Inflation and the Great Moderation: Evidence from a Large Panel Data Set

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Abstract

This paper investigates the relationship between the Great Moderation and two measures of inflation performance: trend inflation and inflation volatility. Using annual data from 1970 to 2011 for a large panel of 180 developed and developing economies, the results show that, as expected, both measures are positively correlated with output volatility. When the two measures are jointly considered, however, and there is sufficient information to identify their effects separately, our empirical findings show that the effect of inflation volatility is positive, while the effect of trend inflation is negative. The implication is that reduced inflation volatility (holding trend inflation constant) helps stabilize the business cycle, whereas lower inflation (holding inflation volatility constant) exacerbates output volatility.

Keywords: Great Moderation, Trend Inflation, Inflation Volatility

JEL Classification: E31, E32

1. Introduction

One of the most notable macroeconomic developments of the last few decades has been the Great Moderation: the apparent decline in output volatility that has characterized the business cycle of the US and other countries. Because of its obvious importance for macroeconomic theory and policy, the Great Moderation has been extensively scrutinized by both theoretical and empirical research[1].

While numerous factors have been proposed as possible explanations for this

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[1] The term "great moderation" originated in Stock and Watson (2002). See Summers (2005), Gali and Gambetti (2009), Coibion and Gorodnichenko (2011), and Carvalho and Gabaix (2013) for other recent examples. Keating (2012) provides an interesting longer-term perspective. Vesselinov (2012) and Gozgor (2013) provide two interesting country-specific studies of the business cycle and its relation to inflation.

widespread smoothing of the business cycle[2], our focus here is the link between the Great Moderation and inflation performance across countries and over time. Beginning with Blanchard and Simon (2001), a more stable inflation environment is one of the main explanations that have been advanced for the Great Moderation. The literature however is divided on whether this means lower *inflation volatility*, as found by Blanchard and Simon (2001), or lower *trend inflation*, as argued by Coibion and Gorodnichenko (2008).

The goal of the present paper is to shed light on this debate, disentangling the effects of inflation volatility from those of trend inflation. This is less than straightforward because of the very high positive correlation between these two inflation variables in most data sets: periods of high trend inflation tend to coincide with periods of high inflation volatility, so that separate identification of their effects on the business cycle is not always possible.

Our approach manages to achieve this using a panel methodology that analyzes annual data from 1970 to 2011 for 180 developed and developing economies. To our knowledge, this is the most extensive data set used for this purpose, and, as it turns out, it suffices to establish the following conclusions. As expected, both trend inflation and inflation volatility are positively correlated with output volatility in bivariate relations. When both are included in the regression, however, our empirical findings show that the effect of inflation volatility is positive, while the effect of trend inflation is negative. The implication is that reduced inflation volatility (holding trend inflation constant) helps stabilize the business cycle, whereas lower inflation (holding inflation volatility constant) exacerbates output volatility. These results are robust to a couple of different definitions of output volatility and a number of different estimation techniques.

The rest of the paper is organized as follows. Section 2 discusses the sources of the data and defines the variables to be used in the estimation. Section 3 outlines the estimation methodology, derives the main empirical results, and implements a number of robustness checks. Section 4 discusses the findings and concludes.

2. The Data

All data are obtained from the UN National Accounts and the data set consists of a panel of the 180 economies for which annual data exist for each of the years 1970-2011. Nominal aggregate income (Y) is measured by GDP in current prices, while real income (y) is measured by GDP in constant (2005) prices. Both series are expressed in national currencies. The price level (P) is then defined as the GDP deflator, $P = Y/y$, and inflation (π) as the annual growth rate of the price level.

Using i to index over countries and t over time, we denote output volatility by $\sigma_{i,t}$, trend inflation by $\overline{\pi}_{i,t}$, and inflation volatility by $\sigma^{\pi}_{i,t}$. All three variables are constructed using rolling 5-year windows, so they are defined over 1975-2011. $\overline{\pi}_{i,t}$ and $\sigma^{\pi}_{i,t}$ are equal to the mean and standard deviation, respectively, of the inflation rate over each 5-year period.

[2] These include a more stable economic structure, stabilizing monetary and/or fiscal policies, and less violent exogenous shocks ("good luck").

To quantify output volatility, $\sigma_{i,t}$, two techniques are used. First, we compute the standard deviation of the real GDP growth rate, again calculated over rolling 5-year windows. We denote this simple measure by $\sigma_{i,t}^{\Delta y}$. In addition, we decompose the real GDP series between the trend and a cyclical component, using the Hodrick-Prescott (HP) filter, proposed by Hodrick and Prescott (1980, 1997), and extensively used in the business-cycle literature. Letting $x_{i,t} = \ln(y_{i,t})$ denote (the log of) real GDP, the HP filter defines its trend, $\bar{x}_{i,t}$, as the component that minimizes

$$\sum_{t=1}^{T}\left(x_{i,t} - \bar{x}_{i,t}\right)^2 + \lambda\sum_{t=2}^{T-1}\left[\left(\bar{x}_{i,t+1} - \bar{x}_{i,t}\right) - \left(\bar{x}_{i,t} - \bar{x}_{i,t-1}\right)\right]$$

for $\lambda > 0$. In the empirical section below we report results for $\lambda = 100$, the value suggested by Hodrick and Prescott for annual data, but we also tried $\lambda = 6.25$, the smoothing parameter value recommended by Ravn and Uhlig (2002) for annual data (with no appreciable difference in our findings). The cyclical output component is then simply given by $x_{i,t} - \bar{x}_{i,t}$, and its standard deviation over the rolling 5-year windows, $\sigma_{i,t}^{HP}$, provides our second measure of business-cycle volatility.

The Appendix provides a list of the 180 economies[3]. As the Appendix makes clear, the sample of countries is quite diverse, including economies which are at various stages of development, and have had very different growth and inflation experiences.

Figure 1 plots the simple (unweighted) averages of our two measures of business-cycle volatility, $\sigma_{i,t}^{\Delta y}$ and $\sigma_{i,t}^{HP}$, over all 180 economies. First, Figure 1 shows that the two measures move closely together, thus providing very similar information about the behavior of the underlying $\sigma_{i,t}$ (and accounting for the robustness of our empirical results in the next section)[4].

In addition, and more to our purpose here, Figure 1 clearly illustrates that the "Great Moderation" is a global phenomenon. Indeed, with two notable exceptions, both measures of cyclical output volatility have steadily declined over the last four decades (the two exceptions are 1988-1992 and the period following the 2008 financial crisis).

The next two Figures visualize the relationship between output volatility and inflation performance, using again simple averages over all 180 economies. The $\sigma_{i,t}^{\Delta y}$ measure of output volatility is combined with trend inflation on Figure 2, and with inflation volatility on Figure 3. Both Figures paint a similar picture. Particularly since the mid-1980s, output volatility is positively related with both trend inflation and inflation volatility, as expected: lower and more stable inflation has coincided with a smoother business cycle. Note however, that trend inflation and inflation volatility evolve so similarly that telling which of the two is more closely related to output volatility is far from easy. This will be the subject of the more formal empirical investigation of the next section.

[3] As already noted, country selection has been dictated by data availability only.

[4] For the entire panel data set, $corr\left(\sigma_{i,t}^{\Delta y}, \sigma_{i,t}^{HP}\right) = 0.88$.

3. Empirical Evidence

3.1 Trend Inflation

We start with a simple relationship between output volatility and trend inflation. Using Coibion and Gorodnichenko's (2008) empirical specification, the estimated model is:

$$\sigma_{i,t} = w_i + v_t + \alpha \cdot \overline{\pi}_{i,t} + u_{i,t}, \tag{1}$$

where $\sigma_{i,t}$ is output volatility; $\overline{\pi}_{i,t}$ trend inflation; *i* is indexing over countries and *t* over time; *w* and *v* represent country- and time-specific effects; and α, a parameter to be estimated, captures the effect of trend inflation on output volatility.

Table 1 presents the results. Panel A includes all observations, and the estimated α's are found to be positive and highly statistically significant. They are also robust to whether the regression includes fixed or random effects, and to whether $\sigma_{i,t}$ is proxied by $\sigma^{\Delta y}_{i,t}$ or $\sigma^{HP}_{i,t}$. However, they are quite small, questioning the economic significance of the effects. This small size, however, could be the result of a relatively small number of extremely high inflation values that flatten the regression line.

To check this, Panel B of Table 1 repeats the exercise excluding inflation values higher than 100%[5]. The estimated α's remain positive, highly statistically significant, and robust to the various specifications, but they also become much larger, indicating economically significant effects. Panel C pursues this further, excluding inflation values higher than 30%[6]. The estimated α's are once again positive, highly statistically significant, and robust, while now they become even more sizable. These results therefore suggest that the effect of *trend inflation* on business-cycle volatility is positive and significant.

3.2 Inflation Volatility

Next, we move to the relationship between output volatility and inflation volatility. The estimated model becomes:

$$\sigma_{i,t} = w_i + v_t + \beta \cdot \sigma^{\pi}_{i,t} + u_{i,t}, \tag{2}$$

where $\sigma^{\pi}_{i,t}$ is inflation volatility, and β, a parameter to be estimated, captures the effect of inflation volatility on output volatility.

Table 2 presents the results of estimating model (2). Panel A starts by including all observations, showing that the estimated β's are positive, highly statistically significant, and robust to the two different measures of $\sigma_{i,t}$ and to whether fixed or random effects are

[5] This reduces the sample size from 6660 to 6485 observations, or by 2.6%.

[6] This further reduces the sample size to 6081 observations, or by 8.7% of the original size.

included. Like the estimated α 's of Table 1, however, the point estimates of these β 's are very small, casting doubt on the economic significance of their effects. It turns out again, however, that this is because of the small number of observations with very large inflation values that flatten the regression line.

To confirm this, the next two panels of Table 2 repeat the estimation of model (2), excluding inflation values higher than 100% (Panel B) or higher than 30% (Panel C), following the strategy of Table 1. It is apparent that the estimated β 's are still positive, highly statistically significant, and robust to the various specifications, but in addition they increase substantially in size indicating effects that are much more economically significant. These results therefore suggest that the effect of *inflation volatility* on business-cycle volatility is positive and significant.

3.3 Trend Inflation v Inflation Volatility

Our findings so far show that output volatility ($\sigma_{i,t}$) is positively correlated with both trend inflation ($\overline{\pi}_{i,t}$) and inflation volatility ($\sigma^{\pi}_{i,t}$). If $\overline{\pi}_{i,t}$ and $\sigma^{\pi}_{i,t}$ are highly correlated themselves, however, these findings would not necessarily mean that both variables have an independent effect on the business cycle. And, as expected, the correlations between $\overline{\pi}_{i,t}$ and $\sigma^{\pi}_{i,t}$ are rather high: 0.96 for the full sample (Panels A in the Tables), 0.75 for the sample excluding trend inflation greater than 100% (Panels B), and 0.50 for the sample excluding trend inflation greater than 30% (Panels C). Such high correlations mean that, even if only one of the two inflation variables economically mattered for cyclical variability, both would appear to be correlated with $\sigma_{i,t}$ in the bivariate regressions of models (1) and (2).

To address this issue and determine which of the two inflation variables matters the most, we now estimate the nested model:

$$\sigma_{i,t} = w_i + v_t + \alpha \cdot \overline{\pi}_{i,t} + \beta \cdot \sigma^{\pi}_{i,t} + u_{i,t}, \tag{3}$$

where notation is as before, with the following difference in interpretation: α now captures the effect of trend inflation on output volatility, holding inflation volatility constant; while β represents the effect of inflation volatility on output volatility, holding trend inflation constant[7].

The results are presented in Table 3, which is organized like the last two Tables. Begin with Panel A which includes all observations. The estimated α 's are all positive, while the estimated βs are all negative. We note however that all coefficients are very small in magnitude and largely statistically insignificant, across the different specifications. This may not be very helpful, but it is easily explained given the extremely high correlation (0.96) between $\overline{\pi}_{i,t}$ and $\sigma^{\pi}_{i,t}$, which apparently leaves very little independent information to be used in the identification of α and β in the multivariable framework of model (3).

[7] This is similar to the model used by Blanchard and Simon (2001).

Panel B of Table 3 estimates the model excluding trend inflation values higher than 100%. The picture now changes drastically. Both estimated α s and β s are substantially larger (in absolute value) and all are highly statistically significant. It is obvious that the reduced, though still high, correlation between $\overline{\pi}_{i,t}$ and $\sigma_{i,t}^{\pi}$ in this sample (0.75) allows for enough independent variability to identify their separate effects more precisely. Interestingly, the estimated β s are all positive (as expected), while the estimated α s are all negative (the "wrong" sign)[8]. The implication is that reduced inflation volatility (holding trend inflation constant) helps stabilize the business cycle, whereas lower inflation (holding inflation volatility constant) exacerbates output volatility.

Panel C of Table 3 estimates model (3), excluding inflation values higher than 30%. Estimated coefficients are generally greater (in absolute value), but the signs and statistical significance remain the same with Panel B. In particular, the estimated β s are positive while the estimated α s are negative. Once more the results suggest that the effect of inflation volatility on output volatility is positive when trend inflation is controlled for; whereas the effect of trend inflation on output volatility is negative when inflation volatility is controlled for. This is consistent with Blanchard and Simon's (2001) finding that it is the lower *inflation volatility* (rather than lower *trend inflation*) that has mattered more for the reduction in output volatility.

4. Discussion and Conclusions

This paper investigated the relationship between the Great Moderation and two measures of inflation performance: trend inflation and inflation volatility. Using annual data from 1970 to 2011 for a large panel of 180 developed and developing economies, the results show that, as expected, both measures are positively correlated with output volatility.

When both measures are included in the regression, however, and there is sufficient information to identify their effects separately, our empirical findings show that the effect of inflation volatility is positive, while the effect of trend inflation is negative. The implication is that reduced inflation volatility (holding trend inflation constant) helps stabilize the business cycle, whereas lower inflation (holding inflation volatility constant) exacerbates output volatility. These results are found to be robust to a number of different empirical specifications and estimation techniques.

These findings have obvious policy implications. The most obvious is that inflation volatility, rather than trend inflation, matters the most for the severity of the business cycle. It follows that it has been reduced inflation volatility, rather than reductions in trend inflation, that contributed the most to the Great Moderation, as argued by Blanchard and Simon (2001).

Even more strongly, our estimates suggest that, *holding inflation volatility constant*,

[8] Interestingly, these are the same with the signs obtained by Blanchard and Simon (2001), though in a much smaller panel data set.

reducing trend inflation ends up deteriorating the business cycle. The robustness of this somewhat unexpected result should be the subject of further research, but if confirmed by additional evidence this finding may help resolve the apparent paradox of the output volatility reversal of the post-2008 period in an environment of very low inflation.

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Table 1

Estimated Model: $\sigma_{i,t} = w_i + v_t + \alpha \cdot \overline{\pi}_{i,t} + u_{i,t}$

PANEL A: Full Sample

	$\sigma_{i,t} = \sigma_{i,t}^{\Delta y}$			$\sigma_{i,t} = \sigma_{i,t}^{HP}$		
	OLS	FE	RE	OLS	FE	RE
α	0.0006**	0.0006**	0.0007**	$7.4\cdot10^{-6}$**	$5.2\cdot10^{-6}$**	$5.4\cdot10^{-6}$**
	(0.0002)	(0.0002)	(0.0002)	($2.0\cdot10^{-6}$)	($1.8\cdot10^{-6}$)	($1.8\cdot10^{-6}$)

PANEL B: Sample with $\overline{\pi}_{i,t} < 100\%$

	$\sigma_{i,t} = \sigma_{i,t}^{\Delta y}$			$\sigma_{i,t} = \sigma_{i,t}^{HP}$		
	OLS	FE	RE	OLS	FE	RE
α	0.0333**	0.3421**	0.0360**	$3.3\cdot10^{-4}$**	$3.2\cdot10^{-4}$**	$3.4\cdot10^{-4}$**
	(0.0040)	(0.0043)	(0.0042)	($3.6\cdot10^{-5}$)	($3.9\cdot10^{-5}$)	($3.7\cdot10^{-5}$)

PANEL C: Sample with $\overline{\pi}_{i,t} < 30\%$

	$\sigma_{i,t} = \sigma_{i,t}^{\Delta y}$			$\sigma_{i,t} = \sigma_{i,t}^{HP}$		
	OLS	FE	RE	OLS	FE	RE
α	0.0673**	0.0757**	0.0837**	0.0333**	0.0006**	0.0006**
	(0.0087)	(0.0099)	(0.0094)	($7.8\cdot10^{-5}$)	($8.7\cdot10^{-5}$)	($8.3\cdot10^{-5}$)

Notes: Business-cycle volatility, $\sigma_{i,t}$, is measured by $\sigma_{i,t}^{\Delta y}$, the standard deviation of real GDP growth, or $\sigma_{i,t}^{HP}$, the standard deviation of the Hodrick-Prescott detrended (log) real GDP; $\overline{\pi}_{i,t}$ is trend inflation; w_i and v_t represent fixed ("FE") or random ("RE") country and time effects (not reported). "OLS" replaces w_i and v_t by a simple constant term (also not reported). Usable observations are 6660 for Panel A, 6485 for Panel B, and 6081 for Panel C. Estimated standard errors in parentheses. ** and * denote statistical significance at the 1% and 5% significance levels.

Table 2

Estimated Model: $\sigma_{i,t} = w_i + v_t + \beta \cdot \sigma^{\pi}_{i,t} + u_{i,t}$

PANEL A: Full Sample

	$\sigma_{i,t} = \sigma^{\Delta y}_{i,t}$			$\sigma_{i,t} = \sigma^{HP}_{i,t}$		
	OLS	FE	RE	OLS	FE	RE
β	0.0003**	0.0003**	0.0003**	$3.7\cdot10^{-6}$**	$2.7\cdot10^{-6}$**	$2.8\cdot10^{-6}$**
	(0.0001)	(0.0001)	(0.0001)	($1.2\cdot10^{-6}$)	($1.0\cdot10^{-6}$)	($1.0\cdot10^{-6}$)

PANEL B: Sample with $\overline{\pi}_{i,t} < 100\%$

	$\sigma_{i,t} = \sigma^{\Delta y}_{i,t}$			$\sigma_{i,t} = \sigma^{HP}_{i,t}$		
	OLS	FE	RE	OLS	FE	RE
β	0.1018**	0.0701**	0.0736**	$9.3\cdot10^{-4}$**	$6.3\cdot10^{-4}$**	$6.6\cdot10^{-4}$**
	(0.0044)	(0.0044)	(0.0043)	($4.0\cdot10^{-5}$)	($4.0\cdot10^{-5}$)	($3.9\cdot10^{-5}$)

PANEL C: Sample with $\overline{\pi}_{i,t} < 30\%$

	$\sigma_{i,t} = \sigma^{\Delta y}_{i,t}$			$\sigma_{i,t} = \sigma^{HP}_{i,t}$		
	OLS	FE	RE	OLS	FE	RE
β	0.2665**	0.1983**	0.2090**	0.0021**	0.0014**	0.0015**
	(0.0084)	(0.0092)	(0.0089)	($7.6\cdot10^{-5}$)	($8.3\cdot10^{-5}$)	($8.0\cdot10^{-5}$)

Notes: See Table 1. $\sigma^{\pi}_{i,t}$ is the standard deviation of inflation.

Table 3

Estimated Model: $\sigma_{i,t} = w_i + v_t + \alpha \cdot \overline{\pi}_{i,t} + \beta \cdot \sigma^{\pi}_{i,t} + u_{i,t}$

PANEL A: Full Sample

	$\sigma_{i,t} = \sigma^{\Delta y}_{i,t}$			$\sigma_{i,t} = \sigma^{HP}_{i,t}$		
	OLS	FE	RE	OLS	FE	RE
α	0.0017*	0.0012	0.0013	$1.8\cdot10^{-5}$*	$9.1\cdot10^{-6}$	$1.0\cdot10^{-5}$
	(0.0008)	(0.0007)	(0.0007)	($7.5\cdot10^{-6}$)	($6.3\cdot10^{-6}$)	($6.3\cdot10^{-6}$)
β	–0.0007	–0.0003	–0.0004	$-6.7\cdot10^{-6}$	$-2.4\cdot10^{-6}$	$-3.0\cdot10^{-6}$
	(0.0005)	(0.0007)	(0.0004)	($4.4\cdot10^{-6}$)	($3.7\cdot10^{-6}$)	($3.7\cdot10^{-6}$)

PANEL B: Sample with $\overline{\pi}_{i,t} < 100\%$

	$\sigma_{i,t} = \sigma^{\Delta y}_{i,t}$			$\sigma_{i,t} = \sigma^{HP}_{i,t}$		
	OLS	FE	RE	OLS	FE	RE
α	–0.0768**	–0.0413**	–0.0426**	$-6.3\cdot10^{-4}$**	$-3.5\cdot10^{-4}$**	$-3.5\cdot10^{-4}$**
	(0.0057)	(0.0065)	(0.0063)	($5.2\cdot10^{-5}$)	($5.9\cdot10^{-5}$)	($5.7\cdot10^{-5}$)
β	0.1675**	0.1027**	0.1075**	0.0015**	$9.0\cdot10^{-4}$**	$9.4\cdot10^{-4}$**
	(0.0066)	(0.0067)	(0.0066)	($5.9\cdot10^{-5}$)	($6.1\cdot10^{-5}$)	($6.0\cdot10^{-6}$)

PANEL C: Sample with $\overline{\pi}_{i,t} < 30\%$

	$\sigma_{i,t} = \sigma^{\Delta y}_{i,t}$			$\sigma_{i,t} = \sigma^{HP}_{i,t}$		
	OLS	FE	RE	OLS	FE	RE
α	–0.0800**	–0.0419**	–0.0391**	–0.0006**	–0.0002*	–0.0002*
	(0.0093)	(0.0112)	(0.0106)	($8.5\cdot10^{-5}$)	(0.0001)	($9.5\cdot10^{-5}$)
β	0.3074**	0.2192**	0.2282**	0.0024**	0.0015**	0.0016**
	(0.0096)	(0.0108)	(0.0105)	($8.7\cdot10^{-5}$)	($9.6\cdot10^{-5}$)	($9.4\cdot10^{-5}$)

Notes: See Tables 1 and 2.

Figure 1

Two measures of Real GDP Volatility

Unweighted Averages of 180 Economies: 1975-2011

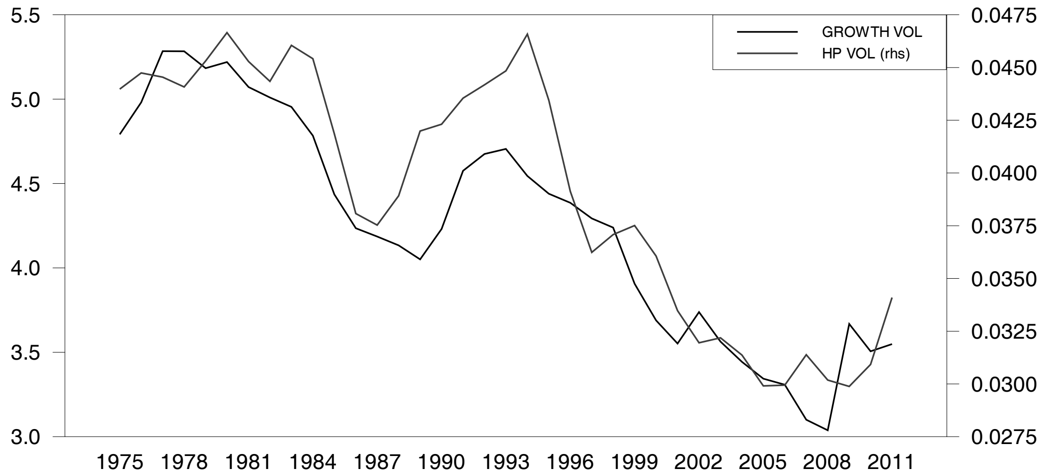


Figure 2

Real GDP Growth Volatility and Trend Inflation

Unweighted Averages of 180 Economies: 1975-2011

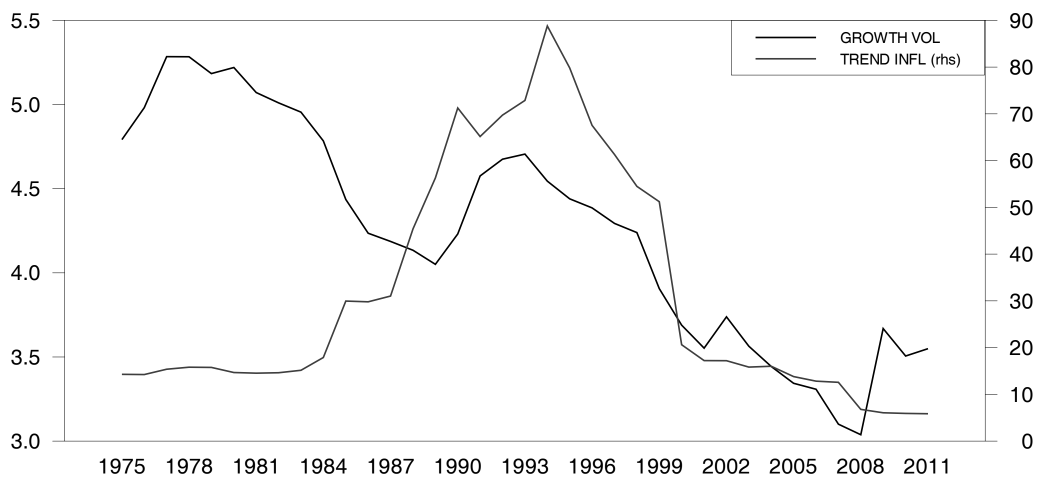
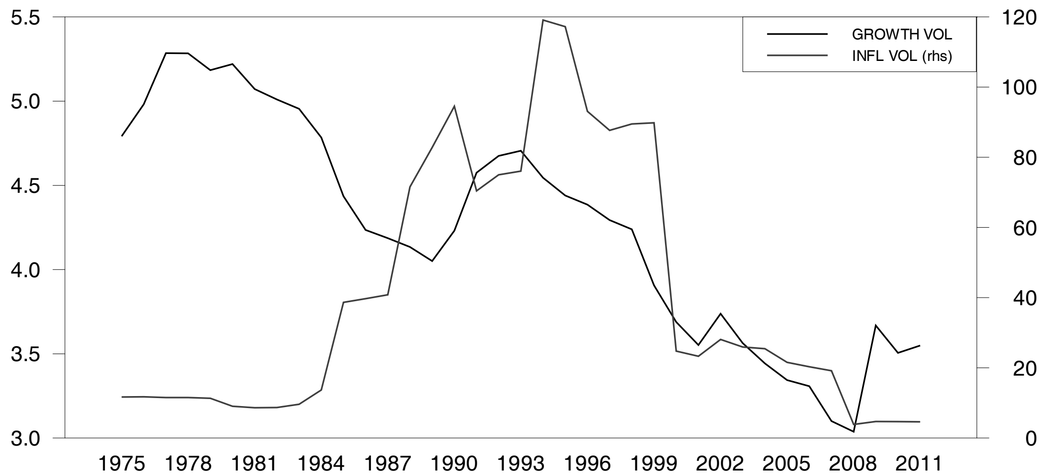


Figure 3

Real GDP Growth Volatility and Inflation Volatility

Unweighted Averages of 180 Economies: 1975-2011



Appendix

List of the 180 Economies

Afghanistan, Albania, Algeria, Andorra, Angola, Anguilla, Antigua and Barbuda, Argentina, Aruba, Australia, Austria, Bahamas, Bahrain, Bangladesh, Barbados, Belgium, Belize, Benin, Bermuda, Bhutan, Bolivia, Botswana, Brazil, British Virgin Islands, Brunei Darussalam, Bulgaria, Burkina Faso, Burundi, Cambodia, Cameroon, Canada, Cape Verde, Cayman Islands, Central African Republic, Chad, Chile, China: People's Republic of, China: Hong Kong SAR, China: Macao SAR, Colombia, Comoros, Congo, Cook Islands, Costa Rica, Côte d'Ivoire, Cuba, Cyprus, Democratic People's Republic of Korea, Democratic Republic of the Congo, Denmark, Djibouti, Dominica, Dominican Republic, Ecuador, Egypt, El Salvador, Equatorial Guinea, Fiji, Finland, France, French Polynesia, Gabon, Gambia, Germany, Ghana,
Greece, Greenland, Grenada, Guatemala, Guinea, Guinea-Bissau, Guyana, Haiti, Honduras, Hungary, Iceland, India, Indonesia, Iran: Islamic Republic of, Iraq, Ireland, Israel, Italy, Jamaica, Japan, Jordan, Kenya, Kiribati, Kuwait, Lao People's Democratic Republic, Lebanon, Lesotho, Liberia, Libya, Liechtenstein, Luxembourg, Madagascar, Malawi, Malaysia, Maldives, Mali, Malta, Marshall Islands, Mauritania, Mauritius, Mexico, Micronesia (Federated States of), Monaco, Mongolia, Montserrat, Morocco, Mozambique, Myanmar, Namibia, Nauru, Nepal, Netherlands, Netherlands Antilles, New Caledonia, New Zealand, Nicaragua, Niger, Nigeria, Norway, Occupied Palestinian Territory, Oman, Pakistan,
Palau, Panama, Papua New Guinea, Paraguay, Peru, Philippines, Poland, Portugal, Puerto Rico, Qatar, Republic of Korea, Romania, Rwanda, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Samoa, San Marino, Sao Tome and Principe, Saudi Arabia, Senegal, Seychelles, Sierra Leone, Singapore, Solomon Islands, Somalia, South Africa, Spain,
Sri Lanka, Suriname, Swaziland, Sweden, Switzerland, Syrian Arab Republic, Thailand, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkey, Turks and Caicos Islands, Tuvalu, Uganda, United Arab Emirates, United Kingdom of Great Britain and Northern Ireland, United Republic of Tanzania: Mainland, United States, Uruguay, Vanuatu, Venezuela (Bolivarian Republic of), Viet Nam, Zambia, Zimbabwe