UNCERTAINTY, FINANCIAL DEVELOPMENT AND ECONOMIC GROWTH: AN EMPIRICAL ANALYSIS

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SOM-theme E: Financial markets and institutions

ABSTRACT

This paper examines whether financial sector development may partly undo growth-reducing effects of policy uncertainty. By performing a cross-country growth regression for the 1970-1995 period I find evidence that countries with a more developed financial sector are better able to nullify the negative effects of policy uncertainty on per capita economic growth. For countries with a very well developed financial sector, it may even be the case that an increase in policy uncertainty positively affects per capita economic growth. This clearly indicates the relevance of financial sector development.

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1. Introduction

Many papers recently have referred to the importance of stable and predictable macroeconomic policies for economic growth, especially for developing countries. Relatedly, many authors state that the successful implementation of a structural adjustment program crucially depends on government policies being credible (see, *e.g.* Rodrik, 1989 and Calvo, 1988). This literature is closely connected to a now booming research theme regarding the effects of uncertainty on investment and economic growth. Well known references in this field are Lucas and Prescott (1971), Arrow (1968), Abel (1983), Bernanke (1983), Caballero (1991), Abel and Eberly (1994) and Dixit and Pindyck (1994). These studies are mainly theoretical, although there are, especially at the firm level, more and more empirical studies appearing (see Leahy and Whited (1996)). Aizenman and Marion (1993) examine the macro-economic effects of uncertainty. However, there is still a lack of empirical macroeconomic studies in which the growth effects of uncertainty are examined. Although most studies suggest that a rise in (policy) uncertainty has a negative effect on investment, and hence on growth, there is also a line in the literature, following Abel (1983), emphasizing the possible positive effects of greater uncertainty.

There is also, especially since the publication of the seminal studies of McKinnon (1973) and Shaw (1973), a vast literature on the effects of financial development on economic growth. The relationship between financial markets and economic growth is now one of the most important issues in development economics. There are too many studies to mention, but see Levine and Renelt (1992) and King and Levine (1993) for some very important recent contributions at the empirical level. Hermes and Lensink (1996) present a survey of recent theoretical and empirical contributions. This literature emphasizes the importance of financial markets in the process of economic growth. By referring to the different functions and services of the financial sector, it is suggested that well developed financial markets are a prerequisite for a sustained level of long run economic growth.

There are several theoretical papers suggesting that the impact of increased uncertainty on firm behaviour depends on the degree of capital market imperfections firms are confronted with (see Ghosal and Loungani, and the references in their section 2.1). A reason is that firms confronted with capital market imperfections can not issue more equity and hence absorb risk. Therefore, if capital markets are imperfect, firms will probably lower investment when uncertainty about profitability increases (Greenwald and Stiglitz, 1990).

On the other hand, with perfect capital markets firms are able to insure themselves against future uncertainties. If the marginal productivity of capital is a convex function of the variable whose behaviour is uncertain, Jensen’s inequality implies that an increase in uncertainty may then even lead to an increase in investment. Since macro-economic growth is strongly correlated with firm investments, the aforementioned papers indirectly suggest that the impact of uncertainty on economic growth depends on financial market development. It is remarkable that there are no empirical studies available that try to relate the effects of uncertainty on economic growth and the development of the financial sector.. A well-developed financial sector may provide various types of insurance, which may help the private sector to avoid negative uncertainty effects, so that it may well be the case that a more developed financial sector helps to undo the growth reducing effects of uncertainty.

This paper tries to provide some first empirical evidence on the influence of financial sector development on the effects of policy uncertainty on economic growth. The aim is to examine whether, and to what extent, a well-developed financial sector may nullify the growth reducing effects of policy uncertainty. This will be done by performing a Barro (1991) -type cross-country growth regression, in which different policy uncertainty measures are included, and in which the interaction between policy uncertainty and financial development is taken into account. A special feature of the paper is that a large-scale stability analysis in line with Sala-i-Martin (1997a,1997b) is done in order to test the reliability of the results.

Section 2 explains how I measure uncertainty and financial sector development. Section 3 describes the method, and presents regression results for the base model. Section 4 deals with the stability analysis. Section 5 concludes.

2. The construction of the uncertainty measures and the financial ratios

The empirical literature distinguishes ex post and ex ante approaches to measure uncertainty (see Bo, 1999). The ex ante approach is mostly based on the variance derived from survey data. However, in cross country analyses this approach is almost impossible to use because it would need an enormous amount of respondents to obtain reliable data. The most popular ex post approaches use measures based on 1) the variance of the unpredictable part of a stochastic process or 2) the conditional variance estimated from a General Autoregressive Conditional Heteroskedastic (GARCH)-type model. The latter is especially relevant for high frequency data, such as financial market data, which display clustering effects. Since the data set I use consists of annual observations, I estimate uncertainty by the variance of the unpredictable part of a stochastic process. More specifically, I first specify and estimate a forecasting equation to determine the expected part of the variable under consideration. Next, the standard deviation of the unexpected part of the variable, *i.e.* the residuals from the forecasting equation, is used as the measure of uncertainty This approach has also been used by *e.g.* Aizenman and Marion (1993), Ghosal (1995), and Ghosal and Loungani (1996). Differences in the measurement of the uncertainty proxy mostly stem from the way in which the forecasting equation is formulated. I follow the customary approach and use a second-order autoregressive process, extended with a time trend, as the forecasting equation:

$$P_t = a_1 + a_2T + a_3P_{t-1} + a_4P_{t-2} + e_t,$$

where P_t is the variable under consideration, T is a time trend, a_1 is an intercept, a_3 and a_4 are the autoregressive parameters and e_t is an error term.

I estimate the above equation for all countries in the data set, over the 1970-1995 period.[1] The data set contains 138 countries (the countries in the Barro-Lee data set), consisting of both developed and developing countries. For most variables some observations are missing, so that the amount of observations in the final regression analysis is less than 138 (see the next section). By calculating, for each country, the standard deviation of the residuals for the entire sample period, I come up with a proxy for uncertainty.

I concentrate on 3 types of uncertainty, which are all meant to measure the uncertainty with regard to government policies (see Appendix for a list of variables):[2]

EBUD: uncertainty with respect to the budget deficit (P variable = *BUDDEF*)
ETAX : uncertainty with respect to taxes (P variable = *TAXGDP*)
EGOVC: uncertainty with respect to government consumption (P variable = *GOVCGDP*)

The next step consists of the construction of the financial ratios. In several papers, financial ratios are suggested to describe the size and structure of, and/or the distribution, of loans through the financial sector. These papers claim that these ratios contain information about the services provided by the financial institutions (see, among others, King and Levine, 1993). I use two measures: the money and quasi-money to GDP ratio (*MGDP*) and credit to the private sector as a percentage of GDP (*CREDITPR*). *MGDP* is assumed to measure the size of the financial sector. It gives some idea of the total amount of financial resources which may be intermediated to investment, and about the total amount of financial services provided. A rising *MGDP* is associated with financial deepening. *CREDITPR* gives information about the amount of loans which are directed to the private sector.

3. The method and base model regression results

As set out in the introduction, the aim of this paper is to examine whether possible growth reducing effects of policy uncertainty may be nullified by financial sector development. In order to do so, I start the analysis by estimating the following cross-section regression equations:

(1) $PCGROWTH = \alpha_1 + \alpha_2 GDPPC + \alpha_3 SECR + \alpha_4 EBUD + \alpha_5 EBUD*MGDP + \mu$

(2) $PCGROWTH = \alpha_6 + \alpha_7 GDPPC + \alpha_8 SECR + \alpha_9 ETAX + \alpha_{10} ETAX*MGDP + \mu$

(3) $PCGROWTH = \alpha_{11} + \alpha_{12} GDPPC + \alpha_{13} SECR + \alpha_{14} EGOVC + \alpha_{15} EGOVC*MGDP + \mu$

Where PCGROWTH is the per capita growth rate of GDP; *GDPPC* is the initial level of per capita GDP; *SECR* is the initial secondary-school enrolment rate and μ is an error term.

The interaction term is included in order to capture the importance of financial development for the effects of policy uncertainty on economic growth.[3] A closer look at equation (1) may explain matters. Differentiating (1) with respect to *EBUD* gives:

$$d(PCGROWTH)/d\,EBUD = \alpha_4 + \alpha_5 * MGDP$$

This clearly shows that the above formulation implies that the growth effects of uncertainty depend on financial development. In line with most empirical analysis, in which it is shown that uncertainty negatively affects economic growth, I expect that $\alpha_4 < 0$. In addition, I assume that countries with a more developed financial system are better able to insure themselves against negative uncertainty effects. Hence, I expect that $\alpha_5 > 0$. If $\alpha_4 < 0$ and α

$_5$ >0, the threshold level of financial development above which uncertainty has a positive effect on economic growth can be calculated by setting the first derivative equal to zero. The threshold level then equals: $-\alpha_4/\alpha_5$.

In order to come up with a reasonable base model I include *GDPPC* and *SECR* in the equations. These variables are shown to have a robust and significant impact on economic growth, and hence are included in most recent growth regression studies (see, for instance, Sala-i-Martin, 1997a and 1997b).[4] *GDPPC* is included to account for the conditional convergence effect. The sign is expected to be negative. *SECR* proxies for the initial stock of human development. The sign is expected to be positive.

Many growth regressions show that the investment to GDP ratio (*INVEST*) is significantly related to economic growth. However, if the investment to GDP ratio is included, the interpretation of a significant coefficient for variable *x* differs from a significant coefficient for variable *x* when the investment rate is not introduced. In the first case, the variable is said to affect growth via the "level of efficiency" whereas in the latter case it is unclear whether it affects growth via investment or via efficiency (see also Sala-i-Martin, 1997b). For this reason, I estimate the equations 1,2, and 3, in which *INVEST* is not included, but also perform a set of regressions in which *INVEST* is included as an additional variable.

As explained in the previous section, financial development may be measured by means of different ratios, which give different insights into the specific characteristics of the financial sector. In order to provide some evidence for the importance of the **size** of the financial sector, I use *MGDP* as the financial sector indicator. In addition, I perform regressions in which *CREDITPR,* in stead of *MGDP,* is taken as the proxy for financial development. This aims to give some evidence for the relevance of the **distribution** of loans through the financial sector. This implies that, in total, 12 base equations are estimated: 6 with *MGDP* and 6 with *SECR*.

Table 1 presents the regression results in case *MGDP* is considered as the proxy for financial development; Table 2 the results when *CREDITPR* is used.

<Insert Table 1 and Table 2 about here>

The tables strongly suggest that policy uncertainty has a significant negative effect on growth performance, at the least for countries with a rudimentary financial sector. The coefficients for *EBUD*, *ETAX* and *EGOVC* are in all cases highly significant with a negative sign. Quite interesting are the results for the interaction terms. In the case where *INVEST* is not included in the base model, the interaction term is always highly significant, with a positive sign. This clearly confirms the hypothesis that countries with a more developed financial sector, as measured both by *MGDP* and *CREDITPR*, are better able to undo the growth reducing effects of policy uncertainties. Also in the models where *INVEST* is included the interaction term is often significant, but not at the 95% level. Moreover, in some of these cases the interaction term is not significant at the usual significance levels. This indicates that financial sector development nullifies the negative growth effects of uncertainty mainly by means of changes in the level of investments, and less so through investment efficiency.

4. Stability analysis

To test the reliability of the above results, I conduct a stability analysis in line with Sala-i-Martin (1997a). This stability analysis tests whether the coefficients for the variables of interest (in our case, the coefficients for the uncertainty measure and the interaction term), are robust when some additional variables are taken into account in the base regressions. The analysis starts by defining a group of variables from which the additional variables are drawn. I use the following set of 21 domestic and international macroeconomic variables:

an index for civil liberties (*CIVIL)*, an index of political rights (*PRIGHTS)*, a war dummy (*WARDUM*), a measure of political instability (*PINSTAB*), the black market premium (*BMP*), the inflation rate (*INFL*), the standard deviation of inflation (*STDINFL*), the trade to GDP ratio (*TRADE)*, an alternative measure of free trade openness (*FREEOP),* the exports to GDP ratio (*EXPGDP*), the deposit rate (*DEPR*), the real interest rate (*RINTR*), the real exchange rate (*REXCHR*), the foreign aid to GDP ratio (*AIDGDP*), external bank lending as a percentage of GDP (*BANKL*), foreign direct investment as a percentage of GDP (*FDI*), the debt to GDP ratio (*DEBTGDP*), the debt service to GDP ratio (*DEBTS*), the government budget deficit as a percentage of GDP (*BUDDEF)*, government expenditures as a percentage of GDP *(GOVCGDP*), and taxes as a percentage of GDP (*TAXGDP*).

Next, I determine all possible combinations of three of the above-presented set of 21 variables and perform regressions in which the base variables are included as well as 3 additional variables. This implies that, for all base models, 21!/(18!3!) = 1330 variants (models *j*) are estimated. Per regression, depending on whether *INVEST* is included, 8 or 9 independent variables are taken into account (the constant, *GDPPC*, *SECR*, *INVEST*, the uncertainty measure, the interaction term, and 3 additional variables from the pool of 21).

For all regressions, coefficients as well as a standard errors for the uncertainty measure and the interaction term are obtained. The stability test entails to looking at the distribution of these coefficients, and calculating the fraction of the cumulative distribution function lying on each side of zero. By assuming that the distribution of the estimates of the coefficients is normal and calculating the mean and the standard deviation of this distribution, the cumulative distribution function (*CDF*) can be calculated.

More precisely, if β_j is the coefficient for the variable in variant (model) *j*, and σ_j is the standard error of the coefficient β_j, I proxy the mean and the standard deviation of the distribution by:

$$\overline{\beta} = \frac{\Sigma \beta_j}{n}$$

$$\overline{\sigma} = \frac{\Sigma \sigma_j}{n}$$

where n =1330. In Table 3 and Table 4 the mean estimate is given by the column Coef, the mean standard deviation by the column *St error*.

By using a table for the (cumulative) normal distribution, I am now able to calculate which fraction of the cumulative distribution function is on the right or left-hand side of zero. The test statistic I use for that is defined as the mean over the standard deviation of the distribution. In the Tables below, *CDF* denotes the larger of the two areas. If *CDF* is above 0.95, I conclude that the variable under consideration has a robust effect on economic growth.

Finally, as an additional stability test, I present in the last columns of both tables the percentage of all regressions for which the variable under consideration is significant at the 90% level.[5]

<Insert Table 3 and Table 4 about here>

Table 3 and Table 4 show that the results obtained in the previous section are robust. According to the stability test, the uncertainty measures have a robust negative effect on economic growth in all cases. Again it appears that the interaction term also has a robust positive effect on economic growth when *INVEST* is not included in the base model. When *INVEST* is included this is not always the case, which is in line with the results of Section 3.

For the models in which *INVEST* is not included, the threshold value of *MGDP* above which an increase in uncertainty starts to have a positive effect on per capita economic growth varies between 44 and 47. In our data set, with 138 countries, this appears to be the case for approximately 30 countries. This group of countries consists of the developed economies, some countries from the Middle East, as well as some east and Southeast Asian countries. The group does not contain countries form Sub-Saharan Africa (with the exception of South Africa), nor does it contain least developed Asian or Latin American countries. The threshold value for *CREDITPR* in the models without *INVEST* varies much more than that of *MGDP*: it lies between 28 and 57, depending on the uncertainty measure. Nevertheless, again the least developed countries are not part of this group.

5. Conclusions

In this paper, I examine whether financial sector development may partly undo growth-reducing effects of policy uncertainty. By performing a standard cross-country growth regression for the 1970-1995 period I show that policy uncertainty, for most countries in the data set, has a robust and negative effect on per capita economic growth. More importantly, I find some strong evidence that countries with a more developed financial sector, both in terms of the size as the distribution of loans through the financial sector, are better able to nullify the negative effects of policy uncertainty on per capita economic growth. For countries with a very well developed financial sector, *i.e.* mainly the group of developed economies, it may even be the case that an increase in policy uncertainty positively affects per capita economic growth.

The results of this paper point at two important policy conclusions. First, especially for developing countries where the financial sector is often very rudimentary, a stable and credible government policy appears to be of utmost importance. Second, a well-developed financial sector is an important means by which growth reducing effects of policy uncertainties can be undone. This clearly indicates the relevance of financial sector development.

Appendix: List of Variables

AIDGDP = development aid as a percentage of GDP

BANKL = bank and trade related lending as a percentage of GDP

BMP = black market premium, calculated as (black market rate/official rate)-1.

BUDDEF = overall budget deficits, including grants as a percentage of GDP

CIVLIB = index of civil liberties

CREDITPR = credit to the private sector as a percentage of GDP

DEBTGDP = the external debt to GDP ratio

DEBTS = total external debt service as a percentage of GDP

DEPR = the deposit rate (%)

EBUD = uncertainty with respect to government budget deficit

EGOVC = uncertainty with respect to government consumption expenditures

ETAX = uncertainty with respect to taxes

EXPGDP = exports of goods and services as a percentage of GDP

FDI = foreign direct investment as a percentage of GDP

FREEOP = measure of free trade openness (calculates as 0.528-0.026 log(*AREA*) –0.095 (*DIST*), where

AREA = size of land and *DIST* = average distance to capitals of world 20 major exporters.

GDPPC= GDP per capita in 1970

GOVCGDP = government consumption as a percentage of GDP

INFL = the annual inflation rate

INVEST = average investment to GDP ratio over 1970-1995 period

MGDP = average money and quasi money to GDP ratio over the 1970-1995 period

PCGROWTH = average real per capita growth rate over 1970-1995 period.

PINSTAB = measure of political instability

PRIGHTS = index of political rights

REXCHR = real exchange rate

RINTR = real interest rate (%)

SECR = secondary school enrollment rate in 1970

STDINFL = the standard deviation of the annual inflation rate, calculated from the inflation figures

TAXGDP = total taxes as a percentage of GDP

TRADE = exports plus imports to GDP. This variable measures the degree of openness.

WARDUM = dummy variable giving a one to countries that participated in at least one external war during the period 1960-1985, and a zero to all other countries.

The source for all variables is World Development Indicators, 1997 (World Bank, available on CD-ROM), except for *BMP*, *CIVLIB*, *FREEOP*, *PINSTAB*, *PRIGHTS* and *WARDUM* that are obtained from the Barro-Lee data set, and the uncertainty measures that are calculated by the author. The variables coming from the Barro-Lee data set refer to averages for the 1970-1990 period. Unless otherwise stated, all other variables refer to averages over 1970-1995 period.

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Table 1: Base model results for models with *MGDP* as financial development indicator

	1	2	3	4	5	6
GDPPC	-0.00018 (-2.33)	-9.74E-05 (-1.55)	-0.00016 (-2.96)	-9.65E-05 (-2.11)	-0.00017 (-7.31)	-0.00016 (-7.04)
SECR	0.031 (3.06)	0.024 (2.69)	0.031 (2.92)	0.021 (2.15)	0.036 (4.53)	0.034 (4.84)
INVEST		0.156 (5.38)		0.142 (5.50)		0.161 (5.74)
CONST	1.048 (2.25)	-2.027 (-3.25)	1.260 (2.45)	-1.583 (-2.87)	0.983 (2.34)	-2.073 (-3.43)
Ad.Var	*EBUD*	*EBUD*	*EGOVC*	*EGOVC*	*ETAX*	*ETAX*
	-0.653 (-2.98)	-0.589 (-3.06)	-0.963 (-3.11)	-0.773 (-3.05)	-1.074 (-3.10)	-0.918 (-2.91)
INT. TERM	0.014 (2.59)	0.009 (1.84)	0.019 (2.92)	0.010 (1.81)	0.022 (2.34)	0.008 (1.00)
R^2	0.35	0.55	0.34	0.54	0.33	0.53
Obs.	72	72	95	95	89	89
MDEPV	1.115	1.115	1.240	1.240	1.241	1.241
SDDEPV	1.934	1.934	1.880	1.880	1.839	1.839
F	8.91	16.37	13.33	22.94	11.63	21.14
JB	2.80	0.15	4.76	0.12	5.67	0.48

Note: dependent variable: *PCGROWTH*. MDEPV = mean of the dependent variable; SDDEPV = standard deviation of the dependent variable; R^2 = adjusted R^2; F = F-statistic. The t-values are between parentheses. t-values are based on White heteroskedasticityconsistent standard errors (this applies to all tables, and hence also to the stability tests). JB = Jarque-Bera normality test. Obs. = amount of observations. INT. TERM: interaction term. It refers to the coefficient for the uncertainty measure under consideration interacted with *MGDP*.

Table 2: Base model results for models with *CREDITPR* as financial development indicator

	1	2	3	4	5	6
GDPPC	-0.00025 (-3.50)	-0.00012 (-1.96)	-0.00025 (-3.84)	-0.00014 (-2.52)	-0.00021 (-5.93)	-0.00017 (-5.80)
SECR	0.044 (4.12)	0.031 (3.07)	0.045 (2.62)	0.027 (2.80)	0.045 (5.34)	0.038 (4.77)
INVEST		0.181 (4.34)		0.162 (5.55)		0.173 (5.31)
CONST	0.699 (1.52)	-2.831 (-3.33)	0.794 (1.73)	-2.247 (-4.01)	1.096 (2.23)	-2.333 (-3.37)
Ad.Var	*EBUD*	*EBUD*	*EGOVC*	*EGOVC*	*ETAX*	*ETAX*
	-0.600 (-2.58)	-0.469 (-2.48)	-0.758 (-2.57)	-0.656 (-3.05)	-1.019 (-3.20)	-0.840 (-3.13)
INT. TERM	0.015 (2.66)	0.007 (1.51)	0.020 (2.42)	0.010 (1.72)	0.014 (2.18)	0.003 (0.58)
R^2	0.30	0.50	0.32	0.52	0.33	0.53
Obs.	74	74	99	99	92	92
MDEPV	1.048	1.048	1.194	1.194	1.238	1.238
SDDEPV	2.092	2.092	1.989	1.989	1.917	1.917
F	8.90	15.63	12.59	22.65	12.36	21.78
JB	4.64	0.65	4.56	0.20	8.04	0.70

Note: see Table 1. INT. TERM now refers to the coefficient for the uncertainty measure under consideration interacted with *CREDITPR.*

Table 3: Stability test based on model with *MGDP*

	R^2	Coef.	St. Error	CDF	Perc.
Without *INVEST* in base model					
EBUD	0.39	-0.616	0.204	0.999	0.95
INT. TERM		0.014	0.005	0.998	0.97
ETAX	0.37	-1.031	0.361	0.998	0.98
INT. TERM		0.022	0.010	0.990	0.88
EGOVC	0.38	-0.854	0.313	0.997	0.98
INT. TERM		0.019	0.008	0.990	0.83
With *INVEST* in base model					
EBUD	0.56	-0.529	0.186	0.998	0.94
INT. TERM		0.009	0.005	0.976	0.69
ETAX	0.57	-0.885	0.329	0.996	0.97
INT. TERM		0.010	0.009	0.864	0.12
EGOVC	0.57	-0.698	0.253	0.997	0.98
INT. TERM		0.001	0.007	0.910	0.30

Note: The uncertainty term, as well as the interaction term (INT. TERM) appear in the same equation. R^2 : the average adjusted R^2 of all regressions for the equation concerned. Coef: the average coefficient of all regressions; St. Error: the average standard error of all regressions; CDF: cumulative distribution function; Perc.: the percentage of all cases in which the coefficient for the uncertainty measure is significant at the 90% level. INT. TERM refers to interaction with *MGDP*.

Table 4: Stability test based on model with *CREDITPR*

	R^2	Coef.	St. Error	CDF	Perc.
Without *INVEST* in base model					
EBUD	0.38	-0.508	0.226	0.988	0.79
INT. TERM		0.015	0.006	0.991	0.80
ETAX	0.40	-1.074	0.350	0.999	0.96
INT. TERM		0.019	0.010	0.978	0.77
EGOVC	0.41	-0.746	0.310	0.992	0.91
INT. TERM		0.027	0.013	0.983	0.75
With *INVEST* in base model					
EBUD	0.53	-0.401	0.195	0.980	0.77
INT. TERM		0.009	0.005	0.951	0.50
ETAX	0.57	-0.863	0.291	0.999	0.96
INT. TERM		0.009	0.008	0.855	0.18
EGOVC	0.57	-0.624	0.223	0.997	0.95
INT. TERM		0.014	0.010	0.927	0.44

Note: see Table 3. INT.TERM is interaction term with *CREDITPR*

Notes

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[1] I also estimated the forecasting equation by using a first and a third order autoregressive process with trend. Results were similar. For reasons of space it is not possible to present the estimation results for all countries. The results can be obtained on request.

[2] I also estimated effects of inflation uncertainty. The effect of inflation uncertainty on economic growth appeared to be insignificant. For reasons of space, results are not presented.

[3] The approach is in line with that of Ghosal (1991)

[4] It should, however, be noted that results are somewhat mixed with respect to the

robustness of *SECR*.

[5] An alternative stability analysis is the Extreme Bound Analysis (*EBA*). I have not used this test since it basically implies that a variable does not have a robust effect on economic growth when it is insignificant in only one of the entire set of regressions. This would be too tough a test when 1330 regressions are done per model.