THE DARK SIDE OF FINANCIAL INNOVATION: DETERRENT FOR ECONOMIC GROWTH

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ABSTRACT

This study explores the impact of financial innovation on economic growth with a unique focus on its detrimental effects. Using data from 164 countries for 1990 to 2017, the paper uses panel OLS regression model with an exhaustive set of variables to conduct the base analysis while GMM is used to accurately study the possible endogenous relationship between financial variables and economic performance across countries. The results show that there is a significant, negative relationship between financial innovation and economic growth, thereby highlighting the dark side of financial innovation. The findings have important policy implications for regulators especially with emphasis on the role of market discipline.

Keywords: Financial Innovation, Financial Crisis, Regulation.

JEL Codes: G01, G00, G20, E00

INTRODUCTION

The term "financial innovation" has been broadly defined as *"the act of creating and then popularizing new financial instruments as well as new financial technologies, institutions and markets"* (Tufano, 2003). In addition to this, innovation does not always imply creation of something entirely foreign. Innovation can be an improvement on something that already exists. It is important to note that innovation is not limited to generation of novel ideas, it also leads to the diffusion of those ideas across space and time. Trading and transfer of securities transcends clock time, and can be easily conducted any moment that is desirable (Merton & Bodie, 1995). While it is true that improvements in human capital, and enhanced capabilities have propelled growth in innovation, it should be noted that not all innovations result from better human expertise. They are also the product of enhanced technological capability. It has afforded the financial system much flexibility and has increased market participation by encouraging round the clock, global trading. However, to understand this, it is first necessary to have a preliminary understanding of the roles of financial innovations.

Financial innovations comprise of actions that lead to the development of financial system. While there is a myriad of functions performed by the financial system, there are six basic functions which combine to form the core of this system. According to Merton (1992), the financial system (1) facilitates moving funds across time; (2) allows pooling of funds; (3) helps manage risk; (4) provides information to ensure smoother decision-making processes; (5) reduces problems related to moral hazard and asymmetric information; (6) permits, and facilitates sale and purchase of goods and services through a defined payment system.

For the purposes of this article, financial innovation is considered to be (1) a means of reducing and hedging risks; (2) a vehicle to address information asymmetry and the resultant

adverse selection and moral hazard problems. According to Merton (1992), financial innovations have also helped improve the quality of banking systems and have spurred banking efficiency as well. They make risk taking a less arduous process by facilitating risk sharing, and by providing hedging options. They also "complete the market" (Duffie & Rahi, 1995) and are lauded for their role in improving allocative efficiency. Studies and reviews have discussed them at length and have analyzed their importance in creating an "innovation spiral" which has been recognized as an essential component of today's financial system.

However, this innovation spiral has led to a "dark side" to financial developments as propagated by the "innovation-fragility view" (Beck et al., 2016). Proponents of this view vehemently argue that financial innovations result in catastrophic consequences, and therefore place such innovations at the root of financial disruptions. One case that features regularly in arguments, is that of credit default swaps (CDS) and how they resulted in a financial meltdown. Advocates of this perspective argue that financial innovations are rampant, and by their very nature, are sufficient to shake the system by exposing it to neglected risks. They also criticize the fact that managers of banks tend to hide their excessive risk-taking by seeking refuge in these financial innovations and thus pose a threat to the investors.

The dark side created through the innovation spiral came forth during the crisis of 2007-2008. The crisis marked a new era in the history of financial systems because it did not just topple one economy, it crippled several others as well. At the heart of this crisis were two outstanding features – financial innovation and lack of regulation. The main factors behind the global financial crisis are highly complicated innovations that included structured investment vehicles (SIVs), credit default swaps (CDS) and collateralized debt obligations (CDOs) (Diaz-Rainley & Ibikunle, 2012). These securities were paraded throughout financial markets as the ultimate risk-hedging techniques (especially credit default swaps). On the contrary, the irony is that their use led to the 'tail-end risk,' that is greatly feared, for all the right reasons.

The objective of this study, is thus, to explain financial innovation in modern context. This paper attempts to fill the gap in literature with respect to the disadvantages of unchecked financial innovation. In addition, the study aims to conduct an empirical analysis to gauge the impact of financial innovation on economic growth across countries and provide insights for policymakers with respect to financial innovation and stringent regulation. The study aims to check the hypothesis that the effect of financial innovation can be positive or in fact detrimental. This study is based on data gathered on 164 countries, from 1990 to 2017. The paper builds on approaches explored by Bara & Mudzingiri (2016), and the finance-growth model by King & Levin (1993).
The remainder of the paper is organized as follows: section 2 outlines the existing literature on the subject, section 3 discusses the methodology and section 4 presents the results. Section 5 concludes.

LITERATURE REVIEW

Role of Regulation and the Future of Financial Innovation

While critics of financial innovation have made a variety of arguments, there have been others who have also tested these claims empirically, and have presented a more balanced view. The study by Beck et al. (2016) conducted an in-depth, empirical analysis of data from 32 countries to assess whether or not a link between financial innovation and bank and economic growth and fragility exists. The results validate the concerns of opponents of financial innovations. Tests that were conducted from the "innovation-fragility" view show that there is a negative relationship

between financial innovation and financial stability (at the bank level and the country level). The main interesting find here is not just the relationship between these variables, but the fact that financial stability is affected more in countries that are deeply entrenched in the financial innovation process. In other words, their capital markets are highly integrated, and the financial linkages formed, act as double-edged swords. Countries that have less integrated markets face lower financial fragility. These results show that financial innovations, alone, cannot pose such a potent threat. The underlying, inherent risks (of financially innovative products) coupled with the complexity of an integrated system can pave the way to destruction.

It is particularly worth mentioning that the failures of financial innovation have been grave. Despite that, holding financial innovation responsible for these failures might be an unjust verdict on their potential for furthering financial development. Moreover, it is also important to recognize the futility of shunning technological advancements in finance. These advancements are rooted in a forward-looking approach and cannot be called back on whim. It is their irreversible nature that should signal caution to those who want to make use of them. This key element has been overlooked in the past, and at each point it has resulted in a shock to the system.

While in the midst of the financial crisis, Crotty (2009) published a review of structural flaws that led to the meltdown. This review highlights how a mortgage-backed CDO converts cash flows from these securities and breaks them down into tranches. Banks sold these tranches to investors in various shapes and forms. At each form, the security retained less information about its core attributes which made pricing these securities an absolute nightmare. Such practices overshadowed this concept, so much so that a typical CDO was inherently non-transparent. Thus, the global financial crisis has made it imperative for bankers and regulators to assess the depth of their financial linkages, and to check financial innovation so that it does not pose threats to systemic integrity.

Apart from such disastrous consequences, there are other disadvantages of financial innovation as well. One such disadvantage is associated with their ability to reduce asymmetric information. Wagner (2007) has contended that financial developments actually induce managers to take more risk because they feel safer in this approach. The agency problem between owners of the banks, and the managers, also aggravates this issue further. Another reason is that they feel costs associated with fragility are lower when information is more or less symmetrical. Again, most studies cite the example of the global crisis when they propose this argument, and it cannot be denied that certain securities were used in ways similar to the ways described above. It is important to note that in these cases, banks are mainly accused of forgetting their responsibility to monitor risk-taking activities.

One study that conducted an empirical analysis in this context is by Subrahmanyam, Tang and Wang (2014). Their research quantified the effect of Credit Default Swaps (CDS) trading on the credit risk borne by firms. The results of this study indicate that bankruptcy risk and possibility of credit downgrade rise once CDS trading begins and also found that firms that are stringent in restructuring their debts encounter more problems due to CDS trading, and that their reluctance causes their credit risk to increase.

Financial innovations are not inherently dangerous. Rather, it is their rampant, unchecked and unmitigated misuse rather abuse that brings the system to a staggering halt. After this, “tail-end risk” does materialize and events that are considered impossibilities, not only occur but also disrupt the whole system. If perverse incentives and lack of ethical practices dominate a system, then a financial crisis will always be on the horizon. Robust systems, and better implementation of regulations can go a long way to keep this side of the financial system at bay.

The present day does not seem to be in favor of complete and utter deregulation. After witnessing the effects of the subprime crisis, it is evident why market participants and financial institutions cannot rely on the "New Financial Architecture (NFA)" (Crotty, 2009). Financial securities, especially those that are as inherently non-transparent as some derivatives cannot be allowed to trade without any regulatory oversight. Moreover, derivatives are no longer the only concern that regulators have to contend with. Other financial innovations have resulted in more complex products and platforms. Cryptocurrencies, blockchains, passive investing and FinTech Startups are still terms that elude comprehension. However, the lack of comprehension does not inhibit people from investing and participating in activities related to them. Nor does it prohibit their speculation. Coupled with their lack of understanding, it is not difficult to see why the future of financial innovation needs to be controlled in order for a better outcome to materialize.

METHODOLOGY

The study builds upon the basic finance-growth model suggested by King and Levine (1993), including variables for financial development and financial innovation. The paper adopts the approach taken by Bara & Mudzingiri (2016) and Laeven et al. (2015). The following panel OLS regression model is constructed as a baseline, using panel techniques:

$$RGDP_{it} = \beta_0 + \beta_1 FIN_{it} + \beta_2 FDEV_{it} + \beta_3 RGDP_{i,t-1} + \beta_4 GEXP_{it} + \beta_5 INF_{it} + \beta_6 TRAD_{it} + \beta_7 CAPFOR_{it} + \varepsilon_{it} \quad \text{(eq.1)}$$

The above equation is relatively simple and does not cater to any correlation that may exist between variables across time, or to any degree of possible endogeneity. However, as the finance-growth nexus establishes, that there may be a bi-directional relationship between financial variables, including financial innovation and development. Therefore, such a model may be insufficient to determine the relationship between financial innovation and economic performance. In order to accurately study the possible endogenous relationship between financial variables and economic performance across countries from 1990 to 2017, the Generalized Method of Moments (GMM) model is deemed most appropriate in this scenario. Using the GMM approach allows us to control for unobserved heterogeneity and any possible endogeneity within our model (Lee et al., 2020). To estimate it, the given equation is adopted:

$$RGDP_{it} = \beta_0 + \beta_1 FIN_{it} + \beta_2 FDEV_{it} + \beta_3 RGDP_{i,t-1} + \beta_4 GEXP_{it} + \beta_5 INF_{it} + \beta_6 TRAD_{it} + \beta_7 CAPFOR_{it} + \theta_{it} + \varepsilon_{it} \quad \text{(eq. 2)}$$

FIN= Financial Innovation
FDEV= Financial Development
RGDP= Real GDP per Capita
GEXP= Government Expenditure
INF= Inflation
TRAD= Trade
CAPFOR= Capital Formation

The measures of financial innovation (*FIN*) adopted for the purpose of this research include the growth of the banking sector credit and the ratio of M1 to M2. These measures have previously

been employed by Laeven et al. (2016); Bara & Mudzingiri (2016), and Bara et al. (2016). the measures included in our study highlight that at the same time as being related to technology, (Beck et al. 2016), financial innovation reflects the efficacy of how the financial sector is improving itself.

Discussion of Variables

The model studies the effect of financial innovation (*FIN*) on the economic performance of an economy (*RGDP*). Economic performance is measured by logged real GDP per capita. Government Expenditure, Inflation, Trade and Capital Formation can potentially have an impact on the relationship and have been included as control variables.

Government expenditure is introduced into the model as a measure of government size. The government's activities may have a significant impact on the financial sector, in different ways, as suggested by Merton (1992). The government may act as a participant, through its open market operations, or as a competitor by introducing new instruments. The government creates a crowding out effect this way, and may end up impeding the process of financial development and innovation in the economy. Conversely, if the government's spending is used inefficiently, it may have a negative impact on the economic performance, where often higher government expenditure is associated with lower economic growth (Afonso and Fureri, 2010). Thus, a negative relation is expected for government expenditure.

The volume of trade is often used as an indicator for trade openness in the economy. Trade openness and trade liberalization have been well established to improve economic performance and growth (Menyah et al, 2014). This is based on the idea that greater openness allows for a flow of information and technology, and encourages specialization, which may help countries achieve greater growth and result in financial development (Beck, 2002).

Inflation is included in the model, despite measuring economic performance in real terms. While economic performance is greatly affected by inflation, the financial sector also faces repercussions. Huang et al. (2010) point out that high levels of inflation may interrupt the role of the financial sector as an intermediary, as the flow of information and credit rationing is distorted. The effectiveness of financial development, and as a result, financial innovation, may also vary with the level of inflation, where financial development may not have any effect on the growth at certain levels (Rousseau and Wachtel, 2002). Thus, it is essential that we control for inflation to clearly understand the effect innovation in isolation.

The model also caters for financial development (FDEV), measured by domestic credit provided to the private sector. It is important to cater for financial development while measuring the effect of innovation because financial development and innovation are closely related. This may be particularly true in the case where financial innovation is measured using the growth banking sector credit, or the changes in financial development (Bara & Mudzingiri, 2016). Financial development in a country sets the threshold for the level of technological innovation. Therefore, financial development is crucial for the economy (Dabla-Norris et al, 2013). Freedman (1983) suggests that financial development increases the demand for money, increasing competition in the financial sector and therefore encouraging banks and institutions to create new instruments. However, as witnessed in the case of the Global Financial Crisis, such instruments are not always beneficial for the economy. Johnson and Kwak (2012) do, however, identify that financial innovation will be beneficial for the overall economy if it facilitates the intermediation role of the financial sector. It is, thus, important to investigate what sort of an effect financial innovation has on the overall economic performance.

As mentioned earlier, trade and financial development may increase the flow of information and technology, and allow improvements in productivity through capital accumulation and fixed capital formation. Thus, capital formation is also included in the model as a control, to isolate the effect of financial development and innovation. Such capital formation is expected to improve the economic performance and growth, as greater capital enables countries to achieve productivity increases and more information allows for a more efficient allocation of capital (Levine, 2005).

Data

The data for this study spans from 1990 to 2017, for 164 countries, obtained from the Global Financial Development Database by the World Bank and International Monetary Fund. Our dataset is a strongly balanced panel. The summary statistics for the variables are reported in Table 1 below.

Table 1
SUMMARY STATISTICS

	N	Mean	St.Dev	Min	Max
Log of Real GDP per capita	3849	8.523	1.518	5.367	11.626
Log of Base to broad money ratio	2299	3.164	0.723	0.728	4.754
Log of Bank Credit growth	2446	-2.757	1.222	-10.303	3.145
Log of Government Expenditure	3849	2.686	0.407	-0.093	4.525
Log of Real GDP per capita (t-1)	3849	8.503	1.519	5.393	11.626
Log of Domestic Credit to Private Sector	3849	3.466	1.034	-1.683	5.891
Log of trade	3849	4.308	0.542	-1.608	6.093
Log of Capital formation	3849	0.212	0.061	-0.007	0.528
Log of Inflation rate	3849	0.085	0.241	-0.2	5.475

Source: Authors own calculations

Table 2
PAIRWISE CORRELATION ANALYSIS

	Log of Real GDP per Capita	Log of Base to Broad Money Ratio	Log of Domestic Credit to Private Sector	Log of Bank Credit Growth	Log of Capital Formation	Log of Government Expenditure	Log of Trade	Log of Inflation Rate	Log of Real GDP per Capita (t-1)
Log of Real GDP per Capita	1.000								
Log of Base to Broad Money Ratio	-6014	1.000							
Log of Domestic Credit to Private Sector	0.668	-0.645	1.000						
Log of Bank Credit Growth	-0.1582	0.262	-0.307	1.000					
Log of Capital Formation	0.112	-0.0050	0.202	0.056	1.000				
Log of Government Expenditure	0.284	-0.1775	0.229	-0.0336	0.020	1.000			
Log of Trade	0.228	-0.0537	0.180	0.051	0.184	0.127	1.000		
Log of Inflation Rate	-0.2612	0.202	-0.2690	0.200	0.054	'-0.1990	-0.086	1.000	

Log of Real GDP per Capita (t-1)	0.999	-0.6000	0.667	-0.1573	0.105	0.287	0.226	-0.262	1.000

Source: Authors' own calculations

Before we start regressing our equations, we perform a correlation analysis (Table 2) on our variables and find that log Real GDP per Capita and log Real GDP per capita (t-1) are strongly correlated, which is expected since the latter is the lagged value of the former. We also find string correlation between log Real GDP per Capita and log Domestic Credit to Private Sector—this finding also makes sense given that as economies grow, the domestic banking sector is more likely to lend to private businesses. We find weak correlations between log Real GDP per Capita and all other variables of interest.

RESULTS

Table 3 presents the results for our baseline regressions; Panel OLS and Panel country-fixed effects model (as determined by the Hausman specification test). The results suggest a negative relationship between financial innovation and economic performance. Some inconsistencies are observed across these models. Financial development, measured by domestic credit to private sector, and government expenditure show inconsistent results, particular in terms of their statistical significance.

Table 3
OLS REGRESSIONS

Dependent Variable	(1)	(2)	(3)	(4)
Log of Real GDP per capita	Panel OLS	Panel OLS	Panel OLS	Panel OLS
		fixed effects		fixed effects
Log of Bank Credit Growth	-0.00249**	-0.00327***		
	(0.00100)	(0.000939)		
Log of Base to Broad Money Ratio			-0.0129***	-0.00751
			(0.00380)	(0.00662)
Log of Government Expenditure	-0.0151*	-0.0240	-0.0175***	-0.0324**
	(0.00806)	(0.0151)	(0.00655)	(0.0146)
Log of Real GDP per capita (t-1)	0.995***	0.950***	0.993***	0.936***
	(0.00217)	(0.0137)	(0.00242)	(0.0180)
Log of Domestic Credit to Private Sector	-0.00277	0.00405	-0.00759**	-0.00582
	(0.00304)	(0.00596)	(0.00372)	(0.00704)
Log of Trade	0.00763**	0.0212***	0.0151***	0.0341***
	(0.00303)	(0.00669)	(0.00379)	(0.00953)
Log of Capital Formation	0.202***	0.205***	0.118***	0.106**
	(0.0328)	(0.0375)	(0.0355)	(0.0459)
Log of Inflation Rate	-0.0443***	-0.0534***	-0.0205**	-0.0350***
	(0.0170)	(0.0174)	(0.00882)	(0.00750)
Constant	0.0344	0.354***	0.107***	0.523***
	(0.0237)	(0.109)	(0.0380)	(0.176)
Observations	2,446	2,446	2,299	2,299
R-squared		0.967		0.952
Number of code	164	164	146	146

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

However, these results do not sufficiently establish the relationship between innovation and economic performance due to the existence of endogeneity and simultaneity bias. The model only caters for the lagged value of economic performance, however, this may be insufficient to address the possible endogeneity, as highlighted by Bara et al (2016). To correct for this bias, it is necessary that a dynamic panel model is implemented. Therefore, this study resorts to GMM, to tackle any biases due to the endogenous nature of the variables. To control for endogeneity, lagged values of financial innovation and economic performance are used as instruments. The results for the GMM Model are presented in Table 4.

Table 4
GMM MODEL

Dependent Variable:	(1)	(2)
Real GDP per capita	System GMM	System GMM
Log of Bank Credit Growth	-0.00547***	
	(0.00196)	
Log of Base to Broad Money Ratio		-0.0276**
		(0.0116)
Log of Government Expenditure	-0.0595**	-0.0587**
	(0.0266)	(0.0279)
Log of Real GDP per Capita (t-1)	0.991***	0.995***
	(0.00775)	(0.00763)
Log of Domestic Credit to Private Sector	-0.0219***	-0.0323***
	(0.00818)	(0.0117)
Log of Trade	0.0721***	0.0553***
	(0.0261)	(0.0214)
Log of Capital Formation	0.423***	0.404**
	(0.152)	(0.157)
Log of Inflation Rate	-0.0856***	-0.00735
	(0.0265)	(0.0125)
Constant	-0.0775	0.0961
	(0.0792)	(0.117)
Observations	2,446	2,299
Number of countries	164	146

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Using GMM, we estimate the model from equation 2. This model is similar to the models presented by Bara & Mudzingiri (2016) and Laeven et al (2015). The results in Table 2 suggest that financial innovation has a negative impact on the real income levels in a country. These results are controlled for endogeneity by using the lagged values of innovation and economic performance as instruments. As regards financial innovation, we find its relationship with economic performance to be negative. This holds true for both the measures of financial innovation, and are in line with the baseline regression. The findings from this model suggest that both the growth of the banking sector credit and increases in base to broad money ratio can hinder the economic performance of a country.

While these findings may seem unusual, they present evidence that the dark side of financial innovation does exist. Table 3 highlights that financial innovation hinders the economic performance of a country, holding all else, including financial development, constant. One

explanation for this is given by Johnson and Kwak (2012) who suggest that when financial development and innovation do not facilitate the financial sector as an intermediary, they may not be beneficial for the economy. The purpose of such development and innovation is to allow for a more efficient allocation of credit. However, when innovation results in the development of instruments that fail to achieve this goal, such as sub-prime mortgages and credit default swaps, they may end up doing more harm than good. The results provide evidence to support this notion, and therefore highlight that financial innovation comes with a price.

As far as the control variables are considered, it is fairly commonplace to find that increases in government expenditure reduces real GDP per capita, as resources diverted from productive uses result in inefficiencies and create a crowding out effect for private investors, distorting the market mechanism (Barro, 1991).

Trade openness of economies, on the other hand, is found to have a positive effect, as expected. Greater international trade allows for a more efficient flow of technology and knowledge from higher income, developed nations to the less developed world (Kim, 2011). Similarly, Rajan & Zingales (2003) point out that higher levels of trade openness lead to competition and specialization, resulting in a long term benefit to the economic performance. Such transfer of knowledge can lead to capital accumulation, and capital formation. This is evident in our findings, which are consistent with Menya et al. (2014), where both trade openness and capital formation are positive and significantly related with economic performance. Inflation shows inconsistencies in its significance to the relationship.

Financial Development shows great significance for both measures of financial innovation, while presenting a negative relationship with economic performance as well. This is consistent with Bara el at (2016) and Rousseau and Wachtel (2002), whose findings suggest that if the credit growth is too quick, it may lead to a detrimental effect on the economy. In fact, the source of the credit growth, that is, innovation, may also play an important role in how it affects the economic performance. A credit boom, such as that in the 1990s, and 2007, may therefore lead to innovation that does not improve the intermediation function of the financial sector (Johnson & Kwak, 2012) and therefore have negative consequences for the overall economic performance.

CONCLUSION

This study attempts to investigate if all financial innovation is beneficial or whether any detrimental effects of financial innovation are felt across economies. The results gathered from our study highlight that financial innovation, while beneficial to an economy, can have a negative impact if left unchecked. As advocated by previous studies, financial innovation can only be as good as the function it is performing. As long as innovation in the sector is helping the system improve, it is completely reasonable to let it flourish. Our study provides support for the notion that oftentimes, there exists a negative relationship between innovation and growth; policymakers must be mindful of the disadvantages as well. It is important to note that these negative impacts result from the misuse of financial innovation. It is not a tool that is inherently dangerously risky, nor is it going to alleviate fundamental problems in the system on its own. Financial innovation, as we argue, is only as good as the people who employ its use. If perverse intentions and excessive risk-taking are rife in the system, then financial innovation becomes a convenient scapegoat when things go to counter to what is desired.

In light of these results, the future of financial innovation encompasses keener regulatory oversight, stringent rules and guidelines. In fact, the concept of market discipline is likely to be a core component of how regulations will work now. The fact that technological impacts cannot be

reversed, only handled (at best), leaves little room for unmitigated risk taking and that is how modern financial institutions will operate now. This study also provides the groundwork for future studies that attempt to investigate the differences across countries that benefit from financial innovation and those that need more stringent regulation for innovation in their financial systems (Appendix 1 & 2).

Appendix 1
SUMMARY STATISTICS FOR BANKING CREDIT GROWTH

	N	Mean	St.Dev	min	max
Log of Real GDP per capita	2446	8.486	1.497	5.406	11.626
Log of Base to broad money ratio	1519	3.189	0.713	0.728	4.754
Log of Bank Credit growth	2446	-2.757	1.222	-10.303	3.145
Log of Government Expenditure	2446	2.68	0.407	-0.093	4.525
Log of Real GDP per capita (t-1)	2446	8.466	1.5	5.432	11.626
Log of Domestic Credit to Private	2446	3.51	0.987	-1.683	5.733
Log of trade	2446	4.298	0.532	-1.608	6.093
Log of Capital formation	2446	0.22	0.062	0.012	0.528
Log of Inflation rate	2446	0.074	0.191	-0.2	4.328

Appendix 2
SUMMARY STATISTICS FOR BASE TO BROAD MONEY RATIO

	N	Mean	St.Dev	min	max
Log of Real GDP per capita	2299	8.425	1.469	5.367	11.425
Log of Base to broad money ratio	2299	3.164	0.723	0.728	4.754
Log of Bank Credit growth	1519	-2.745	1.23	-10.303	3.145
Log of Government Expenditure	2299	2.663	0.382	-0.049	4.525
Log of Real GDP per capita (t-1)	2299	8.4	1.474	5.393	11.425
Log of Domestic Credit to Private	2299	3.504	0.997	-0.846	5.733
Log of trade	2299	4.337	0.529	-1.608	6.093
Log of Capital formation	2299	0.219	0.063	0.021	0.528
Log of Inflation rate	2299	0.058	0.137	-0.2	4.328

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