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Volatility and the Current Account: Extending the Evidence

João Tovar Jalles[a] Georgios Karras[b]

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Abstract

Consistent with standard theoretical priors, generally based on the precautionary saving motive, the empirical literature has documented that increased macroeconomic volatility is associated with improvements in the current account balance *in advanced economies*. Using an updated and extended data set, we first confirm this relationship, but also show that it does not hold *in developing economies*, where macroeconomic volatility is not systematically associated with changes in the current account balance. When we explore potential mechanisms for this asymmetry, we find evidence in favor of precautionary saving in both groups of countries, which allows us to rule this out as the reason behind the observed difference in the current-account/volatility relationship.

Keywords: current account; uncertainty, volatility
JEL codes: F32, F41

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1. Introduction

A growing strand of recent research has shown that comparing business-cycle properties between advanced and developing economies can shed valuable light into the sources of macroeconomic fluctuations.[1] As expected, the literature has established that several macroeconomic relationships appear to be qualitatively similar across the two groups of countries (such as investment and consumption being positively correlated with income, and investment being more volatile than both income and consumption). Other properties, however, have been found to be consistently and intriguingly different between the two groups. One of the best-known examples is that consumption is smoother than income in advanced economies, but more volatile in developing ones. Another is that the trade balance is much more countercyclical in developing than in advanced economies (where it may even be procyclical).

The present study identifies an additional difference between advanced and developing economies: the relationship between the current account and macroeconomic volatility. In particular, we show that macroeconomic volatility is associated with improvements in the current account balance in advanced economies, but not in developing ones.

Episodes of heightened volatility and current account imbalances have been prominent features of the global macroeconomic landscape even before the Covid-19 and Ukraine crises. Not surprisingly, therefore, the relationship between the two has been the subject of both theoretical and empirical research.[2] The consensus of this literature has been that increased (relative) macroeconomic volatility improves the current account, an empirical finding that is consistent with the theoretical mechanism of the precautionary saving motive.[3]

To our knowledge, however, the empirical side of this literature has so far focused almost exclusively on data from advanced (in practice, mainly OECD) economies.[4] One contribution of the present paper is to extend the area of investigation by estimating the relationship separately for advanced and developing economies, which allows us to compare the effects and also look for possible differences in the mechanisms generating them.

In a nutshell, we confirm the existing literature's finding that macroeconomic volatility leads to an improvement in the current account *in advanced economies*, but then proceed to

[1] See for example Aguiar and Gopinath (2007), Carcia-Cicco et al.(2010), Azzimonti and Talbert (2014), and Fernandez and Gulan (2015).
[2] See for example Elgin and Kuzubas (2013), Fogli and Perri (2015) and Karras (2016).
[3] See Schmitt-Grohé, Uribe, and Woodford (2022, chapter 6) for a thorough discussion of the role of precautionary saving in the relationship between uncertainty and the current account.
[4] Elgin and Kuzubas (2013) is an important exception.

show that this is not the case *in developing economies*. Finally, we use data on exports, imports, national saving, and investment, to identify reasons for the observed differences.

The remainder of the paper is structured as follows. Section 2 presents the empirical strategy followed to study the dynamic response of trade variables to past pandemic shocks. Section 3 presents the data and key stylized facts. Section 4 discusses our empirical results together with sensitivity and robustness checks. Section 5 concludes and elaborates on the policy implications.

2. Data

All data are annual and obtained for thirty-four (34) Advanced countries and one hundred and thirty-six (136) Developing countries, mostly for the period 1970 to 2020. National Accounts data are from the IMF´s International Financial Statistics database. Letting *i* index over countries and *t* over time, $Y_{i,t}$ denotes real GDP (Gross Domestic Product, national currency, volume estimates), $G_{i,t}$ real government consumption (general government final consumption expenditure, national currency, volume estimates), and $g_{i,t}^{Y}$ and $g_{i,t}^{G}$ the growth rates of *Y* and *G*, respectively. We also define real net output as $X_{i,t} = Y_{i,t} - G_{i,t}$, and denote its growth rate by $g_{i,t}^{X}$. Current account data are from the Economic Outlook database, and $ca_{i,t}$ stands for the current account balance, as a percentage of GDP.[5]

We use two different methods to construct time-varying measures of macroeconomic volatility. First, following the technique of Fogli and Perri (2015), we compute relative volatility series for $Y_{i,t}$, $G_{i,t}$, and $X_{i,t}$ using rolling ten-year windows. Specifically, time-varying (absolute) volatility series $s_{i,t}^{Y}$, $s_{i,t}^{G}$, and $s_{i,t}^{X}$ are set equal to the standard deviation of the growth rates $g_{i,t}^{Y}$, $g_{i,t}^{G}$, and $g_{i,t}^{X}$, respectively, over each ten-year period.[6] Subtracting the average (across the rest of the countries) standard deviation from the corresponding (absolute) volatility series over the same period, we obtain each country's Fogli-Perri *relative volatility* series, denoted by ${}_{R}\sigma_{i,t}^{Y}$, ${}_{R}\sigma_{i,t}^{G}$, and ${}_{R}\sigma_{i,t}^{X}$.[7]

[5] National Accounts data are available for the full 1970Q1-2014Q4 period for each of the 21 countries. Current account data availability is as follows: Australia, Austria, Canada, Italy, Japan, the Netherlands, the UK, and the US since 1970Q1; Germany since 1971Q1; New Zealand since 1971Q2; Switzerland since 1972Q1; France since 1973Q1; Belgium, Denmark, Finland, South Korea, Norway, Portugal, Spain, and Sweden since 1975Q1; and Mexico since 1980Q1.

[6] Middle-of-window values are used for $s_{i,t}^{Y}$, $s_{i,t}^{G}$, and $s_{i,t}^{X}$.

[7] Using Fogli and Perri's (2015) notation, ${}_{R}\sigma_{i,t}^{k} = s_{i,t}^{k} - \frac{1}{20}\sum_{j \neq i} s_{j,t}^{k}$, for *k* = *Y*, *G*, *X*.

Second, we use the Hodrick-Prescott (1997, HP) and Hamilton (2018) filters to decompose (the logarithms of) $Y_{i,t}$, $G_{i,t}$, and $X_{i,t}$ into permanent and transitory components,[8] and we use again rolling ten-year windows to define our alternative measures of (absolute) volatilities as the standard deviations of the corresponding transitory ("cyclical") components. Refer to section 5.1 where we do a sensitivity analysis to the original FP volatility measure.

Just like in the Fogli-Perri approach, we then subtract the average (across the rest of the countries) standard deviation, to obtain each country's Hodrick-Prescott and Hamilton *relative volatility* series, denoted by ${}_{HP}\sigma_{i,t}^{Y}$, ${}_{HP}\sigma_{i,t}^{G}$, and ${}_{HP}\sigma_{i,t}^{X}$.[9]

In addition, time-varying *average* values (denoted by $\overline{ca}_{i,t}$, $\bar{g}_{i,t}^{Y}$, $\bar{g}_{i,t}^{G}$, and $\bar{g}_{i,t}^{X}$) are constructed using rolling ten-year windows: averages are set equal to the means of the corresponding series over each ten-year period.[10]

Appendix A provides a list of the 34 Advanced and 136 Developing economies. Table B1 in Appendix B shows the summary statistics of the key variables used.[11] As Table B1 makes clear, there are sizable differences in both current account and output performance among economies in both income groups.

At the same time, macroeconomic volatility has also differed substantially across the economies in the sample, though, interestingly, the Fogli-Perri and Hodrick-Prescott measures paint very similar pictures.

[8] For example, using $y_t = ln(Y_t)$, the HP filter defines the trend, $\bar{y}_t$, as the component that minimizes

$$\sum_{t=1}^{T}(y_t - \bar{y}_t)^2 + \lambda \sum_{t=2}^{T-1}[(\bar{y}_{t+1} - \bar{y}_t) - (\bar{y}_t - \bar{y}_{t-1})]^2$$

for $\lambda > 0$. In the empirical section below we report results for λ = 1600, the value suggested by Hodrick and Prescott for quarterly data.

[9] The Band-Pass filter proposed by Baxter and King (1999), and the "optimal" filter of Christiano and Fitzgerald (2003) were also used but their results were so similar to the HP filter's that are not reported below to preserve space.

[10] Middle-of-window values are used for $\overline{ca}_{i,t}$, $\bar{g}_{i,t}^{Y}$, $\bar{g}_{i,t}^{G}$, and $\bar{g}_{i,t}^{X}$.

[11] Country selection is dictated by data availability.

3. Econometric Methodology

Our approach is motivated by the theoretical predictions of the standard model of the current account, so we proceed along similar lines to Fogli and Perri (2015) and Karras (2016). In particular, our estimated specifications are of the form:

$$ca_{i,t} = \delta_X \cdot \sigma_{i,t}^X + \beta_X \cdot g_{i,t}^X + u_{i,t} \quad (1)$$

and

$$ca_{i,t} = \delta_Y \cdot \sigma_{i,t}^Y + \delta_G \cdot \sigma_{i,t}^G + \beta_Y \cdot g_{i,t}^Y + \beta_G \cdot g_{i,t}^G + v_{i,t} \quad (2)$$

where the current account balance as a percent of GDP (*ca*) is regressed on the relative volatilities (the σ's) and growth rates (the g's) of either net output (*X*), or of GDP (*Y*) and government consumption (G). The δ's and β's are parameters to be estimated; the δ's capture the current account effects of the volatility measures, while the β's estimate the effects of the growth rates on the current account. Finally, *u* and *v* are error terms and they are both modeled to include country and time effects.[12]

Equations (1) and (2) follow directly from the predictions of the standard intertemporal model of the current account which can also be used to derive the expected signs of the estimated parameters.[13] Thus, the precautionary saving motive is leading us to expect that the estimated δ's should all be positive: $\delta_X > 0$, $\delta_Y > 0$, and $\delta_G > 0$. Higher macroeconomic uncertainty, from any source, should induce greater (national) saving and thus a higher current account balance.

The predictions with respect to the growth rates are more nuanced. Assuming that changes in the g's represent *temporary* changes in the variables in question, then the theoretical predictions are $\beta_X > 0$, $\beta_Y > 0$, and $\beta_G < 0$.[14] Intuitively, a temporary income gain will be largely saved, because of the consumption smoothing motive, thereby raising the current account balance. On the contrary, a temporary increase in government consumption will have the

[12] Specifically, we set $u_{i,t} = \mu_i^u + \lambda_t^u + e_{i,t}^u$ and $v_{i,t} = \mu_i^v + \lambda_t^v + e_{i,t}^v$, where the μ_i's and λ_t's are the country-specific and time-specific effects, respectively. The μ_i's and λ_t's can be estimated as fixed or random effects, but our results are robust to this choice as will be discussed below.

[13] For example, see Karras (2016) equations (A5) and (A6), or Ghosh and Ostry's (1997) equations (7) or (8). Obstfeld and Rogoff's (1995) "fundamental current account" equation (equation (18), p.74) can also be used for the certainty-equivalent part of the models.

[14] See again equations (A5) and (A6) in Karras (2016), or Obstfeld and Rogoff's (1995) "fundamental current account" equation (equation (18), p.74).

opposite effect on the current account, because the smoothing motive now results in a smaller decrease in current consumption, and thus dissaving.

4. Main Empirical Results

4.1. Baseline Results

We begin by revisiting the relationship between the current account and relative volatility in the sample of advanced economies. Panel A of Table 1 reports the basic specifications. Columns (1) – (3) correspond to versions of models (1) and (2) without the growth rates, while columns (4) – (6) include the growth rates in the regressions. While the effects of the growth rates (the estimated β's) are rather imprecisely estimated, the effects of output volatility on the current account are positive and statistically significant: both δ_X and δ_Y are positive, sizeable, and statistically significant. The estimated effect of government consumption volatility is also positive, but not statistically significant. Note that these estimates are robust to the inclusion of the growth rates in the regressions. We conclude that higher relative volatility in advanced economies is associated with an improvement in the current account, a finding consistent with the existing literature.

Next, we ask whether the same result applies to developing economies, so we proceed with the estimation of the same regressions for the sample of developing economies. Results are reported in Panel B of Table 1, following the same format. What becomes immediately apparent is that the strong positive relationship between (output) volatility and the current account that characterizes the advanced economies does not exist in the developing ones: the estimated δ's are all statistically insignificant, as well as very small in magnitude. Once again this is robust to whether we include the growth variables (columns (4)-(6)) or not (columns (1)-(3)). We conclude that there is no systematic relationship between relative volatility and the current account in developing economies – unlike what characterizes the economically advanced ones. The obvious implication is that something in the determination of the current account must be fundamentally different between the two groups. We will return to this in the next subsection.

Finally, we present estimates for the entire set of countries, in Panel C of Table 1. We note that this estimation imposes the restriction that the parameters (the δ's and β's) are the same for the two groups. We know from Panels A and B of Table 1 that this restriction is not true, so we report the results in Panel C for completeness and not because we expect them to

be unbiased. The lesson from Panel C is that the overall estimates are dominated by the developing economies sample: the estimated δ's in particular are all statistically insignificant (as well as very small in magnitude). The implication is that failing to split the sample, thereby imposing the same parameter values for the two groups of countries, leads to misleading (and biased) results.

Table 1. Current account and FP relative volatility (10-year moving window)

Panel A. Advanced Countries

Specifications	(1)	(2)	(3)	(4)	(5)	(6)
Regressors \dependent variable	ca_gdp	ca_gdp	ca_gdp	ca_gdp	ca_gdp	ca_gdp
$\sigma_{i,t}^{Y}$	0.9767***		0.9198***	0.9664***		0.9054***
	(0.215)		(0.217)	(0.214)		(0.218)
$\sigma_{i,t}^{X}$		0.9584***			0.9479***	
		(0.213)			(0.212)	
$\sigma_{i,t}^{G}$			0.2966**			0.3054**
			(0.138)			(0.138)
$g_{i,t}^{Y}$				-0.0257		-0.0368
				(0.064)		(0.066)
$g_{i,t}^{X}$					-0.0266	
					(0.064)	
$g_{i,t}^{G}$						0.0050
						(0.059)
Constant	-1.4334	-1.0342	-1.3031	-1.3087	-0.9094	-1.1364
	(0.908)	(0.916)	(0.897)	(0.946)	(0.953)	(0.941)
Observations	1,130	1,130	1,130	1,130	1,130	1,130
R-squared	0.6353	0.6350	0.6370	0.6354	0.6351	0.6372

Panel B. Developing Countries

Specifications	(1)	(2)	(3)	(4)	(5)	(6)
Regressors \dependent variable	ca_gdp	ca_gdp	ca_gdp	ca_gdp	ca_gdp	ca_gdp
$\sigma_{i,t}^{Y}$	-0.1102		-0.0724	-0.0848		-0.0485
	(0.186)		(0.183)	(0.167)		(0.167)
$\sigma_{i,t}^{X}$		-0.1151			-0.0896	
		(0.186)			(0.166)	
$\sigma_{i,t}^{G}$			-0.0756**			-0.0712**
			(0.035)			(0.035)
$g_{i,t}^{Y}$				0.3262		0.3189
				(0.274)		(0.279)
$g_{i,t}^{X}$					0.3270	
					(0.274)	
$g_{i,t}^{G}$						0.0087
						(0.020)
Constant	-8.6096*	-8.6610*	-8.3537*	-10.9876*	-11.0312*	-10.8065*
	(5.193)	(5.202)	(5.127)	(6.686)	(6.713)	(6.603)
Observations	2,942	2,942	2,942	2,942	2,942	2,942
R-squared	0.4612	0.4612	0.4624	0.4711	0.4712	0.4722

Panel C. All countries

Specifications	(1)	(2)	(3)	(4)	(5)	(6)
Regressors \dependent variable	ca_gdp	ca_gdp	ca_gdp	ca_gdp	ca_gdp	ca_gdp
$\sigma_{i,t}^{Y}$	-0.0496		-0.0109	-0.0051		0.0319
	(0.173)		(0.170)	(0.144)		(0.144)
$\sigma_{i,t}^{X}$		-0.0552			-0.0105	
		(0.173)			(0.143)	

$\sigma_{i,t}^{G}$			-0.0677*			-0.0629*
			(0.035)			(0.035)
$g_{i,t}^{Y}$				0.2989		0.2904
				(0.242)		(0.246)
$g_{i,t}^{X}$					0.2994	
					(0.242)	
$g_{i,t}^{G}$						0.0113
						(0.019)
Constant	-2.9518*	-2.9809*	-2.9573*	-4.4844*	-4.4972*	-4.4939*
	(1.609)	(1.619)	(1.595)	(2.320)	(2.349)	(2.306)
Observations	4,072	4,072	4,072	4,072	4,072	4,072
R-squared	0.4684	0.4684	0.4693	0.4773	0.4773	0.4781

Note: robust standard errors in parenthesis. Country and time fixed effects included but omitted for reasons of parsimony. *, **, *** denote statistical significance at the 10, 5 and 1 percent levels, respectively.

Why is the relationship between relative macroeconomic volatility and the current account so different between advanced and developing economies? We will investigate some of the possible mechanisms in the next two subsections.

4.2. Channel #1: Exports vs Imports

The biggest component of the current account is almost always the trade balance, so a natural place to start looking deeper is possible differential impacts of macroeconomic volatility on exports and imports.

We begin with exports and estimate versions of models (1) and (2) where the current account balance variable in the left-hand side is replaced by exports as a percent of GDP. Results are shown in Table 2, which is organized the same way as Table 1.

Panel A of Table 2 reports the estimates for the advanced economies. Focusing on the estimated δ's, the results suggest that relative volatility strongly and statistically significantly raises exports as a percent of GDP. This applies now to both output and government consumption volatility, and again remains robust to whether the growth rates are included in the regressions or not.

Panel B of Table 2 repeats the exercise for the developing group and the difference is striking. The evidence here is that exports are negatively associated with relative volatility in developing countries, particularly when the volatility is from output, in which case the effects are statistically significant, as well.

Panel C of Table 2 again estimates the models imposing the (false) restriction that the parameters are the same in the two groups of countries. The objective again is to show that such pooling results in biased and misleading results.

Table 2. Exports and FP relative volatility (10-year moving window)

Panel A. Advanced Countries

Specifications	(1)	(2)	(3)	(4)	(5)	(6)
Regressors \dependent variable	exports_gdp	exports_gdp	exports_gdp	exports_gdp	exports_gdp	exports_gdp
$\sigma_{i,t}^{Y}$	4.4151***		4.1797***	4.5389***		4.2987***
	(0.386)		(0.370)	(0.365)		(0.351)
$\sigma_{i,t}^{X}$		4.3413***			4.4602***	
		(0.381)			(0.360)	
$\sigma_{i,t}^{G}$			0.9619***			0.8754***
			(0.195)			(0.206)
$g_{i,t}^{Y}$				0.6321***		0.6530***
				(0.121)		(0.125)
$g_{i,t}^{X}$					0.6288***	
					(0.121)	
$g_{i,t}^{G}$						-0.1127
						(0.107)
Constant	0.7585	2.5229	1.7193	-2.5144	-0.6858	-1.3120
	(2.987)	(2.984)	(2.855)	(3.047)	(3.040)	(2.860)
Observations	1,327	1,327	1,327	1,327	1,327	1,327
R-squared	0.9370	0.9369	0.9378	0.9383	0.9382	0.9391

Panel B. Developing Countries

Specifications	(1)	(2)	(3)	(4)	(5)	(6)
Regressors \dependent variable	exports_gdp	exports_gdp	exports_gdp	exports_gdp	exports_gdp	exports_gdp
$\sigma_{i,t}^{Y}$	-0.1426**		-0.1547**	-0.1418**		-0.1523**
	(0.067)		(0.069)	(0.067)		(0.069)
$\sigma_{i,t}^{X}$		-0.1437**			-0.1428**	
		(0.066)			(0.067)	
$\sigma_{i,t}^{G}$			0.0249			0.0250
			(0.028)			(0.028)
$g_{i,t}^{Y}$				0.1056**		0.0993**
				(0.044)		(0.045)
$g_{i,t}^{X}$					0.1055**	
					(0.044)	
$g_{i,t}^{G}$						0.0150
						(0.016)
Constant	10.6238***	10.5623***	10.5471***	9.8346***	9.7753***	9.6031***
	(3.709)	(3.706)	(3.692)	(3.336)	(3.333)	(3.299)
Observations	3,028	3,028	3,028	3,028	3,028	3,028
R-squared	0.8472	0.8472	0.8473	0.8477	0.8478	0.8479

Panel C. All countries

Specifications	(1)	(2)	(3)	(4)	(5)	(6)
Regressors \dependent variable	exports_gdp	exports_gdp	exports_gdp	exports_gdp	exports_gdp	exports_gdp
$\sigma_{i,t}^{Y}$	0.3176***		0.2766***	0.3281***		0.2867***
	(0.080)		(0.082)	(0.082)		(0.083)
$\sigma_{i,t}^{X}$		0.3146***			0.3251***	
		(0.080)			(0.081)	
$\sigma_{i,t}^{G}$			0.0735***			0.0764***
			(0.026)			(0.026)
$g_{i,t}^{Y}$				0.1310***		0.1320***
				(0.045)		(0.046)
$g_{i,t}^{X}$					0.1310***	
					(0.045)	
$g_{i,t}^{G}$						0.0062
						(0.016)
Constant	0.7163	0.8459	0.7684	0.0172	0.1511	0.0375
	(3.090)	(3.090)	(3.085)	(3.063)	(3.062)	(3.058)

Observations	4,355	4,355	4,355	4,355	4,355	4,355
R-squared	0.8954	0.8954	0.8957	0.8958	0.8958	0.8960

Note: robust standard errors in parenthesis. Country and time fixed effects included but omitted for reasons of parsimony. *, **, *** denote statistical significance at the 10, 5 and 1 percent levels, respectively.

Next, we turn to imports, replacing the dependent variable in regressions (1) and (2) with imports as a percent of GDP. Results are shown in Table 3, following the format of the previous table.

Table 3. Imports and FP relative volatility (10-year moving window)

Panel A. Advanced Countries

Specifications	(1)	(2)	(3)	(4)	(5)	(6)
Regressors \dependent variable	imports_gdp	imports_gdp	imports_gdp	imports_gdp	imports_gdp	imports_gdp
$\sigma_{i,t}^{Y}$	2.5193***		2.2417***	2.6315***		2.3583***
	(0.320)		(0.303)	(0.306)		(0.290)
$\sigma_{i,t}^{X}$		2.4844***			2.5924***	
		(0.316)			(0.301)	
$\sigma_{i,t}^{G}$			1.1341***			1.0864***
			(0.172)			(0.183)
$g_{i,t}^{Y}$				0.5729***		0.5557***
				(0.101)		(0.106)
$g_{i,t}^{X}$					0.5710***	
					(0.101)	
$g_{i,t}^{G}$						-0.0146
						(0.092)
Constant	3.9883**	4.9984***	5.1211***	1.0217	2.0845	2.2528
	(1.840)	(1.839)	(1.771)	(1.849)	(1.844)	(1.723)
Observations	1,327	1,327	1,327	1,327	1,327	1,327
R-squared	0.9432	0.9432	0.9447	0.9447	0.9446	0.9461

Panel B. Developing Countries

Specifications	(1)	(2)	(3)	(4)	(5)	(6)
Regressors \dependent variable	imports_gdp	imports_gdp	imports_gdp	imports_gdp	imports_gdp	imports_gdp
$\sigma_{i,t}^{Y}$	0.1837**		0.1292	0.1839**		0.1270
	(0.091)		(0.092)	(0.091)		(0.092)
$\sigma_{i,t}^{X}$		0.1843**			0.1845**	
		(0.091)			(0.090)	
$\sigma_{i,t}^{G}$			0.1122***			0.1149***
			(0.033)			(0.033)
$g_{i,t}^{Y}$				0.0268		0.0384
				(0.103)		(0.104)
$g_{i,t}^{X}$					0.0267	
					(0.103)	
$g_{i,t}^{G}$						-0.0114
						(0.019)
Constant	15.4455***	15.5246***	15.0998***	15.2455***	15.3252***	14.9580***
	(4.869)	(4.872)	(4.788)	(4.828)	(4.834)	(4.741)
Observations	3,028	3,028	3,028	3,028	3,028	3,028
R-squared	0.8096	0.8096	0.8110	0.8097	0.8097	0.8111

Panel C. All countries

Specifications	(1)	(2)	(3)	(4)	(5)	(6)
Regressors \dependent variable	imports_gdp	imports_gdp	imports_gdp	imports_gdp	imports_gdp	imports_gdp

$\sigma_{i,t}^{Y}$	0.4029***		0.3226***	0.4086***		0.3236***
	(0.087)		(0.089)	(0.085)		(0.087)
$\sigma_{i,t}^{X}$		0.4016***			0.4074***	
		(0.087)			(0.084)	
$\sigma_{i,t}^{G}$			0.1439***			0.1488***
			(0.033)			(0.033)
$g_{i,t}^{Y}$				0.0709		0.0878
				(0.093)		(0.093)
$g_{i,t}^{X}$					0.0710	
					(0.093)	
$g_{i,t}^{G}$						-0.0177
						(0.019)
Constant	4.2928**	4.4598**	4.3948**	3.9143*	4.0831**	4.0109**
	(2.012)	(2.013)	(2.001)	(2.044)	(2.047)	(2.026)
Observations	4,355	4,355	4,355	4,355	4,355	4,355
R-squared	0.8795	0.8795	0.8805	0.8796	0.8796	0.8807

Note: robust standard errors in parenthesis. Country and time fixed effects included but omitted for reasons of parsimony. *, **, *** denote statistical significance at the 10, 5 and 1 percent levels, respectively.

Panel A of Table 3 shows that macroeconomic volatility is positively associated with imports in the group of advanced economies: the import δ's are positive and statistically significant, as well as robust across the different specifications and sources of volatility. Note, however, that while the estimated effect of volatility on imports is sizeable, it is smaller in magnitude than its effect on exports (in other words, the import δ's are smaller than the export δ's) which is why the effect on the overall current account balance is positive.

Panel B of Table 3 shows a quantitatively different picture for the developing economies. Imports are also positively affected by volatility here, and while the effects are often statistically significant, they are always substantially smaller than for the advanced economies.

Finally, Panel C of Table 3 estimates the import equations jointly for the two groups to demonstrate the pitfalls of pooling. In the case of imports, the (biased) pooled estimates would underestimate the effects of volatility for the advanced economies and overestimate for the developing ones.

Overall, the export and import regressions have contributed a valuable piece to the puzzle we are trying to solve. The evidence is that, in advanced economies, macroeconomic volatility is associated with increases in both exports and imports, but the current account improves because the export effect has been stronger. On the contrary, in developing economies, both exports nor imports are substantially less affected by volatility (effects are often less than one tenth of those for advanced economies), which accounts for the absence of a strong relationship with the current account.

4.3. Channel #2: Saving vs Investment

An alternative way to think of the current account balance is in terms of saving and investment. As is well known, the open-economy national accounting identities can be combined to express the current account balance as equal to the difference between national saving and gross domestic investment. We now make use of this and employ models (1) and (2) to estimate the effects on saving and investment. We also decompose national saving into its private and government components and separately estimate the effects on those components as well.

We start with the effects of volatility on saving and estimate versions of models (1) and (2) where the current account balance variable in the left-hand side is replaced by national saving as a percent of GDP. Results are shown in Table 4, again organized the usual way.

Table 4. National Saving and FP relative volatility (10-year moving window)

Panel A. Advanced Countries

Specifications	(1)	(2)	(3)	(4)	(5)	(6)
Regressors \dependent variable	savings_gdp	savings_gdp	savings_gdp	savings_gdp	savings_gdp	savings_gdp
$\sigma_{i,t}^{Y}$	0.0940		0.0326	0.2268		0.2378
	(0.155)		(0.160)	(0.152)		(0.155)
$\sigma_{i,t}^{X}$		0.0954			0.2261	
		(0.154)			(0.151)	
$\sigma_{i,t}^{G}$			0.3559**			0.2610*
			(0.152)			(0.149)
$g_{i,t}^{Y}$				0.3980***		0.3255***
				(0.066)		(0.067)
$g_{i,t}^{X}$					0.3969***	
					(0.066)	
$g_{i,t}^{G}$						0.2129***
						(0.066)
Constant	22.7727***	22.8142***	22.8739***	21.5494***	21.6502***	21.0897***
	(1.385)	(1.390)	(1.450)	(1.484)	(1.487)	(1.781)
Observations	1,115	1,115	1,115	1,115	1,115	1,115
R-squared	0.7616	0.7616	0.7632	0.7762	0.7762	0.7816

Panel B. Developing Countries

Specifications	(1)	(2)	(3)	(4)	(5)	(6)
Regressors \dependent variable	savings_gdp	savings_gdp	savings_gdp	savings_gdp	savings_gdp	savings_gdp
$\sigma_{i,t}^{Y}$	-0.5460**		-0.5508***	-0.5544***		-0.5626***
	(0.217)		(0.211)	(0.209)		(0.206)
$\sigma_{i,t}^{X}$		-0.5485**			-0.5570***	
		(0.216)			(0.208)	
$\sigma_{i,t}^{G}$			0.0159			0.0227
			(0.048)			(0.049)
$g_{i,t}^{Y}$				0.6120**		0.6159**
				(0.298)		(0.301)
$g_{i,t}^{X}$					0.6127**	
					(0.298)	

$g^G_{i,t}$						-0.0077
						(0.023)
Constant	12.7561***	13.3422***	12.6877***	21.5790***	22.1902***	21.4721***
	(1.286)	(1.450)	(1.351)	(5.003)	(5.178)	(5.038)
Observations	2,738	2,738	2,738	2,738	2,738	2,738
R-squared	0.5483	0.5484	0.5483	0.5735	0.5737	0.5736

Panel C. All countries

Specifications	(1)	(2)	(3)	(4)	(5)	(6)
Regressors \dependent variable	savings_gdp	savings_gdp	savings_gdp	savings_gdp	savings_gdp	savings_gdp
$\sigma^Y_{i,t}$	-0.5834***		-0.5864***	-0.5395***		-0.5453***
	(0.197)		(0.191)	(0.174)		(0.171)
$\sigma^X_{i,t}$		-0.5857***			-0.5417***	
		(0.196)			(0.173)	
$\sigma^G_{i,t}$			0.0076			0.0149
			(0.048)			(0.048)
$g^Y_{i,t}$				0.6061**		0.6062**
				(0.255)		(0.258)
$g^X_{i,t}$					0.6063**	
					(0.255)	
$g^G_{i,t}$						0.0006
						(0.022)
Constant	22.4550***	22.2031***	22.4564***	20.5178***	20.2857***	20.5182***
	(1.330)	(1.336)	(1.332)	(1.779)	(1.803)	(1.776)
Observations	3,853	3,853	3,853	3,853	3,853	3,853
R-squared	0.5603	0.5604	0.5604	0.5868	0.5870	0.5868

Note: robust standard errors in parenthesis. Country and time fixed effects included but omitted for reasons of parsimony. *, **, *** denote statistical significance at the 10, 5 and 1 percent levels, respectively.

Panel A of Table 4 reports the estimates for the advanced economies. Focusing on the estimated δ's first, the results show that the effects of relative volatility on national saving are positive, but small and statistically insignificant. On the contrary, the effects of the growth rates on saving (the estimated β's) are all positive and precisely estimated.

Repeating the exercise for the developing group of countries in Panel B of Table 4 reveals a very different picture. Macroeconomic relative (output) volatility is associated here with a sizeable and statistically significant *decrease* in national saving. Interestingly enough, the effects of growth on national saving (the estimated β's) are positive and statistically significant for the output variables, a finding that echoes that for the advanced economies in Panel A.[15]

Panel C of Table 4 estimates the saving models for the full sample, finding again that the results are (misleadingly) dominated by the developing group if one pools.

Next, we turn to investment, replacing the dependent variable in regressions (1) and (2) with gross capital formation as a percent of GDP. Results are shown in Table 5.

[15] While this qualitative similarity is giving us confidence on the validity of the estimated models, we also point out that the saving effect of government consumption growth is different in the two groups: statistically significantly positive in the advanced economies, but basically zero in the developing ones. While accounting for this difference is beyond the scope of the present paper, we note that it is of interest.

Table 5. Investment and FP relative volatility (10-year moving window)

Panel A. Advanced Countries

Specifications	(1)	(2)	(3)	(4)	(5)	(6)
Regressors \dependent variable	inv_gdp	inv_gdp	inv_gdp	inv_gdp	inv_gdp	inv_gdp
$\sigma^{Y}_{i,t}$	-0.8972***		-0.8839***	-0.7618***		-0.6784***
	(0.225)		(0.225)	(0.219)		(0.216)
$\sigma^{X}_{i,t}$		-0.8843***			-0.7508***	
		(0.223)			(0.217)	
$\sigma^{G}_{i,t}$			-0.0938			-0.1520
			(0.136)			(0.135)
$g^{Y}_{i,t}$				0.3811***		0.3270***
				(0.054)		(0.054)
$g^{X}_{i,t}$					0.3805***	
					(0.053)	
$g^{G}_{i,t}$						0.2204***
						(0.060)
Constant	23.1696***	22.7969***	23.1408***	22.0121***	21.6982***	21.3447***
	(1.480)	(1.488)	(1.462)	(1.300)	(1.303)	(1.480)
Observations	1,013	1,013	1,013	1,013	1,013	1,013
R-squared	0.6391	0.6388	0.6394	0.6665	0.6662	0.6785

Panel B. Developing Countries

Specifications	(1)	(2)	(3)	(4)	(5)	(6)
Regressors \dependent variable	inv_gdp	inv_gdp	inv_gdp	inv_gdp	inv_gdp	inv_gdp
$\sigma^{Y}_{i,t}$	-0.3809***		-0.4078***	-0.3851***		-0.4148***
	(0.071)		(0.072)	(0.072)		(0.073)
$\sigma^{X}_{i,t}$		-0.3782***			-0.3824***	
		(0.070)			(0.072)	
$\sigma^{G}_{i,t}$			0.0873**			0.0888**
			(0.041)			(0.041)
$g^{Y}_{i,t}$				0.1956***		0.1999***
				(0.060)		(0.061)
$g^{X}_{i,t}$					0.1950***	
					(0.060)	
$g^{G}_{i,t}$						-0.0120
						(0.015)
Constant	18.5275***	18.9143***	18.1549***	21.3519***	21.7379***	20.9350***
	(0.847)	(0.875)	(0.850)	(1.252)	(1.294)	(1.249)
Observations	2,649	2,649	2,649	2,649	2,649	2,649
R-squared	0.6261	0.6261	0.6285	0.6326	0.6325	0.6350

Panel C. All countries

Specifications	(1)	(2)	(3)	(4)	(5)	(6)
Regressors \dependent variable	inv_gdp	inv_gdp	inv_gdp	inv_gdp	inv_gdp	inv_gdp
$\sigma^{Y}_{i,t}$	-0.5083***		-0.5327***	-0.4940***		-0.5200***
	(0.069)		(0.071)	(0.068)		(0.070)
$\sigma^{X}_{i,t}$		-0.5046***			-0.4902***	
		(0.068)			(0.067)	
$\sigma^{G}_{i,t}$			0.0620			0.0630
			(0.040)			(0.040)
$g^{Y}_{i,t}$				0.2351***		0.2376***
				(0.055)		(0.055)
$g^{X}_{i,t}$					0.2345***	
					(0.055)	
$g^{G}_{i,t}$						-0.0059

						(0.015)
Constant	23.3467***	23.1323***	23.3605***	22.5995***	22.3940***	22.6269***
	(1.504)	(1.504)	(1.516)	(1.374)	(1.375)	(1.383)
Observations	3,662	3,662	3,662	3,662	3,662	3,662
R-squared	0.6154	0.6154	0.6165	0.6253	0.6253	0.6265

Note: robust standard errors in parenthesis. Country and time fixed effects included but omitted for reasons of parsimony. *, **, *** denote statistical significance at the 10, 5 and 1 percent levels, respectively.

Panel A of Table 5 contains the results for the advanced economies, and they are found to be unsurprising. Investment is negatively associated with macroeconomic (output) volatility and positively associated with growth rates, all these effects being sizeable and statistically significant.

Panel B of Table 5 repeats for the developing group and reveals something interesting: investment in the developing economies behaves similarly to the advanced ones, so that for the first time in our regressions, there is no qualitative difference between the two groups of countries. In particular, the investment effect for the developing economies is also negative for macroeconomic (output) volatility and positive for the growth rates, again these effects being sizeable and statistically significant.[16]

Panel C shows the investment estimates for the full sample, and provides our only example so far of harmless pooling. The reason of course is that the imposed restriction of common δ's and β's is now not false.

The saving and investment regressions have added another piece to the puzzle we are trying to assemble. Summing up, the evidence is that, in advanced economies, macroeconomic volatility is associated with substantially lower investment, but no systematic effect on national saving, therefore improving the current account balance. The investment effect is remarkably similar in developing economies, but there higher relative volatility also reduces national saving, and by a comparable amount, leaving the current account statistically unaffected.

We note that our estimated saving effects may appear to cast serious doubts on the "precautionary saving" explanation of the observed relationship between volatility and the current account. That mechanism requires that saving *increase* with volatility, whereas in our estimations we get no effect for the advanced economies and a *decrease* for the developing ones. One possible explanation is that our measure of national saving includes the government budget, whereas the precautionary saving mechanism applies to private saving only.

To test this, we now report regressions for private saving as a percent of GDP in Table 6. The results are easy to summarize: both panel A (for the advanced economies) and panel B

[16] The similarity even extends to the statistical insignificance of the government consumption volatility (though not the government consumption growth rate).

(developing) find a strong, positive and robust relationship between output uncertainty and private saving. The precautionary saving motive is shown to be present in both groups of countries, though quantitatively stronger in the advanced economies, where the estimated δ's are roughly twice as big. Once again, Panel C reports the full sample results for completeness.[17]

The estimates of Table 6 confirm the existence of precautionary saving in both groups of countries, and therefore rule out absence of this mechanism in developing economies as a possible explanation for why the current account there does not respond to uncertainty.

Table 6. Private Saving and FP relative volatility (10-year moving window)

Panel A. Advanced Countries

Specifications	(1)	(2)	(3)	(4)	(5)	(6)
Regressors \dependent variable	prisav_gdp	prisav_gdp	prisav_gdp	prisav_gdp	prisav_gdp	prisav_gdp
$\sigma_{i,t}^{Y}$	0.7876**		0.5924*	0.6692**		0.4001
	(0.314)		(0.329)	(0.306)		(0.320)
$\sigma_{i,t}^{X}$		0.7841**			0.6662**	
		(0.314)			(0.306)	
$\sigma_{i,t}^{G}$			1.1880***			1.2677***
			(0.359)			(0.348)
$g_{i,t}^{Y}$				-0.3071***		-0.2960***
				(0.105)		(0.102)
$g_{i,t}^{X}$					-0.3065***	
					(0.105)	
$g_{i,t}^{G}$						-0.1869
						(0.133)
Constant	-1.1222	-1.1253	8.4442***	0.0746	0.0712	10.3538***
	(1.234)	(1.235)	(3.075)	(1.262)	(1.263)	(3.107)
Observations	587	587	587	587	587	587
R-squared	0.5727	0.5726	0.5901	0.5840	0.5839	0.6093

Panel B. Developing Countries

Specifications	(1)	(2)	(3)	(4)	(5)	(6)
Regressors \dependent variable	prisav_gdp	prisav_gdp	prisav_gdp	prisav_gdp	prisav_gdp	prisav_gdp
$\sigma_{i,t}^{Y}$	0.3709***		0.3802***	0.3716***		0.3816***
	(0.129)		(0.125)	(0.132)		(0.127)
$\sigma_{i,t}^{X}$		0.3675***			0.3684***	
		(0.128)			(0.131)	
$\sigma_{i,t}^{G}$			-0.0219			-0.0227
			(0.054)			(0.055)
$g_{i,t}^{Y}$				0.0045		0.0056
				(0.069)		(0.071)
$g_{i,t}^{X}$					0.0059	
					(0.069)	
$g_{i,t}^{G}$						0.0020
						(0.022)
Constant	-5.0550***	-5.0488***	-5.1611***	-5.0746***	-5.0745***	-5.1981***
	(1.089)	(1.088)	(1.116)	(1.146)	(1.147)	(1.150)
Observations	2,108	2,108	2,108	2,108	2,108	2,108
R-squared	0.6176	0.6176	0.6177	0.6176	0.6176	0.6177

[17] We note here that the sample sizes in Tale 6 are smaller in all three panels than in previous tables, as the private saving data are not available for the entirety of our longer sample.

Panel C. All countries

Specifications	(1)	(2)	(3)	(4)	(5)	(6)
Regressors \dependent variable	prisav_gdp	prisav_gdp	prisav_gdp	prisav_gdp	prisav_gdp	prisav_gdp
$\sigma_{i,t}^{Y}$	0.4897***		0.4921***	0.4819***		0.4831***
	(0.118)		(0.114)	(0.121)		(0.116)
$\sigma_{i,t}^{X}$		0.4862***			0.4787***	
		(0.117)			(0.120)	
$\sigma_{i,t}^{G}$			-0.0049			-0.0025
			(0.053)			(0.055)
$g_{i,t}^{Y}$				-0.0443		-0.0431
				(0.062)		(0.064)
$g_{i,t}^{X}$					-0.0431	
					(0.063)	
$g_{i,t}^{G}$						-0.0019
						(0.022)
Constant	0.0377	0.0349	0.0126	0.1130	0.1083	0.0991
	(0.912)	(0.912)	(0.973)	(0.913)	(0.913)	(0.964)
Observations	2,695	2,695	2,695	2,695	2,695	2,695
R-squared	0.6150	0.6150	0.6150	0.6151	0.6151	0.6151

Note: robust standard errors in parenthesis. Country and time fixed effects included but omitted for reasons of parsimony. *, **, *** denote statistical significance at the 10, 5 and 1 percent levels, respectively.

5. Robustness and Extensions

5.1. Sensitivity

There are many ways to detrend macroeconomic variables. Despite substantial progress in the estimation methodologies, we still lack a universally accepted approach (Borio et al., 2013, 2014).[18] In a nutshell, some methods rely on statistical techniques[19] while others rely on models guided by economic theory. All have strengths and weaknesses. Note, however, that statistical methods are anything but "theory-free" (as they are sometimes characterized, see for example Bassanetti et al. 2010, p.7; see also Oksanen 2018, p. 5), being instead based on the theoretical presumption that actual macroeconomic series to fluctuate around their long-term trend. We are mindful of the criticisms surrounding the use of the popular HP filter (Harvey and Jaeger, 1993; Cogley and Nason, 1995), For this reason in a complementary sensitivity exercise, we also apply the recent filtering technique developed by Hamilton (2018). Hamilton (2018) criticized the HP filter because of three main drawbacks (i) spurious cycles, (ii) end-of-sample

[18] Comprehensive reviews or surveys of available methods is provided in Gibbs (1995), Giorno et al. (1995), Ladiray et al. (2003); Horn et al. (2007); Bassanetti et al. (2010); Anderton et al. (2014); Alichi et al. (2017).

[19] Note that these methods used to compute potential output do not benchmark their trends to inflation or any independent measure of capacity and therefore cannot be interpreted as estimating the level of maximum sustainable output. That is, they provide a measure of trend output but not potential output.

bias, (iii) ad hoc assumptions regarding the smoothing parameter), and proposed a regression filter as an alternative.[20]

Tables C1 and C2 in Appendix C re-estimate the key equations employing instead HP and Hamilton-based relative volatility measures, respectively. We can observe that our main result is robust to the choice of filtering technique: the current account balance is positively associated with macroeconomic volatility in advanced economies, but not in developing ones.

5.2. Extensions

In addition to distinguishing between Advanced and Developing economies, we also tried another way to introduce heterogeneity, splitting the sample between countries that have run chronic surpluses versus chronic deficits on their current accounts. The results are shown in Table 7 with the FP relative volatility measure and illustrate a sharp asymmetry between the responses of the two groups of countries. In particular, we see that the positive relationship between the current account balance and macroeconomic volatility is most clear in the chronic deficit economies, where it appears to be economically strong and highly statistically significant. On the contrary, in the chronic surplus group, we get an inverse relationship but very imprecisely estimated. While accounting for this asymmetry is beyond the scope of the present paper, we believe it is a valuable piece of information and consider it a promising avenue of future research.

[20] Note, however, that Schüler (2018) demonstrates that Hamilton's regression filter shares some of the HP filter drawbacks, so that it is not a panacea. He argues that the "correct" filter depends on the researcher's objective, i.e., the feature of the data she would like to focus on. If the objective is to remain agnostic about the importance of the different cyclical characteristics, one should use first differences to detrend a typical economic time series. For difference stationary data, such transformation preserves all dynamics of a series, while the HP filter –but also the regression filter extract specific frequencies of a time series, masking potentially relevant fluctuations.

Table 7. Current account and FP relative volatility (10-year moving window): chronic surplus vs chronic deficit

Panel A. Chronic Surplus

Specifications	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Regressors \dependent variable	ca_gdp	ca_gdp	exp_gdp	exp_gdp	imp_gdp	imp_gdp	savings	savings	inv	inv
$\sigma_{i,t}^{Y}$	-0.6082	-0.7022*	0.4068***	0.2470*	1.0711***	0.8593***	-0.7912**	-0.9785***	-0.1634**	-0.2739***
	(0.402)	(0.367)	(0.132)	(0.140)	(0.183)	(0.178)	(0.401)	(0.361)	(0.076)	(0.072)
$\sigma_{i,t}^{G}$		0.1314		0.3986***		0.4922***		0.3470		0.2121***
		(0.187)		(0.085)		(0.089)		(0.219)		(0.053)
$g_{i,t}^{Y}$	1.0382*	1.0532*	0.2017**	0.1696*	-0.1032	-0.1306	1.1608*	1.1540*	0.0575	0.0494
	(0.641)	(0.650)	(0.092)	(0.093)	(0.221)	(0.213)	(0.611)	(0.624)	(0.087)	(0.082)
$g_{i,t}^{G}$		-0.0704		0.0349		0.0043		-0.0621		-0.0189
		(0.069)		(0.045)		(0.040)		(0.088)		(0.027)
Constant	-14.7010**	-14.3084*	30.9386***	31.0362***	36.1441***	36.4478***	18.1895***	18.5623***	29.1291***	29.2363***
	(7.216)	(7.294)	(2.936)	(2.923)	(3.965)	(3.832)	(4.430)	(4.596)	(0.756)	(0.766)
Observations	1,074	1,074	1,186	1,186	1,186	1,186	1,021	1,021	956	956
R-squared	0.4707	0.4719	0.9207	0.9224	0.9182	0.9210	0.5165	0.5212	0.6583	0.6676

Panel B. Chronic Deficit

Specifications	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Regressors \dependent variable	ca_gdp	ca_gdp	exp_gdp	exp_gdp	imp_gdp	imp_gdp	savings	savings	inv	inv
$\sigma_{i,t}^{Y}$	0.3072***	0.3788***	0.3465***	0.3461***	0.0748	0.0137	-0.3804***	-0.3557***	-0.7761***	-0.7865***
	(0.077)	(0.082)	(0.102)	(0.104)	(0.101)	(0.104)	(0.085)	(0.086)	(0.091)	(0.094)
$\sigma_{i,t}^{G}$		-0.1193***		0.0007		0.0982***		-0.0757*		0.0330
		(0.035)		(0.028)		(0.034)		(0.042)		(0.049)
$g_{i,t}^{Y}$	-0.0405	-0.0687	0.1167**	0.1190**	0.1450*	0.1715**	0.2970***	0.2831***	0.3336***	0.3389***
	(0.040)	(0.044)	(0.047)	(0.047)	(0.078)	(0.074)	(0.044)	(0.047)	(0.046)	(0.047)
$g_{i,t}^{G}$		0.0311*		-0.0039		-0.0290		0.0151		-0.0073
		(0.018)		(0.018)		(0.021)		(0.021)		(0.017)
Constant	0.2633	0.2279	-0.3650	-0.3593	2.5575	2.6680	22.2040***	22.1854***	21.6766***	21.6893***
	(0.347)	(0.348)	(4.296)	(4.295)	(2.684)	(2.669)	(1.684)	(1.686)	(1.609)	(1.607)
Observations	2,968	2,968	3,135	3,135	3,135	3,135	2,832	2,832	2,706	2,706
R-squared	0.4145	0.4245	0.8360	0.8360	0.8323	0.8334	0.6187	0.6207	0.6258	0.6262

Note: robust standard errors in parenthesis. Country and time fixed effects included but omitted for reasons of parsimony. *, **, *** denote statistical significance at the 10, 5 and 1 percent levels, respectively.

6. Conclusions

Despite the abundance of studies on the behavior of the current account, much of the related literature has maintained an assumption of no uncertainty or certainty equivalence. While undeniably convenient because of its simplifying properties, this unrealistic assumption is increasingly being relaxed by the more recent literature, for two main reasons. First, the assumption is unnecessary because the widely used neoclassical open-economy model makes clear and testable predictions about the effects of uncertainty on the current account balance. Second, imposing the assumption on estimated models is potentially harmful because the omission of volatility may produce biased results, as well as limit their usefulness in periods of unusually high macroeconomic uncertainty.

The present paper contributes to this recent literature by investigating the determinants of the current account balance, paying particular attention to the role of macroeconomic volatility. The paper's empirical methodology is based on the predictions of the standard theoretical model. As it is well known, the theory predicts that the current account should be positively affected by macroeconomic volatility and temporary changes in output, but should be negatively related to temporary changes in government consumption.

Using annual data for a panel of 34 Advanced and 136 Developing countries since the early 1970s, we first construct time-varying relative volatility measures for GDP, net output, and government consumption, using the technique proposed by Fogli and Perri (2015) and an alternative approach based on the Hodrick and Prescott (1997) and Hamilton (2018) filters. Next, guided by the theoretical model's predictions, we estimate empirical models for the current account with explanatory variables that include the three volatility measures mentioned above, as well as the growth rates of GDP, net output, and government consumption.

The paper's main empirical findings can be summarized as follows. The current account balance is shown to be positively affected by macroeconomic uncertainty in Advanced Economies but not in Developing ones. This is robust to whether uncertainty is measured by the relative volatility of GDP, net output, or government consumption.

When we explore potential mechanisms for this asymmetry, our results identify fundamental differences in how components of the current account respond between the two groups of countries. The Table 8 below presents a stylized version of our findings.

Table 8. Effects of Increased Macroeconomic Volatility

Advanced Economies	Developing Economies
$\Delta CA > 0$	$\Delta CA \approx 0$
$\Delta EX >> 0 \quad \Delta IM > 0$	$\Delta EX \leq 0 \quad \Delta IM \geq 0$
$\Delta S \approx 0 \quad \Delta I < 0$	$\Delta S < 0 \quad \Delta I < 0$
$\Delta S_p > 0$	$\Delta S_p > 0$

With the exceptions of domestic investment and private saving, all other determinants of the current account balance respond differently (and sometimes very differently, as in the case of exports) between advanced and developing economies. Accounting for these differences appears to be a fruitful area for future research.

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APPENDIX A

List of Advanced Economies:

United States, United Kingdom, Austria, Belgium, Denmark, France, Germany, Italy, Luxembourg, Netherlands, Norway, Sweden, Canada, Japan, Finland, Greece, Ireland, Malta, Portugal, Spain, Australia, New Zealand, Cyprus, Israel, Hong Kong SAR, China, Korea, Rep., Macao SAR, China, Singapore, Czech Republic, Slovak Republic, Estonia, Latvia, Lithuania, Slovenia

List of Developing Economies:

Turkey, South Africa, Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, El , Salvador, Guatemala, Haiti, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, Uruguay, Venezuela, RB, Antigua and Barbuda, Bahamas, The, Aruba, Barbados, Dominica, Grenada, Belize, Jamaica, St. Vincent and the Grenadines, Suriname, Bahrain, Iraq, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, United Arab Emirates, Egypt, Arab Rep., West Bank and Gaza, Bangladesh, Bhutan, Brunei Darussalam, Myanmar, Cambodia, Sri Lanka, India, Indonesia, Timor-Leste, Lao PDR, Malaysia, Nepal, Pakistan, Palau, Philippines, Thailand, Vietnam, Algeria, Angola, Botswana, Burundi, Cameroon, Cabo Verde , Central African Republic, Chad, Comoros, Congo, Rep., Congo, Dem. Rep., Benin, Gabon, Gambia, The, Ghana, Guinea-Bissau, Guinea, Cote d'Ivoire, Kenya, Lesotho, Liberia, Libya, Madagascar, Mali, Mauritania, Mauritius, Morocco, Mozambique, Niger, Nigeria, Zimbabwe, Rwanda, Seychelles, Senegal, Sierra Leone, Namibia, Sudan, Eswatini, Tanzania, Togo, Tunisia, Uganda, Burkina Faso, Zambia, Solomon Islands, Fiji, Kiribati, Vanuatu, Samoa, Tonga, Marshall Islands, Micronesia, Fed. Sts., Armenia, Azerbaijan, Belarus, Albania, Georgia, Kazakhstan Kyrgyz Republic, , Bulgaria, Moldova, Russian , Federation, Tajikistan, China, Turkmenistan, Ukraine, Uzbekistan, Serbia, Montenegro, Hungary, Mongolia, Croatia, North Macedonia, Bosnia and Herzegovina, Poland, Kosovo, Romania

APPENDIX B

Table B1. Summary Statistics

Variable	obs	mean	Std.dev.	min	max
Advanced Economies					
CA_GDP	1319	0.425	6.951	-20.69	40.38
Exports_gdp	1299	49.22	42.987	5.40	228.99
Imports_gdp	1299	46.88	38.892	5.19	221.01
Savings_gdp	1128	24.73	7.54	4.66	58.23
Investment_gdp	1128	24.13	5.32	9.88	55.13
$\sigma_{i,t}^{Y}$ FP	1203	-1.48	1.63	-4.22	8.47
$\sigma_{i,t}^{Y}$ HP	1216	-0.013	0.018	-0.041	0.101
$\sigma_{i,t}^{G}$ FP	1130	-5.23	2.913	-10.891	2.23
$\sigma_{i,t}^{G}$ HP	1148	-0.045	0.026	-0.096	0.032
$g_{i,t}^{Y}$	1263	2.840	3.354	-16.033	22.43
$g_{i,t}^{G}$	1229	2.587	3.032	-15.40	24.65
Variable	**obs**	**mean**	**Std.dev.**	**min**	**max**
Developing Economies					
CA_GDP	4857	-4.22	15.68	-275.81	351.72
Exports_gdp	4694	32.88	19.95	0.09	158.37
Imports_gdp	4694	42.35	22.80	0	236.39
Savings_gdp	3940	20.42	18.20	-236.26	372.98
Investment_gdp	3940	24.01	11.20	-89.61	104.19
$\sigma_{i,t}^{Y}$ FP	4388	0.14	3.91	-4.19	60.40
$\sigma_{i,t}^{Y}$ HP	4391	0.001	0.035	-0.04	0.43
$\sigma_{i,t}^{G}$ FP	2942	1.56	10.05	-10.36	99.43
$\sigma_{i,t}^{G}$ HP	2968	0.013	0.078	-0.08	0.63
$g_{i,t}^{Y}$	4736	3.39	6.34	-109.83	80.96
$g_{i,t}^{G}$	3660	3.93	12.92	-148.02	161.15

APPENDIX C

Table C1. HP relative volatility (10-year moving window)

Panel A. Advanced Countries

Specifications	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Regressors \dependent variable	ca_gdp	ca_gdp	exp_gdp	exp_gdp	imp_gdp	imp_gdp	savings	savings	inv	inv
$\sigma_{i,t}^{Y}$	58.0822**	47.2038	315.6387***	302.4045***	195.8135**	168.3811**	-13.1845	-16.5484	-68.3293**	-56.0583*
	(26.862)	(28.829)	(106.249)	(106.816)	(74.473)	(71.780)	(35.501)	(36.148)	(30.474)	(32.922)
$\sigma_{i,t}^{G}$		32.3716		22.7187		60.9585		26.4863		-27.7318
		(26.486)		(78.120)		(71.806)		(24.011)		(21.535)
$g_{i,t}^{Y}$	-0.0690	-0.0735	0.5011**	0.5498**	0.4963***	0.5095***	0.3893***	0.3188***	0.4154***	0.3637***
	(0.103)	(0.097)	(0.202)	(0.206)	(0.128)	(0.120)	(0.111)	(0.098)	(0.049)	(0.045)
$g_{i,t}^{G}$		-0.0042		-0.1413		-0.0446		0.1982**		0.2190**
		(0.045)		(0.097)		(0.093)		(0.078)		(0.092)
Constant	-1.2389	-1.2592	-1.9564	-1.5736	1.3539	1.6941	21.4129***	20.8441***	21.9578***	21.4022***
	(1.080)	(1.097)	(3.596)	(3.577)	(1.929)	(1.967)	(1.550)	(1.859)	(1.236)	(1.494)
Observations	1,130	1,130	1,327	1,327	1,327	1,327	1,115	1,115	1,013	1,013
R-squared	0.6279	0.6301	0.9359	0.9361	0.9440	0.9444	0.7759	0.7810	0.6674	0.6811

Panel B. Developing Countries

Specifications	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Regressors \dependent variable	ca_gdp	ca_gdp	exp_gdp	exp_gdp	imp_gdp	imp_gdp	savings	savings	inv	inv
$\sigma_{i,t}^{Y}$	-25.7127	-14.0919	-17.1813	-15.8141	21.3595	14.9816	-70.1298**	-65.3278**	-24.1060	-29.2054
	(33.722)	(33.589)	(19.665)	(20.541)	(23.699)	(23.577)	(34.419)	(32.846)	(15.754)	(18.430)
$\sigma_{i,t}^{G}$		-19.1481***		-1.6287		11.8266		-9.6697		11.7851
		(5.550)		(9.621)		(7.418)		(8.527)		(10.798)
$g_{i,t}^{Y}$	0.2938	0.2771	0.1054**	0.0958**	0.0144	0.0222	0.5687**	0.5620**	0.1890**	0.1904**
	(0.260)	(0.266)	(0.050)	(0.048)	(0.103)	(0.104)	(0.247)	(0.249)	(0.087)	(0.086)
$g_{i,t}^{G}$		0.0233		0.0168		-0.0072		0.0117		-0.0094
		(0.021)		(0.016)		(0.019)		(0.014)		(0.019)
Constant	-11.0531*	-11.0289*	9.6844**	9.5465**	15.5257**	15.4870**	20.7904***	20.9384***	20.4370***	20.1811***
	(6.826)	(6.707)	(4.782)	(4.757)	(6.019)	(5.954)	(4.579)	(4.638)	(1.761)	(1.736)
Observations	2,901	2,884	2,982	2,972	2,982	2,972	2,698	2,682	2,609	2,593
R-squared	0.4752	0.4811	0.8457	0.8457	0.8088	0.8093	0.6213	0.6229	0.6308	0.6341

Note: robust standard errors in parenthesis. Country and time fixed effects included but omitted for reasons of parsimony. *, **, *** denote statistical significance at the 10, 5 and 1 percent levels, respectively.

Table C2. Hamilton relative volatility (10-year moving window)

Panel A. Advanced Countries

Specifications	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Regressors \dependent variable	ca_gdp	ca_gdp	exp_gdp	exp_gdp	imp_gdp	imp_gdp	savings	savings	inv	inv
$\sigma_{i,t}^{Y}$	47.0411*	32.1853	319.5159***	308.1151***	204.5450***	186.5979**	-0.8804	-4.9088	-57.1826*	-45.7108
	(25.345)	(24.364)	(94.574)	(92.135)	(70.501)	(68.970)	(26.254)	(27.952)	(31.065)	(31.715)
$\sigma_{i,t}^{G}$		57.6021***		64.5974		64.1139		33.0250**		-35.5146*
		(18.838)		(46.009)		(43.280)		(15.085)		(19.104)
$g_{i,t}^{Y}$	-0.0457	-0.0454	0.4237**	0.4597**	0.4264***	0.4168***	0.4183***	0.3570***	0.4142***	0.3840***
	(0.109)	(0.100)	(0.186)	(0.182)	(0.127)	(0.121)	(0.109)	(0.091)	(0.052)	(0.044)
$g_{i,t}^{G}$		-0.0546		-0.1082		-0.0046		0.1617*		0.2311**
		(0.048)		(0.084)		(0.081)		(0.097)		(0.101)
Constant	-0.3404	-0.6311	3.5041*	-1.6115	4.8348***	1.5008	22.1064***	19.9344***	21.5995***	21.0289***
	(0.972)	(0.990)	(1.837)	(3.362)	(1.332)	(2.128)	(1.811)	(1.051)	(1.655)	(0.896)
Observations	1,100	1,080	1,284	1,259	1,284	1,259	1,087	1,069	990	973
R-squared	0.6267	0.6501	0.9413	0.9422	0.9480	0.9484	0.7799	0.7911	0.6671	0.6885

Panel B. Developing Countries

Specifications	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Regressors \dependent variable	ca_gdp	ca_gdp	exp_gdp	exp_gdp	imp_gdp	imp_gdp	savings	savings	inv	inv
$\sigma_{i,t}^{Y}$	-8.0059	-6.9585	-9.5541	-10.6994	6.2085	4.3999	-45.0073***	-45.3329***	-28.5976***	-29.1574***
	(15.637)	(14.847)	(15.232)	(15.721)	(13.507)	(13.382)	(11.660)	(10.387)	(10.339)	(10.332)
$\sigma_{i,t}^{G}$		-11.3128***		-0.5347		6.7459		-8.9711		5.7617
		(3.639)		(6.012)		(4.891)		(6.877)		(6.254)
$g_{i,t}^{Y}$	0.2967	0.2843	0.0999**	0.1032**	0.0101	0.0104	0.5662**	0.6113**	0.1862**	0.1979**
	(0.262)	(0.276)	(0.050)	(0.048)	(0.103)	(0.101)	(0.246)	(0.270)	(0.087)	(0.085)
$g_{i,t}^{G}$		0.0204		0.0141		-0.0137		-0.0054		-0.0194
		(0.026)		(0.015)		(0.018)		(0.018)		(0.018)
Constant	-14.0173***	-7.5968**	19.3940***	9.3985	22.1184***	15.1633**	20.1139***	20.4376***	20.5774***	20.1578***
	(3.687)	(3.667)	(1.635)	(7.911)	(1.961)	(6.147)	(3.943)	(4.328)	(1.683)	(1.584)
Observations	2,874	2,702	2,955	2,762	2,955	2,762	2,676	2,503	2,587	2,434
R-squared	0.4733	0.4910	0.8478	0.8548	0.8112	0.8203	0.6221	0.6416	0.6406	0.6566

Note: robust standard errors in parenthesis. Country and time fixed effects included but omitted for reasons of parsimony. *, **, *** denote statistical significance at the 10, 5 and 1 percent levels, respectively.