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Jiménez Sotelo, Renzo

Universidad Nacional Mayor de San Marcos, Universidad del Pacífico

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THE INFLUENCE OF DOMESTIC PUBLIC DEBT MARKET IN THE FINANCIAL DEVELOPMENT: EVIDENCE OF 52 COUNTRIES IN 1990-2020*

LA INFLUENCIA DEL MERCADO DE DEUDA PÚBLICA INTERNA EN EL DESARROLLO FINANCIERO: EVIDENCIA DE 52 PAÍSES EN 1990-2020

Renzo A. Jiménez-Sotelo**

Abstract

The objective of the study was to determine if a policy of preference for the domestic public debt market influences the development of the respective national financial system. This research finds that such influence does exist. Using panel data techniques, the causal relationship between the internal marketing of public debt and eight indicators of financial development was tested. The results confirm that the traditional theories of financial development were incomplete. Although the research shows that the preference for the internal public debt market influences financial development, and therefore economic development, it does not explain why in some less developed countries it is not given greater importance, an answer that would also involve the fields of study in which politics and ethics move.

Keywords: sovereign curve; panel data; sovereign debt; economic development; securities market; financial policy; monetary policy; financial system.

Resumen

El objetivo del estudio fue determinar si una política de preferencia por el mercado de deuda pública interna influye en el desarrollo del sistema financiero nacional respectivo. Esta investigación encuentra que dicha influencia sí existe. Usando técnicas de datos de panel, se contrastó la relación de causalidad entre el mercadeo interno de la deuda pública y ocho indicadores del desarrollo financiero. Los resultados confirman que las tradicionales teorías del desarrollo financiero estaban incompletas. Si bien la investigación muestra que la preferencia por el mercado de deuda pública interna influye en el desarrollo financiero, y por tanto en el desarrollo económico, no explica por qué en algunos países menos desarrollados no se le da una mayor importancia, respuesta que también involucraría los campos de estudio en los que se mueven la política y la ética.

Claves: curva soberana; datos de panel; deuda soberana; desarrollo económico; mercado de valores; política financiera; política monetaria; sistemas financieros.

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** The author has a doctorate in Economics from the Universidad Nacional Mayor de San Marcos and is a professor at the Universidad del Pacífico, Lima, Peru (rjimenezsotelo@yahoo.es).

I. Introduction

The dismantling of the financial development model implemented after the Second World War (that based on banking systems, directed credit, public development banks, closed capital accounts, limited interest rates and active monetary intervention) became one of the central elements of the economic reform and structural adjustment processes directed by international financial organizations in developing countries (FitzGerald, 2007: 6-7). In its replacement, extreme financial liberalization became predominant (along with economic deregulation and trade liberalization), although in the 1990s the greater frequency of monetary and banking crises observed was not only linked to the increasing recommendations of financial liberalization, but also to the almost non-existent development of their national financial markets (Correa, 1998; Krugman, 1999).

According to Chami, Fullerkamp and Sharma (2010: 120-124), the evolution of different financial markets can be studied by analyzing the incentives faced by their key players: debtors, creditors, liquidity providers and regulators. The policy actions that are implemented will determine whether the market develops or not, and even in what sequence the instruments, markets and intermediaries would have to develop. Logically, markets for domestic debt securities issued by each country's central government, federal government or crown should develop before other local financial markets.

In the new development model, the existence of a complete, liquid and accessible sovereign curve for all market participants in their respective local currency is key to managing risk (for example, see Moody's, 2013; Fitch, 2016; S&P, 2018). The sovereign curve in each currency is the basis on which all other risk premiums are added to price the different types of financial operations, from interbank loans (Freixas and Rochet, 1997) to securities issues by different resident companies (Borensztein, Cowan and Valenzuela, 2013). If there is no liquid sovereign curve, there is no certainty about what is the basis for constructing market prices of the yields to be demanded from other counterparties, generating the tendency to further widen spreads between the bid and ask prices, as part of a natural defensive strategy in trading under greater uncertainty.

Gray and Talbot (2009: 38-64) mention that many of the principles involved in the development of sovereign public debt securities markets would be the same ones that govern the more familiar markets for physical products and revolve around the basic economic principles of supply and demand. Thus, the financial policy applied in each country would have consequences for its sovereign debt market in a manner analogous to how the commercial policy applied by any company would have consequences for the market of its respective unique products. However, as the sovereign curve serves as the backbone for the entire time and risk structure of interest rates and exchange rates in its respective country, its greater or lesser development also has consequences for the development of its respective national financial system.

Consequently, the problem could be limited and formulated as follows: does the State's greater preference for its domestic public debt market encourage the development of the respective national financial system? To provide an answer, this study measures this policy based on the proportion of public debt that is financed with the issuance of internal debt securities instead of with external debt securities. This study starts from the hypothesis that greater internal marketing of public debt encourages financial development.

The article is divided into six parts, including this introduction. The second section summarizes the literature on the determinants of financial development. The third section discusses the effect of the public debt market. The fourth section reviews the applied methodology. The fifth section presents the results obtained. At the end the discussion of these results is shown.

II. The role of the financial development

Although the direction of causality between finance and economics has been the subject of debate, even since the late 19th century, their relationship is fairly well established: the most economically developed countries have the most developed financial systems, and vice versa. This relationship had already been emphasized by Schumpeter (1911/1967), when analyzing the relationship between profits, capital, credit, interest and the economic cycle, as well as by Keynes (1936/2003), when he highlighted the conditioning effect of the financial system on the economy.

This debate should have been even more relevant for less developed countries, since no country's economy could be sustainably more competitive without having a more developed financial system. And having a more developed financial system implies having a national financial system that manages to more effectively and efficiently fulfill its central function of facilitating the allocation and deployment of economic resources, spatially and temporally, in an uncertain environment (Merton, 1990).

However, the study of the determinants of financial development has tended to focus on almost predetermined factors: the legal tradition that has prevailed in each country (La Porta, López-de-Silanes, Shleifer and Vishny, 1997 and 1998); the political economy that explains the existence of the different types of regulations (Pagano and Volpin, 2001); the geographical endowment that influences the prevailing institutional configuration (Acemoglu, Johnson and Robinson, 2001 and 2005); religion that determines cultural habits and institutional rules (Stulz and Williamson, 2003); the origin of the legal system that influences the financial access of companies (Beck, Demirgüç-Kunt and Levine, 2003 and 2005); the social capital that becomes more important in places where compliance with the law is not usually so strict (Guiso, Sapienza and Zingales, 2004); the securities laws that influence the development of securities markets (La Porta, Lopez-de-Silanes and Shleifer, 2006); among others.

Only Rajan and Zingales (2003) had argued that financial development did not change monotonically over time. For example, to demonstrate this, they showed that, if measurements with traditional indicators were used, several countries would have been more financially

developed in 1913 than in 1980. Thus, they proved that in 1913 France had a stock market that, in relative terms, doubled that of the United States, despite the fact that, according to theory, the French legal system would not be investor-friendly, and that GDP per capita of France was not much higher than that of the United States, which also made it difficult to maintain that at that time the difference was only a different demand for funding. In this way, the authors maintained that structural theories were incomplete, since they required having some variable factor that explains not only the cross-sectional differences but also the temporal differences in financial development. For this reason, they proposed the theory of interest groups as an explanation of the problem and simultaneous commercial and financial openings as a policy solution.

Other studies then provided additional evidence that the change in financial development was not actually monotonous. For example, Chinn and Ito (2006) found that a higher level of financial openness contributed to the development of securities markets only if a minimum level of general institutional quality had previously been achieved, especially in emerging markets, where higher bureaucratic quality and public order, as well as lower levels of corruption, increased the effect of financial openness. They also found that finance-related institutional variables do not increase the effect of capital account openness as strongly as general institutional variables did; however, they argued that trade liberalization would be a precondition for financial liberalization. In fact, Baltagi, Demetriades and Law (2009) found that financial and commercial openness could even be considered substitute mechanisms.

Different subsequent studies formulated other determinants of financial development that can also vary over time, such as inequality (Demirgüç-Kunt and Levine, 2009), government capacity (Becerra; Cavallo and Scartascini, 2010), financial integration (Trabelsi and Cherif, 2017) or macroeconomic stability (Borensztein, Eichengreen and Panizza, 2008; Almarzoqi, Naceur and Kotak, 2015; Ehigiamusoe, Lean and Chan, 2020). However, none investigated the effect of changes in the policy applied by States to internal marketing of public debt as a determinant of financial development, a key variable for economic development.

III. The influence of the sovereign debt market

The regular exercise of fiscal policy affects the development of the sovereign debt securities market in various ways. The most important is when it annually proposes and approves in the budget (or in the indebtedness) laws what fraction of the fiscal deficit will be financed with issues of internal debt securities, and what fraction with issues of external debt securities. This decision, in turn, will structurally condition the way in which monetary policy will influence the development of the domestic financial system. For example, it depends on this decision whether, or not, the central bank can use domestic sovereign debt securities to carry out all or only some of its operations. Its operations can be carried out to affect the interest rate of the local interbank system, as a signal of its stance for the entire interest rate structure of the national financial system, or only to provide eventual liquidity to an individual financial entity, as lender of last resort (Freixas, 1999; Jiménez-Sotelo, 2009).

Thus, if financial policy does not prioritize the internal marketing of its sovereign debt or, worse still, discourages it, either by directly repressing its amount or by offering it with characteristics inappropriate for its greater demand, monetary policy could be forced to : (i) establish maximum limits to ration the operation with Treasury values; or (ii) resort to the requirement of reserve reserves to alter interbank liquidity; or (iii) issue its own debt securities and subsidize all of its operating expenses; or (iv) even using foreign currencies as collateral for their monetary operations. This, in turn, will end up making the domestic market for sovereign debt less liquid and deep than it could be, not to mention the additional financial cost implied by the greater aggregate issuance of public debt (by the Treasury and the Central Bank) to the public budget as a whole. In the end, all of this also ends up limiting the potential development of the rest of the national financial system and the effectiveness of the transmission mechanisms of monetary policy on the rest of the economy (Togo, 2007).

Instead, if the Treasury prioritizes the primary market for domestic sovereign debt securities, the Central Bank could in turn substantially strengthen the development of its secondary market. According to Gray and Talbot (2009), this development should not only strengthen the channelling of monetary policy operations, but also sustain financial stability and reduce the financing costs of the Treasury itself in the securities market, simultaneously providing broader benefits to the entire the economy. This would allow for the subsequent introduction of related financial markets such as repos and derivatives, which in turn should allow for better risk management and greater well-being; although the progress of these markets will also require a more appropriate market infrastructure so that all financial entities can clear, settle or record payments, securities and derivatives or other related financial operations (BIS and IOSCO, 2012: 205; Rafailov, 2018).

Furthermore, increased marketing of domestic sovereign debt may also have positive externalities in non-wholesale markets. McConnachie (1998) points out that governments may have an interest in developing a retail market for sovereign debt, either to broaden the investor base for public financing, or to encourage the savings habit in their population, or more commonly to stimulate the development of financial instruments and markets. An alternative is to sell to retailers the same marketable sovereign debt securities that wholesalers will buy. Another alternative is to devise non-negotiable values specifically aimed at families. The experience in the United Kingdom and some countries in Central and Eastern Europe is extensive, not to mention that of Japan, the United States or even Brazil.

Consequently, the relationship between the preference for the domestic sovereign debt market and the development of their respective financial systems should be direct. Given a lower preference for the domestic sovereign debt market, which would be reflected in lower liquidity and depth of that market, the financial system would face greater difficulties in pricing its different operations and achieving its central function more effectively and efficiently. In the long term, financing costs would increase for all its participants and the financial system would become more vulnerable to the sudden change in risk appetite in external debt markets (Piketty, 2015, interviewed by Cosoy, 2016).

IV. Methodology

Given the serious limitations of data published on the different existing independent countries or territories, the sample was equal to the number of countries for which there was information with which a representative indicator of the independent variable could be constructed: the policy of preference for the internal marketing of sovereign public debt. Thus, the research included the 52 countries for which some data was obtained about the composition of internal and external debt values in the period 1990-2020: 31 industrialized countries and 21 developing countries (see Table 1).

Table 1: Countries included in the study

#	Country	Obs.	I.C.	T.H.	#	Country	Obs.	I.C.	T.H.
1	Germany	19	Yes	-	27	India	4	-	-
2	Saudi Arabia	5	-	-	28	Indonesia	24	-	-
3	Argentina	30	-	-	29	Ireland	23	Yes	yes
4	Australia	31	Yes	-	30	Iceland	31	Yes	-
5	Austria	23	Yes	-	31	Israel	31	Yes	Yes
6	Belgium	23	Yes	-	32	Italy	23	Yes	-
7	Brazil	28	-	-	33	Japan	31	Yes	Yes
8	Canada	31	Yes	-	34	Lebanon	26	-	Yes
9	Czech Republic	19	Yes	-	35	Luxembourg	10	Yes	Yes
10	Chile	9	-	-	36	Malaysia	31	-	Yes
11	China	31	-	-	37	Mexico	31	-	-
12	Cyprus	8	Yes	Yes	38	Norway	14	Yes	-
13	Colombia	31	-	-	39	New Zealand	31	Yes	-
14	South Korea	31	Yes	-	40	Netherland	23	Yes	Yes
15	Croatia	24	-	-	41	Pakistan	27	-	-
16	Denmark	28	Yes	-	42	Peru	24	-	-
17	Slovakia	18	Yes	-	43	Poland	19	-	-
18	Slovenia	12	Yes	-	44	Portugal	23	Yes	-
19	Spain	23	Yes	-	45	United Kingdom	23	Yes	Yes
20	United States	20	Yes	Yes	46	Russia	25	-	-
21	Philippines	31	-	Yes	47	Singapore	10	Yes	Yes
22	Finland	23	Yes	-	48	South Africa	31	-	-
23	France	23	Yes	-	49	Sweden	31	Yes	-
24	Greece	22	Yes	-	50	Swiss	19	Yes	Yes
25	Hong Kong	9	Yes	Yes	51	Thailand	29	-	Yes
26	Hungary	30	-	-	52	Turkey	31	-	-

Source: Own elaboration, based on databases of WB (2021a), IMF (2020) and Moody's (2012-2019).

Notes: Observations (Obs.), industrialized country (IC) and tax heaven (TH).

To deal with any problem attributable to extreme values, those that exceeded +/- 4 standard deviations above the mean were purged, which was equivalent to losing 0.29% of the original data for some indicators of the dependent variable. However, not the entire purified sample was used in the different hypothesis tests since its use also depended on the sufficiency of data used to construct the indicators of the other independent or control variables.

Given its multidimensional nature, four approaches with eight indicators were used to approximate financial development (Y): i) the financial development indices constructed by Svirydzienka (2016) based on the work of Sahay and others (2015); ii) the assessment of the bank spreads between active and passive interest rates; iii) the level of financial de-dollarization; and iv) the usual indicator of credit leverage of economic activity and the assessment of financial leverage of economic activity (see Table 2).

Table 2: Data and indicators of financial development

Variables	Indicators	Formulas	Symbols	Databases
Financial development (approach i)	Multidimensional assessment of financial systems	Index of relative level of general financial development	Yaa	IMF (2021a)
	Multidimensional assessment of financial entities	Index of relative level of development of financial entities	Yab	
	Multidimensional assessment of financial markets	Index of relative level of development of financial markets	Yac	
Financial development (approach ii)	Assessment of the bank spread between nominal interest rates	$1 / (1 + \text{Nominal active interest rate} - \text{Nominal passive interest rate}) * 100$, average	Yba_i	WB (2021a)
	Assessment of the bank spread between real interest rates	$1 / (1 + \text{Real active interest rate} - \text{Real passive interest rate}) * 100$, average	Ybb_i	
Financial development (approach iii)	Level of financial dedollarization	$1 - (\% \text{ Dollarization of bank deposits}) * 100$, average	Yc	Moody's (2012-2019) and central banks
Financial development (approach iv)	Level of credit leverage of economic activity	$(\text{Private credit from depository institutions and others}) / \text{GDP} * 100$	Yda	WB (2021a)
	Assessment of financial leverage of economic activity	Index of the relative level of depth of financial entities	Ydb	IMF (2021a)

Source: Own elaboration, based on respective databases.

To assess the policy of preference for internal marketing of sovereign public debt in each country (X), the balance of public debt agreed in internal values was used as a proportion of the balance of public debt agreed in internal and external values. To calculate this indicator in each country, the average proportion of the beginning and end of each year was considered (see Table 3).

Table 3: Data and indicator of the preference policy for internal sovereign debt

Variables	Indicators	Formulas	Symbols	Databases
Internal marketing of sovereign public debt	Proportion of sovereign debt securities issued in the domestic market of each country	$\% (\text{Domestic sovereign debt securities}) / (\text{Internal} + \text{external sovereign debt securities}) * 100$, average	X	WB (2021a)

Source: Own elaboration, based on respective database.

Furthermore, given the relationship between financial development and economic development, to include this last one as a control variable, the following were used in alternative models: (i) the human development index (Z1a); or (ii) the gross domestic product per capita (Z1c) or (iii) the net national income per capita (Z1d); any of them together with the participation of the poorest 50% in the national income before taxes and pensions of each country

(Z1e), as an approximation of relative inequality (see Table 4).

Table 4: Linkage between economic development indicators

Result	Dimensions	Indicators
Human development index (Z1a)	Health	Life expectancy at birth, between 20 and 85 years
	Education	Expectation of years of schooling, between 0 and 18 years
		Average years of schooling, between 0 and 15 years
	Wealth	Gross national income per capita, between 100 and 75,000 dollars purchasing power parity (Z1d)
Not included in Z1a	Inequality	Equity of the distribution of gross national income per capita (Z1e)

Source: Own elaboration, based on UNDP (2021).

Likewise, all the determinants of financial development that had some variation over time were individually incorporated. Such was the case of trade openness (Z2), stability (Z3), population (Z4), governance (Z5) and financial openness (Z6). Additionally, dummy variables were added for the most developed countries, the years with banking crises and tax havens (see Table 5).

And the determinants of financial development that practically do not evolve over time, such as the type of legislation (Z7), the geographical endowment (Z8), the culture (Z9), and any other, were taken into account in aggregate form, as part of the heterogeneity of each individual country.

In this way, taking into account the state of the current literature, in a more general way, the theory updated with the hypothesis of this research was expressed as follows:

$$\text{Theory: } y = F(x, z1, z2, z3, z4, z5, z6, z7, z8, z9 \dots) = F(X', Z')$$

$$\text{Hypothesis: } \frac{\partial y}{\partial x} = \gamma > 0$$

Thus, to falsify the specific hypothesis proposed as a tentative response to the research problem, the one that the literature has been assuming to be true was proposed as the null hypothesis and its opposite position as the alternative hypothesis:

H0: Greater domestic marketing of sovereign public debt hinders or does not facilitate financial development ($\gamma \leq 0$)

H1: Greater domestic marketing of sovereign public debt facilitates financial development ($\gamma > 0$)

Likewise, given the problem of model uncertainty facing the explanation of financial development (Huang, 2011), the same general strategy followed in the literature with panel data from various time periods was followed:

$$\text{Instrument: } y_{i,t} = \alpha + x_{i,t-1} * \gamma + Z_{i,t-1}' * \beta + \varepsilon_{i,t}$$

Where $Z' = [z1 \ z2 \ z3 \ z4 \ z5 \ z6 \ z7 \ z8 \ z9 \dots]$ and $\beta' = [\beta1 \ \beta2 \ \beta3 \ \beta4 \ \beta5 \ \beta6 \ \beta7 \ \beta8 \ \beta9 \dots]$ are respectively the vector of the explicative variables and their parameters; α is a scalar ε represent the error term that can include individual and temporal fixed effects.

Table 5: Data and indicators for other variables

Variable	Indicator	Fórmula	Símbolos	Base de datos
Economic development	Human development Index	Human development Index	Z1a	UNDP (2021)
	Adjusted GDP per capita 1	GDP, purchasing power parity in 2011 dollars / total population	Z1b	WB (2021b)
	Adjusted GDP per capita 2	GDP, purchasing power parity in 2011 euros / total population	Z1c	
	Adjusted per capita net income	(Net domestic product + net external income, purchasing power parity in 2021 euros) / total population	Z1d	WIL (2021)
	Net income inequality	National income before taxes and after pensions of the poorest 50% / National income before taxes and after pensions of 100% of the population	Z1e	
Commercial opening	International trade	(Imports + Exports) / GDP	Z2	
Stability	Level of prices	Consumer's price index	Z3	WB (2021b)
Population	Population	Number of inhabitants	Z4	
Governance	Public governance	Simple average of public governance indicators	Z5	WB (2021c)
Financial opening	Total external balance	(External assets + External liabilities) / GDP	Z6a	Milesi-Ferreti (2022)
	Degree of openness of the capital account	Financial openness index	Z6b	Chinn and Ito (2022)
Countries more developed	Industrialized countries	1, in other case 0	B1a	Moody's (2012-2019)
	Countries with risk "A-" or better	1, in other case 0	B1b	Expansión (2021)
Crisis	Banking crisis	1, in other case 0	B2	WB (2021a)
Tax heaven	Overseas financial centers	1, in other case 0	B3	IMF (2000)
Monetary policy in USA	Formal real reference rate	(Formal reference rate / Moving inflation 12 m centered), average 12 m	EFT1a	Federal Reserve Bank of Atlanta (2022)
	Shadow real reference rate	(Shadow reference rate / Moving inflation 12 m centered), average 12 m	EFT1b	
Terms of exchange	Raw materials prices	Raw materials price index	EFT2	IMF (2021b)

Sources: Own elaboration, based on the indicated databases.

Thus, the models included: (i) a static causal approach similar to that of Rajan and Zingales (2003), plus a long-term correlational variant; and (ii) a dynamic causal approach similar to that of Baltagi, Demetriades and Law (2009), in which a $z0_{i,t} = y_{i,t-1}$ was added as a regressor within the vector Z' with its respective parameter β_0 within the vector β' .

For the static approach, a panel data model with fixed effects was used, considering the effects of financialization (Palley, 2009), for which the following specification tests were carried out: the Wald test (Wald, 1940) to verify if the fixed coefficients were jointly and significantly different from zero; the Lagrange multiplier test (Breush and Pagan, 1980) to verify whether the variance of the random effects estimator and the pooled data estimator was different; the modified Wald test (Greene, 2002) to verify if heteroscedasticity existed in the individual fixed effects; the Wooldridge test (Wooldridge, 2002) to verify if there was a first-

order correlation in the errors; and the Hausman test (Hausman, 1978) to determine whether a specification with random effects instead of fixed effects was viable. In addition, the restriction over-identification test was also used to contrast the correlation¹ with the average preference for internal marketing of public debt as a time-invariant variable with the use of generalized instrumental variable models (Hausman and Taylor, 1981).

For the dynamic approach, the Arellano and Bond (1991) test was used in the first differences model in order to determine if it presents autocorrelation of order 1 and the original error term does not present autocorrelation. Although the non-existence of order 1 autocorrelation should be rejected, it should not be possible to reject order 2 autocorrelation in order to be able to use order 2 lags as instruments. If the non-existence of order 1 autocorrelation could not be rejected, this would imply that a dynamic approach does not make sense. In the dynamic model, it would also be necessary to carry out the Sargan (1958) and Hansen (1982) tests to determine the joint validity of the instruments used in the estimation of the generalized method of moments (GMM), where only the second test is robust to heteroscedasticity or autocorrelation, although prone to weakness due to excess instruments. For this reason, it was considered as a minimally arbitrary general rule that the instruments do not exceed the number of individuals or entities involved, as well as that the probability value of the Hansen test is ideally between 0.10 and 0.25 (Roodman, 2009) or at less between 0.05 and 0.80 (Labra and Torrecillas, 2014).

However, as the time series used as indicators of the variables were not very short, and in some cases even involved macroeconomic series, it was very likely that some would have a trend or show persistence after any change or shock over time. Therefore, after some logarithmic transformations, in all tests (p , Z , L^* and P_m) the financial development indicators $\ln Y_{aa}$, $\ln Y_{ab}$, Y_{ac} , Y_{ba_i} , Y_{bb_i} , Y_c , $\ln Y_{da}$ and $\ln Y_{db}$ rejected, at a level of significance less than 5%, the null hypothesis that all panels contain unit roots for the indicators when both the time trend option and the drift-only option were included, both without removing and removing the cross-sectional means, to help control the eventual contemporary correlation.

In the case of the indicator of preference for internal marketing of public debt, it was not necessary to apply any transformation to reject, at a level of significance less than 5%, the null hypothesis that all panels contain a unit root with temporal trend or only with drift removing the cross-sectional means. When the cross-sectional means were not removed, the null hypothesis was also rejected.

In the case of the other independent variables, the results of the unit root tests were consistent with what was predicted by the theory, so in each case the relevant transformations were made, or not. In the case of the indicators of economic activity, stability, population and financial openness with total external balance, these were stationary in logarithmic differences ($d\ln Z_{1a}$, $d\ln Z_{1c}$, $d\ln Z_{1d}$, $d\ln Z_3$, $d\ln Z_4$ and $d\ln Z_{6a}$), while in the case of the indicator

¹ Translation's note: In this case, the hypotheses would be reformulated as follows:

H0: Greater internal marketing of sovereign public debt is correlated with lower financial development or there is no correlation between internal marketing of public debt and financial development ($\gamma \leq 0$)

H1: Greater internal marketing of sovereign public debt is correlated with greater financial development ($\gamma > 0$)

of inequality, trade openness, governance and financial openness with the degree of capital account openness, no transformation was necessary (Z1e, Z2, Z5 and Z6b).

Given the nature of the hypothesis, one-tailed tests were programmed for each particular case in the statistical program Stata version 16.1.

V. Results

The hypothesis tests were carried out against eight indicators of financial development and, with each of them, between six and twelve models were proposed that differed by their methodological approach or by the change of some regressors² that intervened as control variables. The results obtained on the different approaches³ to multidimensional financial development are briefly detailed below:

1. Contrast on the influence on domestic financial systems ($X \rightarrow \ln Y_{aa}$)

It is concluded that ' γ ' is greater than zero (HE is not false) as its opposite position (H0) has been falsified from a dynamic causal approach at one year with: (i) a fixed effects OLS; (ii) an exogenous GMM, and (iii) a predetermined GMM, for a significance level of less than 5% in all cases, in a sample of 51 to 52 countries in 1990-2019 (see Table 6).

Furthermore, a significant correlation is found from a long-term average approach, for a significance level of less than 1%.

Table 6: Hypothesis testing for models with X and lnYaa

Model	Alternative regressors	Null hypothesis	Probability value	Contrast
Dynamic with fixed effects	$X_r / \ln Z1d_r / Z6a_r$	$\gamma \leq 0$ (Causality)	0.01799139**	H0 is rejected
	$X_r / \ln Z1d_r / Z6b_r$		0.01695242**	H0 is rejected
Dynamic in differences	$X_r, \ln Z1d_r, Z1e_r$ as exogenous / $Z6a_r$		0.01639586**	H0 is rejected
	$X_r, \ln Z1d_r, Z1e_r$ as exogenous / $Z6b_r$		0.01973837**	H0 is rejected
	$X_r, \ln Z1d_r, Z1e_r$ as predeterm. / $Z6a_r$		0.04805782**	H0 is rejected
Static with variable effects controlled by fixed effects	$X_r, \ln Z1d_r, Z1e_r$ as predeterm. / $Z6b_r$		0.04902285**	H0 is rejected
	$X_m / \ln Z1a_r / Z6a_r$	$\gamma \leq 0$ (Correlation)	0.00144508***	H0 is rejected
	$X_m / \ln Z1c_r / Z6a_r$		0.00196159***	H0 is rejected
$X_m / \ln Z1d_r / Z6a_r$	0.00191145***		H0 is rejected	

Source: Own elaboration, based on the results of the research. Note: The other regressors are maintained in all models. Significance less than 1%(***), 5%(**) and 10%(*).

2. Contrast on the influence on domestic financial entities ($X \rightarrow \ln Y_{ab}$)

It is concluded that ' γ ' is greater than zero (HE is not false) as its opposite position (H0) has been falsified from a causal dynamic approach at one year with: (i) a fixed effects OLS for a

² Translation's note: The suffix '_r' in the regressors means lagged (derived from 'rezagado') by one year and the suffix '_m' means average (derived from 'media') of all years.

³ Translation's note:

- Approach i) covers contrasts 1, 2 and 3, which use indices that subsume qualitative and quantitative indicators.
- Approach ii) covers contrasts 4 and 5, which use a qualitative indicator subsumed in the indices used in contrasts 1 and 2.
- Approach iii) covers contrast 6, which uses a qualitative indicator that has not been subsumed in any of the previous indices.
- Approach iv) covers contrasts 7 and 8, which only cover or use quantitative indicators.

significance level of less than 5%, and (ii) a exogenous GMM but only for a significance level of less than 10%, in a sample of 51 to 52 countries in 1990-2019 (see Table 7).

Furthermore, a significant correlation is found from a long-term average approach, for a significance level of less than 1%.

Table 7: Hypothesis testing for models with X and InYab

Model	Alternative regressors	Null hypothesis	Probability value	Contrast
Dynamic with fixed effects	X _r / dlnZ1d _r / Z6a _r		0.03717508**	H0 is rejected
	X _r / dlnZ1d _r / Z6b _r		0.03415158**	H0 is rejected
Dynamic in differences	X _r , dlnZ1d _r y Z1e _r as exogenous / Z6a _r	$\gamma \leq 0$ (Causality)	0.07332546*	-
	X _r , dlnZ1d _r y Z1e _r as exogenous / Z6b _r		0.06341563*	-
	X _r , dlnZ1d _r y Z1e _r as predeterm. / Z6a _r		0.40852411	H0 is not rejected
	X _r , dlnZ1d _r y Z1e _r as predeterm. / Z6b _r		0.41920979	H0 is not rejected
Static with variable effects controlled by fixed effects	X _m / dlnZ1a _r / Z6a _r	$\gamma \leq 0$ (Correlation)	0.00197753***	H0 is rejected
	X _m / dlnZ1c _r / Z6a _r		0.00314821***	H0 is rejected
	X _m / dlnZ1d _r / Z6a _r		0.00317584***	H0 is rejected

Source: Own elaboration, based on the results of the research. Note: The other regressors are maintained in all models. Significance less than 1%(***), 5%(**) and 10%(*).

3. Contrast on the influence on domestic financial markets (X → InYac)

It is concluded that 'γ' is greater than zero (HE is not false) as its opposite position (H0) has been falsified from a causal dynamic approach at one year with: (i) a fixed effects OLS, (ii) a exogenous GMM, and (ii) a predetermined GMM, respectively for a significance level less than 5%, 5% and 1% in a sample of 51 to 52 countries in 1990-2019 (see Table 8).

Furthermore, a significant correlation is found from a long-term average approach, for a significance level of less than 1%.

Table 8: Hypothesis testing for models with X and InYac

Model	Alternative regressors	Null hypothesis	Probability value	Contrast
Dynamic with fixed effects	X _r / dlnZ1d _r / Z6a _r		0.04312128**	H0 is rejected
	X _r / dlnZ1d _r / Z6b _r		0.03856781**	H0 is rejected
Dynamic in differences	X _r , dlnZ1d _r y Z1e _r as exogenous / Z6a _r	$\gamma \leq 0$ (Causality)	0.01104343**	H0 is rejected
	X _r , dlnZ1d _r y Z1e _r as exogenous / Z6b _r		0.01359914**	H0 is rejected
	X _r , dlnZ1d _r y Z1e _r as predeterm. / Z6a _r		0.00763580***	H0 is rejected
	X _r , dlnZ1d _r y Z1e _r as predeterm. / Z6b _r		0.00797913***	H0 is rejected
Static with variable effects controlled by fixed effects	X _m / dlnZ1a _r / Z6a _r	$\gamma \leq 0$ (Correlation)	0.00246980***	H0 is rejected
	X _m / dlnZ1c _r / Z6a _r		0.00263063***	H0 is rejected
	X _m / dlnZ1d _r / Z6a _r		0.00240843***	H0 is rejected
	X _r , dlnZ1d _r y Z1e _r as predeterm. / Z6b _r		0.00797913***	H0 is rejected

Source: Own elaboration, based on the results of the research. Note: The other regressors are maintained in all models. Significance less than 1%(***), 5%(**) and 10%(*).

4. Contrast on the influence on the bank spread of nominal interest rates ($X \rightarrow Y_{ba_i}$)

It cannot be concluded that ' γ ' is greater than zero because it has not been possible to falsify its opposite position (H0), at least from a one-year causal static approach in a sample of 30 countries in 1996-2020, where there are no endogenous dynamic effects (see Table 9).

Furthermore, there is also no evidence of a correlation from a long-term average approach.

Table 9: Hypothesis testing for models with X and Y_{ba_i}

Model	Alternative regressors	Null hypothesis	Probability value	Contrast
Static with fixed effects	$X_r / \ln Z1a_r / Z6a_r$	$\gamma \leq 0$ (Causality)	0.14314935	H0 is not rejected
	$X_r / \ln Z1c_r / Z6a_r$		0.36212748	H0 is not rejected
	$X_r / \ln Z1d_r / Z6a_r$		0.37375609	H0 is not rejected
Static with variable effects controlled by fixed effects	$X_m / \ln Z1a_r / Z6a_r$	$\gamma \leq 0$ (Correlation)	0.35441558	H0 is not rejected
	$X_m / \ln Z1c_r / Z6a_r$		0.27541607	H0 is not rejected
	$X_m / \ln Z1d_r / Z6a_r$		0.25712971	H0 is not rejected

Source: Own elaboration, based on the results of the research. Note: The other regressors are maintained in all models. Note: Significance less than 1%(***), 5%(**) and 10%(*).

5. Contrast on the influence on the bank spread of real interest rates ($X \rightarrow Y_{bb_i}$)

It cannot be concluded that ' γ ' is greater than zero because it has not been possible to falsify its opposite position (H0), at least from a one-year causal static approach in a sample of 30 countries in 1996-2020, where there are no endogenous dynamic effects (see Table 10).

Furthermore, there is also no evidence of a correlation from a long-term average approach.

Table 10: Hypothesis testing for models with X and Y_{bb_i}

Model	Alternative regressors	Null hypothesis	Probability value	Contrast
Static with fixed effects	$X_r / \ln Z1a_r / Z6a_r$	$\gamma \leq 0$ (Causality)	0.15661334	H0 is not rejected
	$X_r / \ln Z1c_r / Z6a_r$		0.45266196	H0 is not rejected
	$X_r / \ln Z1d_r / Z6a_r$		0.46764391	H0 is not rejected
Static with variable effects controlled by fixed effects	$X_m / \ln Z1a_r / Z6a_r$	$\gamma \leq 0$ (Correlation)	0.25603270	H0 is not rejected
	$X_m / \ln Z1c_r / Z6a_r$		0.16528980	H0 is not rejected
	$X_m / \ln Z1d_r / Z6a_r$		0.15059755	H0 is not rejected

Source: Own elaboration, based on the results of the research. Note: The other regressors are maintained in all models. Significance less than 1%(***), 5%(**) and 10%(*).

6. Contrast on the influence on the dollarization of bank deposits ($X \rightarrow Y_c$)

It cannot be concluded that ' γ ' is greater than zero because it has been possible to falsify its opposite position (H0), at least from a one-year causal static approach in a sample of 30 countries in 1996-2020, where there are no endogenous dynamic effects (see Table 11).

However, it is shown that there is a correlation from a long-term average approach, for a significance level of less than 1%, in a sample of 47 to 48 countries in 1996-2020.

Table 11: Hypothesis testing for models with X and Yc

Model	Alternative regressors	Null hypothesis	Probability value	Contrast
Static with fixed effects	X _r / dlnZ1a _r / Z6a _r	$\gamma \leq 0$ (Causality)	0.25791443	H0 is not rejected
	X _r / dlnZ1c _r / Z6a _r		0.17397956	H0 is not rejected
	X _r / dlnZ1d _r / Z6a _r		0.17689955	H0 is not rejected
Static with variable effects controlled by fixed effects	X _m / dlnZ1a _r / Z6a _r	$\gamma \leq 0$ (Correlation)	0.00009368***	H0 is rejected
	X _m / dlnZ1c _r / Z6a _r		0.00122263***	H0 is rejected
	X _m / dlnZ1d _r / Z6a _r		0.00108385***	H0 is rejected

Source: Own elaboration, based on the results of the research. Note: The other regressors are maintained in all models. Note: Significance less than 1%(***), 5%(**) and 10%(*).

7. Contrast on the influence on credit leverage (X → lnYda)

It is concluded that ‘ γ ’ is greater than zero (HE is not false) as its opposite position (H0) has been falsified from a causal dynamic approach at one year with: (i) a fixed effects OLS, (ii) a exogenous GMM, (iii) a predetermined GMM, respectively for a significance level of less than 1%, 1%, and 5% in a sample 51 to 52 countries in 1990-2020 (see Table 12).

Furthermore, a significant correlation is found from a long-term average static approach, for a significance level of less than 5%.

Table 12: Hypothesis testing for models with X and lnYda

Model	Alternative regressors	Null hypothesis	Probability value	Contrast
Dynamic with fixed effects	X _r / dlnZ1d _r / Z6a _r	$\gamma \leq 0$	0.00909827***	H0 is rejected
	X _r / dlnZ1d _r / Z6b _r		0.00194245***	H0 is rejected
Dynamic in differences	X _r , dlnZ1d _r y Z1e _r as exogenous / Z6a _r	$\gamma \leq 0$ (Causality)	0.00513353***	H0 is rejected
	X _r , dlnZ1d _r y Z1e _r as exogenous / Z6b _r		0.00061547***	H0 is rejected
	X _r , dlnZ1d _r y Z1e _r as predeterm. / Z6a _r		0.02755074**	H0 is rejected
	X _r , dlnZ1d _r y Z1e _r as predeterm. / Z6b _r		0.01983461**	H0 is rejected
Static with variable effects controlled by fixed effects	X _m / dlnZ1a _r / Z6a _r	$\gamma \leq 0$ (Correlation)	0.01463714**	H0 is rejected
	X _m / dlnZ1c _r / Z6a _r		0.01664832**	H0 is rejected
	X _m / dlnZ1d _r / Z6a _r		0.01740237**	H0 is rejected

Source: Own elaboration, based on the results of the research. Note: The other regressors are maintained in all models. Note: Significance less than 1%(***), 5%(**) and 10%(*).

8. Contrast on the influence on the depth of financial institutions (X → lnYdb)

It is concluded that γ is greater than zero (HE is not false) as its opposite position (H0) has been falsified from a causal dynamic approach at one-year with: (i) a fixed effects OLS, (ii) a exogenous GMM, and (iii) a predetermined GMM, respectively for a significance level of less than 5%, 5%, and 10%, in a sample from 51 to 52 countries in 1990-2019 (see Table 13).

Furthermore, a significant correlation is found from a long-term average approach, for a significance level of less than 1%.

Table 13: Hypothesis testing for models with X and lnYdb

Model	Alternative regressors	Null hypothesis	Probability value	Contrast
Dynamic with fixed effects	X _r / dlnZ1d _r / Z6a _r	$\gamma \leq 0$ (Causality)	0.01791907**	H0 is rejected
	X _r / dlnZ1d _r / Z6b _r		0.00615289***	H0 is rejected
Dynamic in differences	X _r , dlnZ1d _r y Z1e _r as exogenous / Z6a _r		0.03551784**	H0 is rejected
	X _r , dlnZ1d _r y Z1e _r as exogenous / Z6b _r		0.00247631***	H0 is rejected
	X _r , dlnZ1d _r y Z1e _r as predeterm. / Z6a _r		0.06448101*	-
	X _r , dlnZ1d _r y Z1e _r as predeterm. / Z6b _r		0.05751948*	-
Static with variable effects controlled by fixed effects	X _m / dlnZ1a _r / Z6a _r	$\gamma \leq 0$ (Correlation)	0.00010687***	H0 is rejected
	X _m / dlnZ1c _r / Z6a _r		0.00014388***	H0 is rejected
	X _m / dlnZ1d _r / Z6a _r		0.00010849***	H0 is rejected

Source: Own elaboration, based on the results of the research. Note: The other regressors are maintained in all models. Note: Significance less than 1%(***), 5%(**) and 10%(*).

VI. Discussion

Before concluding, there are two points that deserve to be discussed. First of all, it is worth highlighting the strong sampling limitations faced in this study. It is verified that historically there has not been much interest in collecting information on the structure of local bond markets, despite the fact that their data is generated much more frequently than other economic variables. Even since 2012, the World Bank stopped publishing statistics on public and private domestic debt values for almost 40% of the countries that had been reporting data (USA, Singapore, Hong Kong, the United Kingdom and the 17 countries of the European Union), which significantly reduced the study sample.

Secondly, the results presented allow to assess the influence of the sovereign curve on quantitative and qualitative aspects of financial development depending on each indicator used. In relation to the indicators that only include quantitative aspects (Tables 12 and 13), a slightly greater causal significance was found when it is considered exogenous instead of predetermined in the difference model and also in the model calculated by fixed effects. The causal significance levels deteriorate slightly when both quantitative and qualitative aspects are included (Tables 6 and 7). Although more significant results are obtained when the quantitative part is related to financial markets (Table 8) instead of financial entities (Table 7), this difference in results is not considered as very reliable. This is because half of the indicators used to construct the market development index (Yac) included indicators of external debt values (see Table 14), which rather contribute to the development of external financial systems where are issued or traded.

Likewise, in relation to the indicators that only include quantitative aspects, no causal significant evidence of one-year causality was found either with bank spreads between interest rates (Tables 10 and 11) or with the dollarization of bank deposits (Table 12). However, evidence of a correlation was found from a long-term perspective on the level of financial de-dollarization. This last finding would be consistent with the argument that deepening the development of the domestic debt market and reducing credit dollarization would be two

sides of the same coin (Dancourt and Jiménez-Sotelo, 2018: 202-206).

Table 14: *Linkage between financial development indicators used*

Result	Dimensions	Indicator	
Financial development index (<u>Yaa</u>)	Deep (<u>Ydb</u>)	Credit to the private sector / GDP (<u>Yda</u>)	
		Pension fund assets / GDP	
		Mutual fund assets/GDP	
	Access	Life and general insurance premiums / GDP	
		Banking agencies per capita * 100,000	
		ATMs per capita * 100,000	
	Efficiency	Net financial margin	
		Bank spread between interest rates (<u>Yba</u>)	
		Non-financial income / Total income	
		General expenses / Total assets	
		Earnings / Total assets	
		Earnings / Net worth	
	Financial markets index (<u>Yac</u>)	Deep	Market capitalization / GDP
			Stock trading / GDP
			External public debt values / GDP [#]
Access		Domestic and external non-financial private debt values / GDP [#]	
		Domestic and external financial private debt values / GDP [#]	
		Market capitalization of 10 largest companies / GDP	
		Total issuers of internal and external private debt / 100,000 [#]	
Efficiency	Stock Trading / Market Capitalization		
Not included	Efficiency	Financial dollarization (<u>Yc</u>)	

Source: Own elaboration, based on Sahay and others (2015) and Svirydzenka (2016). Note: Indicators with [#] have issuance or trading data that supports the development of foreign financial systems.

In conclusion, as stated at the beginning, empirical evidence was found that supports the hypothesis that greater internal marketing of sovereign public debt, measured through the proportion of public debt securities issued in the internal market of each country, encourages financial development.

The confirmation of the proposed hypothesis agrees with the consensus collected by the international financial organizations themselves as a result of the havoc produced by the international financial crisis of 1997-1998 (WB and IMF, 2001): the development of domestic bond markets deserved a high priority in the financial sector development agenda.

The strategic role played by the State of each country by using the internal marketing of its debt to promote financial development is also consistent with the historical evidence provided by Andrianova, Demetriades and Xu (2008) regarding the essential role played by the States in promoting financial development, even since pre-capitalist times, in the sense that none of the observed cases of success in London, Amsterdam, Hong Kong and other major cities were spontaneous. In this sense, according to De la Torre, Feyen and Ize (2011), agency frictions would be those that explain why public credit developed before private credit and

why the capital market and its participants developed after the credit entities.

The finding confirms that the best strategy to follow to increase financial development are the priorities outlined by McConnachie (1997 and 1998), Gray (1999) and Gray and Talbot (2009). They argue that there is a whole series of international good practices that can be taught and learned about how to develop a sovereign public debt securities market, not only at the wholesale level but also at the retail level. These practices include recommendations on how the Central Bank should intervene in the secondary market for Treasury securities and how an appropriate market infrastructure for all financial entities should be articulated.

The results obtained also support the initial thesis of Rajan and Zingales (2003) in the sense that the structural theories were incomplete because they only explained the cross-sectional differences, but not the temporal differences in financial development in the different countries of the world. However, the new explanation proposed here could not only be attributed to his theory that certain private interests oppose financial development because a commercial or financial opening could generate more competition for them. If this hypothesis were true, the reforms of the early 1990s, which included trade and financial openings, would have also induced greater financial development in developing countries like Peru. However, according to the financial development index published by the IMF (Svirydzenka, 2016), that country ranked 92nd in 2002 and 2008, that is, it occupied a slightly better position than it had in 1988. Thus, no impact was generated on financial development after the drastic reforms of the early 1990s, which included a controversial change in the political constitution in order to reverse the policies of the 1970s and 1980s (Dancourt and Jiménez-Sotelo, 2018: 198-202).

Rather, the explanation of why in many less developed countries the internal sovereign debt market is not prioritized would be related to the fields of study in which politics and ethics move, that is, with the struggle to achieve power (Bunge, 1999: 176-180) to decide who gets what, when and how (Lasswell, 1936) and define who decides what is better or worse, what is good or bad, in terms of financial policy in particular and economic policy in general (Jiménez-Sotelo, 2018). From that perspective, the determination of a greater preference for the internal sovereign debt market, instead of the external market, would not be so much a fortuitous or inertial result of the management of public affairs in general, but rather the result of the struggles to maintain the privileged access to the lowest relative risk asset of each country, at the same time that less taxes are paid, which involves the use of tax havens from where foreign debt issues are usually made, with all that this entails for some and other investors (Garzón, 2011).

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