The Mystery of Original Sin

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1. Introduction

Previous chapters have shown that inability to borrow abroad in the domestic currency ("original sin") is an important factor in the macroeconomic and financial instability of emerging markets. Indeed, it can be argued that this source of financial fragility is a defining characteristic that differentiates emerging markets from their advanced-economy counterparts. Closing the capital account (which forgoes the benefits of foreign finance), accumulating massive amounts of international reserves (the yield on which is generally substantially below the opportunity cost of funds), and/or increasing the country's reliance on short-term domestic debt at volatile interest rates (substituting maturity mismatches) are three possible ways of preventing original sin from resulting in dangerous currency mismatches, but each of these solutions has very significant costs. Helping emerging markets to acquire the capacity to borrow abroad in their own currencies should thus be a priority for officials striving to make the world a safer financial place and at the same time seeking to quicken the pace, sustainability and resilience of growth.

But defining and implementing appropriate solutions requires first that we identify the distortion that gives rise to the problem. The economist's instinctual reaction is that the inability to borrow abroad in one's own currency reflects the weakness of policies and institutions. The bulk of the literature has thus focused on the shortcomings of borrowing countries, in particular on the underdevelopment of their market-supporting and policy-making institutions. A number of preceding chapters focus on these usual suspects, on the instability and imperfect credibility of monetary and fiscal policies, for example.

Yet evidence for the presumption that the incidence of original sin reflects the instability of policies and the weakness of market-supporting institutions is meager. It is based more on presumption and anecdote than fact. To our knowledge there exists no systematic empirical study for a cross section of countries attempting to test the empirical power of different explanations for original sin.

We seek to provide that systematic analysis here, making use of the indicators of original sin defined and developed in Chapter 1 above. We present evidence on the explanatory power of a series of alternative explanations. Our key – and surprising – finding is that the conventional hypotheses have remarkably little explanatory power for the phenomenon at hand. In other words, the standard policy and institutional variables shed remarkably little light on why so many emerging markets find it so difficult to borrow abroad in their own currencies, and they offer little in the way of an explanation for why a small number of emerging markets have been able to escape this plight. Some readers will find the absence of a smoking gun as counterintuitive; this is why we refer in this chapter to the "mystery" of original sin. We therefore provide an extensive sensitivity analysis establishing the robustness of our results in the appendix to this chapter.

These results then prompt us to explore the possibility that the problem of original sin has at least as much to do with the structure and operation of the international financial system as with any weaknesses of policies and institutions. As we show, country size is a robust factor accounting for the incidence of original sin, a fact that is a telltale sign that economies of scale or network externalities may be at work in explaining the structure of international finance. Moreover, emerging markets that have achieved

redemption from original sin have overcome the obstacles posed by the structure of the international system only with the help of foreign entities -- multinational corporations and international financial institutions -- that have found it attractive, for their own reasons, to issue debt in the currencies of these countries. This observation leads us in turn to offer in the next chapter a proposal for an international solution to the problem.

2. Original Sin and the Level of Economic Development

In Table 1 we explore the relationship between original sin and the level of economic development as measured by the log of per capita GDP. We control for country size and for the groupings across which the incidence of the phenomenon should differ.[1] Three relevant dimensions of size are the log of total GDP, the log of total domestic credit (valued in US dollars) and log of total trade. Table 1 uses the first principal component of the three measures, which we call SIZE. All equations in the table are estimated using weighted tobit.

Strikingly, the coefficient on per capita GDP is not significant at conventional confidence levels. We ran several sensitivity checks to establish the robustness of this surprising result. For example, we dropped the financial centers, which left the result unaffected. We could only get a significant effect by dropping the regional dummies, but this effect is not robust to changing the estimation technique to ordinary least squares. Moreover, even this result is of limited explanatory power, in that it suggests that GDP per capita cannot explain the within group difference in original sin.

In contrast to GDP per capita, the other variable included in these equations, country size, is strongly correlated with original sin even when we control for country

groups. Ability to borrow abroad in one's own currency seems to be heavily concentrated among large countries.[2]

The fact that economic development is not strongly correlated with original sin sets an ominous precedent for what follows. If original sin does not have a robust relationship with the level of development, then country characteristics that are correlated with the level of development are also unlikely to explain the variance in original sin. But, to give these country characteristics their due, we examine a number of them in turn.

3. Monetary credibility

An obvious hypothesis about the causes of original sin is that the phenomenon is a symptom of inadequate policy credibility, which tends to be a particular problem in developing countries. This is the approach taken by Olivier Jeanne in Chapter 7, where he finds that if the central bank is expected to have some low probability of a high burst of inflation and depreciation, interest rates in pesos will be high. Borrowers will prefer to denominate their obligations in dollars and go bankrupt in the event of the inflationary crisis, rather than borrowing in pesos and going bankrupt because of high interest rates, if the crisis is avoided. Moreover, as argued by Tirole (2002), foreigners will take account of the fact that the government has less of an incentive to protect their property rights and may choose to inflate away their claims if they denominate them in a unit that they can manipulate. They will lend only in foreign currency, which is protected against inflation

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[1] As suggested by the evidence in chapter 2.
[2] We have more to say about this below.

risk, or at short maturities, so that interest rates can be adjusted quickly to any acceleration of inflation.

In this view, original sin is not a problem in itself; it is more of a symptom. It is the miner's canary, signaling the presence of weak institutions. Redemption can then be achieved by pursuing institutional changes that enhance the authorities' anti-inflationary credibility. The political and economic independence of the central bank should be strengthened. Fiscal policy making should be centralized and rendered more transparent and accountable, so as to make inflationary finance superfluous. Political support for policies of price stability should be cultivated. The country should accumulate a track record and develop a reputation for maintaining price stability. According to this view, the standard advice given by the IMF and World Bank regarding macroeconomic policies and institutional reforms is both necessary and sufficient for redemption from original sin.

Unfortunately, there are problems with this easy conclusion. If inadequate anti-inflationary credibility is the cause of original sin, then it should be possible to achieve redemption simply by issuing inflation-indexed debt (Chamon, 2002).[3] Yet we do not see very many countries able to issue internationally inflation-indexed debt in their own currencies. In addition, while only governments have the capacity to inflate away debts denominated in their own currency, corporations in many emerging markets also find

[3] Tirole (2002) argues that governments could still attempt to influence the real exchange rate. However, the ability of the government to influence this relative price in a sustained manner is questionable and the political case for doing it is less compelling.

themselves unable to borrow abroad in that currency, despite the fact that this moral hazard, to the extent that it even exists, is more indirect.[4]

We explore the cross-country correlation between original sin and monetary credibility in Table 2. As a metric of monetary credibility we take different measures of inflation for the 1980-1998 period. We regress these measures on OSIN3 after controlling for country groupings and size. Again, we use tobit to estimate these equations. In column 1 we use the average value of the log of inflation and find a positive but not statistically significant relationship. In column 2, we substitute average inflation with the log of maximum inflation over the period and find no significant relationship with original sin. To test potential non-linearities in the relationship between inflation and original sin we use in column 3 both the average log inflation and its square. We find that none of the coefficients are significant. Column 4 uses the principal component of average inflation and maximum inflation and finds no significant correlation with original sin. The results are unchanged if we drop financial centers (column 5). Only if we drop the country group dummies, inflation becomes statistically significant (column 6). But even this relationship seems to be driven by a few high inflation countries (Figure 1). Thus, while inadequate anti-inflationary credibility may help explain the inability of a few chronic high-inflation sufferers to borrow abroad in their own currency, it cannot explain the extremely widespread nature of the phenomenon.

[4] To explain this, Chamon (2002) and Aghion, Bacchetta and Banerjee (2001) argue that the existence of a positive correlation between default risk and devaluation risk means that the claim of dollar lenders on the residual value of a firm goes up relative to those that lend in domestic or CPI-indexed debt. Under these conditions, peso lenders will fear the contingent expropriation implied by future additional dollar borrowing by firms.

It could be argued that the estimated coefficient is attenuated by endogeneity. If the debt is in dollars, the benefits from inflation are low. This would imply that original sin causes low inflation and this reverse causation lowers the value of the estimated coefficient. To deal with this problem we run an instrumental variable regression, using as our instrument the Cukierman (1995) index of central bank independence. Equation 7 runs the same equation as (1) but for the sample for which we have the Cukierman index. Equation (8) runs the instrumental variables regression on this sample (we use tobit in the second stage). The estimated coefficient is now higher but still not significant. While this suggests that endogeneity could be the cause of the weak relationship, even the instrumental variables estimates do not provide any strong evidence for the fact that original sin is significantly correlated with past inflation. It should also be noted, that we use the 1980-1998 period to give inflation the maximum chance to explain original sin. Had we presented the same equations using only the inflation in the 1990s, we would have found even weaker results.

4. Fiscal Solvency and Original Sin

Other theories put greater emphasis on fiscal stories. The argument is that a government that has weak fiscal accounts will have an incentive to debase the currency in order to erode the real value of its obligations (Lucas and Stokey, 1983, Calvo and Guidotti, 1990). The solution is to index the debt to some real price or to issue short-term debt so as to increase the cost of eroding the debt with inflation.

We explore the relationship between original sin and fiscal fundamentals in Table 3. Equations 1, 2 and 3 use, alternatively, the debt-to-GDP ratio, the average deficit, and

the debt-to-revenue ratio. Equation 4 uses the principal component of these three measures. While in a few cases we find a negative relationship between measures of original sin and fiscal fundamentals, that relationship is never even close to being significant at conventional confidence levels. Note that countries with *more* original sin have less public indebtedness.

Following our findings in Chapter 2, there may be reason to worry about reverse causality. Original sin lowers credit ratings – for any given level of debt – by making debt service more uncertain. This limits the ability to accumulate debt and may cause an attenuation bias in our estimates. Hence, we may be finding a negative result that is in fact expressing the impact of original sin on the ability of governments to accumulate debt, not the impact of public indebtedness on original sin. To address this possible source of reverse causality we again employ an instrumental variable approach, where we use the proportion of the population over 65 as an instrument for the fiscal fundamental. The results are presented in equation 6; the key findings are unaffected.

Thus, we find no traction for fiscal interpretations of the causes of original sin. There is little association of original sin with obvious fiscal fundamentals such as the level or persistence of public debts and deficits. Indeed, one can point to any number of emerging markets that have successfully maintained low inflation, avoided large budget deficits, and followed international guidelines for the efficient design of their monetary and fiscal institutions – Chile is a case in point for Latin America, while Korea is a good example for Asia – but are nonetheless chronically unable to borrow abroad in their own currencies.

5. The Strength of Institutions

It is sometimes argued that investors are reluctant to lend to governments and corporations where the institutions designed to enforce their claims are weak or unreliable and there is a significant danger of debt repudiation. Chamon (2002) and Aghion, Bacchetta and Banerjee (2001) present a model in which when a company defaults, its assets are distributed among the creditors in proportion to their nominal claims on it. If depreciation and default risk are correlated, then domestic currency lenders will likely see a double decline in the value of their claims when a default occurs: they will receive a portion of the residual value of the company which will be diminished by the concomitant depreciation. If all lending takes place simultaneously, domestic currency lenders will charge for this effect. However, if lending takes place sequentially firms will have an incentive to increase the proportion of foreign currency lending in order to transfer part of the residual value of the defaulted company from old domestic-currency lenders to new foreign-currency investors. In anticipation of this, the domestic currency market will disappear. This mechanism can be overcome if bankruptcy courts can enforce complicated contracts that for example, distinguish between creditors of different seniority. But if these contracts are infeasible, then domestic currency lending may be affected.

To test this hypothesis, we study the relationship between original sin and a measure of rule of law (*RULEOFLAW*), drawn from Kauffman et al. (1999) that should proxy for the quality of contract enforcement. Table 4 shows that the relationship between institutional quality and original sin is neither statistically nor economically significant. Using instead the La Porta et al. (1997) index of creditor rights yield similar results,

although the sample size is more limited in this case. These negative findings are not entirely surprising, given the fact that these indexes of institutional quality are strongly correlated with the level of development which we found (in Table 1) to have only a weak relationship with original sin.

6. Trade Links

It can be objected that what matter are not institutions, which can always be changed, at some cost, but the fundamental incentives for respecting one's contractual obligations. In terms of respecting the claims of foreigners, it can be argued that countries that trade heavily with their creditors have an incentive to meet their contractual obligations because failing to do so will provoke commercial retaliation or at minimum interrupt the supply of trade credits. This was the insight of the early Eaton and Gersovitz (1981) model of sovereign lending in the presence of potential repudiation, where lending could be supported only in the presence of potential trade sanctions with output costs. Exponents of this view point to Argentina in the 1930s, which was one of the only Latin American countries to stay current on its debts, something that is commonly explained by its exceptional dependence on the British export market and the threat of tariff retaliation (Diaz-Alejandro 1984). More recently, Rose (2002) has shown that borrowing countries that default on their debts in practice suffer a significant reduction in trade with their creditors. Rose and Spiegel (2002) show further that borrowers with economically consequential trade links to their creditors are significantly more likely to service their debts.

This story linking the threat of trade sanctions to the credibility of financial policies is appealing to the extent that it suggests that current account liberalization provides an automatic solution to the problems posed by capital account opening. However Table 5 finds no correlation between the incidence of original sin and the standard measure of trade openness (exports as a share of GDP). The result is unchanged if we drop financial centers and is robust to additional sensitivity tests.[5]

This result should not surprise us. Trade may explain the absence of opportunistic defaults and the existence of debt markets, but it is hard to see why it should affect the denomination of those debts, per se. Trade sanctions can be imposed whether debt is denominated in the domestic or the foreign currency. And, if the presence or absence of the potential for such sanctions is what determines ability to borrow, then we should also see punishments meted out to countries that denominate their debt in their own currencies but then depreciate the exchange rate, thereby eroding the value of creditors' claims. But, in practice, we do not observe countries that issue in their own currency being punished when the exchange rate weakens. In the last 30 years we have seen large trend or cyclical depreciations in many of the countries that suffer least from original sin: Australia, Canada, New Zealand, the UK and South Africa, to name five. In practice, these depreciations have not triggered either trade or credit sanctions.

[5] The results are also robust to dropping two outliers (Singapore and Suriname).

7. Political Economy Explanations

It can be argued that what is required to induce governments to respect the value of the local currency (and of financial liabilities denominated therein) is a domestic constituency of local-currency debt holders prepared to penalize a government that debases the currency. If the median voter holds sovereign bonds, a government will suffer political sanctions if it defaults opportunistically or inflates away the value of the principal. By contrast, if foreigners are the main holders of public and private debts (the argument continues), then there is likely to be a larger domestic political constituency in favor of weakening the value of their claims. Foreign creditors, no fools they, will be reluctant to lend in local currency unless protected by a large constituency of local savers. This is the logic behind Tirole (2002): lending in the currency of the borrower is deterred by a form of sovereign risk arising from the fact that the government cannot commit to protect the rights of foreigners whose welfare it does not value. Redemption can therefore be achieved by developing domestic financial markets.

Our crude measure of these influences is the size of the domestic financial system, proxied alternatively by domestic credit normalized by GDP (DC_GDP), the ratio between foreign liability (measured as the sum of bank claims and securities from the two BIS databases described above) and domestic credit (FOR_DOM), and an index built using the principal component of the previous two variables (SIZE_FIN). The theory

predicts that original sin should exhibit a negative correlation with DC_GDP, a positive correlation with FOR_DOM and a negative correlation with SIZE_FIN.[6]

Table 6 shows that the relationship between size of the financial system and original sin is not statistically significant in the case of DC_GDP and it is statistically significant but *with the wrong sign* in the case of *FOR_DOM*. This is in part due to the fact that Luxembourg is an outlier in this sample. If we drop it (equation 6) the coefficient of FOR_DOM becomes positive but not statistically significant.

Even if there existed a relationship between original sin and size of the domestic financial system, there would still be the question of what governments can do to promote the development of a large constituency of domestic bondholders.[7] Conceivably, they could create a constituency of investors in long-term domestic-currency-denominated debt at one fell swoop by using force majeure to change the currency denomination of existing claims or eliminating from existing contracts provisions indexing principal and interest to the exchange rate. Something along these lines occurred in the United States in 1933, it is argued, when Franklin Delano Roosevelt disregarded the gold clauses in U.S. government and corporate bonds in 1933 on devaluing the dollar and his decision was upheld by the Supreme Court. Doing so did not demoralize the bond markets because the economy's improved growth prospects (with their positive implications for the debt-servicing capacity of borrowers) more than outweighed the effects of the dilution of investor rights (Kroszner 1999).

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[6] Since DC_GDP and FOR_DOM are supposed to have opposite effect on Original Sin SIZE_FIN was contructed with the negative of FOR_DOM.

[7] There is also the problem that our measure of the size of the financial system does not capture the size of the domestic currency market. Countries may have a large, but dollarized, domestic financial system. Section 9 focuses on this issues and attempts at estimating what determines domestic original sin.

Whether a similar forced conversion would in fact reassure investors in emerging markets today is another question.[8] The problem with this argument is that it implies the traditional trade-off between the positive effects associated with a more sustainable debt achieved through force majeure and the negative reputational effects related to tampering with the sanctity of contracts. Investors may react negatively if the second effect dominates and become even more reluctant to absorb new debt issues on the margin. The policy would then be counterproductive from the point of view of "redemption", i.e. of being able to have sustained market access in local currency going forward. [9]

Another approach, less likely to alarm investors but also less capable of delivering immediate results, would be to require banks, pension funds, and the social security system to hold long-term, domestic-currency-denominated, fixed-rate debt. The government could require the banks to hold domestic-currency-denominated bonds as reserves. It could privatize the social security system and require pension funds to hold a specified share of the retirement portfolios in such bonds. But, to the extent that the government has the strength to promulgate such regulations – in effect, to twist the arms of these individuals and institutions – the individuals and institutions in question will presumably lack the leverage to throw a government engaging in opportunistic debt management policies out of office. Hence other investors may lack assurance that there exists an effective class of domestic stakeholders to constrain opportunistic policy.

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[8] To some extent the Argentine forced *pesification* of dollar claims bares some similarity with the US 1933 experiment. It involved allowing the currency to depreciate while limiting the wealth effects associated with the dollar-linked (instead of gold-linked) assets.

[9] Why this contradiction was not more demoralizing in 1933 is an interesting issue that would reward further study.

Not everyone will be convinced by this critique; they will argue that emerging markets should emulate the policies of financial repression used by Western European governments after World War II.[10] There, strict capital controls and tight restrictions on the currency composition of newly issued debt securities succeeded in forcing residents to hold long-term domestic-currency-denominated bonds by offering them few alternative funding or investment opportunities, accelerating the creation of a domestic investor constituency. But, even in postwar Europe, a quarter of a century and more was required before those controls could be removed and foreign investors could be enticed into absorbing significant volumes of domestic issues. Financial repression is no quick fix, in other words. And, again, this approach – encouraging the development of some markets by suppressing the operation of others – may be regarded by investors as disturbingly contradictory and inconsistent.

Evidence from emerging markets suggests that these considerations may in fact be at work and that capital controls may help the development of long term fixed rate domestic markets in local currency but prevent the international acceptance of local currency debt obligations. Recall from Chapter 1 that we were able to identify virtually no countries that can borrow abroad in local currency but which has no long-term fixed-rate domestic markets, suggesting that domestic market development is a necessary condition for redemption from original sin. However, that analysis also suggested that it is not a sufficient condition: we found a number of countries that suffer from international original sin while having "achieved redemption" on the domestic front. Hausmann and Panizza (2003) explore different potential explanations to distinguish

[10] See for example Wyplosz (2001).

between these three groups of countries. Their most robust result relates to the role of capital controls. The 7 countries that have been able to develop their domestic market but still lack the capacity to borrow abroad in their own currency have levels of capital control that are much higher than the countries in the two other quadrants (the difference is always statistically significant at the 10 percent confidence level). This evidence is suggestive of the idea that capital controls facilitate the development of domestic markets, explaining why capital controls are higher in the countries located in the fourth quadrant vis a vis the countries located in the second quadrant. However, while in place, they hinder the capacity to use that currency in international borrowing, explaining thus the difference between the countries in the third quadrant and the countries in the fourth quadrant.

This pattern is clearly reminiscent of the European experience mentioned above. It is also suggestive of the importance given by Bordo, Meisner and Redding in Chapter 5 to the World Wars in their impact on the development of domestic markets in the British Dominions.

As a policy prescription this approach is likely to be especially problematic in low-income countries where there exists only a limited pool of domestic savings and domestic market liquidity is limited. Limiting foreign participation could be particularly onerous. Moreover, the smaller the market, the less likely are foreign investors to willingly hold debt securities denominated in the currency in question. (In fact, precisely the same logic applies to residents.) This observation is key: it points to where to look for the causes – and the solution – to original sin.

8. Putting Things Together

To this point we have tested the various theories of original sin one at a time and only found a strong correlation between original sin and country size, along with a somewhat weaker correlation between original sin and past inflation and original sin and the level of development. We now jointly test the theories by running a set of multivariate regressions that include explanatory variables for all theories.

Table 7 reports a set of regressions that do and do not control for country groups and financial centers. In the appendix, we also consider a measure of original sin that excludes debt instruments issued by international organizations (*OSIN*3*_NOI*). The results are basically unchanged: again, the only robust determinant of original sin is country size. In some specifications, the level of development also appears statistically significant (but economically small), but this result is not robust changes in measures of original sin or estimation techniques. . As shown in the appendix, GDP per capita is not significantly correlated with OSIN1 and OSIN2. Moreover, the correlation between GDP per capita and OSIN3 is not robust to using weighted OLS with robust t statistics instead of weighted tobit. Of the variables considered, only country size appears to be truly robust.

9. International Causes

What accounts for the concentration of the world's portfolio in few currencies and for the fact that it is mainly large countries that seem to be able to issue foreign debt in their own currencies? Obviously, each additional currency adds opportunities for diversification, but with decreasing marginal benefits. At the same time, however, each

currency also adds costs and risks. In a world with transactions costs, the optimal portfolio will have a finite number of currencies. The fact that few currencies survive is indicative that with each additional currency, the benefits of diversification fall faster than the costs.[11]

Imagine the following situation. There are two countries: one has N trees while the other has 1 tree. All trees are identical in their expected income and its variance; the large country just has more of them. Shocks to each tree are uncorrelated. Assume that the exchange rate moves with the realization of relative output. If there were no transactions costs of investing abroad, then it would be optimal to hold a globally diversified portfolio: the large country would invest 1/(N+1) of its wealth in the small country, while the latter would invest N/(N+1) in the large country. Now introduce costs to international transactions. If all countries were of size 1, then the presence of transaction costs would not affect the composition of the world portfolio. But if country size differs, then the benefits of international diversification will be greater for the small country than for the large one. There will be less appetite in the large country to hold the currency of the small country, while there will still be a large appetite for the small country to hold the assets of the large one. This is to say, large countries offer significant diversification possibilities, while small countries do not. If the transaction costs associated with international diversification are the same for investors in both countries, then the world will choose to invest in a few large currencies. Notice that this is through

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[11] This is especially true if the additional currency exposes the investor to concentrated risks. Note that in making this argument we are paralleling the literature on portfolio diversification with transactions costs, in which it is shown that optimizing investors, faced with transactions costs, will include only a limited number of securities in their portfolios, balancing the diversification benefits of adding an additional

no fault of the small country, but a consequence of the existence of cross-border costs and asymmetries in size and diversification.

An implication of this view is that even if we identify characteristics that have allowed a few small countries to issue debt in their own currencies – say, like South Africa, New Zealand or Poland – it would be a fallacy of composition to assume that, if other small countries acquired those same characteristics, then they would all make it into the world portfolio. Each successful country may limit the chances of the others, given the declining marginal benefits of diversification.

A further implication of this approach is that country size matters for original sin. Large countries have an advantage in shedding original sin because the large size of their economies and currency issue makes it attractive as a component of the world portfolio. In contrast, the currencies of small countries add little diversification benefits relative to the additional costs they imply.

We explore this hypothesis further in Table 8. There we use three entirely different measures of size: the log of total GDP, the log of total domestic credit (valued in US dollars), and the log of total trade, in addition to again constructing the first principal component (SIZE, as in previous tables). We also control for country groupings. Equation 1 presents the regression with just the country groupings dummy. In equations 2 to 4 we use alternatively our three different measures of size. Equation 5 uses the principal component of the three measures, as in the previous tables. In equations 6 and 7 we test for robustness with respect to dropping the financial centers and not controlling for country groupings.

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currency, which decline on the margin, against the transactions costs of purchasing additional securities,

The results show that all measures of size are robustly related to original sin. The relationship between original sin and size is also economically important: the effects of SIZE in Table 7 account for more than half of the difference in original sin between developed and developing countries.[12]

SIZE can explain why large countries like the US and Japan do not suffer from original sin. But what about Switzerland and, for that matter, the UK? Note that the financial-center dummy in the equations in Table 9 remains large and significant even after controlling for country size. This is another way of saying that the UK and Switzerland are immune from the problem. But if becoming a financial center is evidently another way of shedding original sin, this is much easier said than done. Countries that either are or were major commercial powers (e.g. the US and Japan today, Britain in the past) clearly have a leg up; the developing countries are not major commercial powers, by definition. In addition, some countries have been able to gain the status of financial centers as a quirk of history or geography (e.g. Switzerland, a mountainous country at the center of Europe which was hard to take over and also small enough to retain its neutrality, became a convenient destination for foreign deposits). Network externalities giving rise to historical path dependence have worked to lock in their currencies' international status: once the Swiss franc was held in some international portfolios and used in some international transactions, it became advantageous for additional investors and traders to do likewise. And because Britain was the world's leading industrial, trading and lending nation once upon a time, sterling acquired its position as a prominent currency for the denomination of international claims, a luxury

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which may not.

that the country enjoys to this day, albeit to a lesser and declining extent. These observations are related to the literature on the determinants of key currency status (Kiyotaki, Matsuyama and Matsui 1992), which explains the dominance of a small number of currencies in international markets as a function of network externalities and transactions costs. This literature does not deny that additional countries cannot gain admission to this exclusive club, but it suggests that they face an uphill battle.

All this suggests that the global portfolio is concentrated in a very few currencies for reasons largely beyond the control of the excluded countries.

11. Lessons from Outliers

An interesting fact about the international issuance of bonds in exotic currencies is that it is done mostly by non-residents. Table 9 presents data on the proportion of local currency debt issued by foreigners in the non-major currency countries that have original-sin OSIN3 ratings below 80 percent. As the table shows, over 80 percent of the cross-border debt issued in the currencies of a number of these countries -- Poland, New Zealand, South Africa and the Czech Republic -- was issued by foreigners. (See Figure 2). The proportion exceeds half of total issuance in the cases of Canada and Denmark.

Why would non-residents issue debt denominated in exotic currencies? Consider the following case. The Inter-American Development Bank (IDB) has issued debt in New Zealand dollars, in Greek drachmas and in Russian rubles, despite the fact that none of these countries is a member of the Bank and their well-being is not a goal of the institution. The reason is that the investment banks underwriting the IDB issue are able to

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[12] We also find that size is also significant in a sub-sample of developing countries.

swap the debt-service obligation back into U.S. dollars in such a way that the net cost of borrowing for the IDB, inclusive of the swap, is less than or equal to the opportunity cost of borrowing directly in U.S. dollars.

The investment bank is able to offer this swap because there are scarce opportunities to hedge the currency mismatch; hence investors there are willing to pay a premium for the privilege. Borrowers with foreign currency liabilities are willing to pay for the swap to entice otherwise indifferent foreigners to issue internationally in local currency.

Why the market favors this structure is an interesting question. One possibility is that the markets value the ability to separate currency and credit risk. While the local-currency debt issued by emerging market residents has both currency and credit risk and the dollar debt issued by emerging market residents has only credit risk, the debt issued by an international financial institution has only currency risk (and a small, uncorrelated and well priced credit risk). Markets may prefer to separate these risks in order to facilitate the pricing of risk and thus facilitate the development of market liquidity. In addition, if there is a positive correlation between default and devaluation risk, as is likely in potential sufferers of original sin, an instrument that has both sources of risk may be inefficient in the sense that it will have each source of risk plus twice the covariance between them. Under these conditions, the market may prefer to have those two risks in separate instruments in order to get rid of the covariance term. The IFIs are particularly well placed to issue bonds that have the currency risk without the country's credit risk.

In fact, the international financial institutions (IFIs) have played a very significant role in the international bond issuance in exotic currencies (see Table 10). The IFIs issued

almost half of all internationally-placed bonds in exotic currencies in the period 1992-98. This includes countries like the Czech Republic, Portugal, Spain and South Africa. In the more recent period, the relative participation of IFIs in these currencies has declined as the market has found its footing, but it has increased in other newer entrants such as Estonia, Taiwan and Trinidad and Tobago.

12. Conclusion

In attempting to understand the causes of original sin, this chapter has started by rounding up the usual suspects. These shady characters turn out to have convincing alibis. There is little systematic support for the view that the inability of emerging markets to borrow abroad in their own currencies reflects the instability and imperfect credibility of monetary and fiscal policies. There is little evidence that it reflects the weakness of their market-supporting institutions, due to the manipulability of their institutions of contract enforcement or an unfavorable constellation of political economy forces. In a sense this is not surprising. The quality of monetary and fiscal policies and the development of market-supporting institutions vary enormously across countries. Contrast Chile with Venezuela, for example, or Korea with Indonesia. But while the quality of institutions and policies varies enormously, original sin is very widespread; it is all but universal in the developing world. Even emerging markets that have made major investments in strengthening their policies and institutions have made relatively little headway in redeeming themselves from original sin.

The widespread nature of original sin leads us to search for a source in the structure and operation of the international financial system. To be clear, we are not

arguing that country policies are irrelevant. Strong policies and institutions at the national level are clearly necessary to escape the problem. But they may not be sufficient over the horizon relevant for practical policy decisions. Even countries with strong policies and institutions apparently find it difficult to infiltrate their currencies into international investment portfolios. On reflection, it is not hard to see why. Both theory and evidence suggest that international portfolio diversification eventually encounters diminishing returns. And, even in the era of modern information technology, there will be significant costs to managing a portfolio of many exotic currencies that are obligations of small economies, each with its own distinctive politics and circumstances. This suggests that developing countries and their currencies, which are latecomers to the international financial game, face an uphill battle when attempting to add their currencies to the international portfolio. They do not enjoy first-mover advantages – to the contrary. In turn, this suggests that the problem of original sin can more readily be addressed by an international initiative that heightens the attractions of these currencies for international investors. We propose one such initiative in the next chapter.

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Table 1: Original Sin and economic development

	(1)	(2)	(3)
	OSIN3	OSIN3	OSIN3
LGDP_PC	-0.141	-0.128	-0.170
	(1.59)	(1.43)	(2.99)***
SIZE	-0.310	-0.310	-0.415
	(3.37)***	(3.33)***	(4.51)***
FIN_CENTER	-0.680		
	(1.99)*		
EUROLAND	-0.126	-0.152	
	(0.62)	(0.74)	
OTH_DEVELOPED	0.007	-0.021	
	(0.03)	(0.10)	
Constant	2.522	2.414	2.833
	(3.39)***	(3.24)***	(5.46)***
Observations	75	71	75

t statistics in parentheses (tobit estimations)
*significant at 10%; ** significant at 5%; *** significant at 1%

Table 2: Original sin and monetary credibility

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
					Dropping Financial centers		OLS same sample as 8	Instrumental Variables
	OSIN3	OSIN3	OSIN3	OSIN3	OSIN3	OSIN3	OSIN3	OSIN3
AV_INF	0.306		0.436					
	(1.19)		(0.69)					
AV_INF2			-0.116					
			(0.23)					
MAX_INF		0.067						
		(0.95)						
INF				0.085	0.083	0.175	0.022	0.314
				(1.09)	(1.07)	(2.08)**	(0.35)	(1.13)
SIZE	-0.318	-0.318	-0.316	-0.318	-0.318	-0.503	-0.323	-0.319
	(3.57)***	(3.54)***	(3.52)***	(3.55)***	(3.50)***	(5.75)***	(4.27)***	(4.30)***
FIN_CENTER	-0.866	-0.897	-0.857	-0.881			-0.603	-0.550
	(2.88)***	(2.99)***	(2.83)***	(2.93)***			(2.77)***	(2.52)***
EUROLAND	-0.304	-0.329	-0.296	-0.315	-0.318		-0.360	-0.312
	(2.12)**	(2.31)**	(1.99)*	(2.21)**	(2.21)**		(2.80)***	(2.39)**
OTH_DEVELOPED	-0.199	-0.224	-0.192	-0.211	-0.213		-0.207	-0.155
	(1.47)	(1.67)*	(1.37)	(1.56)	(1.57)		(2.15)**	(1.52)
Constant	1.277	1.310	1.259	1.346	1.347	1.358	1.321	1.233
	(10.87)***	(11.60)***	(8.83)***	(13.56)***	(13.46)***	(13.41)***	(14.07)***	(10.29)***
Observations	74	74	74	74	70	74	33	33

t statistics in parentheses (tobit estimations), the instrument for column 8 is Cukierman's index of Central Bank Independence
*significant at 10%; ** significant at 5%; *** significant at 1%

Figure 1: Original Sin and inflation

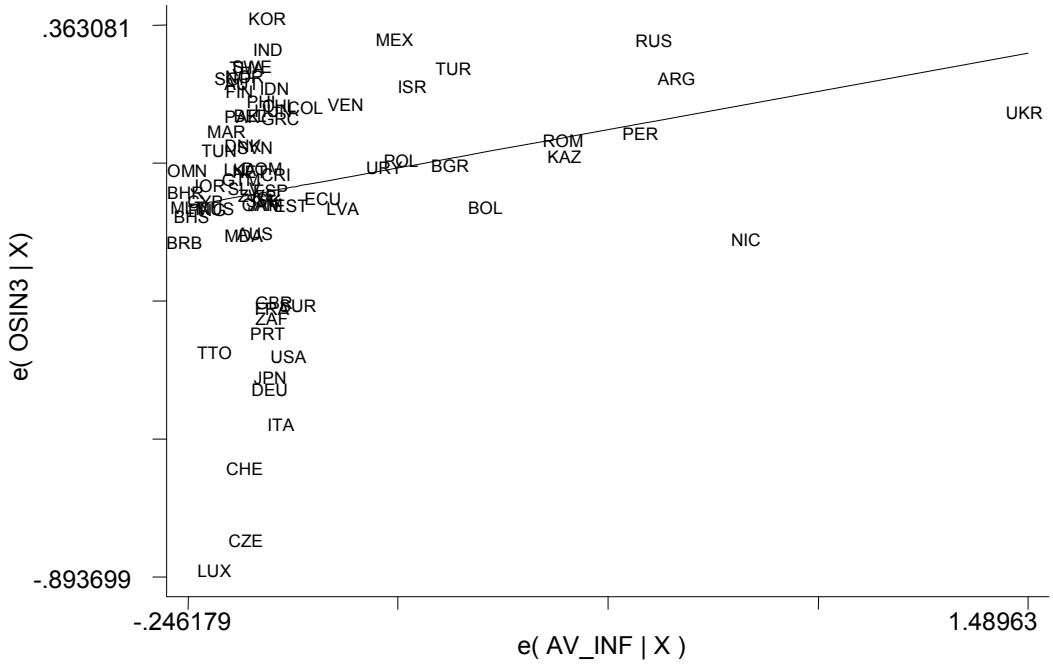

Table 3: Original Sin and Fiscal Sustainability

	(1)	(2)	(3)	(4)	(5)	(6)
	OSIN3	OSIN3	OSIN3	OSIN3	OSIN3	OSIN3 IV Estimations
DE_GDP2	-0.073					
	(0.50)					
DEFICIT		1.777				
		(0.92)				
DE_RE2			0.014			
			(0.24)			
FISC				-0.025	-0.024	-0.061
				(0.30)	(0.28)	(0.22)
SIZE	-0.350	-0.327	-0.354	-0.342	-0.345	-0.124
	(3.71)***	(3.52)***	(3.51)***	(3.42)***	(3.40)***	(2.17)**
FIN_CENTER	-0.825	-0.926	-0.816	-0.839		-0.736
	(2.72)***	(3.09)***	(2.57)**	(2.66)**		(4.12)***
EUROLAND	-0.344	-0.361	-0.327	-0.348	-0.348	-0.149
	(2.61)**	(2.66)***	(2.22)**	(2.48)**	(2.46)**	(1.21)
OTH_DEVELOPED	-0.275	-0.215	-0.245	-0.272	-0.272	-0.117
	(2.18)**	(1.54)	(1.73)*	(2.01)**	(1.99)*	(0.67)
Constant	1.426	1.311	1.370	1.382	1.385	0.996
	(11.99)***	(11.46)***	(10.06)***	(12.04)***	(11.93)***	(34.99)***
Observations	64	74	57	57	54	

t statistics in parentheses (tobit estimations). The instrument for column 9 is OLD

*** significant at 10%; ** significant at 5%; *** significant at 1%**

Table 4: Original Sin and institutions

	(1)	(2)
	OSIN3	OSIN3
RULEOFLAW	-0.050	-0.053
	(0.46)	(0.49)
SIZE	-0.323	-0.322
	(3.53)***	(3.48)***
FIN_CENTER	-0.883	
	(2.65)**	
EUROLAND	-0.326	-0.325
	(1.81)*	(1.79)*
OTH_DEVELOPED	-0.203	-0.201
	(1.03)	(1.01)
Constant	1.388	1.390
	(13.17)***	(13.08)***
Observations	75	71

t statistics in parentheses (tobit estimations)
*significant at 10%; ** significant at 5%; *** significant at 1%

Table 5: Original Sin and trade openness

	(1)	(2)
	OSIN3	OSIN3
OPEN	-0.174	-0.183
	(1.28)	(1.36)
SIZE	-0.359	-0.360
	(3.74)***	(3.73)***
FIN_CENTER	-0.937	
	(3.23)***	
EUROLAND	-0.360	-0.360
	(2.71)***	(2.71)***
OTH_DEVELOPED	-0.269	-0.270
	(2.15)**	(2.15)**
Constant	1.515	1.523
	(9.60)***	(9.64)***
Observations	75	71

t statistics in parentheses (tobit estimations)
*significant at 10%; ** significant at 5%; *** significant at 1%

Table 6: Original Sin and Size of the Financial System

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	OSIN3	OSIN3	OSIN3	OSIN3	OSIN3	OSIN3	OSIN3
DC_GDP	-0.332				-0.311		
	(1.49)				(1.53)		
FOR_DOM		-7.289				7.224	
		(2.15)**				(0.86)	
SIZE_FIN			0.261	0.354			-0.918
			(0.53)	(0.70)			(1.62)
SIZE	-0.290	-0.360	-0.326	-0.332	-0.320	-0.323	-0.306
	(3.22)***	(4.02)***	(3.43)***	(3.42)***	(3.82)***	(3.72)***	(3.61)***
FIN_CENTER	-0.753	-0.843	-0.997		-0.663	-0.895	-0.698
	(2.40)**	(3.02)***	(3.25)***		(2.33)**	(3.23)***	(2.52)**
EUROLAND	-0.226	-0.301	-0.410	-0.421	-0.142	-0.299	-0.156
	(1.37)	(2.34)**	(2.86)***	(2.92)***	(0.94)	(2.42)**	(1.09)
OTH_DEVELOPED	-0.224	-0.223	-0.278	-0.280	-0.187	-0.254	-0.200
	(1.75)*	(1.86)*	(2.18)**	(2.19)**	(1.62)	(2.16)**	(1.76)*
Constant	1.521	1.431	1.377	1.383	1.501	1.291	1.312
	(10.13)***	(13.76)***	(13.44)***	(13.33)***	(10.94)***	(11.15)***	(14.44)***
Observations	74	73	72	68	73	72	71

t statistics in parentheses (tobit estimations)
*significant at 10%; ** significant at 5%; *** significant at 1%

Table 7: The Determinants of Original Sin

	(1)	(2)	(3)
	OSIN3	OSIN3	OSIN3
LGDP_PC	-0.286	-0.333	-0.314
	(1.96)*	(2.70)***	(2.09)**
FISC	0.082	-0.078	-0.098
	(0.70)	(0.76)	(0.96)
SIZE	-0.342	-0.404	-0.347
	(2.79)***	(3.82)***	(3.37)***
SIZE_FIN	0.084	0.338	0.650
	(0.20)	(0.61)	(1.07)
RULEOFLAW	0.312	0.268	0.245
	(1.69)*	(1.55)	(1.43)
INF	0.112	0.109	0.129
	(1.10)	(1.08)	(1.11)
OPEN	-0.093	-0.131	-0.102
	(0.52)	(0.62)	(0.43)
FIN_CENTER	-0.683		
	(1.85)*		
EUROLAND	-0.143		-0.034
	(0.56)		(0.14)
OTH_DEVELOPED	0.009		0.035
	(0.03)		(0.13)
Constant	3.674	4.170	3.941
	(3.15)***	(4.06)***	(3.31)***
Observations	56	56	53

Tobit estimations t statistics in parentheses
*significant at 10%; ** significant at 5%; *** significant at 1%

TABLE 8: Original Sin and Country Size

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
		OSIN3	OSIN3	OSIN3	OSIN3	OSIN3	OSIN3
LGDP		-0.113					
		(3.32)***					
LTRADE			-0.138				
			(3.67)***				
LCREDIT				-0.128			
				(3.67)***			
SIZE					-0.320	-0.320	-0.562
					(3.52)***	(3.47)***	(6.16)***
FIN_CENTER	-1.522	-1.013	-1.021	-0.833	-0.954		
	(5.39)***	(3.53)***	(3.69)***	(2.72)***	(3.19)***		
EUROLAND	-0.671	-0.418	-0.402	-0.298	-0.383	-0.385	
	(5.56)***	(3.48)***	(3.32)***	(2.12)**	(2.86)***	(2.85)***	
OTH_DEVELOPED	-0.508	-0.331	-0.340	-0.229	-0.274	-0.275	
	(4.17)***	(2.86)***	(2.96)***	(1.79)*	(2.15)**	(2.15)**	
Constant	1.279	1.662	2.042	1.619	1.375	1.376	1.387
	(15.95)***	(10.07)***	(8.34)***	(10.87)***	(13.77)***	(13.66)***	(13.14)***
Observations	90	80	88	75	75	71	75

Tobit estimations, t statistics in parentheses
*significant at 10%; ** significant at 5%; *** significant at 1%

Table 9: Proportion of debt issued by foreigners and measures of original sin (Average 1999-2001)

Country	% Foreign	SIN33
Czech Republic	100.0%	0.0%
South Africa	97.6%	9.5%
New Zealand	82.0%	4.5%
Poland	81.7%	0.0%
Hong Kong, China	59.7%	29.4%
Denmark	57.1%	71.1%
Canada	51.2%	75.5%
Singapore	35.4%	69.5%
Australia	31.5%	69.8%
Taiwan	0.0%	54.0%

Note: Table includes all non-major currency countries with measures of Sin3 less than or equal to 0.8.

Figure 2: Original Sin in Exotic Currencies

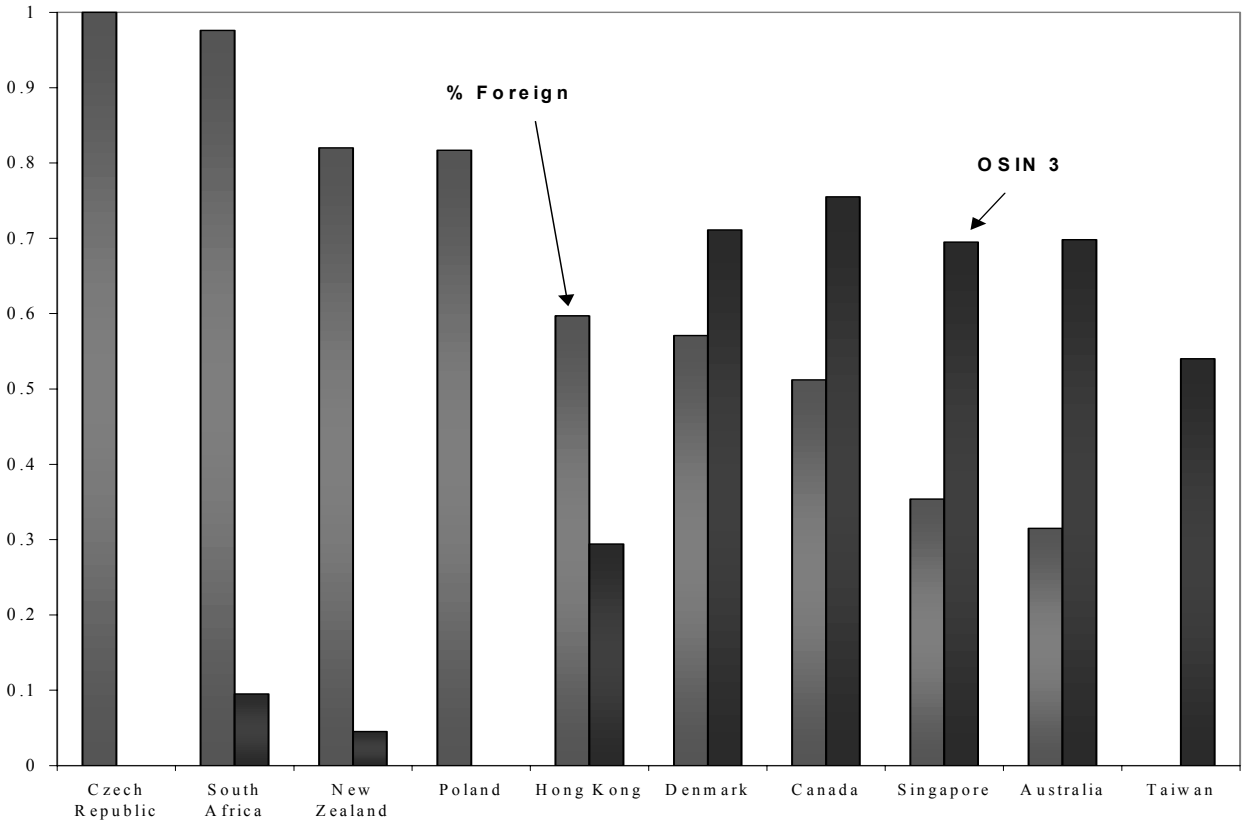

Table 10: Bonds in exotic currencies

	Total Debt (Bil USD)	Share of Instruments with fixed interest rate	TOP 3 ISSUERS			TYPE OF ISSUER		
						GOV.	FIN. INST.	PRIVATE CORP.
Czech Republic			Int. Org	Germany	USA			
1992-1998	0.93	100.0%	40.0%	21.0%	10.0%	8.0%	52.0%	0.0%
			Germany	Int. Org	Nether.			
1999-2001	1.11	80.0%	24.0%	22.0%	15.0%	3.0%	71.0%	4.0%
Estonia			Int. Org	Finland				
1999-2001	0.30	100.0%	99.0%	1.0%		0.0%	1.0%	0.0%
Hong Kong			Hong Kong	Int. Org	Australia			
1992-1998	21.41	64.3%	40.0%	38.0%	8.0%	3.0%	43.0%	16.0%
			Int. Org	Hong Kong	Australia			
1999-2001	43.93	82.0%	29.0%	27.0%	17.0%	8.0%	59.0%	4.0%
Poland			Int. Org	Poland	USA			
1992-1998	0.54	56.0%	43.0%	28.0%	12.0%	12.0%	14.0%	31.0%
			Int. Org	Germany	Ireland			
1999-2001	1.79	92.0%	34.0%	26.0%	7.0%	1.0%	63.0%	2.0%
Portugal			Int. Org	UK	USA			
1992-1998	10.00	39.0%	40.0%	12.0%	11.0%	9.0%	43.0%	8.0%
Singapore			Singapore	Hong Kong	UK			
1992-1998	2.30	15.0%	52.0%	45.0%	3.0%	0.0%	45.0%	55.0%
			USA	Singapore	Int. Org.			
1999-2001	12.74	99.8%	26.0%	15.0%	11.0%	20.0%	61.0%	8.0%
Slovak Republic			Int. Org	Germany	Nether.			
1992-1998	0.46	100.0%	65.0%	20.0%	15.0%	0.0%	35.0%	0.0%
			Int. Org	Germany	Austria			
1999-2001	2.58	76.0%	44.0%	20.0%	12.0%	0.0%	44.0%	0.0%
South Africa			Int. Org	Germany	Nether.			
1992-1998	2.99	97.0%	56.0%	18.0%	11.0%	7.0%	29.0%	8.0%
			Int. Org	Germany	S. Africa			
1999-2001	6.17	99.0%	48.0%	13.0%	13.0%	3.0%	33.0%	16.0%
Spain			Int. Org	Spain	Germany			
1992-1998	36.48	87.0%	59.0%	9.0%	7.0%	11.0%	27.0%	3.0%
Taiwan			Int. Org	Taiwan				
1992-1998	3.04	0.0%	0.0%	100.0%		0.0%	0.0%	100.0%
1999-2001	7.06	94.0%	98.0%	2.0%		0.0%	0.0%	2.0%
Thailand			Hong Kong	Thailand	S. Korea			
1992-1998	7.87	77.5%	34.0%	29.0%	14.0%	5.0%	55.0%	39.0%
			Thailand	USA	Australia			
1999-2001	12.15	5.0%	95.0%	4.0%	0.8%	0.0%	85.0%	15.0%
Trinidad & Tobago			Int. Org					
1992-1998	0.40	100.0%	100.0%			0.0%	0.0%	0.0%
1999-2001	1.06	100.0%	100.0%			0.0%	0.0%	0.0%

Source: Own calculations based on data from the Bank for International Settlements.

Appendix

Table A1: Original Sin and the Level of Economic Development (Tobit estimates)

	(1)	(2)	(3)	(4)	(5)
	OSIN3	OSIN3	OSIN3	OSIN1	OSIN2
LGDP_PC	-0.141	-0.128	-0.170	-0.031	0.000
	(1.59)	(1.43)	(2.99)***	(0.95)	(0.03)
SIZE	-0.310	-0.310	-0.415	-0.199	-0.024
	(3.37)***	(3.33)***	(4.51)***	(4.48)***	(1.43)
FIN_CENTER	-0.680			-0.254	-0.592
	(1.99)*			(2.15)**	(9.69)***
EUROLAND	-0.126	-0.152		-0.067	-0.267
	(0.62)	(0.74)		(0.86)	(6.36)***
OTH_DEVELOPED	0.007	-0.021		-0.074	-0.112
	(0.03)	(0.10)		(0.90)	(2.30)**
Constant	2.522	2.414	2.833	1.498	0.991
	(3.39)***	(3.24)***	(5.46)***	(5.42)***	(10.20)***
Observations	75	71	75	75	75

t statistics in parentheses

*significant at 10%; ** significant at 5%; *** significant at 1%

Table A2: Original Sin and Monetary Credibility

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
							Dropping Financial centers		OLS same sample as 8	Instrumental Variables
	OSIN3	OSIN3	OSIN3	OSIN3	OSIN1	OSIN2	OSIN3	OSIN3	OSIN3	OSIN3
AV_INF	0.306		0.436							
	(1.19)		(0.69)							
AV_INF2			-0.116							
			(0.23)							
MAX_INF		0.067								
		(0.95)								
INF				0.085	0.009	0.005	0.083	0.175	0.022	0.314
				(1.09)	(0.31)	(0.43)	(1.07)	(2.08)**	(0.35)	(1.13)
SIZE	-0.318	-0.318	-0.316	-0.318	-0.201	-0.024	-0.318	-0.503	-0.323	-0.319
	(3.57)***	(3.54)***	(3.52)***	(3.55)***	(4.51)***	(1.44)	(3.50)***	(5.75)***	(4.27)***	(4.30)***
FIN_CENTER	-0.866	-0.897	-0.857	-0.881	-0.310	-0.587			-0.603	-0.550
	(2.88)***	(2.99)***	(2.83)***	(2.93)***	(3.03)***	(10.38)***			(2.77)***	(2.52)***
EUROLAND	-0.304	-0.329	-0.296	-0.315	-0.116	-0.263	-0.318		-0.360	-0.312
	(2.12)**	(2.31)**	(1.99)*	(2.21)**	(2.03)**	(7.30)***	(2.21)**		(2.80)***	(2.39)**
OTH_DEVELOPED	-0.199	-0.224	-0.192	-0.211	-0.128	-0.107	-0.213		-0.207	-0.155
	(1.47)	(1.67)*	(1.37)	(1.56)	(2.17)**	(2.57)**	(1.57)		(2.15)**	(1.52)
Constant	1.277	1.310	1.259	1.346	1.241	0.992	1.347	1.358	1.321	1.233
	(10.87)***	(11.60)***	(8.83)***	(13.56)***	(25.50)***	(78.09)***	(13.46)***	(13.41)***	(14.07)***	(10.29)***
Observations	74	74	74	74	74	74	70	74	33	33

Robust t statistics in parentheses, tobit estimations, the instrument for column 10 is Cukierman's index of Central Bank Independence
*significant at 10%; ** significant at 5%; *** significant at 1%

Table A3: Original Sin and Fiscal Sustainability

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	OSIN3	OSIN3	OSIN3	OSIN3	OSIN3	OSIN1	OSIN2	OSIN3 IV Estimations
DE_GDP2	-0.073							
	(0.50)							
DEFICIT		1.777						
		(0.92)						
DE_RE2			0.014					
			(0.24)					
FISC				-0.025	-0.024	-0.015	0.003	-0.061
				(0.30)	(0.28)	(0.43)	(0.14)	(0.22)
SIZE	-0.350	-0.327	-0.354	-0.342	-0.345	-0.188	-0.037	-0.124
	(3.71)***	(3.52)***	(3.51)***	(3.42)***	(3.40)***	(3.82)***	(1.73)*	(2.17)**
FIN_CENTER	-0.825	-0.926	-0.816	-0.839		-0.411	-0.537	-0.736
	(2.72)***	(3.09)***	(2.57)**	(2.66)**		(3.55)***	(8.18)***	(4.12)***
EUROLAND	-0.344	-0.361	-0.327	-0.348	-0.348	-0.138	-0.224	-0.149
	(2.61)**	(2.66)***	(2.22)**	(2.48)**	(2.46)**	(2.34)**	(5.68)***	(1.21)
OTH_DEVELOPED	-0.275	-0.215	-0.245	-0.272	-0.272	-0.150	-0.100	-0.117
	(2.18)**	(1.54)	(1.73)*	(2.01)**	(1.99)*	(2.44)**	(2.24)**	(0.67)
Constant	1.426	1.311	1.370	1.382	1.385	1.237	0.997	0.996
	(11.99)***	(11.46)***	(10.06)***	(12.04)***	(11.93)***	(23.07)***	(63.29)***	(34.99)***
Observations	64	74	57	57	54	57	57	57

t statistics in parentheses, tobit estimations. The instrument for column 9 is OLD
* significant at 10%; ** significant at 5%; *** significant at 1%

Table A4: Original Sin and Institutions

	(1)	(2)	(3)	(4)
	OSIN3	OSIN3	OSIN1	OSIN2
RULEOFLAW	-0.050	-0.053	-0.039	-0.003
	(0.46)	(0.49)	(0.90)	(0.19)
SIZE	-0.323	-0.322	-0.206	-0.024
	(3.53)***	(3.48)***	(4.53)***	(1.44)
FIN_CENTER	-0.883		-0.261	-0.586
	(2.65)**		(2.23)**	(9.72)***
EUROLAND	-0.326	-0.325	-0.078	-0.263
	(1.81)*	(1.79)*	(1.09)	(6.71)***
OTH_DEVELOPED	-0.203	-0.201	-0.077	-0.106
	(1.03)	(1.01)	(0.94)	(2.22)**
Constant	1.388	1.390	1.257	0.994
	(13.17)***	(13.08)***	(24.35)***	(80.77)***
Observations	75	71	75	75

t statistics in parentheses tobit estimates
*significant at 10%; ** significant at 5%; *** significant at 1%

Table A5: Original Sin and trade openness

	(1)	(2)	(3)	(4)	(5)
	OSIN3	OSIN1	OSIN2	OSIN3	OSIN3
OPEN	-0.174	-0.088	-0.020	-0.183	-0.233
	(1.28)	(1.34)	(0.97)	(1.36)	(1.42)
SIZE	-0.359	-0.220	-0.032	-0.360	-0.600
	(3.74)***	(4.70)***	(1.73)*	(3.73)***	(6.23)***
FIN_CENTER	-0.937	-0.313	-0.586		
	(3.23)***	(3.27)***	(10.58)***		
EUROLAND	-0.360	-0.109	-0.261	-0.360	
	(2.71)***	(2.11)**	(7.41)***	(2.71)***	
OTH_DEVELOPED	-0.269	-0.126	-0.109	-0.270	
	(2.15)**	(2.39)**	(2.69)***	(2.15)**	
Constant	1.515	1.311	1.012	1.523	1.573
	(9.60)***	(18.17)***	(45.62)***	(9.64)***	(8.75)***
Observations	75	75	75	71	75

t statistics in parentheses, tobit estimations
*significant at 10%; ** significant at 5%; *** significant at 1%

Table A6: Original Sin and Size of the Financial System

	(1)	(2)	(3)	(4)	(5)	(6)
	OSIN3	OSIN3	OSIN3	OSIN3	OSIN1	OSIN2
DC_GDP	-0.332					
	(1.49)					
FOR_DOM		-7.289				
		(2.15)**				
SIZE_FIN			0.261	0.354	0.237	-0.004
			(0.53)	(0.70)	(1.39)	(0.06)
SIZE	-0.290	-0.360	-0.326	-0.332	-0.213	-0.025
	(3.22)***	(4.02)***	(3.43)***	(3.42)***	(4.69)***	(1.36)
FIN_CENTER	-0.753	-0.843	-0.997		-0.347	-0.590
	(2.40)**	(3.02)***	(3.25)***		(3.57)***	(10.12)***
EUROLAND	-0.226	-0.301	-0.410	-0.421	-0.144	-0.266
	(1.37)	(2.34)**	(2.86)***	(2.92)***	(2.77)***	(7.35)***
OTH_DEVELOPED	-0.224	-0.223	-0.278	-0.280	-0.136	-0.110
	(1.75)*	(1.86)*	(2.18)**	(2.19)**	(2.65)**	(2.65)**
Constant	1.521	1.431	1.377	1.383	1.250	0.994
	(10.13)***	(13.76)***	(13.44)***	(13.33)***	(26.07)***	(72.76)***
Observations	74	73	72	68	72	72

t t statistics in parentheses
*significant at 10%; ** significant at 5%; *** significant at 1%

TableA7: The Determinants of Original Sin

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	OSIN3	OSIN3_NOI	OSIN3	OSIN3	0SIN3	OSIN1	OSIN2
LGDP_PC	-0.286	-0.230	-0.333	-0.314	-0.286	-0.083	0.011
	(1.96)*	(1.98)*	(2.70)***	(2.09)**	(1.96)*	(1.53)	(0.48)
FISC	0.082	-0.136	-0.078	-0.098	0.082	-0.073	0.006
	(0.70)	(1.73)*	(0.76)	(0.96)	(0.70)	(1.79)*	(0.27)
SIZE	-0.342	-0.323	-0.404	-0.347	-0.342	-0.193	-0.050
	(2.79)***	(4.06)***	(3.82)***	(3.37)***	(2.79)***	(3.88)***	(2.03)**
SIZE_FIN	0.084	0.314	0.338	0.650	0.084	0.436	-0.015
	(0.20)	(0.71)	(0.61)	(1.07)	(0.20)	(1.98)*	(0.17)
RULEOFLAW	0.312	0.134	0.268	0.245	0.312	-0.030	0.006
	(1.69)*	(1.01)	(1.55)	(1.43)	(1.69)*	(0.46)	(0.17)
INF	0.112	0.067	0.109	0.129	0.112	0.046	0.002
	(1.10)	(0.73)	(1.08)	(1.11)	(1.10)	(1.00)	(0.13)
OPEN	-0.093	-0.071	-0.131	-0.102	-0.093	0.055	-0.051
	(0.52)	(0.39)	(0.62)	(0.43)	(0.52)	(0.57)	(1.33)
FIN_CENTER	-0.683	-0.600			-0.683	-0.249	-0.561
	(1.85)*	(2.04)**			(1.85)*	(1.74)*	(7.22)***
EUROLAND	-0.143	-0.050		-0.034	-0.143	0.011	-0.241
	(0.56)	(0.25)		(0.14)	(0.56)	(0.11)	(4.53)***
OTH_DEVELOPED	0.009	-0.048		0.035	0.009	0.039	-0.130
	(0.03)	(0.22)		(0.13)	(0.03)	(0.35)	(2.11)**
Constant	3.674	3.265	4.170	3.941	3.674	1.892	0.948
	(3.15)***	(3.57)***	(4.06)***	(3.31)***	(3.15)***	(4.47)***	(5.41)***
Observations	56	56	56	53	56	56	56

Tobit estimations t statistics in parentheses
*significant at 10%; ** significant at 5%; *** significant at 1%

TABLE A8: Original Sin and Country Size

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	OSIN3	OSIN3	OSIN3	OSIN3	OSIN3	OSIN3	OSIN3	OSIN1	OSIN2
LGDP	-0.113								
	(3.32)***								
LTRADE		-0.138							
		(3.67)***							
LCREDIT			-0.128						
			(3.67)***						
SIZE				-0.320	-0.320	-0.562	-0.278	-0.304	-0.030
				(3.52)***	(3.47)***	(6.16)***	(2.12)**	(7.31)***	(1.95)*
FIN_CENTER	-1.013	-1.021	-0.833	-0.954					
	(3.53)***	(3.69)***	(2.72)***	(3.19)***					
EUROLAND	-0.418	-0.402	-0.298	-0.383	-0.385			-0.047	-0.262
	(3.48)***	(3.32)***	(2.12)**	(2.86)***	(2.85)***			(0.95)	(8.19)***
OTH_DEVELOPED	-0.331	-0.340	-0.229	-0.274	-0.275			-0.065	-0.107
	(2.86)***	(2.96)***	(1.79)*	(2.15)**	(2.15)**			(1.20)	(2.87)***
Constant	1.662	2.042	1.619	1.375	1.376	1.387	1.312	1.299	0.994
	(10.07)***	(8.34)***	(10.87)***	(13.77)***	(13.66)***	(13.14)***	(10.95)***	(23.55)***	(89.71)***
Observations	80	88	75	75	71	75	54	75	71

Tobit estimations, t statistics in parentheses

*significant at 10%; ** significant at 5%; *** significant at 1%.