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**THE INTERNATIONAL POLICY TRILEMMA IN THE
POST-BRETTON WOODS ERA**

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The International Policy Trilemma in the Post-Bretton Woods Era

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Abstract

The international macroeconomic policy trilemma suggests that despite the appeal of exchange rate stability, financial account openness and monetary sovereignty, these cannot be achieved simultaneously. Using elements of Euclidean geometry, this paper proposes a new method for testing the trilemma and finds considerable evidence in support of it. Further tests indicate that, on average, policy configurations are not on the trilemma constraint, i.e. there is a degree of ‘trilemma-ineffectiveness’, which is costly for real output growth and price inflation. It is shown that these costs can be attributed to limited exchange rate stability and financial account openness, respectively.

Keywords: International Policy Trilemma, Exchange Rate Stability, Financial Openness, Monetary Sovereignty

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1 Introduction

There are several reasons why each aspect of the international macroeconomic trilemma—exchange rate stability, financial account openness and monetary sovereignty—may appeal to policymakers. Exchange rate stability prevents unnecessary resource shifts into and out of trade-oriented sectors that may result from exchange rate overshooting; it may be desirable as a nominal anchor for inflationary expectations; and, it protects a dollarised banking system from balance sheet shocks.¹ Financial openness should lead to an increase of investment inflows, which boosts output in the short-run.² It may also generate long-run benefits through a more efficient allocation of capital and by increasing the costs of policy mistakes and lack of reforms.³ Monetary sovereignty allows for a more effective policy toolbox both for achieving internal balance and for responding to external shocks.

But, despite the attractiveness of each aspect of the trilemma, a policy-maker cannot achieve all three simultaneously. For example, operating an open financial account and achieving perfect exchange rate stability necessarily implies the loss of monetary sovereignty. Any effort to change the monetary base (or, correspondingly, the interest rate) will lead to offsetting actions by the central bank in order to maintain the current level of the exchange rate. In the case of an expansion accompanied by a lower interest rate, the reduction in capital inflows will tend to weaken the domestic currency. In order to prevent the exchange rate (expressed here as the price of the foreign currency in local currency units) from appreciating, the central bank will have to absorb

¹See Calvo and Reinhart (2002).

²See Bussière and Fratzscher (2008).

³The seminal contribution of Kose et al. (2009) explores all aspects of financial globalisation and concludes that it can have a “catalytic role” for total factor productivity (TFP) growth and welfare in developing countries.

the extra liquidity it has generated by running down its international reserves. So, in order to maintain a degree of monetary sovereignty, the country needs to implement restrictions in its financial account or sacrifice—to the required extent—the exchange rate stability objective.⁴

This logic presumes that there are limits to the extent that the monetary authority can sterilise the foreign exchange market intervention by injecting liquidity in the banks' balance sheets. Sustaining a monetary expansion under fixed exchange rates with an open financial account would require a prolonged reserve haemorrhage, something which the policymaker cannot accept for too long.⁵ Irrespective of the hoard, international reserves are an exhaustible resource and such policies cannot persist indefinitely. Ultimately, the trilemma should be a binding constraint.

In spite of the importance of the trilemma's implications for conducting macroeconomic policy, systematic efforts in assessing its empirical validity using large datasets are relatively recent.⁶ This paper contributes to the related literature by offering a new way of testing the trilemma using elements of Euclidean geometry. The procedure is described, and, using data from the post-Bretton Woods era, implemented in section 2. In addition, the paper explores the macroeconomic consequences of failing to implement policies that maximise the extent to which the three aspects of the trilemma are met. This is done in section 4, following the introduction of the term 'trilemma efficacy' in section 3. Section 5 concludes.

⁴See Aizenman (2013) for more examples on the constraint the trilemma places on policymakers.

⁵Quantitatively, the relationship between the change in the domestic component of the monetary base and the corresponding change in international reserves is captured by the *offset coefficient*. An early discussion of sterilisation and the offset coefficient can be found in Herring and Marston (1977).

⁶See, e.g., Shambaugh (2004), Obstfeld et al. (2005), Bleaney et al. (2013) and Aizenman et al. (2013).

2 The Trilemma Constraint

Previous studies have investigated the trilemma constraint by gauging the responsiveness of the domestic interest rate to the foreign one (the latter is the interest rate of an appropriately selected ‘base’ country). The interest rate of a country implementing a fixed exchange rate regime with an open financial account will converge to—and fluctuate in tandem with—the foreign interest rate. If this is not the case, then there will be arbitrage opportunities. For example, a too-high domestic interest rate vis-à-vis the foreign interest rate will see an inflow of foreign capital exploiting the differential. This inflow, given perfect capital mobility, will result in higher asset prices and lower yields. The arbitrage activity will continue until the interest rate differential between the domestic and foreign assets, which are assumed to be perfect substitutes, is zero.⁷

In other words, under these arrangements, a country is not expected to possess a meaningful degree of control over its monetary policy. Shambaugh (2004) and Obstfeld et al. (2005) find evidence that broadly support this expectation. Bleaney et al. (2013) find that pegs without capital controls are linked to a higher degree of monetary sovereignty than the constraints of the trilemma would suggest. Nevertheless, when they account for peg credibility issues, their results become more consistent with the trilemma.⁸

A different approach, more closely related to the one pursued in this paper, is implemented by Aizenman et al. (2013). Instead of concentrating on interest rate correlations, they include measures of exchange rate stability, financial

⁷In reality, however, transaction costs may allow a financially open, exchange rate-fixing country some degree of monetary sovereignty. This is a point made by Obstfeld et al. (2005).

⁸Their argument is that in low-credibility pegs, devaluation expectations feed into the domestic interest rate disentangling it to some extent from the base country’s rate and generating a false perception of relative monetary independence.

account openness and monetary sovereignty in a regression framework. Their three goals are to determine whether the relationship among the three trilemma variables is a linear one, to obtain estimates of the tradeoffs between them and to test the trilemma itself. They find that the trilemma has been binding for industrialised countries since the early 1990s and for developing countries since the mid 2000s. Most important for the aims of this paper, their results suggest that the relationship between the trilemma variables is likely to be a linear one.

The presumption of linearity allows the depiction of the trilemma constraint as a triangle in the space defined by the three aspects of the trilemma. This is shown in Figure 1 as triangle ABC . At each point in time, the combination of exchange rate stability, financial account openness and monetary sovereignty determines each country's location in this three-dimensional space. In the context of this paper, each point represents a macroeconomic policy outcome (or configuration). If the trilemma is binding, then the mean distance between the constraint and policy configurations exceeding the constraint, i.e. points that lie off the trilemma triangle in the opposite direction of the origin, will be statistically insignificant. This is the essence of the test proposed and implemented in this paper.

[INSERT FIGURE 1 ABOUT HERE]

The trilemma constraint is given by

$$s + m + f - 2 = 0, \tag{1}$$

where s stands for exchange rate stability (the abscissa in Figure 1), m stands for monetary sovereignty (the ordinate) and f stands for financial account

openness (the height), and $0 \leq s, m, f \leq 1$. Geometrically, the distance between a point and a plane is found by projecting a vector that connects the point of interest with a point on the plane onto the unit normal vector (i.e. a vector of length one, which is perpendicular to the plane). The length of a vector \mathbf{v} connecting, e.g., a point $P(s_1, m_1, f_1)$, which is off the plane, and, e.g., a point $Q(s, m, f)$, which lies on the plane, is

$$\mathbf{v} = \begin{pmatrix} s_1 - s \\ m_1 - m \\ f_1 - f \end{pmatrix}. \quad (2)$$

Given (1), the unit normal vector \mathbf{u} is⁹

$$\mathbf{u} = \frac{(1, 1, 1)}{\sqrt{3}}. \quad (3)$$

The projection is just $|\mathbf{v} \cdot \mathbf{u}|$. Hence, the distance, k , is

$$k = \frac{|(s_1 - s) + (m_1 - m) + (f_1 - f)|}{\sqrt{3}}. \quad (4)$$

Substituting the trilemma constraint in (4) yields

$$k = \frac{|s_1 + m_1 + f_1 - 2|}{\sqrt{3}}. \quad (5)$$

Dropping the absolute value gives the ‘signed’ trilemma distance (henceforth, *trilemma distance*): a negative value means that the point in question lies somewhere between the origin and the trilemma plane, whereas a positive value means that the point lies off the plane in the opposite direction of the

⁹More generally, it is $\frac{a,b,c}{\sqrt{a^2+b^2+c^2}}$ for a plane described by an equation $ax + by + cz = d$.

origin.¹⁰

Using the updated versions of the data on exchange rate stability, financial account openness and monetary sovereignty in Aizenman et al. (2010), we calculate the distance between a configuration and the trilemma triangle.¹¹ The dataset consists of 5,289 usable observations—i.e. years between the period 1970 and 2012 for which the distance from the plane can be calculated. Table 1 reports overwhelming evidence that policy configurations are, on average, consistent with there being a binding trilemma constraint. This is true across income groups (panel A in Table 1), geographic regions (panel B) and time (panel C), as evidenced by the negative average values for the trilemma distance variable.

[INSERT TABLE 1 ABOUT HERE]

A more formal test of the trilemma involves testing the null hypothesis that the mean of the trilemma distance is zero against the alternative that it is positive. Inability to reject the null is interpreted as evidence that the constraint is binding, i.e. that the mean of the positive values observed are insignificant.¹²

A natural candidate for this assessment is a Student's t -test. The latter is based on the classical assumptions about the distribution of observations, including the assumption of normality. Statistically, this is rejected for the

¹⁰There is, of course, no concept of negative distance: the sign solely identifies the direction.

¹¹Aizenman et al. (2010) use annual standard deviations of the exchange rate to construct the exchange rate stability measure; they use correlations between the home and base country interest rates to construct the monetary sovereignty measure; and, they use the IMF's Annual Report of Exchange Arrangements and Exchange Restrictions to construct the capital account openness variable KAOPEN. For the latter, also see Chinn and Ito (2006).

¹²Why these exist in the first place is an important question, but not one that is pursued at length here. One explanation could be that the degree of monetary sovereignty is actually exaggerated as it may reflect credibility issues rather than actual monetary independence. See Bleaney et al. (2013) for details.

trilemma distance variable.¹³ However, the extent of similarity between the normal density and the variable’s kernel density—both plotted along with a histogram in Figure 2—is conducive to using the t-test. Results are reported in the last column of Table 1 for the entire sample, income groups, geographical regions and decades in the sample. In all cases, the null cannot be rejected.¹⁴

[INSERT FIGURE 2 ABOUT HERE]

3 Introducing Trilemma Efficacy

The numbers reported in Table 1 show that, on average, trilemma distance is negative. In this paper, this situation is defined as ‘trilemma inefficacy’. In contrast, an observation corresponds to a trilemma-effective configuration if the mean lies on the trilemma plane, i.e. if $k = 0$, or exceeds it. Statistical tests (not reported here but available from the author upon request) reject the hypothesis that the average trilemma distance is zero, in favour of the alternative that it is negative. The aim of this section is to probe the extent of trilemma inefficacy.

The numbers reported in Panel A of Table 1 show that low income countries are, collectively, the most trilemma-ineffective. In other words, these countries could enjoy the benefits of a greater degree of financial account openness, exchange rate stability or monetary independence—or a combination of these—by implementing the relevant policies. Middle income countries are more trilemma-effective, even though they are some way off the, historically,

¹³Skewness is equal to 0.12 and the hypothesis that the difference with the degree of skewness of a normal distribution is zero cannot be rejected. Hence, on this criterion, normality cannot be rejected. However, one should reject the same hypothesis about kurtosis (equal to 2.5).

¹⁴Table A1 in the Appendix reports results for individual countries. Again, the null cannot be rejected in the majority of cases.

better performing high income group.

But what are the precise policy profiles of the three income groups? The top graphic in Figure 3 clarifies this. High income countries are the most financially open while enjoying a similar degree of exchange rate stability with the other groups. Naturally, they have the least independent monetary policies, even though not to an extent that would jeopardise their trilemma efficacy. In contrast, low income countries, have a low degree of financial account openness and, at the same time, the lowest degree of exchange rate stability. This, consequently, affords them a more independent monetary policy compared to the other income groups, especially the high income group. Still, the average degree of monetary sovereignty is far from perfect, and, consequently, their monetary policies are not truly shielded from the world's monetary conditions.

[INSERT FIGURE 3 ABOUT HERE]

A breakdown of average trilemma efficacy by geographical region for low and middle income countries reveals that economies in the Latin America and Caribbean region have implemented trilemma policies that are as effective as those of high income countries. This region, as a whole, is also substantially more financially open than the rest, even though it is not as open as high income countries. Europe and Central Asia, South Asia, Sub-Saharan Africa and East Asia and the Pacific are at the other end of the spectrum, where large improvements in trilemma efficacy could be made. Middle East and North Africa's average policy configuration is closer to the trio lemma constraint. Overall, the economies in our sample took big steps towards trilemma efficacy in the 1990s and 2000s. This period corresponds to the opening up of financial accounts, as can be seen in the bottom graphic of Figure 3.

4 Trilemma Efficacy and Macro Performance

4.1 Initial considerations

Having established that international macroeconomic policy is bound by the trilemma, it is natural to ask whether trilemma efficacy is linked to macroeconomic performance. Two aspects of the latter are examined, real economic growth and price inflation outcomes. The *a priori* expectation regarding growth is that economies achieving a greater degree of exchange rate stability, financial openness and monetary autonomy should grow faster—even though there are some qualifications to this assertion. Calvo and Reinhart (2002) report a “widespread” aversion of large currency swings, especially among emerging economies. They offer a range of possible explanations for this aversion, including the existence of output costs associated with exchange rate fluctuations. Aghion et al. (2009) find that real exchange rate volatility can indeed have a significant impact on productivity growth, especially in less financially developed economies.

The role of financial integration has been explored in a number of studies, many of which have established a positive correlation with economic growth. As mentioned in the introduction, Kose et al. (2009) conclude that the effects on TFP growth can be catalytic for developing countries. Using data for the period 1976-1995, Klein and Olivei (2008) find that countries with more open capital accounts grow faster, even though this result is driven by the developed countries in their sample. But, of course, an open financial account does not guarantee a smooth inflow of investment from abroad. Calvo (1998) shows how capital may suddenly stop flowing into the domestic economy with deleterious effects. And, more recently, Rey (2013) has argued that the extent of financial integration in recent times has led to a ‘global financial cycle’. As

this tends to be unrelated to individual economies' macroeconomic conditions, it generates credit booms and busts. The implication is that irrespective of the exchange rate regime, an open capital account is equivalent to a loss of monetary independence. And this can lead to crises, if, for example, the global financial cycle leads to an 'extreme' credit expansion.

The link between trilemma efficacy and inflation is more difficult to infer from the theory because in the small open economy framework of Mundell-Fleming prices are sticky. Real world considerations, however, give rise to an expectation that, on balance, the two should move in opposite directions. The first consideration is exchange rate stability. In the long run, if purchasing power parity holds, a stable exchange rate can be seen as an indication of a credible anti-inflation monetary stance. Hence, it should be linked to lower inflation rates.¹⁵ The second consideration is financial integration. The potential link between an open financial account and prices is *a priori* quite uncertain. If unemployment is low and the financial account leads to a higher inflow of direct investment, there could be upward pressure on wages and prices. Or, in different circumstances, the additional domestic production due to capital inflows could put downward pressure on product prices. Increased inward investment may also increase the value of the domestic currency making imports cheaper, and, hence, help reduce inflation. Available empirical evidence are consistent with the argument that financial integration should be linked to lower inflation rates, e.g. Wei and Tytell (2004). Finally, monetary independence can cut both ways. It should be good news for inflation outcomes if the monetary authorities have established their anti-inflation credentials. Equally,

¹⁵Note that exchange rate stability is not necessarily a feature associated only with exchange rate pegs. It could be the case that the currency is stable within a flexible exchange rate framework. It is also possible that instability is associated with a fixed exchange rate regime if the latter is readjusted frequently or abandoned altogether.

it should be bad news if the monetary authorities lack such credibility. Ultimately, the precise relationship between trilemma efficacy and inflation is an empirical question, which is what this paper tries to answer next.

This very brief discussion has touched upon the issues surrounding international macroeconomic policy, the latter being defined as the combination of exchange rate stability, financial account openness and monetary independence. Depending on preferences, a policymaker may want to pursue one particular policy at the expense of another, but, overall, and in the long-run, they will want to adopt a configuration that places the economy on the trilemma constraint. For example, if a policymaker values exchange rate stability but would like to manage the financial account, then she would expect to get at least some degree of monetary sovereignty.

4.2 Data and methodology

The degree of trilemma efficacy is captured by the trilemma distance variable.¹⁶ Recall that it is a ‘signed’ distance in that a negative value shows that the trilemma constraint has not been violated and a positive sign shows that it has.¹⁷ Values corresponding to points closer to the constraint, on it, or exceeding it are preferred to points that lie away from the constraint and towards the origin, as they correspond to more favourable combinations of the three aspects of the trilemma.

The functional forms of the estimated growth and inflation equations are similar to Husain et al. (2005), amalgamated with the trilemma efficacy measure. Descriptive statistics for all variables are presented in Table 2. The

¹⁶The configuration is observed but is not ‘actual’ due to the *de jure* nature of financial account openness. This point is discussed further in the conclusions.

¹⁷The analysis in the previous section has shown that, collectively, the hypothesis of a positive mean trilemma distance is rejected.

dependent variable in the growth equation is the natural log change per annum of GDP per capita in 2005 international dollars (using PPP rates).¹⁸ In explaining growth, factor accumulation is captured via the inclusion of investment (gross fixed capital formation divided by GDP) and population—both in level (natural log) and as a growth rate (change in natural log).¹⁹ The government sector is captured by the budget balance (as a share of GDP) and tax revenue (again as a share of GDP). In addition, imports plus exports (percent of GDP) and terms of trade (change in the natural log of net barter terms of trade) are also included.²⁰

[INSERT TABLE 2 ABOUT HERE]

The inflation equation features M2 growth, real output growth (as defined above), imports plus exports as a share of GDP, terms of trade growth, the budget balance as a share of GDP and the central bank governor’s time in office.²¹

The econometric specifications feature country fixed effects or country and time fixed effects (year dummies). Inclusion of country effects controls for individual country characteristics that are not captured by the explanatory variables (e.g. the quality of institutions). The year dummies capture external shocks that affect all countries (e.g. a US monetary policy shock). The resulting specification, where both country and time dummies are included,

¹⁸The source for all variables is the World Bank’s *World Development Indicators*, unless otherwise stated.

¹⁹Data for the mean years of schooling for over-25s (source: UNESCO) were collected in order to capture the effect of human capital on economic growth. However, the number of observations is too small to include this variable in the specification.

²⁰To capture output convergence, each country’s real output per capita was divided by US’s real output per capita in 1980 (the first year for which US data are available for this variable). It turns out that the estimated coefficient of this variable is insignificant in all estimations and does not affect the estimates of trilemma distance. Hence, it is not included in the model.

²¹Data for the latter are from Dreher et al. (2010).

captures the relationship between trilemma efficacy and macroeconomic performance *within* countries.²²

The decision to model effects as fixed rather than treat them as random was based on the results from a test by Schaffer and Stillman (2006). This test is appropriate for use in panel data estimations where standard errors are cluster-robust, i.e. errors that are robust to cross-sectional heteroscedasticity and within-panel serial correlation.^{23,24} The Wald test statistic leads to the rejection of random effects in both the estimated inflation and growth equations.

Finally, a lag of the dependent variable is introduced in the list of explanatory variables in order to control for persistence effects. Strict exogeneity is assumed, i.e. a shock in the error term is not supposed to exert influence on current or future values of any of the independent variables. Clearly, this is a restrictive assumption, but one that is relaxed in robustness checks. The two-step system estimator of Blundell and Bond (2000) is used with correction for heteroscedasticity in the errors.

4.3 Results

Table 3 reports results for the growth equation. The baseline model, where trilemma efficacy is the only explanatory variable of growth, shows that the link between the two variables is statistically significant. This result does not depend on whether year dummies are added to the specification. It also

²²Estimates from a pooled model, i.e. a specification that does not allow for country-specific and year-specific effects are not reported because effects are likely to be significant. Heterogeneity ('Chow') tests confirm this statistically. The fixed nature of the effects allows the use of the Chow test. Had the effects been modelled as random it would have been preferable to use a Roy-Zellner type test, see Baltagi (2005), chapter 4 for details.

²³The commonly used Hausman test is not suitable in this case. The two tests are asymptotically equivalent under conditional homoscedasticity.

²⁴For more details on cluster-robust errors see Nichols and Schaffer (2007).

survives almost intact the inclusion of variables from Husain et al. (2005) in the augmented specification. In the latter, investment, population growth and the budget balance are statistically significant and with the expected sign under both effects formulations (country-only and time and country effects). The dynamic specification results confirm the importance of trilemma-effective policies.²⁵

[INSERT TABLE 3 ABOUT HERE]

Table 4 reports results for the inflation equation. The estimates of trilemma efficacy in the baseline equations are, as expected, negative and statistically significant. Even as part of a richer specification (the augmented models) this remains the case and, along with money growth and real output growth, trilemma efficacy is a significant determinant of inflation in the sample. The dynamic specification results are slightly more ambiguous, as the inclusion of year dummies removes the significance from the trilemma efficacy coefficient. But, the overall picture that emerges from these models is difficult to blur: trilemma inefficacy goes hand-in-hand with higher inflation rates.

[INSERT FIGURE 4 ABOUT HERE]

4.4 Breaking down the trilemma

These results warrant further exploration. If trilemma inefficacy is associated with macroeconomic costs, is it possible to identify the precise aspect of the trilemma that underlies this link? In order to answer this question, the relative importance of the distance between policy configurations and the trilemma triangle's vertices (A , B and C in Figure 1) needs to be quantified. More

²⁵The estimations were repeated sequentially treating investment as a predetermined or endogenous variable. The thrust of the results remained unaffected.

specifically, each vertex corresponds to a combination of the maximum possible value for two of the trilemma policy objectives and zero for the other. Point A depicts a financially open economy with stable exchange rates (“Stable, Open”); point B depicts a financially open economy with monetary sovereignty (“Open, Sovereign”); and, point C depicts a financially closed economy with monetary sovereignty (“Stable, Sovereign”). The distance from each vertex is calculated using the Euclidean norm:

$$d_{it,x} = \sqrt{(s_{it} - \tilde{s})^2 + (m_{it} - \tilde{m})^2 + (f_{it} - \tilde{f})^2},$$

where $x = (A, B, C)$ and $(\tilde{s}, \tilde{m}, \tilde{f})$ is $(1, 0, 1)$ for vertex A , $(0, 1, 1)$ for vertex B , and $(1, 1, 0)$ for vertex C ; subscript it indexes a country i and year t observation; s , m and f stand for exchange rate stability, monetary sovereignty and financial account openness, as before.

Table 5 shows results from the growth and inflation models where trilemma efficacy has been replaced by the distances from the stable and open, open and sovereign, and stable and sovereign configurations. For the growth equation, the greater the distance from points A (stable and open) and C (stable and sovereign), the lower the real growth rate. The distance from point B (open and sovereign) is not significant. Since the common element of points A and C is exchange rate stability, it is likely that this aspect of trilemma policies is associated with higher economic growth.

[INSERT TABLE 5 ABOUT HERE]

For the inflation equation, the distance from A (stable and open) and the distance from B (open and sovereign) are significant, whereas the distance from C (stable and sovereign) is not. The common element of points A and B is

financial account openness, so it is likely that this aspect of trilemma policies is commensurate with a lower inflation rate. This result provides support for the argument that increased financial account openness generates these conditions that are necessary for inflation to be reigned in.

5 Conclusions

The international macroeconomic policy trilemma is now more than half a century old (Mundell, 1963). It has profound implications for open macroeconomic policy, as it sets out clear constraints within which the latter has to operate. Under perfect capital mobility, and assuming asset substitutability, the prevalence of the trilemma is guaranteed by the no-arbitrage condition. But if markets are imperfect, there is scope to examine whether countries' policies are really bound by it.

There have been few such tests in the literature and most of these have appeared in the last decade. This paper proposes a new method for testing the trilemma based on Euclidean geometry. The appeal of this approach is that it is straightforward to implement and easy to visualise. Using annual data between 1970 and 2012 on exchange rate stability, financial account openness and monetary independence for 123 countries, the tests support the policy relevance of the trilemma constraint.

But what happens in terms of macroeconomic outcomes when countries' policies deviate from it? Tests indicate that, on average, policy configurations are not on the trilemma constraint, i.e. there is a degree of 'trilemma-ineffectiveness'. The paper shows that this has costs in terms of real output growth and price inflation. It also explores the role of each of the trilemma's dimensions and finds that exchange rate stability matters for growth and fi-

nancial account openness matters for inflation. These results are consistent with Aghion et al. (2009) and Wei and Tytell (2004), respectively.

This work can be extended in several directions. First, more work is needed on the measurement of the trilemma dimensions. For example, Shambaugh's (2004) approach may need to be refined in order to ensure that common shocks are not misinterpreted as increased monetary dependence. Popper et al. (2013) derive an alternative measure of monetary sovereignty but this presupposes the validity of the trilemma and, hence, cannot be used to test it. In addition, the use of a *de facto* measure of financial account openness would be advantageous compared to a *de jure* measure, as it would be consistent with the *de facto* nature of exchange rate stability and monetary independence variables. Deviations from covered interest parity can be used for this purpose but, clearly, there are data limitations. Improved measurement of the relevant variables should also motivate a thorough examination of the trilemma's linearity. Alternative functional forms may be explored. Finally, the role of reserves in relaxing the trilemma constraint in the short run can be a fruitful direction of research.

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Table 1: Trilemma Distance

Country	Mean	Median	Min	Max	S.D.	N	t-stat
<i>Panel A: Income Groups</i>							
All	-0.28	-0.27	-0.99	0.42	0.26	5289	-79.8*
LIC	-0.39	-0.38	-0.96	0.33	0.23	1181	-58.3*
MIC	-0.28	-0.28	-0.99	0.42	0.27	2581	-54.1*
HIC	-0.21	-0.19	-0.98	0.41	0.24	1527	-33.3*
<i>Panel B: Geographical Regions</i>							
EAP	-0.37	-0.39	-0.85	0.35	0.24	473	-33.8*
ECA	-0.35	-0.36	-0.98	0.29	0.23	268	-25.1*
LAC	-0.21	-0.20	-0.99	0.39	0.28	940	-22.4*
MENA	-0.29	-0.34	-0.85	0.42	0.30	332	-17.5*
SA	-0.36	-0.39	-0.83	0.39	0.25	255	-23.4*
SSA	-0.36	-0.32	-0.96	0.33	0.22	1494	-62.0*
<i>Panel C: Decades</i>							
1970s	-0.31	-0.29	-0.98	0.32	0.23	858	-39.0*
1980s	-0.34	-0.32	-0.99	0.33	0.26	1175	-45.1*
1990s	-0.28	-0.26	-0.98	0.42	0.27	1479	-40.2*
2000s	-0.23	-0.22	-0.96	0.39	0.25	1777	-39.4*

Notes: $H_0 : Mean = 0, H_1 : Mean > 0$. A “*” indicates that H_0 cannot be rejected at the 5% level. A minus sign ‘-’ signifies direction. Definitions of income groups: LIC: low income countries; MIC: middle income countries; HIC: high income countries. Definition of geographical regions: EAP: East Asia and the Pacific; ECA: Europe and Central Asia; LAC: Latin America and the Caribbean; MENA: Middle East and North Africa; SA: South Asia; SSA: Sub-Saharan Africa.

Table 2: Descriptive Statistics for Variables as Used in the Estimations

Variable	Mean	Median	Min.	Max.	S.D.	N
<i>Variables Used in the Economic Growth Estimations</i>						
<i>Real output (y-o-y growth)</i>	2.51	2.7	-19.29	32.25	4.33	907
<i>Investment (percent GDP)</i>	22.51	21.53	6.44	74.82	6.67	907
<i>Population (nat. log level)</i>	16.29	16.14	11.54	20.92	1.63	907
<i>Population (growth)</i>	1.43	1.32	-3.43	16.8	1.57	907
<i>Budget (percent GDP)</i>	-1.26	-1.68	-19.15	22.48	4.53	907
<i>Tax (percent GDP)</i>	17.19	16.05	0.89	63.4	7.26	907
<i>Trade (percent GDP)</i>	89.51	75.51	18.12	444.1	58.27	907
<i>Terms of Trade (y-o-y growth)</i>	0.57	-0.17	-14.44	24.21	4.64	907
<i>Trilemma Efficacy (see notes)</i>	-0.2	-0.18	-0.82	0.39	0.24	907
<i>Convergence (see notes)</i>	52.43	31.96	1.52	269.26	51.38	907
<i>Schooling (see notes)</i>	9.14	9.33	0.56	13.79	2.69	172
<i>Variables Used in the Inflation Estimations</i>						
<i>Inflation</i>	6.83	4.54	-10.11	167.29	10.22	1044
<i>M2 (y-o-y growth)</i>	16.04	12.96	-25.34	501.62	21.77	1044
<i>Real output (y-o-y growth)</i>	2.61	2.64	-19.29	32.25	4.23	1044
<i>Trade (percent GDP)</i>	89.60	78.60	15.24	562.06	58.67	1044
<i>Terms of Trade (y-o-y growth)</i>	0.61	-0.22	-53.08	70.12	8.48	1044
<i>Budget (percent GDP)</i>	-1.32	-1.66	-30.62	29.06	5.01	1044
<i>CB Governor time in office (see notes)</i>	3.91	3.00	0.00	25.00	3.98	1044
<i>Trilemma Efficacy</i>	-0.22	-0.21	-0.86	0.39	0.24	1044

Notes. *Trilemma efficacy* is defined as the signed distance from the trilemma constraint —see text for more details; *Convergence* is real output per capita divided by the US real output per capita in 1980; *Schooling* measures the mean years of schooling for over-25s (source: UNESCO); *CB Governor time in office* is measured in years.

Table 3: Trilemma Efficacy and Economic Growth

	Static		Dynamic	
	Baseline	Augmented	Baseline	Augmented
Effects	<i>i</i>	<i>i</i> and <i>t</i>	<i>i</i>	<i>i</i> and <i>t</i>
<i>Lagged output growth</i>			0.11*	0.05
			(0.06)	(0.21)
<i>Investment (percent GDP)</i>		0.16***	0.36***	0.28**
		(0.05)	(0.12)	(0.13)
<i>Population (level)</i>		4.75	0.02	0.84
		(4.44)	(0.27)	(0.61)
<i>Population (growth)</i>		-1.43**	-1.97***	-2.24
		(0.5)	(0.54)	(1.84)
<i>Budget (percent GDP)</i>		0.15**	-0.09	0.01
		(0.07)	(0.06)	(0.17)
<i>Tax (percent GDP)</i>		-0.18	-0.38**	-0.07
		(0.12)	(0.07)	(0.23)
<i>Trade (percent GDP)</i>		0.05***	0.03**	0.02
		(0.02)	(0.01)	(0.02)
<i>Terms of Trade (growth)</i>		0.06	0.18***	0.1
		(0.04)	(0.03)	(0.06)
<i>Trilemma Efficacy</i>	3.94***	2.94**	5.76**	4.47*
	(1.35)	(1.12)	(2.23)	(2.54)
<i>Constant</i>	3.29***	2.89***		
	(0.27)	(0.88)		
ρ	0.31	0.37	—	—
<i>Instruments</i>	—	—	106	124
<i>2nd-order AR test p-value</i>	—	—	0.30	0.43
Obs. (Countries)	907 (103)	907 (103)	791 (103)	

Note: Dependent variable: Percent change per annum of GDP per capita in constant 2005 international dollars (using PPP rates). Variables *Budget*, *Tax*, *Terms of Trade* and *Population (growth)* are 3-year backward averages. Country effects (*i*) as well as country and time effects (*i* and *t*) are included. ρ measures how much of the estimated variance of the overall error is accounted for by the effects. Standard errors in parentheses are robust to cross-sectional heteroskedasticity and within-panel (serial) correlation for the static models and to cross-sectional heteroscedasticity only for the dynamic models.

Table 4: Trilemma Efficacy and Inflation

	Static			Dynamic		
	Baseline	Augmented	Augmented	Baseline	Augmented	Augmented
Effects	<i>i</i>	<i>i</i>	<i>i</i> and <i>t</i>	<i>i</i>	<i>i</i>	<i>i</i> and <i>t</i>
<i>Lagged output growth</i>				0.36***	0.34***	0.34***
<i>M2 (growth)</i>		0.31***	0.29***	(0.06)	(0.05)	(0.08)
<i>Real output (growth)</i>		(0.05)	(0.04)	0.1***	(0.03)	0.05**
<i>Trade (percent GDP)</i>		-0.26***	-0.24***	(0.03)	(0.03)	(0.25)
<i>Terms of Trade (growth)</i>		(0.06)	(0.07)	-0.04	(0.09)	-0.12
<i>Budget (percent GDP)</i>		0.02	0.02	(0.02)	(0.02)	(0.08)
<i>CB Governor time in office</i>		(0.02)	(0.02)	0.02**	(0.01)	0.02
<i>Trilemma Efficacy</i>		-0.01	-0.03	(0.02)	(0.02)	(0.02)
<i>Constant</i>		(0.03)	(0.03)	0.01	(0.03)	0.1
ρ		0.01	-0.04	(0.09)	0.21**	(0.09)
<i>Instruments</i>		(0.09)	(0.1)	(0.1)	(0.1)	(0.09)
<i>2nd-order AR test p-value</i>		-0.06	-0.03	-0.06	-0.06	-0.02
Obs. (Countries)		(0.09)	(0.09)	(0.12)	(0.12)	(0.12)
		-16.75***	-14.84***	-4.57***	-4.57***	-2.84
		(6.98)	(5.9)	(1.76)	(1.76)	(1.75)
		3.1**	15.07***			
		(1.55)	(4.25)			
		0.29	0.29	0.32	0.3	—
		—	—	—	—	117
		—	—	—	—	137
		1044 (100)	1044 (100)	1044 (100)	929 (100)	0.44

Note: Dependent variable: Percent change per annum of consumer price index. Variables *Budget*, *Tax*, *Terms of Trade* and *Population (growth)* are 3-year backward averages. Country effects (*i*) as well as country and time effects (*i* and *t*) are included. ρ measures how much of the estimated variance of the overall error is accounted for by the effects. Standard errors in parentheses are robust to cross-sectional heteroskedasticity and within-panel (serial) correlation for the static models and to cross-sectional heteroscedasticity only for the dynamic models.

Table 5: Stable, Open, Sovereign: Which Ones Matter?

<i>Economic Growth Equation</i>		
<i>Investment (percent GDP)</i>	0.206***	(0.065)
<i>Population (level)</i>	-2.134	(2.495)
<i>Population (growth)</i>	-1.652***	(0.500)
<i>Budget (percent GDP)</i>	0.130*	(0.077)
<i>Tax (percent GDP)</i>	-0.167	(0.107)
<i>Trade (percent GDP)</i>	0.054***	(0.020)
<i>Terms of Trade (growth)</i>	0.064*	(0.033)
<i>Distance from Stable & Open</i>	-4.813***	(1.120)
<i>Distance from Open & Sovereign</i>	-1.402	(1.275)
<i>Distance from Stable & Sovereign</i>	-6.519***	(1.189)
<i>Constant</i>	45.197	(40.333)
<i>Inflation Equation</i>		
<i>M2 (growth)</i>	0.074***	(0.013)
<i>Real output (growth)</i>	-0.199***	(0.069)
<i>Trade (percent GDP)</i>	0.015	(0.015)
<i>Terms of Trade (growth)</i>	0.031	(0.035)
<i>Budget (percent GDP)</i>	0.215**	(0.100)
<i>CB Governor time in office</i>	-0.202	(0.153)
<i>Distance from Stable & Open</i>	29.330**	(14.652)
<i>Distance from Open & Sovereign</i>	23.790*	(13.147)
<i>Distance from Stable & Sovereign</i>	11.337	(9.339)
<i>Constant</i>	-52.323	(32.216)

Note: Country effects included. Standard errors in parentheses are robust to cross-sectional heteroskedasticity and within-panel (serial) correlation. For information on the variables see notes of Tables 3 and 4.

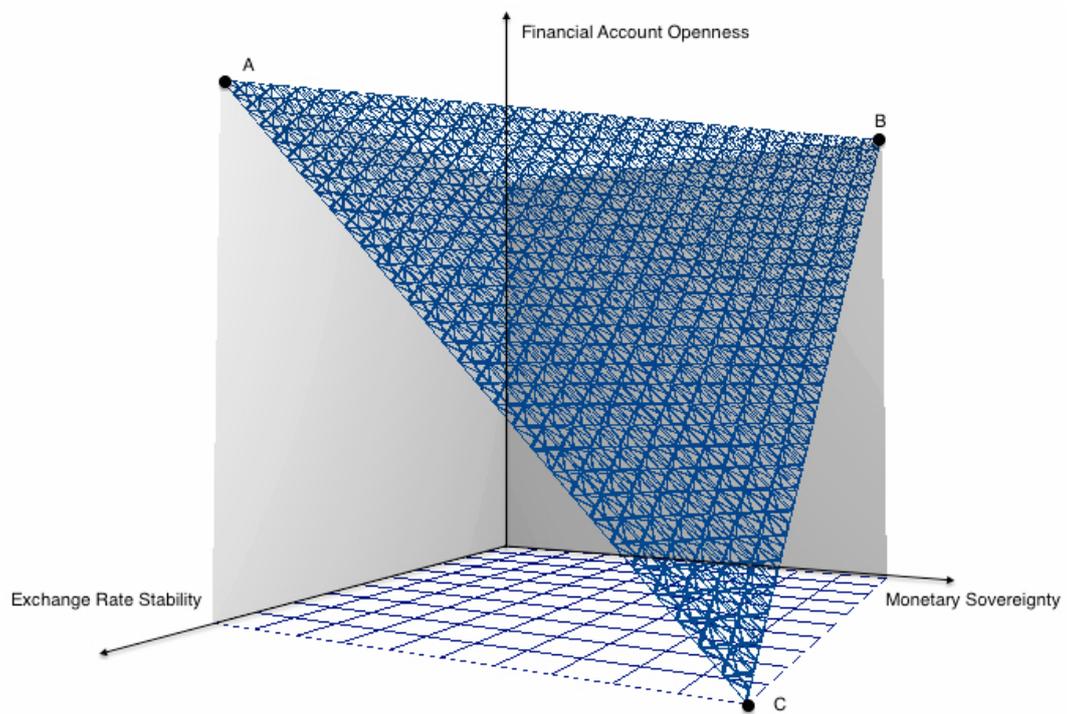


Figure 1: The Trilemma Constraint

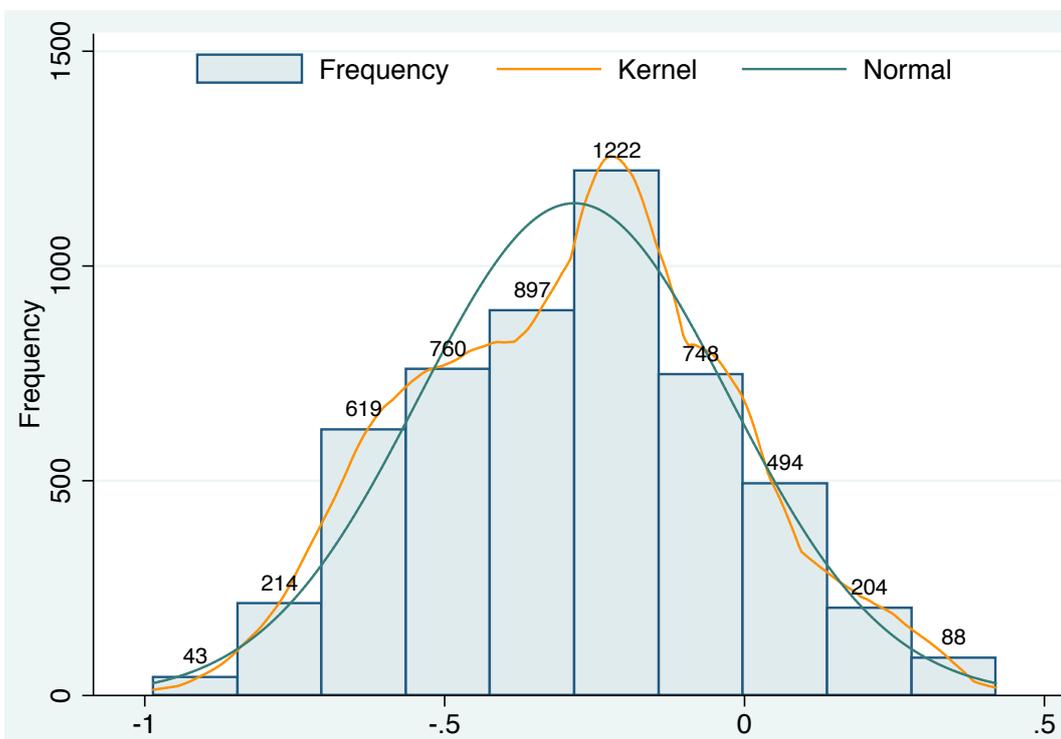


Figure 2: Histogram and Densities of Trilemma Distance

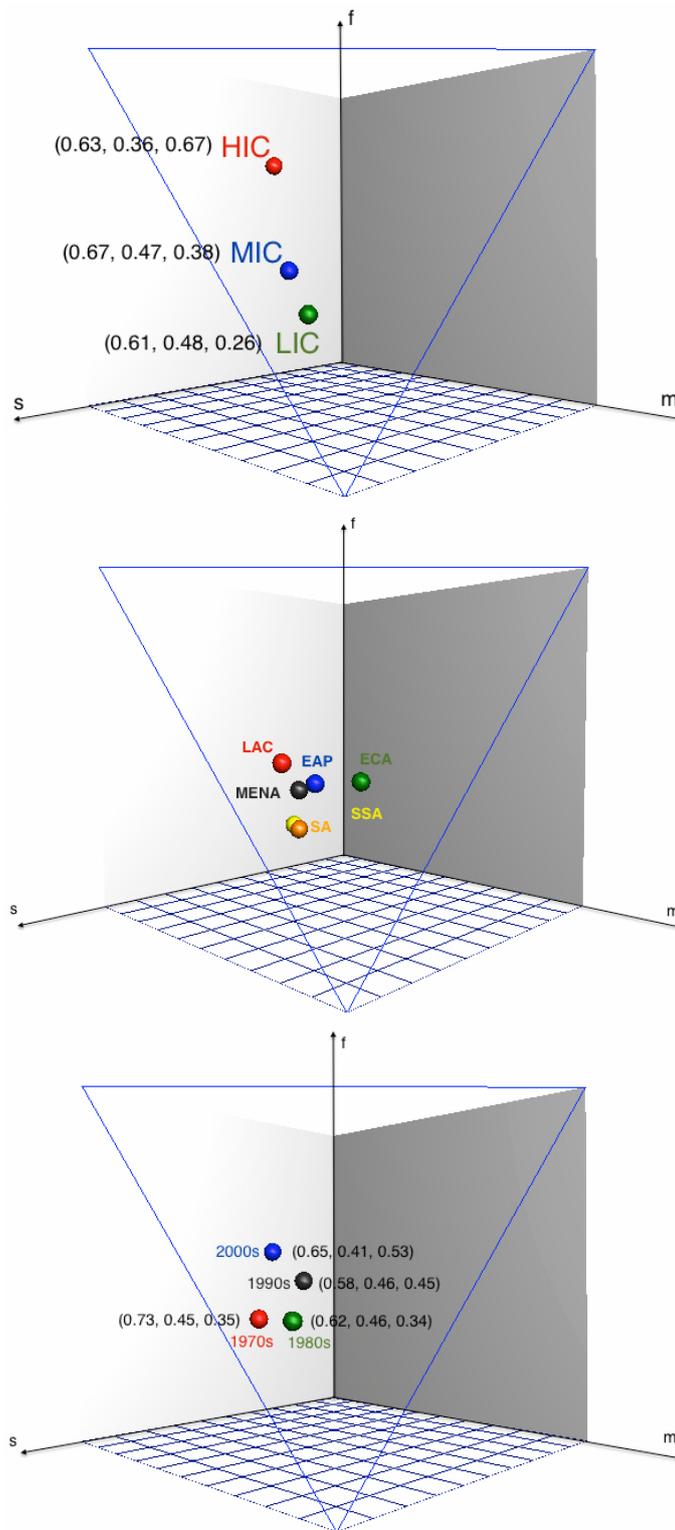


Figure 3: Trilemma Policy Choices: by Income (top graph), by Geographical Region (middle graph) and by Decade (bottom graph). Exchange rate stability, monetary independence and financial account openness in parentheses.

A Appendix

Table A1: Trilemma Distance by Country

Country	Mean	Median	Min	Max	SD	N	t-stat
Albania	-0.45	-0.42	-0.71	-0.21	0.15	17	-12.3*
Algeria	-0.61	-0.63	-0.74	-0.39	0.09	38	-41.1*
Angola	-0.63	-0.62	-0.84	-0.18	0.21	17	-12.5*
Antigua	0.20	0.19	-0.04	0.29	0.10	25	10.2
Argentina	-0.41	-0.49	-0.89	0.28	0.35	35	-6.7*
Armenia	-0.10	-0.09	-0.43	0.19	0.15	16	-2.6*
Aruba	-0.17	-0.20	-0.28	-0.05	0.08	18	-9.3*
Australia	-0.33	-0.34	-0.66	-0.03	0.15	42	-14.2*
Austria	-0.09	-0.05	-0.33	0.03	0.10	42	-5.6*
Azerbaijan	-0.29	-0.32	-0.55	0	0.15	16	-8.0*
Bahamas, The	-0.21	-0.25	-0.39	0.15	0.12	35	-10.7*
Bahrain	0.14	0.13	-0.01	0.37	0.09	35	8.5
Bangladesh	-0.46	-0.46	-0.79	0.04	0.21	36	-13.0*
Barbados	-0.21	-0.17	-0.69	0.04	0.15	38	-9.0*
Belarus	-0.50	-0.55	-0.98	0.03	0.30	16	-6.7*
Belgium	-0.10	-0.06	-0.47	0.08	0.12	42	-5.4*
Belize	-0.15	-0.17	-0.33	0.02	0.11	27	-7.0*
Benin	-0.18	-0.20	-0.33	-0.05	0.08	33	-12.7*
Bhutan	-0.22	-0.20	-0.41	-0.17	0.06	25	-17.7*
Bolivia	-0.07	0.04	-0.91	0.23	0.29	41	-1.4*
Botswana	-0.36	-0.33	-0.72	-0.06	0.19	36	-11.5*
Brazil	-0.59	-0.58	-0.98	-0.19	0.17	42	-22.9*
Bulgaria	-0.22	-0.23	-0.74	0.29	0.33	18	-2.8*
Burkina Faso	-0.16	-0.16	-0.33	-0.02	0.09	24	-8.57*
Burundi	-0.52	-0.57	-0.82	-0.20	0.17	35	-17.91*
Cambodia	-0.33	-0.29	-0.78	0.04	0.23	17	-5.9*
Cameroon	-0.19	-0.21	-0.53	0.02	0.12	42	-10.2*

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Table A1 – continued from previous page

Country	Mean	Median	Min	Max	SD	N	t-stat
Canada	-0.14	-0.15	-0.35	0.07	0.09	42	-10.4*
Cape Verde	-0.37	-0.47	-0.62	-0.09	0.18	27	-10.6*
Central African	-0.22	-0.23	-0.53	-0.05	0.10	42	-14.0*
Chad	-0.23	-0.24	-0.53	-0.05	0.10	42	-14.5*
Chile	-0.44	-0.49	-0.85	-0.01	0.21	35	-12.3*
China	-0.34	-0.29	-0.65	-0.12	0.15	28	-11.6*
Colombia	-0.45	-0.45	-0.78	-0.18	0.15	42	-19.8*
Comoros	-0.35	-0.41	-0.48	-0.20	0.12	20	-12.9*
Congo, Dem. Rep.	-0.67	-0.66	-0.92	-0.39	0.14	25	-23.5*
Congo, Rep.	-0.23	-0.23	-0.41	-0.05	0.10	42	-15.0*
Costa Rica	-0.20	-0.11	-0.78	0.30	0.28	42	-4.6*
Cote d'Ivoire	-0.22	-0.21	-0.50	0.01	0.11	42	-13.1*
Croatia	-0.22	-0.21	-0.38	-0.13	0.06	16	-13.7*
Cyprus	-0.40	-0.49	-0.65	0.01	0.21	42	-12.5*
Czech Republic	-0.19	-0.19	-0.42	0	0.13	16	-5.9*
Denmark	-0.16	-0.10	-0.50	0.17	0.22	42	-4.6*
Djibouti	0.21	0.19	0.04	0.42	0.13	16	6.6
Dominica	-0.10	-0.05	-0.27	0.14	0.09	30	-6.4*
Dominican Republic	-0.31	-0.35	-0.72	0.18	0.30	17	-4.2*
Ecuador	-0.17	-0.05	-0.67	0.29	0.30	39	-3.5*
Egypt, Arab Rep.	-0.21	-0.29	-0.85	0.22	0.25	42	-5.3*
El Salvador	-0.00	0.12	-0.82	0.39	0.32	29	-0.1*
Equatorial Guinea	-0.24	-0.26	-0.39	-0.07	0.08	27	-15.6*
Estonia	0.00	0.06	-0.38	0.18	0.17	16	0.1*
Ethiopia	-0.29	-0.20	-0.72	-0.13	0.17	24	-8.5*
Fiji	-0.53	-0.53	-0.78	-0.29	0.14	35	-23.4*
Finland	-0.19	-0.21	-0.53	0.07	0.17	42	-7.5*
France	-0.27	-0.26	-0.72	0.07	0.25	42	-7.1*

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Table A1 – continued from previous page

Country	Mean	Median	Min	Max	SD	N	t-stat
Gabon	-0.17	-0.14	-0.53	0.03	0.12	42	-9.3*
Gambia, The	-0.23	-0.22	-0.63	-0.04	0.14	35	-10.0*
Georgia	-0.24	-0.25	-0.56	0.03	0.16	16	-6.0*
Germany	-0.19	-0.20	-0.40	0.17	0.13	42	-9.6*
Ghana	-0.45	-0.43	-0.87	-0.08	0.22	42	-13.0*
Greece	-0.34	-0.40	-0.79	0.04	0.26	42	-8.6*
Grenada	-0.23	-0.27	-0.38	-0.05	0.08	31	-15.3*
Guatemala	-0.10	-0.13	-0.61	0.32	0.22	41	-2.9*
Guinea	-0.54	-0.48	-0.96	-0.12	0.20	21	-12.2*
Guinea-Bissau	-0.64	-0.63	-0.85	-0.42	0.09	31	-38.8*
Guyana	-0.17	-0.20	-0.81	0.28	0.27	42	-4.0*
Haiti	-0.29	-0.30	-0.84	0.13	0.26	18	-4.8*
Honduras	-0.16	-0.20	-0.74	0.25	0.23	33	-4.0*
Hong Kong, China	0.15	0.18	-0.24	0.37	0.13	30	6.4
Hungary	-0.36	-0.33	-0.84	0.08	0.28	26	-6.6*
Iceland	-0.51	-0.57	-0.98	-0.10	0.21	42	-15.8*
India	-0.51	-0.53	-0.80	-0.22	0.14	42	-23.8*
Indonesia	-0.16	-0.27	-0.52	0.22	0.26	29	-3.4*
Iran, Islamic Republic	-0.17	-0.24	-0.43	0.21	0.20	19	-3.6*
Ireland	-0.19	-0.17	-0.65	0.03	0.19	42	-6.5*
Israel	-0.38	-0.42	-0.78	-0.03	0.22	30	-9.5*
Italy	-0.30	-0.31	-0.95	0.19	0.31	42	-6.3*
Jamaica	-0.23	-0.22	-0.96	0.19	0.27	42	-5.7*
Japan	-0.20	-0.21	-0.46	-0.01	0.10	42	-12.7*
Jordan	-0.18	-0.26	-0.64	0.39	0.31	42	-3.8*
Kazakhstan	-0.37	-0.33	-0.69	-0.17	0.13	16	-11.9*
Kenya	-0.40	-0.42	-0.74	-0.04	0.20	42	-12.5*
Korea, Rep.	-0.38	-0.39	-0.79	-0.12	0.18	42	-13.8*

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Table A1 – continued from previous page

Country	Mean	Median	Min	Max	SD	N	t-stat
Kuwait	-0.08	-0.08	-0.30	0.14	0.11	37	-4.5*
Kyrgyzstan	-0.11	-0.10	-0.33	0.05	0.10	15	-4.5*
Lao PDR	-0.47	-0.47	-0.85	-0.20	0.18	30	-13.9*
Latvia	-0.06	-0.05	-0.32	0.13	0.12	16	-2.1*
Lebanon	-0.04	-0.02	-0.35	0.38	0.21	42	-1.1*
Lesotho	-0.31	-0.32	-0.47	-0.06	0.11	32	-15.6*
Liberia	-0.03	-0.07	-0.46	0.33	0.19	29	-0.8*
Libya	-0.42	-0.53	-0.75	-0.05	0.23	33	-10.5*
Lithuania	-0.19	-0.17	-0.37	-0.06	0.08	16	-9.3*
Madagascar	-0.48	-0.52	-0.76	-0.18	0.19	40	-16.2*
Malawi	-0.53	-0.59	-0.87	-0.09	0.18	42	-18.7*
Malaysia	-0.21	-0.16	-0.57	0.18	0.19	42	-7.2*
Maldives	0.06	0.13	-0.39	0.39	0.26	30	1.1*
Mali	-0.20	-0.20	-0.43	0.01	0.11	42	-11.7*
Malta	-0.46	-0.55	-0.69	0.02	0.22	40	-13.1*
Mauritania	-0.50	-0.53	-0.76	-0.20	0.13	41	-23.6*
Mauritius	-0.42	-0.33	-0.78	-0.07	0.22	40	-12.0*
Mexico	-0.29	-0.31	-0.61	0.22	0.22	36	-7.8*
Micronesia, Fed.	0.12	0.10	-0.13	0.35	0.16	16	3.0
Moldova	-0.46	-0.48	-0.57	-0.33	0.07	16	-28.3*
Mongolia	-0.19	-0.18	-0.41	0	0.13	17	-6.2*
Morocco	-0.50	-0.48	-0.72	-0.26	0.10	40	-31.2*
Mozambique	-0.62	-0.62	-0.85	-0.35	0.17	18	-15.8*
Myanmar	-0.58	-0.58	-0.71	-0.45	0.07	37	-50.4*
Namibia	-0.42	-0.45	-0.58	-0.26	0.08	18	-22.9*
Nepal	-0.39	-0.41	-0.83	-0.03	0.17	38	-14.4*
Netherlands	-0.05	0	-0.46	0.16	0.14	36	-2.0*
New Zealand	-0.32	-0.32	-0.69	-0.07	0.15	42	-13.7*

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Table A1 – continued from previous page

Country	Mean	Median	Min	Max	SD	N	t-stat
Nicaragua	0.09	0.19	-0.62	0.39	0.28	22	1.5*
Niger	-0.22	-0.19	-0.53	0.01	0.13	42	-10.7*
Nigeria	-0.45	-0.47	-0.77	-0.05	0.19	42	-15.3*
Norway	-0.31	-0.29	-0.55	-0.05	0.14	42	-14.7*
Oman	0.20	0.23	0.01	0.29	0.09	32	13.0
Pakistan	-0.39	-0.38	-0.71	-0.01	0.18	42	-14.0*
Panama	0.17	0.16	0.02	0.38	0.10	26	8.6
Papua New Guinea	-0.42	-0.46	-0.63	-0.07	0.16	33	-15.0*
Paraguay	-0.29	-0.27	-0.70	0.04	0.14	22	-9.4*
Peru	-0.32	-0.22	-0.99	0.08	0.31	42	-6.7*
Philippines	-0.42	-0.42	-0.85	-0.12	0.18	42	-15.5*
Poland	-0.64	-0.68	-0.86	-0.37	0.14	21	-21.0*
Portugal	-0.28	-0.33	-0.64	0.19	0.25	42	-7.2*
Qatar	0.21	0.23	0.01	0.35	0.10	31	11.3
Romania	-0.32	-0.34	-0.72	-0.02	0.23	18	-5.9*
Russian Federation	-0.35	-0.36	-0.64	-0.16	0.13	16	-10.3*
Rwanda	-0.47	-0.49	-0.75	-0.11	0.16	42	-19.0*
Samoa	-0.61	-0.60	-0.81	-0.35	0.12	29	-26.1*
Sao Tome and Principe	-0.50	-0.49	-0.85	-0.17	0.20	24	-12.3*
Saudi Arabia	-0.06	-0.14	-0.16	0.14	0.11	15	-2.2*
Senegal	-0.19	-0.20	-0.41	0.01	0.10	42	-11.8*
Seychelles	-0.16	-0.15	-0.44	0.07	0.14	31	-6.4*
Sierra Leone	-0.47	-0.50	-0.84	-0.17	0.20	41	-15.1*
Singapore	-0.07	-0.05	-0.39	0.19	0.13	40	-3.2*
Slovak Republic	-0.40	-0.42	-0.65	-0.14	0.16	16	-10.0*
Slovenia	-0.16	-0.14	-0.56	0.11	0.18	16	-3.6*
Solomon Islands	-0.35	-0.32	-0.81	-0.09	0.18	30	-10.9*
South Africa	-0.56	-0.59	-0.95	-0.04	0.22	42	-16.3*

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Table A1 – continued from previous page

Country	Mean	Median	Min	Max	SD	N	t-stat
Spain	-0.25	-0.31	-0.65	0.17	0.23	42	-7.2*
Sri Lanka	-0.45	-0.44	-0.83	-0.08	0.17	42	-16.9*
St. Kitts & Nevis	-0.16	-0.17	-0.38	-0.05	0.10	24	-8.2*
St. Lucia	-0.11	-0.10	-0.24	0.01	0.07	29	-8.1*
St. Vincent & Grenadines	-0.16	-0.20	-0.38	-0.05	0.10	29	-9.2*
Sudan	-0.26	-0.29	-0.29	-0.22	0.04	7	-18.4*
Suriname	-0.37	-0.29	-0.95	-0.03	0.26	21	-6.5*
Swaziland	-0.29	-0.30	-0.84	0.06	0.18	38	-9.7*
Sweden	-0.26	-0.26	-0.43	0.02	0.11	42	-15.4*
Switzerland	-0.14	-0.15	-0.24	-0	0.07	16	-7.4*
Syrian Arab Republic	-0.28	-0.30	-0.31	-0.23	0.04	3	-11.5*
Tajikistan	-0.54	-0.57	-0.83	-0.28	0.19	14	-10.6*
Tanzania	-0.53	-0.56	-0.77	-0.20	0.16	37	-20.3*
Thailand	-0.42	-0.40	-0.71	-0.19	0.17	35	-14.2*
Togo	-0.26	-0.24	-0.53	0.01	0.12	42	-13.9*
Tonga	-0.47	-0.45	-0.72	-0.27	0.12	23	-19.6*
Trinidad and Tobago	-0.01	-0	-0.45	0.41	0.20	42	-0.2*
Tunisia	-0.50	-0.50	-0.77	-0.20	0.12	42	-28.1*
Turkey	-0.51	-0.53	-0.85	-0.12	0.18	42	-18.6*
Uganda	-0.35	-0.34	-0.80	0.18	0.30	32	-6.7*
Ukraine	-0.40	-0.43	-0.72	-0.05	0.22	16	-7.3*
United Kingdom	-0.28	-0.26	-0.67	0.05	0.18	42	-10.2*
Uruguay	-0.19	-0.19	-0.61	0.22	0.19	36	-5.8*
Vanuatu	-0.03	-0.01	-0.22	0.13	0.09	16	-1.2*
Venezuela	-0.15	-0.14	-0.64	0.24	0.25	42	-4.0*
Vietnam	-0.23	-0.24	-0.49	0.01	0.15	14	-5.7*
Yemen, Rep.	0.02	0.06	-0.35	0.24	0.18	15	0.5*
Zambia	-0.38	-0.25	-0.82	0.07	0.27	42	-9.1*

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Table A1 – continued from previous page

Country	Mean	Median	Min	Max	SD	N	t-stat
Zimbabwe	-0.61	-0.69	-0.83	-0.09	0.22	24	-13.6*

Notes: $H_0 : Mean = 0, H_1 : Mean > 0$. A “*” indicates that we cannot reject H_0 at the 5% level.