-0.005** [-2.38]	-0.005** [-2.20]	-0.005** [-2.21]	0.003 [0.67]
Legal Origin	0.799*** [12.23]	0.810*** [12.59]	0.814*** [12.55]	0.804*** [12.42]	0.806*** [12.45]	1.212*** [6.94]
Constant	-28.762*** [-18.88]	-26.846*** [-16.89]	-27.937*** [-18.12]	-28.728*** [-18.62]	-28.560*** [-18.32]	-27.060*** [-5.74]
Observations	2086	2086	2086	2086	2086	253
R <sup>2</sup>	0.419	0.42	0.419	0.419	0.419	0.537
Adj. R <sup>2</sup>	0.417	0.418	0.417	0.417	0.417	0.519

**Table 7.3A: Determinants of Capital Market Development Using Financial Innovation Indicators and FinTECH: Multivariate OLS Regressions**

This table shows the estimated coefficients from 6 multivariate ordinary least squares regressions. The dependent variables are the three measures of capital market development, while the independent variables are the five indicators of financial innovation, its index and other control variables. The dependent variable PCM/GDP is the size of domestic private credit market normalized by GDP. The winsorized dependent variable was normalized using **log transformation**. The definitions of all predictor variables are provided in Table 1. In the present table, "\*\*\*\*" indicates significance measured at the 1% level, "\*\*\*" the 5% level and "\*" the 10% level. The t-statistics are in square brackets. All beta coefficients were standardized.

	Dependent Variables in the Regression					
	(1)	(2)	(3)	(4)	(5)	(6)
	<u>PCM/GDP</u>					
ATM	0.097*** [3.08]					
Cheque Payments		0.247*** [8.10]				
Credit & Debit Payments			0.196*** [6.36]			
Payment Card Transactions				0.172*** [5.37]		
Payment Card Locations					0.129*** [4.04]	
FinTECH						0.041*** [3.37]
Demand for Finance	0.835*** [24.12]	0.746*** [21.11]	0.783*** [22.49]	0.800*** [23.06]	0.819*** [23.46]	-0.299 [-1.24]
Supply Side Impediments	0.016 [1.08]	0.011 [0.79]	0.019 [1.33]	0.016 [1.10]	0.015 [1.04]	0.139 [1.22]
Trade Openness	-0.222*** [-7.92]	-0.226*** [-8.13]	-0.226*** [-8.10]	-0.224*** [-8.02]	-0.224*** [-8.00]	0.227 [0.90]
Political Openness	-0.039 [-1.11]	-0.044 [-1.27]	-0.039 [-1.13]	-0.041 [-1.17]	-0.04 [-1.15]	1.098*** [3.47]
External Financing Constraints	0.345*** [10.08]	0.273*** [7.81]	0.303*** [8.76]	0.320*** [9.34]	0.333*** [9.67]	-1.046*** [-4.74]
Minority Investor Protection	-0.002*** [-2.67]	-0.002*** [-2.86]	-0.002*** [-2.97]	-0.002*** [-2.77]	-0.002*** [-2.67]	-0.016*** [-7.02]
Enforcement of Contracts	0.003*** [3.45]	0.002*** [2.73]	0.003*** [3.16]	0.003*** [3.28]	0.003*** [3.31]	0.006*** [3.06]
Legal Origin	0.320*** [10.83]	0.306*** [10.45]	0.324*** [11.01]	0.319*** [10.85]	0.318*** [10.78]	0.670*** [7.26]
Constant	-9.183*** [-25.20]	-8.263*** [-22.19]	-8.650*** [-23.58]	-8.832*** [-24.20]	-9.014*** [-24.56]	2.477 [1.01]
Observations	4274	4274	4274	4274	4274	244
R <sup>2</sup>	0.509	0.516	0.513	0.511	0.51	0.675
Adj. R <sup>2</sup>	0.508	0.515	0.512	0.51	0.509	0.662

**Table 8A: Determinants of Capital Market Development Using Financial Innovation Indicators: Multivariate OLS Regressions**

This table shows the estimated coefficients from 3 unconditional multivariate ordinary least squares regressions. The dependent variables are the three measures of capital market development, while the independent variables are the five indicators of financial innovation and other control variables. The dependent variable STM/PCM is the domestic equity market normalized relative to the domestic private credit market; STM/GDP is the size of domestic equity market normalized by GDP; PCM/GDP is the size of domestic private credit market normalized by GDP. The three winsorized dependent variables were normalized using **log transformation**. The definitions of all predictor variables are provided in Table 1. In the present table, "\*\*\*\*" indicates significance measured at the 1% level, "\*\*\*" the 5% level and "\*\*" the 10% level. The t-statistics are in square brackets. Errors (to achieve the sample size) & beta coefficients were standardized.

	Dependent Variables in the Regression		
	(1)	(2)	(3)
	STM/PCM	STM/GDP	PCM/GDP
ATM	0.068 [0.62]	-0.314*** [-2.59]	-0.385*** [-5.80]
Cheque Payments	0.095 [1.08]	0.346*** [3.60]	0.306*** [5.80]
Credit & Debit Payments	-0.222** [-2.41]	0.009 [0.09]	0.201*** [3.63]
Payment Card Transactions	-0.844*** [-4.40]	-0.273 [-1.30]	0.550*** [4.77]
Payment Card Locations	0.809*** [3.75]	0.26 [1.10]	-0.565*** [-4.37]
Demand for Finance	1.901*** [13.64]	2.491*** [16.34]	0.606*** [7.26]
Supply Side Impediments	0.183*** [6.12]	0.203*** [6.20]	0.015 [0.85]
Trade Openness	0.360** [2.33]	-0.670*** [-3.97]	-1.022*** [-11.04]
Political Openness	0.372** [2.24]	0.964*** [5.30]	0.607*** [6.08]
External Financing Constraints	1.606*** [12.00]	1.672*** [11.43]	0.078 [0.97]
Minority Investor Protection	0 [0.29]	0.004* [1.93]	0.004*** [3.53]
Enforcement of Contracts	-0.009*** [-4.23]	-0.007*** [-3.29]	0.001 [1.16]
Legal Origin	0.504*** [8.26]	0.734*** [10.99]	0.230*** [6.29]
Constant	-20.273*** [-13.69]	-27.597*** [-17.04]	-7.543*** [-8.49]
Observations	2044	2044	2044
R <sup>2</sup>	0.208	0.429	0.509
Adj. R <sup>2</sup>	0.203	0.426	0.505

**Table 9A: Determinants of Capital Market Development Using Financial Innovation Index: Multivariate OLS Regressions**

This table shows the estimated coefficients from 3 multivariate ordinary least squares regressions. The dependent variables are the three measures of capital market development, while the independent variables are the index of financial innovation and other control variables. The dependent variable STM/PCM is the domestic equity market normalized relative to the domestic private credit market; STM/GDP is the size of domestic equity market normalized by GDP; PCM/GDP is the size of domestic private credit market normalized by GDP. The three winsorized dependent variables were normalized using **log transformation**. The definitions of all predictor variables are provided in Table 1. In the present table, "\*\*\*\*" indicates significance measured at the 1% level, "\*\*\*" the 5% level and "\*\*" the 10% level. The t-statistics are in square brackets. All errors (to achieve the sample size) and beta coefficients were standardized.

	Dependent Variables in the Regression		
	(1)	(2)	(3)
	STM/PCM	STM/GDP	PCM/GDP
FinTECH	-0.032 [-1.36]	0.009 [0.42]	0.041*** [3.36]
Demand for Finance	3.025*** [6.53]	2.712*** [6.05]	-0.314 [-1.30]
Supply Side Impediments	0.018 [0.08]	0.152 [0.71]	0.139 [1.21]
Trade Openness	0.369 [0.76]	0.597 [1.28]	0.225 [0.89]
Political Openness	-1.584*** [-2.61]	-0.474 [-0.81]	1.105*** [3.49]
External Financing Constraints	2.484*** [5.83]	1.425*** [3.46]	-1.061*** [-4.77]
Minority Investor Protection	-0.004 [-0.98]	-0.021*** [-4.84]	-0.016*** [-7.00]
Enforcement of Contracts	-0.002 [-0.58]	0.004 [0.99]	0.006*** [2.94]
Legal Origin	0.544*** [3.07]	1.225*** [7.16]	0.669*** [7.23]
Constant	-30.096*** [-6.33]	-27.452*** [-5.97]	2.644 [1.07]
Observations	243	243	243
R <sup>2</sup>	0.23	0.562	0.674
Adj. R <sup>2</sup>	0.2	0.545	0.662

**Table 5B: Determinants of Capital Market Development Using Financial Innovation Indicators: Unconditional Univariate OLS Regressions**

This table shows the estimated coefficients from 6 unconditional univariate ordinary least squares regressions. The dependent variables are the three measures of capital market development, while the independent variables are the five indicators of financial innovation and other control variables. The dependent variable STM/PCM is the domestic equity market normalized relative to the domestic private credit market; STM/GDP is the size of domestic equity market normalized by GDP; PCM/GDP is the size of domestic private credit market normalized by GDP. The three winsorized dependent variables were normalized using **square root transformation**. The definitions of all predictor variables are provided in Table 1. In the present table, "\*\*\*\*" indicates significance measured at the 1% level, "\*\*\*" the 5% level and "\*" the 10% level. The t-statistics are in square brackets.

		Independent Variables in the Regression					
<u>STM/PCM</u>	ATM	Cheque Payments	Credit & Debit Payments	Payment Card Transactions	Payment Card Locations	FinTECH	
Coefficient	0.026	0.067***	0.009	0.02	0.039**	0.012	
	[1.54]	[4.15]	[0.56]	[1.21]	[2.33]	[1.19]	
Constant	0.810***	0.795***	0.814***	0.811***	0.806***	0.856***	
	[90.94]	[86.49]	[90.12]	[91.02]	[90.16]	[44.82]	
Observations	2584	2584	2584	2584	2584	249	
R <sup>2</sup>	0.001	0.007	0	0.001	0.002	0.006	
Adj. R <sup>2</sup>	0.001	0.006	0	0	0.002	0.002	
<hr/>							
<u>STM/GDP</u>	ATM	Cheque Payments	Credit & Debit Payments	Payment Card Transactions	Payment Card Locations	FinTECH	
Coefficient	0.188***	0.253***	0.196***	0.216***	0.216***	0.047***	
	[13.56]	[19.79]	[14.53]	[15.82]	[15.88]	[4.45]	
Constant	0.535***	0.504***	0.528***	0.526***	0.525***	0.737***	
	[73.09]	[69.00]	[71.51]	[72.56]	[72.20]	[38.09]	
Observations	2662	2662	2662	2662	2662	259	
R <sup>2</sup>	0.065	0.128	0.074	0.086	0.087	0.071	
Adj. R <sup>2</sup>	0.064	0.128	0.073	0.086	0.086	0.068	
<hr/>							
<u>PCM/GDP</u>	ATM	Cheque Payments	Credit & Debit Payments	Payment Card Transactions	Payment Card Locations	FinTECH	
Coefficient	0.352***	0.389***	0.368***	0.383***	0.372***	0.044***	
	[39.46]	[48.93]	[43.45]	[43.55]	[42.50]	[6.02]	
Constant	0.511***	0.501***	0.507***	0.509***	0.509***	0.850***	
	[181.92]	[184.32]	[182.72]	[184.28]	[183.36]	[62.29]	
Observations	7589	7589	7589	7589	7589	250	
R <sup>2</sup>	0.17	0.24	0.199	0.2	0.192	0.128	
Adj. R <sup>2</sup>	0.17	0.24	0.199	0.2	0.192	0.124	

**Table 6B: Determinants of Capital Market Development Using Financial Innovation Indicators: Multivariate OLS Regressions**

This table shows the estimated coefficients from 3 multivariate ordinary least squares regressions. The dependent variables are the three measures of capital market development, while the independent variables are the five indicators of financial innovation and other control variables. The dependent variable STM/PCM is the domestic equity market normalized relative to the domestic private credit market; STM/GDP is the size of domestic equity market normalized by GDP; PCM/GDP is the size of domestic private credit market normalized by GDP. The three winsorized dependent variables were normalized using **square root transformation**. The definitions of all predictor variables are provided in Table 1. In the present table, "\*\*\*\*" indicates significance measured at the 1% level, "\*\*\*" the 5% level and "\*" the 10% level. The t-statistics are in square brackets. All errors (to achieve the sample size) and beta coefficients were standardized.

	Dependent Variables in the Regression		
	(1)	(2)	(3)
	<u>STM/PCM</u>	<u>STM/GDP</u>	<u>PCM/GDP</u>
ATM	-0.064 [-1.51]	-0.157*** [-4.60]	-0.157*** [-5.88]
Cheque Payments	0.208*** [6.49]	0.320*** [12.40]	0.252*** [12.55]
Credit & Debit Payments	-0.174*** [-5.04]	-0.071** [-2.56]	0.037* [1.71]
Payment Card Transactions	-0.381*** [-5.16]	0.066 [1.12]	0.327*** [7.05]
Payment Card Locations	0.437*** [5.23]	0.086 [1.27]	-0.193*** [-3.68]
Constant	0.801*** [87.42]	0.501*** [67.88]	0.637*** [110.84]
Observations	2584	2584	2584
R <sup>2</sup>	0.029	0.145	0.227
Adj. R <sup>2</sup>	0.027	0.144	0.226

**Table 7.1B: Determinants of Capital Market Development  
Using Financial Innovation Indicators and FinTECH: Multivariate OLS Regressions**

This table shows the estimated coefficients from 6 multivariate ordinary least squares regressions. The dependent variables are the three measures of capital market development, while the independent variables are the five indicators of financial innovation, its index and other control variables. The dependent variable STM/PCM is the domestic equity market normalized relative to the domestic private credit market. The winsorized dependent variable was normalized using **square root transformation**. The definitions of all predictor variables are provided in Table 1. In the present table, "\*\*\*\*" indicates significance measured at the 1% level, "\*\*\*" the 5% level and "\*\*" the 10% level. The t-statistics are in square brackets. All beta coefficients were standardized.

	Dependent Variables in the Regression					
	(1)	(2)	(3)	(4)	(5)	(6)
	<u>STM/PCM</u>					
ATM	-0.051**					
	[ -2.56]					
Cheque Payments		-0.046**				
		[ -2.33]				
Credit & Debit Payments			-0.074***			
			[ -3.82]			
Payment Card Transactions				-0.096***		
				[ -4.70]		
Payment Card Locations					-0.066***	
					[ -3.20]	
FinTECH						-0.016
						[ -1.57]
Demand for Finance	0.728***	0.735***	0.757***	0.774***	0.748***	1.332***
	[14.77]	[14.32]	[15.23]	[15.62]	[14.90]	[6.50]
Supply Side Impediments	0.070***	0.070***	0.068***	0.072***	0.071***	-0.007
	[6.47]	[6.47]	[6.32]	[6.67]	[6.58]	[ -0.07]
Trade Openness	0.123**	0.132**	0.139**	0.138**	0.137**	0.091
	[2.17]	[2.32]	[2.46]	[2.45]	[2.42]	[0.42]
Political Openness	0.187***	0.190***	0.184***	0.188***	0.188***	-0.607**
	[3.02]	[3.07]	[2.98]	[3.06]	[3.04]	[ -2.26]
External Financing Constraints	0.632***	0.641***	0.658***	0.666***	0.648***	1.095***
	[13.27]	[12.96]	[13.65]	[13.96]	[13.43]	[5.81]
Minority Investor Protection	0	0	0	0	0	-0.002
	[ -0.43]	[ -0.49]	[ -0.24]	[ -0.31]	[ -0.46]	[ -1.26]
Enforcement of Contracts	-0.002***	-0.002***	-0.002***	-0.002***	-0.002***	-0.001
	[ -3.03]	[ -2.81]	[ -2.84]	[ -2.73]	[ -2.78]	[ -0.33]
Legal Origin	0.188***	0.199***	0.188***	0.187***	0.191***	0.227***
	[8.48]	[9.08]	[8.54]	[8.55]	[8.67]	[2.90]
Constant	-6.798***	-6.879***	-7.104***	-7.276***	-7.008***	-12.291***
	[ -13.01]	[ -12.61]	[ -13.47]	[ -13.85]	[ -13.16]	[ -5.85]
Observations	2044	2044	2044	2044	2044	243
R <sup>2</sup>	0.187	0.186	0.19	0.193	0.188	0.213
Adj. R <sup>2</sup>	0.183	0.183	0.186	0.189	0.185	0.182



**Table 7.2B: Determinants of Capital Market Development  
Using Financial Innovation Indicators and FinTECH: Multivariate OLS Regressions**

This table shows the estimated coefficients from 6 multivariate ordinary least squares regressions. The dependent variables are the three measures of capital market development, while the independent variables are the five indicators of financial innovation, its index and other control variables. The dependent variable STM/GDP is the size of domestic equity market normalized by GDP. The winsorized dependent variable was normalized using **square root transformation**. The definitions of all predictor variables are provided in Table 1. In the present table, "\*\*\*\*" indicates significance measured at the 1% level, "\*\*\*" the 5% level and "\*" the 10% level. The t-statistics are in square brackets. All beta coefficients were standardized.

	Dependent Variables in the Regression					
	(1)	(2)	(3)	(4)	(5)	(6)
	<b>STM/GDP</b>					
ATM	-0.027*					
	[-1.80]					
Cheque Payments		0.017				
		[1.14]				
Credit & Debit Payments			-0.008			
			[-0.56]			
Payment Card Transactions				-0.034**		
				[-2.18]		
Payment Card Locations					-0.031**	
					[-1.98]	
FinTECH						0.001
						[0.13]
Demand for Finance	0.734***	0.688***	0.717***	0.742***	0.741***	1.162***
	[20.04]	[18.03]	[19.34]	[20.00]	[19.76]	[7.21]
Supply Side Impediments	0.036***	0.033***	0.034***	0.036***	0.037***	0.02
	[4.44]	[4.01]	[4.26]	[4.45]	[4.48]	[0.26]
Trade Openness	-0.126***	-0.126***	-0.123***	-0.119***	-0.118***	0.048
	[-3.00]	[-2.99]	[-2.92]	[-2.83]	[-2.80]	[0.29]
Political Openness	0.251***	0.250***	0.251***	0.251***	0.251***	-0.333
	[5.42]	[5.39]	[5.41]	[5.43]	[5.43]	[-1.56]
External Financing Constraints	0.549***	0.513***	0.537***	0.555***	0.554***	0.713***
	[15.47]	[13.92]	[14.88]	[15.52]	[15.38]	[4.77]
Minority Investor Protection	0.002***	0.001***	0.001***	0.002***	0.001***	-0.009***
	[3.23]	[3.07]	[3.16]	[3.25]	[3.21]	[-5.65]
Enforcement of Contracts	0	0	0	0.001	0.001	0
	[0.88]	[0.40]	[0.72]	[0.95]	[0.99]	[0.28]
Legal Origin	0.223***	0.228***	0.227***	0.224***	0.224***	0.493***
	[13.37]	[13.88]	[13.71]	[13.57]	[13.58]	[8.06]
Constant	-7.321***	-6.840***	-7.144***	-7.404***	-7.391***	-10.542***
	[-18.83]	[-16.85]	[-18.15]	[-18.81]	[-18.58]	[-6.38]
Observations	2086	2086	2086	2086	2086	253
R <sup>2</sup>	0.427	0.427	0.427	0.428	0.428	0.545
Adj. R <sup>2</sup>	0.425	0.424	0.424	0.425	0.425	0.528

**Table 7.3B: Determinants of Capital Market Development  
Using Financial Innovation Indicators and FinTECH: Multivariate OLS Regressions**

This table shows the estimated coefficients from 6 multivariate ordinary least squares regressions. The dependent variables are the three measures of capital market development, while the independent variables are the five indicators of financial innovation, its index and other control variables. The dependent variable PCM/GDP is the size of domestic private credit market normalized by GDP. The winsorized dependent variable was normalized using **square root transformation**. The definitions of all predictor variables are provided in Table 1. In the present table, "\*\*\*\*" indicates significance measured at the 1% level, "\*\*\*" the 5% level and "\*" the 10% level. The t-statistics are in square brackets. All beta coefficients were standardized. All beta coefficients were standardized.

	Dependent Variables in the Regression					
	(1)	(2)	(3)	(4)	(5)	(6)
	<u>PCM/GDP</u>					
ATM	0.059*** [6.43]					
Cheque Payments		0.114*** [13.08]				
Credit & Debit Payments			0.090*** [10.22]			
Payment Card Transactions				0.088*** [9.59]		
Payment Card Locations					0.074*** [8.12]	
FinTECH						0.019*** [4.01]
Demand for Finance	0.267*** [26.78]	0.232*** [23.00]	0.249*** [24.94]	0.253*** [25.40]	0.258*** [25.77]	-0.069 [-0.74]
Supply Side Impediments	-0.003 [-0.71]	-0.005 [-1.14]	-0.001 [-0.27]	-0.003 [-0.64]	-0.003 [-0.79]	0.042 [0.93]
Trade Openness	-0.056*** [-6.93]	-0.058*** [-7.27]	-0.058*** [-7.21]	-0.057*** [-7.11]	-0.057*** [-7.10]	0.048 [0.49]
Political Openness	-0.01 [-0.96]	-0.012 [-1.21]	-0.01 [-0.98]	-0.011 [-1.06]	-0.01 [-1.04]	0.335*** [2.71]
External Financing Constraints	0.138*** [13.96]	0.109*** [10.92]	0.123*** [12.38]	0.128*** [12.99]	0.131*** [13.27]	-0.350*** [-4.06]
Minority Investor Protection	0 [-0.49]	0 [-0.70]	0 [-0.89]	0 [-0.61]	0 [-0.46]	-0.008*** [-8.38]
Enforcement of Contracts	0.001*** [5.46]	0.001*** [4.46]	0.001*** [5.14]	0.001*** [5.25]	0.001*** [5.19]	0.003*** [3.31]
Legal Origin	0.102*** [11.93]	0.094*** [11.22]	0.102*** [12.11]	0.100*** [11.90]	0.100*** [11.81]	0.310*** [8.60]
Constant	-2.050*** [-19.53]	-1.688*** [-15.87]	-1.867*** [-17.74]	-1.910*** [-18.23]	-1.963*** [-18.60]	1.613* [1.68]
Observations	4274	4274	4274	4274	4274	244
R <sup>2</sup>	0.529	0.542	0.535	0.534	0.531	0.68
Adj. R <sup>2</sup>	0.528	0.541	0.534	0.533	0.53	0.668

**Table 8B: Determinants of Capital Market Development Using Financial Innovation Indicators: Multivariate OLS Regressions**

This table shows the estimated coefficients from 3 unconditional multivariate ordinary least squares regressions. The dependent variables are the three measures of capital market development, while the independent variables are the five indicators of financial innovation and other control variables. The dependent variable STM/PCM is the domestic equity market normalized relative to the domestic private credit market; STM/GDP is the size of domestic equity market normalized by GDP; PCM/GDP is the size of domestic private credit market normalized by GDP. The three winsorized dependent variables were normalized using **square root transformation**. The definitions of all predictor variables are provided in Table 1. In the present table, "\*\*\*\*" indicates significance measured at the 1% level, "\*\*\*" the 5% level and "\*\*" the 10% level. The t-statistics are in square brackets. All errors (to achieve the sample size) and beta coefficients were standardized.

	Dependent Variables in the Regression		
	(1)	(2)	(3)
	<b>STM/PCM</b>	<b>STM/GDP</b>	<b>PCM/GDP</b>
ATM	0.033 [0.81]	-0.063** [-2.04]	-0.131*** [-5.86]
Cheque Payments	0.04 [1.25]	0.095*** [3.87]	0.113*** [6.33]
Credit & Debit Payments	-0.103*** [-3.03]	-0.006 [-0.24]	0.067*** [3.58]
Payment Card Transactions	-0.411*** [-5.80]	-0.061 [-1.15]	0.176*** [4.54]
Payment Card Locations	0.349*** [4.38]	0.023 [0.39]	-0.179*** [-4.09]
Demand for Finance	0.750*** [14.59]	0.718*** [18.56]	0.257*** [9.10]
Supply Side Impediments	0.059*** [5.37]	0.034*** [4.10]	0.003 [0.45]
Trade Openness	0.132** [2.31]	-0.142*** [-3.32]	-0.338*** [-10.84]
Political Openness	0.182*** [2.97]	0.263*** [5.71]	0.145*** [4.32]
External Financing Constraints	0.643*** [13.04]	0.531*** [14.30]	0.091*** [3.38]
Minority Investor Protection	0 [0.17]	0.001*** [3.13]	0.001*** [4.02]
Enforcement of Contracts	-0.003*** [-3.46]	0 [-0.14]	0.001*** [3.56]
Legal Origin	0.184*** [8.16]	0.206*** [12.18]	0.091*** [7.38]
Constant	-6.992*** [-12.80]	-7.131*** [-17.36]	-2.135*** [-7.13]
Observations	2044	2044	2044
R <sup>2</sup>	0.204	0.439	0.518
Adj. R <sup>2</sup>	0.199	0.436	0.515

**Table 9B: Determinants of Capital Market Development Using Financial Innovation Index: Multivariate OLS Regressions**

This table shows the estimated coefficients from 3 multivariate ordinary least squares regressions. The dependent variables are the three measures of capital market development, while the independent variables are the index of financial innovation and other control variables. The dependent variable STM/PCM is the domestic equity market normalized relative to the domestic private credit market; STM/GDP is the size of domestic equity market normalized by GDP; PCM/GDP is the size of domestic private credit market normalized by GDP. The three winsorized dependent variables were normalized using square root transformation. The definitions of all predictor variables are provided in Table 1. In the present table, "\*\*\*\*" indicates significance measured at the 1% level, "\*\*\*" the 5% level and "\*\*" the 10% level. The t-statistics are in square brackets. All errors (to achieve the sample size) and beta coefficients were standardized.

	Dependent Variables in the Regression		
	(1)	(2)	(3)
	<u>STM/PCM</u>	<u>STM/GDP</u>	<u>PCM/GDP</u>
FinTECH	-0.016 [-1.57]	0.002 [0.19]	0.019*** [3.99]
Demand for Finance	1.332*** [6.50]	1.157*** [7.26]	-0.075 [-0.79]
Supply Side Impediments	-0.007 [-0.07]	0.02 [0.27]	0.041 [0.92]
Trade Openness	0.091 [0.42]	0.038 [0.23]	0.047 [0.48]
Political Openness	-0.607** [-2.26]	-0.308 [-1.47]	0.338*** [2.73]
External Financing Constraints	1.095*** [5.81]	0.714*** [4.87]	-0.355*** [-4.08]
Minority Investor Protection	-0.002 [-1.26]	-0.009*** [-5.77]	-0.008*** [-8.36]
Enforcement of Contracts	-0.001 [-0.33]	0.001 [0.50]	0.003*** [3.20]
Legal Origin	0.227*** [2.90]	0.497*** [8.16]	0.310*** [8.57]
Constant	-12.291*** [-5.85]	-10.521*** [-6.43]	1.672* [1.72]
Observations	243	243	243
R <sup>2</sup>	0.213	0.559	0.68
Adj. R <sup>2</sup>	0.182	0.542	0.667