The Impact of Financial Integration on Growth-Volatility Relationship -A Reappraisal

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Abstract

A plethora of studies have been done on the effect of trade and financial integration on growth-volatility relationship. One of the key findings has been that, trade integration and financial integration weaken growth-volatility relationship. Trade integration is empirically found to positively affect growth significantly but results were less robust for financial integration. This paper finds that, by controlling for some key variables in addition to the variables used in the literature, as well as using alternate classifications and extending the data slightly the coefficient of financial integration is also positive and robust and hence weakens growth-volatility relationship. However, results for trade integration become insignificant after controlling for these crucial variables.

Index terms— financial integration, trade integration, volatility, growth, and openness.

1 Introduction

inancial integration and trade openness have been given ample attention by researches, particularly in the role they play in economic growth. Levine (2001) shows that financial integration positively impacts economic growth by improving financial markets and banks. Henry (2000) employs event study techniques to investigate the effect of stock market liberalization on investment and found that stock market liberalization do matter for investment. He also finds that developing countries in the sample of his study experience abnormally high growth private investment but could not conclude whether this was due to stock market liberalization since several factors can lead to this outcome. Prasad et al., (2003) report that consumptionoutput volatility decreases as financial integration increases. Bekaert and Harvey (2000) observe that capital market liberalization leads a decrease in the cost of capital. Moreover, their results suggest that countries with higher levels of foreign ownership experience much larger decrease in the cost of capital and that the reduction continues in the post liberalization period. On the other hand, Obstfeld (1994) points out that financial globalization leads to large steady-state welfare gains for most countries and that the mechanism of linking global diversification to growth is the shift of world portfolios from low yield capital to high yield capital.

A report by **??**oyd and Bruce (1992) on the other hand, show that financial integration leads to capital outflows from countries with weak institutions to those with strong institutions. Similarly, Arteta, Eichengreen and Wyplosz **??**2001) indicate that while trade openness promotes economic growth, financial integration can promote or hurt economic growth regardless of trade openness. They show that financial integration can hurt an economy if black markets or macroeconomic imbalances exit, or help in the absence of these imbalances.

Kose, Prasad and Terrons (2006) explore the relationship between trade and financial integration and their effect on growth-volatility relationship using a sample of 85 countries comprising of 21 industrial countries and 64 developing countries. The developing countries were sub-divided into MFI's (more financially integrated) countries and LFI's (less financially integrated countries).

Using both cross sectional and panel data analytical techniques, the researchers found that the relationship between growth and volatility is positive for developed countries, and negative for developing countries. Among

the different groups of the developing countries, the relationship for LFI's is negative whiles that for MFI's was positive for the entire period. Specifically however, the relationship was strongly negative before trade and financial integration, strongly positive after trade and financial integration and less obvious in between these periods. This paper employs cross sectional analysis to re-examine how trade and financial integration affect growth-volatility relationship. We exclude some extreme values from the data used by previous studies as well use an alternate index for some of variables in our study to see if result are similar.

In the following section, we outline our methodology. The next section focuses on unearthing the stylized facts established from cross-sectional scatter diagrams. Section 3 comprises of formal regression analysis to expound these stylized facts. Section 4 follows with explanations for the outcome of the study, and the final section presents the concluding remarks.

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The Impact of Financial Integration on Growth-Volatility Relationship -A Reapraisal II.

3 Methodology a) Data

All data are taken from Penn World Table and World Bank databases. Time period for this study is 1960-2004; a total of 45 years; which is an extension by 4 years of Kose et al., (2006). Also, contrary to the sample of 85 countries used in their study, data used in this analysis consist of a total of 83 countries, and this excludes Ghana because it has an extremely high volatility, which could bias the results of the study. The countries in the study are grouped into industrial and developing countries. Developing countries are then sub-divided into MFI's and LFI. By using the Morgan Stanley Capital International (MSCI) world index, we find 23 industrial countries (including Portugal and Singapore) and 23 emerging markets (including Czech Republic) classified as MFI's. The rest are LFI countries. Contrary to other classifications in the literature, we exclude Singapore and Portugal from MFI's in our analysis using the MSCI world index. Singapore in particular seems to have influenced the results of other papers and its reclassification could be one of the major differences in this article study.

In Kose et al., (2006) and other related literature, different measures of trade and financial integration are employed. These include binary measures (using dates of regulation or deregulation) and continuous measures. In this study however, only the continuous measure (also referred to as de facto measure) of these variables are used since they depict more clearly how the degree of trade and financial integration change over time.

4 b) Model

To test the relationship between trade openness, financial integration and the growth-volatility relationship the following ordinary least squares (OLS) model is estimated: where, Growth is the annual growth rate of real GDP per capita, Volatility is the standard deviation of growth, Income is log of initial income (GDP per capita), Primeduc is primary education, Popgrowth is population growth, Invest is investment share of GDP, Openess is trade integration (measured as the ratio of volume of trade to GDP), Fint is the continuous measure of financial integration as the ratio of capital flows to GDP, ICT is the ratio of expenditure on information and communication technology to GDP, and ? is iid error term. The dependent variable is growth, and the independent variable is volatility. The control variables are income, investment, and primary education. Data is taken from the World Bank databases and Penn World Tables. Country names are in Appendix 1.

5 III. Stylized Facts from Cross-Sectional Plots of Growth and Volatility

It is to be expected that the average growth rate of GDP decrease as we move from industrial countries to MFI's and LFI's respectively. However, the same cannot be said of volatility. Ghana for example has a volatility rate higher than most countries (MFI's and industrialized countries). A cross sectional plot of these variables could help identify if there are any stylized facts about the relationship between growth and volatility.

Scatter plots are presented in Fig. **??**-Fig. **??** for each category as well as the full sample. It is apparent from the information in Fig. **??**-Fig. **??** that for the full sample, developing countries and MFI's in particular, there exists a negative relationship between growth and volatility as also reported in related literature such as Kose et al., (2006). However for industrial countries and LFI's, the relationship is positive. The scatter plots in Fig. **??**-Fig. **??** also show a positive relationship between growth and ICT for the full sample and for developing countries.

6 IV.

7 Results

Table 1 reports two sets of regressions for each category. The first regression for each category is a regression of volatility of on growth without the other independent variables whereas the second includes the some of the other independent variables.

In the first set of regressions in Table 1, the coefficient of volatility was positive and significant for industrial countries. The coefficient is 0.59, a little higher than 0.42 of Kose et al., (2006). For MFI's the coefficient on volatility is -0.36 and is not significant. Also, the coefficient on volatility is 0.034 (positive) but not significant for LFI's.

For the second set of regressions in Table 1, log level of initial income, average population growth rate, fraction of population with primary education and investment share of GDP were controlled for. The coefficient of volatility is still positive (0.67) and significant for industrial countries, negative (-0.51) but now significant for MFI's and negative but still not significant for LFI's.

Table 2 reports the results for the full sample. In the first regression, the coefficient on volatility is -0.19 and is significantly at one percent level. Thus, a unit increase in volatility leads to a 19 percent decrease in growth. This result however contradicts the findings of Kormendi and Meguire (1985) that growth and volatility are positively related. In order to see how the continuous measures of trade integration (openness) and financial integration weaken or strengthen this relationship for the full sample, they were introduced in the next two regressions. First openness was added as the second

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The Impact of Financial Integration on Growth-Volatility Relationship -A Reapraisal regressor and the result shows that the coefficient on openness is positive (0.007) and is significant at 1 percent level. Now, we regress growth on volatility and financial integration separately. From the results, as displayed in Table 2, the coefficient (-0.016) on financial integration is positive and significant just as openness. This implies that financial integration positively impacts growth and seems to weaken the growth-volatility relationship.

Having found all the separate effects of financial integration and trade openness on growth, we now include both of them with the other explanatory variables use by Kose et al., (2006). The result shows that the coefficient of financial integration is not significant just as their paper reports. The fifth regression in Table 2 displays this regression results. The coefficients of financial integration (0.010) and trade integration (0.003) are both positive but not significant. The coefficient of volatility (-0.062) is also negative but not significant, suggesting the weakening effect of the openness and trade integration on the relationship between growth and volatility.

In addition to the variables controlled for in the literature, this paper attempts to find other important variables that are not accounted for by the other papers. From macro-economic theory, growth should closely relate to technology. Solow growth model and other macro models emphasize the role of technology in explaining growth. Scatter plots (Fig. **??** and Fig. **??**) suggest that ICT positively impacts growth. Consequently this paper uses the ratio of expenditure on information and communication to GDP as a proxy for technology as an additional control variable.

The result in Table 2 reports a positive coefficient for trade integration (0.003), but it is not significant. Financial integration has both a higher coefficient (0.130) and is significant (at 5 percent level), against the coefficient (0.010) obtained by excluding ICT, which was significant only at the 10 percent level.

It is noteworthy that, financial integration in practice interacts positively with ICT because capital mobility requires much use of ICT. This positive interaction means that the growth volatility relationship should also be weakened as we can see from the sixth regression in Table 2. The coefficient (-0.109) of volatility is smaller and insignificant when these control variables were added than the case when they are excluded in earlier regressions.

V.

9 Conclusion

This paper attempts to find the impact of financial integration on growth volatility relationship. We find that by accounting for the key control variables, financial integration positively affects growth. We also establish that growth and volatility are negatively related and come out with a result that implies that financial integration weakens the negative growth-volatility relationship. This is accentuated after accounting for information and communication technology, distinguishing this paper from previous literature.

In addition, the results suggest that in countries where the degree of financial integration is high, high fluctuations in output (volatility) does not adversely affect growth rate. This may be due to the fact that countries with high degrees of financial integration are also deeply rooted in information and communication technology, which helps them easily and quickly, offset any output shocks using their highly developed stock and capital markets. We have also found a positive and significant relationship between trade integration and growth. However, like Fatas (2002) our results indicate that the positive impact of trade integration on growth volatility relationship is not significant, once other key variables are controlled for.

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Globalization on Developing Countries: Some Empirical Evidence," IMF Occasional Paper, No. 220.

Figure 1: F

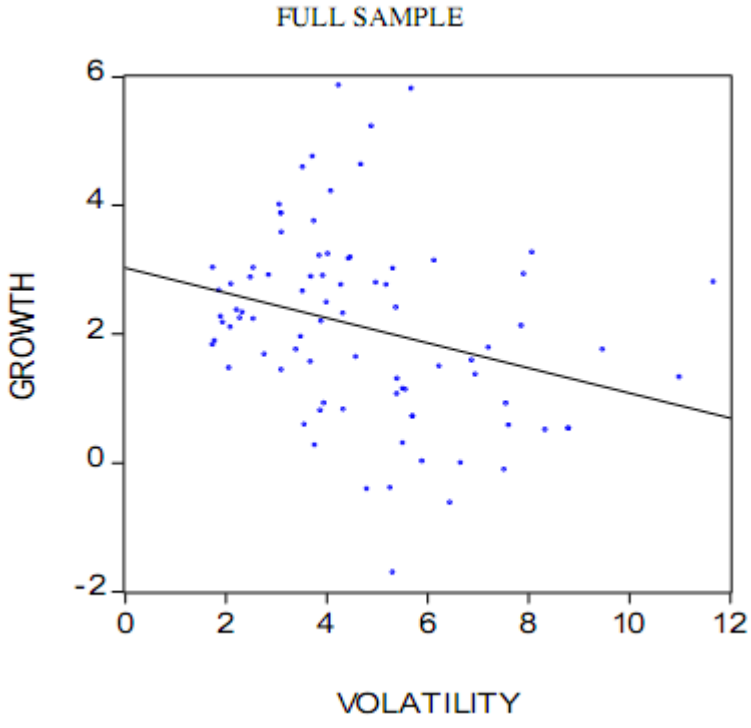

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Figure 2: Fig 1 :Fig 2 :Fig 3 :Fig 4 :Fig 5 :Fig 6 :

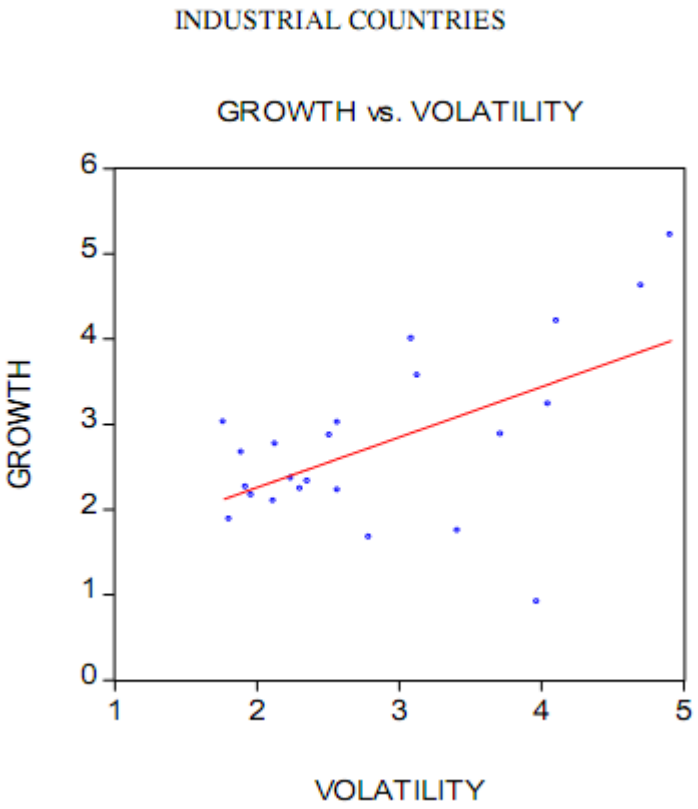

Figure 3:

154 12. Romer, Paul (1994), "The origins of Growth Theory," Journal of Economic Perspectives, 8(1): 3-22.
155 [1] [2]

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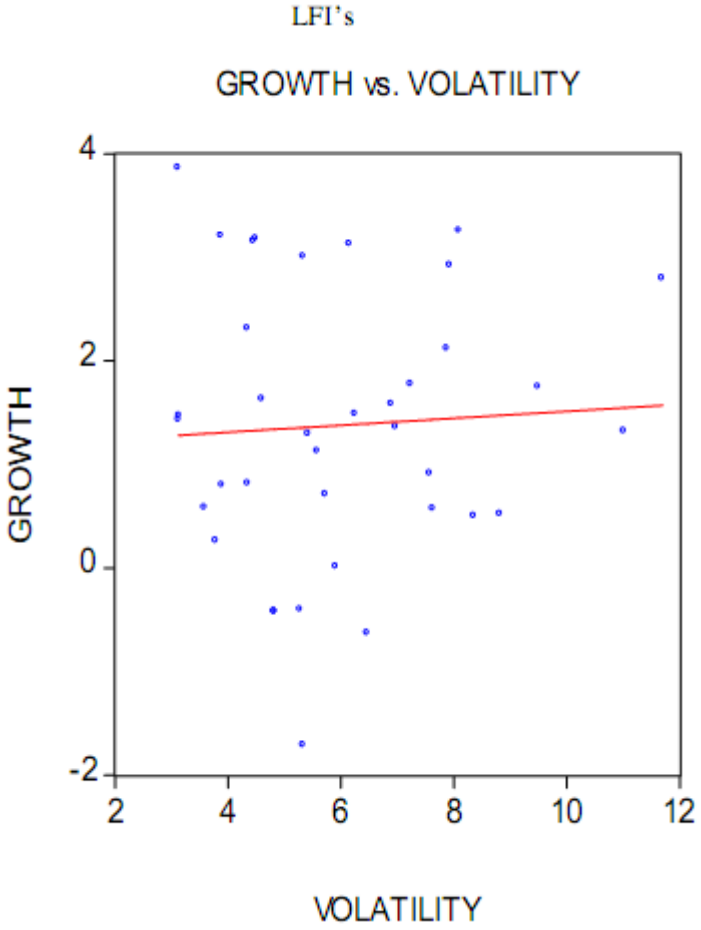
LFI's
GROWTH vs. VOLATILITY
GROWTH
VOLATILITY
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12

Figure 4:

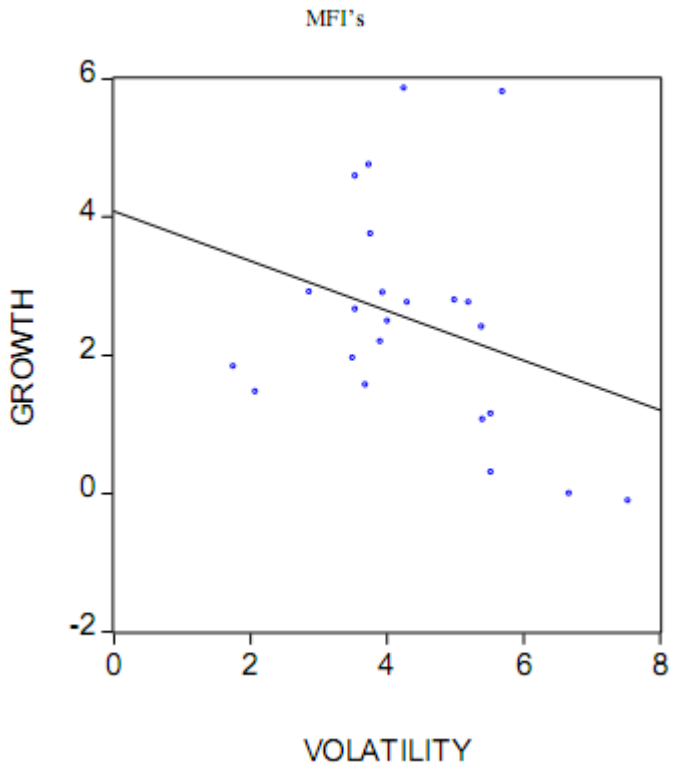

Figure 5:

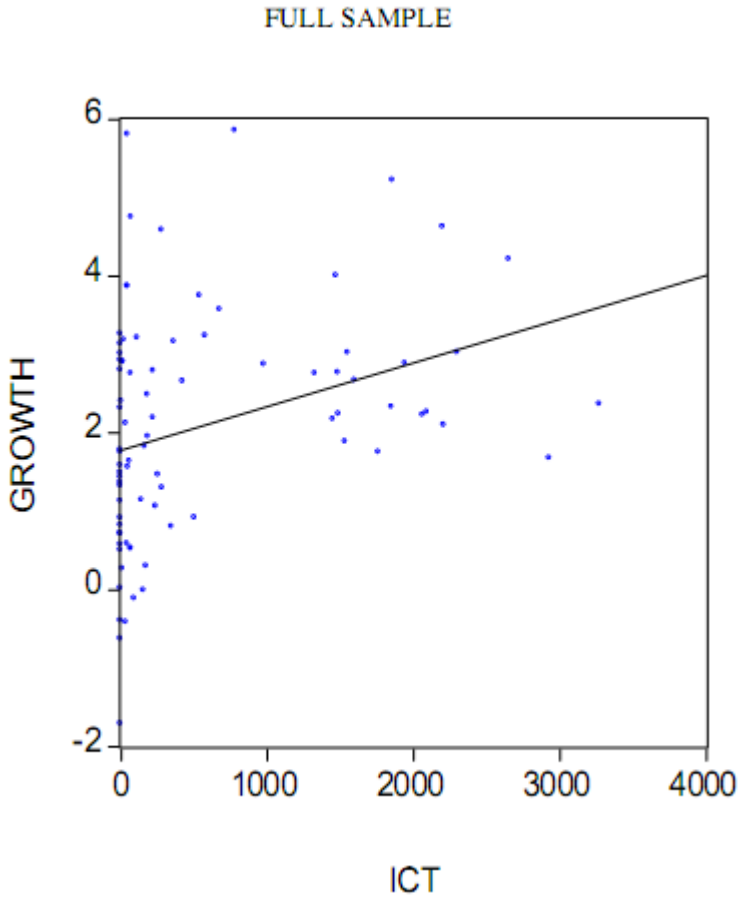

Figure 6:

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Figure 7:

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*[Note: Notes: t-statistics in parentheses; asterisks indicate significance as follows: ***=1%, **=5%, *=10%.]*

Figure 8: Table 1 :

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Independent Variables	IND	MFI	LFI	IND	MFI	LFI
Constant	1.078*	4.085***	1.176*	2.510	14.314***	-2.426
	(1.86)	(3.59)	(1.78)	(0.24)	(4.78)	(-1.14)
Volatility	0.591***	-0.360	0.033	0.673**	-0.511**	0.057
	(3.09)	(-1.45)	(0.32)	(2.79)	(-3.530)	(0.62)
Openess						
Income				-0.232	-1.490***	0.515**
				(-0.23)	(-4.23)	(2.18)
Financial Integration						
Population Growth				-0.051	0.039	-0.423
				(-0.114)	(0.073)	(-1.39)
Investment				0.023	0.225***	0.045*
				(0.566)	(5.32)	(1.82)
Education				0.024	-0.062	-0.001
				(0.26)	(-0.77)	(-0.02)
Information Technology						
R-Squared	0.31	0.09	0.003	0.59	0.74	0.41
Number of Observations	23	23	38	23	23	38
Independent Variables	I	II	III	IV	V	VI
Constant	3.028***	2.584***	2.679***	0.961	1.474	0.227
	(8.12)	(6.25)	(6.95)	(0.51)	(0.79)	(0.12)
Volatility	-0.194***	-0.202***	-0.175***	-0.043	-0.062	-0.109
	(-2.72)	(-2.91)	(2.53)	(-0.55)	(-0.80)	(-1.40)
Openess		0.007**			0.003	0.003
		(2.26)			(1.11)	(1.13)
Income				0.086	-0.006	0.188
				(0.43)	(-0.04)	(0.90)
Financial Integration			0.016***		0.010*	0.0130**
			(2.56)		(1.69)	(2.17)
Population Growth				-0.089	-0.182	-0.144
				(-0.36)	(-0.74)	(-0.60)
Investment				0.069**	0.067***	0.082***
				(3.63)	(3.58)	(4.26)
Education				-0.062	-0.014	-0.025
				(-0.77)	(-0.48)	(-0.85)
Information Technology						-0.001**
						(-2.39)
R-Squared	0.08	0.33	0.15	0.14	0.38	0.42
Number of Observations	84	84	84	84	84	84

*[Note: Notes: t-statistics in parentheses; asterisks indicate significance as follows: ***=1%, **=5%, *=10%.]*

Figure 9: Table 2 :

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