Sovereign Default, International Lending and Trade

Robert Zymek*
Universitat Pompeu Fabra

First Draft: February 2009
This Draft: February 2009

Abstract

This paper sheds new light on the nature of the much-cited, but little-understood "trade costs" of sovereign default. It provides empirical evidence that sovereign default reduces the supply of credit to exporters in the defaulting economy, thereby altering trading patterns at the sectoral level and reducing exports overall. The key finding is that default leads to the strongest reduction in the exports of those sectors which are most dependent on external financing. My results suggest that any impact of sovereign default on trade, rather than a cost of default in its own right, may be a symptom of reduced access to international capital markets.

JEL Classification codes: F10, F14, F21, F34, F37
Keywords: international trade, sovereign debt, default, credit

*Robert Zymek, Faculty of Economics and Business, Universitat Pompeu Fabra, Ramon Trias Fargas 25-27, 08005 Barcelona, robert.zymek@upf.edu.

I am grateful to Alberto Martin, Jaume Ventura and Hans-Joachim Voth for their advice and encouragement, and to participants of the CREI International Lunch and the CEP/LSE International Economics Seminar for helpful comments and suggestions.

1 Introduction

This paper sheds new light on the nature of the much-cited "trade costs" of sovereign default. I employ a large panel of developed and emerging markets to analyse the impact of default episodes on sectoral export behaviour. The key finding is that default leads to the strongest reduction in the exports of those sectors which are most dependent on external financing. This observation contributes to a growing body of evidence suggesting that sovereign default affects the patterns of international trade. However, the underlying mechanism it highlights - that default reduces exporters' access to external financing - contradicts the widespread notion that reduced access to international *goods* markets constitutes a cost of sovereign default. Instead, shifting trading patterns may be a mere symptom of reduced access to international *capital* markets.

The view that the economic costs of sovereign default manifest themselves partly in the form of reduced imports and exports has a long tradition in the literature on sovereign borrowing. For example, in their seminal paper about sovereign lending in the presence of strategic default Eaton and Gersovitz (1981) justify the assumption that defaulters incur a direct output cost by appealing to "retaliatory interference by the creditors or their governments with commodity trade". Similarly, Bulow and Rogoff (1989) argue that foreign lenders' ability to interfere with debtor's trade flows poses a credible threat, claiming that "trade sanctions can plausibly explain the actual repayments that do occur".

These examples reflect a wider, as yet unanswered, question about the incentives for sovereign debtors to honour their obligations towards foreign creditors. By definition, loan contracts with sovereign entities suffer from limited legal enforceability. Yet for decades large volumes of such international loans have been extended, and subsequently repaid. Much research has been dedicated to uncovering the economic penalties for default which may sustain these cross-border financial transactions, and "trade costs" are one among several explanations which have been put forward. Exclusion from international capital markets is a prominent alternative explanation.

While there is extensive evidence that countries which default on their international debt obligations experience reduced access to international capital markets[1], the hypothesis that default also limits their ability to engage in international goods exchange has only recently been tested formally. Rose (2005) is the first to document that debt renegotiations are followed by significant and sustained declines in import and export flows between the debtor country and its foreign creditor nations. His

[1] See Gelos et al. (2003), Arteta and Hale (2008), Fuentes and Saravia (2006) and Mendoza and Yue (2008) for recent examples.

findings, however, are open to the criticism of reverse causality as default may anticipate rising costs of imports or a sustained decline in export demand. Moreover, Rose himself is agnostic about what drives the decline in trade he observes which further weakens his claim to have identified a causal relationship.

In this paper I test directly for a particular causal link between sovereign default and trading patters - namely that default reduces the supply of credit to the defaulting economy. In doing so, I relate the "trade costs" of default to the extensively documented costs from capital-market exclusion. The international capital market has become and important source of funds for the private sector in emerging economies: about 25% of emerging markets' corporate bonds and bank debt are held by foreign investors.[2] Furthermore, firms involved in foreign trade are generally acknowledged to enjoy better access to international lending than those which are not.[3]

I proceed by applying a difference-in-difference approach, inspired by Rajan and Zingales (1998), to an annual panel of sectoral exports for 27 industries in 83 countries between 1980 and 2000. My analysis aims to verify whether default episodes result in a stronger decline in the exports of those sectors which are most dependent on external financing. By focussing on sector-level exports, this approach is less prone to potential biases arising from endogeneity or reverse causality than previous work in this area.

The results lend robust support to the hypothesis that shocks to the supply of credit to exporters can explain the "trade costs" of sovereign default. This finding is independent of the precise composition of the industry sample and the lag structure of the econometric model, but more pronounced for the 1980s than the 1990s. It also remains unaltered when additional controls for industry characteristics or large-scale domestic financial turmoil are introduced. Moreover, I observe that default episodes are associated with a decline in the average exports per establishment, rather the number of exporting establishments, which adds weight to the argument that defaults lead to a rise in exporters' cost of obtaining credit and do not proxy for contemporaneous contractions in the defaulting economy.

The reader should be aware that I do not provide an explanation for why default may be penalised with capital-market exclusion of the sovereign, or how this may raise the cost of obtaining credit for private-sector exporters. While this point is of considerable theoretical interest, it is beyond the scope of this paper. Nevertheless, the findings presented here can be viewed as a contribution to theory formation. Recent macroeconomic models of sovereign risk and default have tended to assume

[2]See Chapter 4 of the Global Financial Stability Report, IMF, April 2005.

[3]See Chapter 5 of the Global Development Finance, The World Bank, 2004.

that defaulters suffer from capital-market exclusion as well as a separately calibrated output loss, frequently motivated as "trade cost".[4] I argue here that the two are intrinsically linked and that, therefore, any plausible dynamic theory of default risk should treat them thus.[5]

The remainder of the paper is structured as follows. Section 2 places my findings in the context of the related literature. Section 3 offers a graphical preview of the key empirical observation. Section 4 motivates the econometric approach with a simple model of international lending and trade in a small, open and capital-scarce economy. Section 5 describes the data and empirical methodology. The main results are presented in Section 6. Section 7 concludes.

2 Related Literature

The impact of sovereign default on the debtor economy's trade with the rest of the world has only recently started to receive formal empirical attention.

Applying a gravity regression to an unbalanced panel of over 150 countries in the period 1948-1997, Rose (2005) finds a significant 7% annual decline in trade between countries involved in debt renegotiation, lasting for 15 years, with an equal-sized impact on the defaulting country's imports and exports. Although he remains agnostic about the precise explanation for this observation, Rose interprets his findings as consistent with deliberate trade sanctions by creditor nations designed to punish obstinate debtors.

Martinez and Sandleris (2006) augment Rose's baseline specification and show, using the same data, that one cannot reject the hypothesis of an equal decline in the debtor country's trade with *all* its trading partners, whether sovereign creditor or otherwise. In addition to the absence of a single known instance in which sovereign default was punished with overt trade sanctions in the last 30 years, they use the evidence of a multilateral decline in debtor openness to cast doubts on the hypothesis of a targeted creditor punishment through trade flows.[6]

As both papers only consider export and import patterns in the aggregate they are open to the criticism of reverse causality: sovereign governments may choose to default in anticipation of "bad times", such as a sustained rise in the cost of imports or a prolonged slump in the demand for exports. This problem is exacerbated by

[4] See Arellano (2008) for a widely-cited paper which makes this assumption.

[5] Mendoza and Yue (2008) make a smiliar point and present a dynamic stochastic general equilibrium model of sovereign default in this spirit.

[6] By contrast, Mitchener and Weidenmier (2005) document that between 1870 and 1914, disgruntled creditors *did* resort to gunboat diplomacy to punish instances of sovereign default, and that such "supersanctions" triggered a decline in trade.

the fact that they fail to identify a plausible causal mechanism linking defaults with declines in aggregate trade flows.

A different approach to the identification of the "trade costs" of default is adopted by Borensztein and Panizza (2006). The authors use a panel of 28 industries in 24 countries between 1980 and 2000 to test whether sovereign default "hurts" exporters. They show that default episodes see the largest decline in the value-added growth of those sectors that are most export-oriented. Since their study analyses the differing effects of default at the sector level it is less likely to suffer from problems of reverse causality. However, just as its precursors, it fails to highlight a possible causal link between default and the value-added growth of export industries.

Like Borensztein and Panizza (2006) I employ the difference-in-difference approach of Rajan and Zingales (1998) to study the impact of sovereign default on exporters at the sector level. Unlike these authors I consider the impact of default on the volume of sectoral exports and test for a particular channel through which sovereign default may "hurt" exporters. The choice to explain the volume of industry exports - rather than value-added growth - allows me to use a larger country sample and to assess the impact of default on trading patterns directly. By proposing and testing for a particular causal mechanism, I can paint a clearer picture of the origins of the perceived "trade costs" of default and minimise potential concerns about the direction of causality. Indeed, to the extent that we accept the mounting evidence that sovereign default impedes the access of public and private-sector borrowers to foreign credit, my estimates should identify the effect on sectoral exports accurately.

From the vantage point of the empirical literature on financial development and trade, this paper is closely related to Manova (2008). Her work examines the impact of financial liberalisation on trade, and finds that it boosts the exports of the most financially vulnerable sectors. Treating default as "inverse" financial liberalisation, I find that it leads to the largest contraction in the exports of the sectors which are most dependent on external financing.

3 Default and the Average Financial Dependence of Exports

This section visualises the paper's key empirical observation by plotting the behaviour of the average financial dependence of exports around several episodes of sovereign default from my sample. I calculate the average financial dependence of exports as $\sum_i (FinDep_{cit} \times Exp_{cit}) / \sum_i Exp_{cit}$, where Exp_{cit} are sector i exports in country c and year t, and $FinDep_i$ is a measure of the financial dependence of pro-

duction in sector i. The source of the export data is Nicita and Olarreaga (2006), and financial dependence is defined as the share of capital expenditure not financed from cash flows by the median US firm in sector i, as in Rajan and Zingales (1998). Data sources and definitions are discussed in greater detail in Section 5. In the graphs, vertical lines indicate the timing of sovereign default episodes.

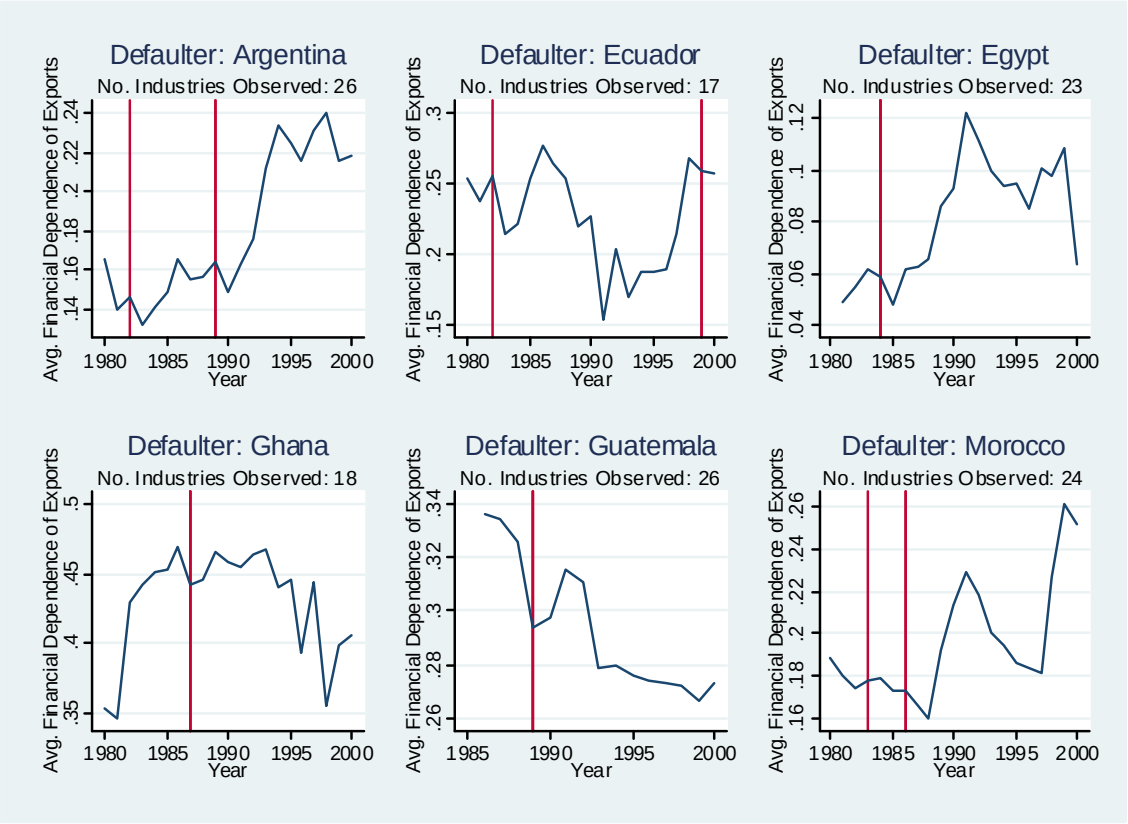

Figure 1: Default and the Average Financial Dependence of Exports

The time-series pattern of the average financial dependence of exports, as depicted in Figure 1, is characterised by low-frequency as well as high-frequency movements. For example, the graph for Argentina exhibits a strong positive trend reflecting the country's increased specialisation in the export of financially dependent produce over the given time period. However, several large deviations from this trend can also be observed. In particular, it is striking that sovereign defaults tend to coincide, or to be followed immediately, by sharp, short declines in the average financial dependence of exports. To different degrees this is true for all default episodes captured in Figure 1. It thus appears that default is followed by a short-term shift in the composition of exports, away from highly financially dependent and towards less financially vul-

nerable goods. This would be consistent with a temporary reduction in the supply of credit to exporting producers.

Of course Figure 1 merely assembles a number of suggestive examples of this pattern. In Section 6 I apply the full force of econometric analysis to the task of establishing its generality.

4 A Small, Open and Capital-Scarce Economy

In the following I develop a simple model of international lending and trade in order to motivate the paper's baseline empirical specification. I consider the impact of sovereign default (modelled as a "black-box" increase in international financial frictions) on the sectoral exports of a small open economy which borrows all capital used for production from abroad.

4.1 Consumption

Let the world consist of C countries, $c \in \{1, ..., C\}$, each producing perfectly tradable goods in I industries, $i \in \{1, ..., I\}$. Producers in each country have access to a technology for manufacturing a unique variety c in each industry i. As a result, $C \times I$ goods will be produced and traded in equilibrium. The representative consumer's preferences in country c' over these goods are defined by

$$U_t^{c'} = \prod_{i=1}^{I} \left\{ \left[\sum_{c=1}^{C} \left(x_{cit}^{c'} \right)^{\eta} \right]^{\frac{1}{\eta}} \right\}^{\sigma_i}, \tag{1}$$

where $x_{cit}^{c'}$ describes the consumption by country c' of the variety of country c in industry i at time t, $0 < \eta < 1$, $\sigma_i > 0$ and $\sum_i \sigma_i = 1$. The representative consumer's utility thus takes a Cobb-Douglas form across aggregate industry-level consumption, and an identical CES form across country varieties within each industry. She maximises utility subject to the budget constraint,

$$\sum_{i=1}^{I} \sum_{c=1}^{C} p_{cit} x_{cit}^{c'} \leq M_{c't}, \tag{2}$$

where p_{cit} is the price of good c in industry i in international goods markets, and $M_{c't}$ is the total nominal income of country c' at t. Hence, country c''s nominal demand

for good c in industry i at time t is given by

$$p_{cit}\hat{x}_{cit}^{c'} = \left(\frac{p_{cit}}{P_{it}}\right)^{\frac{\eta}{\eta-1}} \sigma_i M_{c't}, \tag{3}$$

where $P_{it} \equiv \left(\sum_c p_{cit}^{\frac{\eta}{\eta-1}}\right)^{\frac{\eta-1}{\eta}}$. As is widely established for the standard functional form of utility chosen here, country c' will spent a constant fraction σ_i of its total nominal income on consumption in industry i, and split industry-i expenditure across the C varieties in a manner which is inversely proportional to each variety's share in a measure of the industry-price level, P_{it}.

To obtain world demand for country c's production variety in industry i, I sum over all c', yielding

$$p_{cit}\hat{x}_{cit} = \left(\frac{p_{cit}}{P_{it}}\right)^{\frac{\eta}{\eta-1}} \sigma_i M_t, \tag{4}$$

where $\hat{x}_{cit} = \sum_{c'} \hat{x}_{cit}^{c'}$ and $M = \sum_{c'} M_{c't}$.

4.2 Production

Factor markets are perfectly competitive and the unique, country-specific technology for producing variety c in industry i is described by the minimum-cost function

$$b_t(y_{cit}) = \left(\frac{R_{ct}}{\alpha_i}\right)^{\alpha_i} \left(\frac{W_{ct}}{1-\alpha_i}\right)^{1-\alpha_i} y_{cit}, \tag{5}$$

where y_{cit} is the output produced by country c in industry i, and R_{ct} and W_{ct} are, respectively, the cost of capital and the wage rate in c at time t. The parameter α_i is a measure of the industry's capital intensity. Since all capital will be purchased on credit, it is also a measure of the industry's financial dependence.

I assume that there is only one producer in each of country c's I industries.[7] Since this producer competes with $C-1$ foreign producers of substitutable varieties in industry i, she is faced with a downward-sloping demand curve for her output, given by equation (4). As is standard in this monopolistic-competition setup, the solution to the domestic producer's profit maximisation problem is found assuming that she takes P_{it} as given, because domestic production is small relative to world production in industry i. This results in an optimal pricing rule of the form:

[7] This assumption is not crucial. It would be possible, but more cumbersome, to allow for a continuum of monopolistically competitive domestic producers of domestically differentiated varieties of good c in industry i.

$$\hat{p}_{cit} = \frac{1}{\eta} b_t'(y_{cit}) = \frac{1}{\eta} \left(\frac{R_{ct}}{\alpha_i} \right)^{\alpha_i} \left(\frac{W_{ct}}{1-\alpha_i} \right)^{1-\alpha_i}. \tag{6}$$

Finally, capital is perfectly mobile across borders, while labour is not.

4.3 The Capital-Scarce Economy with Default Risk

Suppose country c is a capital-scarce economy. For simplicity, let country c's domestic holdings of capital be zero. The economy can thus only obtain capital for domestic use in international markets at a price which will depend on the international rental rate R_t^* as follows:

$$R_{ct} = \frac{R_t^*}{1-\pi_{ct}}. \tag{7}$$

The parameter $\pi_{ct} \geq 0$ can be thought of as a generic friction that applies to country c's transactions in world capital markets at time t. Clearly, if $\pi_{ct} = 0$, country c can borrow at the world rental rate, while if $\pi_{ct} > 0$, the cost of capital in country 1 is higher than in world markets. The subsequent empirical analysis will test the hypothesis that sovereign default raises π_{ct} without providing rigorous microfoundations for this claim. Nevertheless, it would be possible to provide several theoretical justifications from the recent literature[8].

The assumption that the domestic cost of capital is entirely determined by the economy's cost of borrowing in international financial markets is certainly extreme, but useful for illustrative purposes. All defaulter economies in the data sample employed in this paper were net importers of foreign capital during (most of) the sample period, and thus would have experienced a positive relationship between the supply of foreign lending and the domestic cost of credit similar to one in equation (7). Moreover, the cost of foreign borrowing should have greater relevance for emerging-market exporters, which enjoy better access to international capital markets through vehicles such as private or government-sponsored trade credit, than for businesses not engaged in international trade.

[8] There is an extensive literature which has attempted to determine the conditions under which it is incentive-compatible for foreign creditors to withhold capital from sovereign defaulters. In a recent example, Sandleris (2006) argues that, by revealing information about the debtor government's likely adverse stance towards foreign creditors, sovereign default may naturally reduce lending to the defaulter economy.

4.4 Empirical Implications

Substituting (6) into (3), and imposing the normalisation $W_{1t} = 1$, I obtain the following expression for the nominal value of country c's exports in industry i at t:

$$X_{1it} = \hat{p}_{cit}(\hat{x}^W_{cit} - \hat{x}^c_{cit}) = \left\{ [\alpha_i^{\alpha_i}(1-\alpha_i)^{1-\alpha_i}\eta P_{it}]^{-1} \left(\frac{R^*_t}{1-\pi_{ct}} \right)^{\alpha_i} \right\}^{\frac{\eta}{\eta-1}} \sigma_i(M_t - M_{ct}) \quad (8)$$

Taking logs on both sides,

$$\ln X_{cit} = \frac{\eta}{1-\eta} \left[\ln \eta + \ln A_i + \ln P_{it} - \alpha_i \ln R^*_t - \alpha_i \pi_{ct} \right] + \ln M_t, \quad (9)$$

where $A_i = \sigma_i^{\frac{1-\eta}{\eta}} \alpha_i^{\alpha_i}(1-\alpha_i)^{1-\alpha_i}$ and I appeal to the small-country assumption to justify the exogeneity of P_{it} and M_t as well as $M_t - M_{ct} \approx M_t$. According to equation (9), we should expect two effects of default (in the sense of a rise in π_{ct}): first, that it reduces country c's exports in each sector i and, furthermore, that it reduces exports more dramatically the larger the financially dependence of that sector, represented by α_i. In other words, we should observe default as a country-industry-time-specific shock.

The next section describes the paper's empirical strategy, designed to exploit the theoretical insight derived above.

5 Empirical Methodology and Data

5.1 Empirical Methodology

The empirical objective of this paper is to establish whether the impact of sovereign default on sectoral export patterns is consistent with the hypothesis that default reduces exporters' access to credit. As illustrated in the previous section, this would require us to observe that sovereign default reduces the exports of highly financially dependent industries relative to those which are less financially vulnerable.

In order to establish whether this is the case, I employ a difference-in-difference approach in the spirit of Rajan and Zingales (1998) but extended to an (unbalanced) annual panel for the period 1980-2000. The baseline regression takes the form

$$\begin{aligned} \ln Exp_{cit} &= \alpha + \beta_0 FinDep_i \times Default_{ct} + \beta_1 FinDep_i \times Default_{ct-1} \\ &\quad + \gamma Z_{cit} + \delta_{ci} + \delta_{ct} + \delta_{it} + \varepsilon_{cit}, \end{aligned} \quad (10)$$

where $\ln Exp_{cit}$ is the log of country c's exports in sector i at time t, $FinDep_i$ is a

measure of sector i's financial dependence, $Default_{ct}$ is a dummy taking value 1 if country c defaulted in t and 0 otherwise, Z_{cit} is a vector of country-industry-time-varying control variables and δ_{ci}, δ_{ct} and δ_{it} are, respectively, sets of country-industry, country-time and industry-time dummies. The baseline period is 1980-1990, but I extend the analysis to the full period 1980-2000 in section 6.3.

The coefficients of interest are β_0 and β_1. If the hypothesis set out above is correct, we should observe $\beta_0, \beta_1 < 0$. Note that the identification of these coefficients derives from the cross-sectional and time-series variation in the occurrence of default across countries, and the cross-industry variation in financial dependence. They estimate the (temporary) comparative disadvantage that default inflicts upon an economy in financially vulnerable sectors relative to a similar country that did not default. Note further that unobserved permanent country-industry characteristics, or time-specific country or industry shocks (such as a decline in domestic GDP, or a fall in world demand for sector-i output) should be controlled for by the large array of fixed effects used - insofar as their sectoral impact is not systematically correlated with the sector's financial dependence.

5.2 Data

5.2.1 Export Data

Data on the value of sector-level exports is taken from the World Bank's *Trade, Production and Protection Database* by Nicita and Olarreaga (2006). Export flows are reported annually in US dollars and coded at the three-digit level of ISIC.

I check the data for errors, inconsistencies and changes in definitions and convert it into constant 2000 US dollars, using the US Consumer Price Index. To ensure sufficiently long time series, and sufficient within-country variation, I drop all sectoral export series with fewer than ten annual observations, and all countries with fewer than ten sectoral export series that satisfy this criterion. To minimise the number of sectoral export series lost, I interpolate single missing values in otherwise continuous series, and use mirrored export data wherever the exporter-reported series is insufficiently complete or non-existent. However, none of the paper's main results are sensitive to the use of interpolation or mirrored data. In order to address potential concerns about reverse causality, I also exclude all exporting sectors whose average value of output during the sample period accounts for more than 5% of domestic GDP. Section 6.2.3 explores the impact of altering the value of this arbitrarily chosen cut-off.

The final cleaned export data comprises exports in 27 industries for 83 countries, 23 of which experienced at least one sovereign default during the sample period.

5.2.2 Sectoral Financial Dependence

As in Rajan and Zingales (1998), financial dependence of sector-i production is defined as the share of capital expenditure not financed from cash flows by the median US firm in that sector, according to *Compustat*. The measure is based on US firm-level data for two reasons. Firstly, similarly detailed financial data at the firm level is not available for the majority of countries in the sample used here, most notably the set of emerging economies. Secondly, even if such data were available, the observed use of finance would reflect an equilibrium market outcome which, to the extent that financial-market frictions are pervasive, may reflect domestic market distortions, rather than the true "technological" financial dependence of a sector. Seeing as US financial markets can be viewed as the most frictionless in the world, US data on the use of external financing is likely to provide the best indicator of the technological external financing requirement of different sectors.[9]

While the ranking of sectors according to their financial dependence is fairly stable across different firm samples and time periods, the actual value of the indicator is not. Therefore, the regression results presented below should be interpreted chiefly in qualitative terms: the regressions allow us to assess whether the impact of default on one sector is larger than on another, but not to put a precise figure to the difference.

Table 1 lists the three most and least financially dependent industries according to the Rajan-Zingales measure.

Most fin. dependent industries		**Least fin. dependent industries**	
1.	356 Plastic products	25.	323 Leather products
2.	385 Professional, scientific equipment	26.	361 Pottery; china, earthenware
3.	383 Machinery, electric	27.	314 Tobacco

Table 1: Most and Least Financially Dependent Industries

5.2.3 Default

The default dummy is based on the initial year of any government bank or bond default reported in Standard & Poor's (2003). This yields 31 distinct episodes of sovereign debt repudiation across 23 countries during the baseline sample period.[10] Table 2 compares two characteristics of interest, the average financial dependence of exports (as defined in Section 3) and the average ratio of private-sector domestic

[9] For a more detailed discussion, see Rajan and Zingales (1998).

[10] The countries which experienced at least one default episode during the baseline sample period are Argentina, Bolivia, Cote d'Ivoire. Ecuador, Egypt, Ghana, Guatemala, Jordan, Malawi, Morocco, Mozambique, Nigeria, Panama, Peru, Philippines, Poland, Senegal, Tanzania, Trinidad and Tobago, Uruguay, Venezuela and Yemen.

credit to GDP, of the median defaulter and non-defaulter economy in the baseline sample.

	Median Defaulter	Median Non-Defaulter
Avg. FinDep. of Exp.	.18	.25
Avg. DC/GDP	.22	.43
No. Countries	23	60

Table 2: In-Sample Defaulters vs. Non-Defaulters (1980-1990)

As the table demonstrates, the average financial dependence of exports is lower in defaulter economies than in those which did not default during the sample period. This is no surprise as we would expect sovereign default to be correlated with weak financial and legal institutions which, in turn, should lead domestic producers to specialise in goods that are less reliant on both.[11] In line with this argument, the average level of domestic credit to the private sector relative to GDP - a widely used measure of financial development - is lower for the median defaulter than for the median non-defaulter country. This observation also supports the notion that exporters in default-prone economies should find it cheaper to borrow in international capital markets than domestically.

5.2.4 Control Variables

The main additional control variables used are the ratio of private-sector domestic credit to GDP, the annual volatility of the exchange rate and a dummy capturing the incidence of domestic banking crises. Data on domestic credit to the private sector and GDP are taken from the World Bank's *World Development Indicators*. Monthly exchange-rate data is provided in the IMF's *International Financial Statistics*, and the banking-crises dummy is based on the first crisis year listed in Caprio and Klingebiel (2003).

6 Empirical Results

6.1 Baseline Specification

The results of the baseline regression are reported in Table 3. Column 5 lists the results from the full specification as set out in equation (10), while columns 1 to 4 detail the outcome when the number of controls is varied.

[11] Beck (2003) and Nunn (2007) show that this is indeed the case.

Dep. Variable: $\ln Exp_{cit}$	(1)	(2)	(3)	(4)	(5)
$Default_{ct}$	-2.221***	0.035	0.036		
	(0.170)	(0.047)	(0.052)		
$Default_{ct-1}$	-2.504***	-0.112**	-0.059		
	(0.184)	(0.050)	(0.056)		
$FinDep_i * Default_{ct}$	0.185	-0.214*	-0.199*	-0.221**	-0.200*
	(0.393)	(0.110)	(0.120)	(0.103)	(0.112)
$FinDep_i * Default_{ct-1}$	0.275	-0.213*	-0.217*	-0.234**	-0.236*
	(0.429)	(0.119)	(0.130)	(0.111)	(0.121)
DC_{ct}/GDP_{ct} (%)			-0.005***		
			(0.001)		
$FinDep_i * DC_{ct}/GDP_{ct}$ (%)			0.003		0.002
			(0.002)		(0.002)
$\sigma(ER_{ct})$			0.001		
			(0.001)		
$FinDep_i * \sigma(ER_{ct})$			0.001		0.000
			(0.002)		(0.001)
$\ln GDP_{ct}$			1.284***		
			(0.101)		
δ_{ci}	No	Yes	Yes	Yes	Yes
δ_{it}	No	Yes	Yes	Yes	Yes
δ_{ct}	No	No	No	Yes	Yes
Observations	17,186	17,186	15,209	17,186	15,354
Adjusted R-squared	0.028	0.940	0.942	0.948	0.949

Standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

Table 3: Baseline Regression

Column 1 shows that sovereign default is strongly negatively correlated with exports across all sectors, while the coefficients of the interaction of default with sectoral financial dependence are statistically insignificant. Clearly, these results are largely driven by country-industry differences that are not otherwise controlled for, but they do indicate that countries which are prone to sovereign default tend to export less than non-defaulters overall. Moreover, according to column 1, the variables of interest alone can explain almost 3% of the variation in the data.

Once I employ fixed effects to control for all country-industry and industry-time variation in export flows, the adjusted R^2 rises dramatically. At the same time, the key coefficients of interest, capturing the impact of default conditional on the exporting sector's financial dependence, turn negative and statistically significant at the 10% level. The non-interacted lagged default dummy remains negative and statistically significant, albeit at a much-reduced magnitude.

Note that throughout columns 2 to 5, and indeed throughout almost all of the subsequent robustness analysis, the coefficients on $FinDep_i \times Default_{ct}$ and $FinDep_i \times Default_{ct-1}$ (respectively, β_0 and β_1 in Section 5) are negative, statis-

tically significant, estimated at similar magnitudes and with comparable standard errors. This confirms the hypothesis developed in the previous sections and represents the main finding of the paper: there is robust evidence that sovereign default reduces the exports of highly financially dependent sectors relative to those which are less financially vulnerable, consistent with a contraction in the supply of credit to exporters.

The total effect of sovereign default on sector i exports of country c at time t is given by the sum of the coefficients on $Default_{ct}$ and $FinDep_i \times Default_{ct}$. Column 3 demonstrates that the unconditional, "average" sectoral effect of default virtually disappears once further macroeconomic control variables are introduced. Nevertheless, since the $FinDep_i$-index is positive for all but 4 out of 27 industries this evidence does not contradict the default-induced aggregate decline in exports reported elsewhere. The sectoral pattern it highlights, however, strongly suggests a particular causal link between default and reduced exports, namely that sovereign default reduces the supply of (foreign) credit to domestic exporters. In the following, I will disregard the unconditional impact of default on sectoral exports since my identification strategy - more precisely, the use of a full set of country-time dummies - does not permit me to estimate the relevant coefficient separately.

As would be expected, a rise in domestic GDP is associated with export growth across all sectors while the volatility of the exchange rate, measured as the standard-deviation of the country's average monthly exchange rate in year t, does not appear to be correlated with sectoral exports. Somewhat puzzlingly, the ratio of domestic credit to GDP seems to be negatively correlated with sectoral exports, but this effect, if robust, is small, with a 1% increase in domestic credit over GDP causing a 0.005% decline in sectoral exports.

In columns 3 and 5, I interact the domestic-credit ratio and my measure of exchange-rate fluctuations with the financial-dependence indicator to control for country-industry-specific effects of domestic financial or foreign-exchange volatility around the time of default. The former may be important if exporters heavily rely on domestic financial markets for their supply of credit, the latter if frequent, large exchange-rate movements raise the cost of foreign-supplied financing. As it turns out, neither of the two additional interaction terms yields an economically or statistically significant coefficient.

Aside from strengthening the robustness of my main finding, this observation provides an intriguing contrast with Rajan and Zingales (1998). Their paper shows, for the same time period, that a high level of development of domestic financial markets benefits the *overall growth* of industries which are very financially dependent. Yet my findings indicate that domestic financial development, represented by

the domestic supply of credit, is irrelevant to the *exports* of financially dependent sectors. This lends support to the view that domestic exporters are more reliant on international than on domestic capital markets, and is in line with the findings of Manova (2008) who shows that improved access to foreign credit benefits financially dependent exporters.

This section has shown that, for the period 1980-1990, the empirical specification derived in Sections 4 and 5 lends strong support to the hypothesis default hurts domestic exporters via a reduction in the supply of credit. The next section explores the robustness of this finding.

6.2 Robustness Analysis

In the following I test the robustness of the main results from the previous section to a number of changes in the empirical specification. In particular, I analyse the effect of changes in the lag structure of the model, an extension of the sample period, variations in the industry sample and the introduction of additional interaction terms to capture a larger set of sectoral characteristics. In two further sections I compare the impact of default to that of other domestic financial crises, and I provide evidence that the sectoral effect of sovereign debt crises manifests itself at the establishment level, rather than through a reduction in the number of exporting establishments.

6.2.1 Lags and Leads of Default

So far, I have arbitrarily estimated a model with a single lag of the default dummy, implying that the average effect of default on sectoral exports persists for a total of two years. In principle, however, there is no reason why the effect should not be more persistent. Table 4 presents the estimation results when an additional lag (as well as a lead) of the default dummy is included in the estimation.

Column 3 shows that an additional lag of default is not statistically significant at any reasonable level, but leaves the baseline coefficients and standard errors virtually unaltered. The same results are obtain from the inclusion of a single lead of default (in column 2), or the simultaneous inclusion of both (in column 4). Adding a third lag of default does nothing to change this pattern.

Dep. Variable: $\ln Exp_{cit}$	(1)	(2)	(3)	(4)
$FinDep_i * Default_{ct+1}$		-0.136		-0.138
		(0.115)		(0.115)
$FinDep_i * Default_{ct}$	-0.200*	-0.236**	-0.218*	-0.255**
	(0.112)	(0.116)	(0.114)	(0.118)
$FinDep_i * Default_{ct-1}$	-0.236*	-0.268**	-0.257**	-0.290**
	(0.121)	(0.124)	(0.124)	(0.127)
$FinDep_i * Default_{ct-2}$			-0.121	-0.125
			(0.138)	(0.138)
$FinDep_i * DC_{ct}/GDP_{ct}$ (%)	0.002	0.002	0.002	0.002
	(0.002)	(0.002)	(0.002)	(0.002)
$FinDep_i * \Delta(ER_{ct})$	0.000	0.000	0.000	0.000
	(0.001)	(0.001)	(0.001)	(0.001)
Observations	15,354	15,354	15,354	15,354
Adjusted R-squared	0.949	0.949	0.949	0.949

Standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%
Note: full set of country-industry, industry-time and country-time dummies used.

Table 4: Additional Lag and Lead of Default

The fact that a lead of the interacted default-financial-dependence term returns a statistically insignificant, though negative, coefficient is reassuring as it indicates that there is no robust change in sectoral export patterns prior to the default event. This supports the hypothesis of a causal relationship proposed here.

With no more than a single relevant lag of default, my model seems to find a less persistent impact of default on trading patterns than previous studies. Rose's (2005) baseline specification contains 15 lags of default, and Martinez and Sandleris (2006) choose 5 lags in their most preferred specification. Both admit, however, that problems of multicolinearity make the appropriate lag structure difficult to determine[12]. Moreover, the finding that the average default episode affected export patterns for two years between 1980 and 1990 is broadly consistent with the observation by Gelos et al. (2003) that the median period of capital-market exclusion suffered by defaulters in the 1980s was four years. Once again, this suggests that capital-market access is crucial in explaining the link between sovereign default and trading patterns.

[12]Note that Rose (2005) and Martinez and Sandleris (2006) use renegotiations of *publicly held* debt through the Paris Club to construct their default dummy, while I use Standard & Poor's records of defaults on *private* bank or bond debt. The Paris Club data is useful to the particular question these studies attempt to address, but Paris Club renegotiations are more frequent than the repudiation of privately held debt - giving rise to multicolinearity problems in lagged models - and, in my view, less representative of the non-cooperative nature of default commonly alleged in the theoretical literature.

6.2.2 Sample Period

Table 5 compares the regression for the baseline period (column 1) with the regression for 1980-2000 (column 2) and 1980-1997 (column 3), 1997 being the final year of Rose-Martinez-Sandleris data sample.

Dep. Variable: $lnExp_{cit}$	**(1)** **1980-1990**	**(2)** **1980-2000**	**(3)** **1980-1997**
$FinDep_i$*$Default_{ct}$	-0.200* (0.112)	-0.014 (0.087)	-0.142 (0.094)
$FinDep_i$*$Default_{ct-1}$	-0.236* (0.121)	0.051 (0.086)	-0.092 (0.094)
$FinDep_i$*DC_{ct}/GDP_{ct} (%)	0.002 (0.002)	0.000 (0.001)	-0.000 (0.001)
$FinDep_i$*$\Delta(ER_{ct})$	0.000 (0.001)	0.000 (0.000)	-0.000 (0.000)
Observations	15,354	32,812	27,568
No. Defaults	31	44	37
Adjusted R-squared	0.949	0.938	0.940

Standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%
Note: full set of country-industry, industry-time and country-time dummies used.

Table 5: Extended Sample Period

As can be seen from column 2, extending the sample period up to the year 2000 causes the coefficients of interest to shrink in magnitude and to become statistically insignificant. To a lesser extent, this is also true when the sample period is only extended up to 1997. Thus, the evidence of a default-induced credit contraction to exporters during the 1980s is not reproduced in larger sample which also incorporates the 1990s.

Two facts should be borne in mind when interpreting this outcome. Firstly, while extending the sample period up to 2000 doubles the number of observations, it only raises the number of observed default episodes by roughly 50% (half of which only take place between 1997 and 2000). Hence, in terms of default occurrences, the results from the baseline period carry somewhat greater weight.

Secondly, emerging market borrowing had significantly changed by the late 1990s as compared to the 1980s: while most private loans to emerging markets where syndicalised in the 1980s, and renegotiations of defaulted debt conducted by a small number of banks with the power to withhold financing until an agreement had been reached, this was no longer the case during the latter half of the subsequent decade when defaults affected a more heterogeneous group of creditors[13]. As a result of

[13] See Chapter 1 of Sturzenegger and Zettlemeyer (2007) for a more in-depth discussion of the role of the "Bank Advisory Committees" (BACs) in the 1980s, and their reduced importance during the debt crises of the late 1990s.

this structural break, it is highly plausible that credit flows to emerging markets in the aftermath of default, and hence sectoral exports, behaved differently during the 1980s and the 1990s. Gelos et al. (2003) present further evidence to this effect by highlighting that the median capital-market exclusion period during the 1980s was four years, while the median defaulter did not experience exclusion during the 1990s. Insofar as we accept this evidence, therefore, the failure to identify the same link between default and export patterns in the larger sample further validates the hypothesis that capital-market exclusion is the key to explaining the impact of default on trade.

6.2.3 Industry Sample

Table 6 explores two changes to the set of sectors included in the estimations. In column 2 I exclude the three most and least financially dependent sectors (all of which are listed in Table 1). This is to ensure that my results are not driven by a handful of extremely financially dependent, or independent, industries. In column 3 I impose a stricter cut-off for "large" sectors, defining as large a value of output in excess of 1% of GDP.

Dep. Variable: $\ln Exp_{cit}$	**(1)**	**(2)** Exclude most & least fin. dep. sectors	**(3)** Exclude sectors with output/gdp>.01
$FinDep_i$*$Default_{ct}$	-0.200*	-0.661**	-0.212
	(0.112)	(0.275)	(0.153)
$FinDep_i$*$Default_{ct-1}$	-0.236*	-0.586**	-0.236
	(0.121)	(0.290)	(0.165)
$FinDep_i$*DC_{ct}/GDP_{ct} (%)	0.002	0.006	0.003
	(0.002)	(0.005)	(0.003)
$FinDep_i$*$\sigma(ER_{ct})$	0.000	0.001	-0.001
	(0.001)	(0.003)	(0.002)
Observations	15,354	11,716	8,195
Adjusted R-squared	0.949	0.951	0.934

Standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%
Note: full set of country-industry, industry-time and country-time dummies used.

Table 6: Restricted Industry Samples

Column 2 demonstrates that excluding the most and least financially dependent industries actually strengthens the main finding of the paper, both in terms of coefficient magnitude and in terms of statistical significance. Dropping all industries with a GDP share of more than 1%, as done in column 3, reduces the statistical significance of the results but only by raising the standard errors due to the exclusion of nearly half the original observations. The estimated magnitude of the coefficients is virtually unchanged, as compared to the baseline regression in column 1.

6.2.4 Additional Interactions

If emerging-market default is a symptom of weak legal and financial institutions, we would expect defaulters to be specialised in the production and export of less financially intensive goods, and to be net importers in financially dependent sectors. Thus, in economies prone to default sectoral financial dependence should be negatively correlated with a sector's export orientation, and positively with its import penetration. At the same time, hypothetical *sub rosa* trade sanctions might lead to output and export contractions in sectors which are highly dependent on foreign export markets, or on foreign import supplies. In that case, sectoral financial dependence as used in the regressions above may act as a mere proxy for the export orientation, or import penetration, of a given sector.

To verify that this is not the case, Table 7 introduces additional interaction terms of default with measures of both sectoral export orientation and import penetration, respectively defined as $ExpOrt_{ci} = \frac{1}{T}\sum_{t=0}^{T}\frac{Exp_{cit}}{\sum_i Exp_{cit}}$ and $ImpPen_{ci} = \frac{1}{T}\sum_{t=0}^{T}\frac{Imp_{cit}}{\sum_i Imp_{cit}}$, where Exp_{cit} is the nominal value of exports, and Imp_{cit} the nominal value of imports, for country c in industry i at time t.

Dep. Variable: lnExp$_{cit}$	**(1)**	**(2)**	**(3)**	**(4)**	**(5) Excl. most, least fin. dep.**
FinDep$_i$*Default$_{ct}$	-0.200*	-0.203*	-0.163	-0.167	-0.600**
	(0.112)	(0.113)	(0.114)	(0.114)	(0.281)
FinDep$_i$*Default$_{ct-1}$	-0.236*	-0.235*	-0.198	-0.198	-0.510*
	(0.121)	(0.122)	(0.123)	(0.123)	(0.297)
ExpOrt$_{ci}$*Default$_{ct}$		-0.350		-0.632	-0.511
		(0.840)		(0.851)	(0.912)
ExpOrt$_{ci}$*Default$_{ct-1}$		0.178		-0.122	-0.220
		(0.860)		(0.873)	(0.934)
ImpPen$_{ci}$*Default$_{ct}$			-0.141*	-0.150*	-0.127
			(0.076)	(0.077)	(0.091)
ImpPen$_{ci}$*Default$_{ct-1}$			-0.147*	-0.149*	-0.131
			(0.077)	(0.078)	(0.092)
FinDep$_i$*DC$_{ct}$/GDP$_{ct}$ (%)	0.002	0.002	0.002	0.002	0.006
	(0.002)	(0.002)	(0.002)	(0.002)	(0.005)
FinDep$_i$*∂(ER$_{ct}$)	0.000	0.000	0.000	0.000	0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.003)
Observations	15,354	15,354	15,344	15,344	11,706
Adjusted R-squared	0.949	0.949	0.949	0.949	0.951

Standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%
Note: full set of country-industry, industry-time and country-time dummies used.

Table 7: Financial Dependence, Export Orientation and Import Penetration

As can be seen from columns 2, 4 and 5, default does not appear have a significantly stronger effect on export-oriented sectors. From inspection of columns 3

and 4, however, it does seem to reduce the exports of more import-penetrated industries. Once we introduce this interaction term, the magnitude of the coefficients on the original financial-dependence interaction is reduced, rendering the effect insignificant at the 10% level. The likely colinearity between $FinDep_i \times Default_{ct}$ and $ImpPen_{ci} \times Default_{ct}$ makes an accurate identification of the associated coefficients difficult, but the exclusion of the most and least financially dependent industries (performed in column 5) provides an important clue: the overall fit of the regression is improved and, in particular, we find that only sectoral financial dependence significantly, and strongly, determines the impact of default on export patterns. This evidence, in addition to the absence of a plausible non-financial explanation of the effect of default on import-penetrated sectors, strongly favours the interpretation that sectoral financial dependence, rather than import-penetration *per se*, does in fact predict the impact of default on exports.

6.2.5 Domestic Banking Crises

There is a widespread perception that sovereign default tends to coincide with periods of financial fragility in the domestic banking sector. Recent research has suggested both that sovereign default springs from domestic financial crises (see, for example, Arellano and Kocherlakota, 2008) and that sovereign default may hurt the domestic banking sector (see Brutti, 2008). It could be argued, therefore, that the default dummy above only captures the detrimental impact of domestic financial upheaval, which may affect exporters in one of two ways. If they are reliant on domestic financial markets a domestic banking crises will directly impede their access to credit, while if they are mostly reliant on foreign financing a rise in creditor risk perceptions, or the inability of domestic banks to engage in intermediation, may reduce foreign capital inflows.

Table 8 introduces two further (lagged) interaction terms into the baseline regression to control for the sectoral impact of small and large-scale domestic banking crises. The dummies capturing the onset of domestic banking trouble, and the classification of crises into "small" and "systemic", is based on Caprio and Klingebiel (2003).

According to Caprio and Klingebiel (2003), 26 systemic banking crises occurred in countries within my sample between 1980 and 1990. However, it should be noted that out of the 31 episodes of sovereign default during the same period, only 5 coincided with a systemic banking crises in the preceding, same or subsequent year.

As a result, the degree of colinearity between default and banking dummies is small, as is the likelihood that my baseline results are driven by the correlation between sovereign debt and banking crises.

Dep.Variable: $lnExp_{cit}$	(1)	(2)	(3)	(4)
$FinDep_i$*$Default_{ct}$	-0.200*	-0.205*	-0.199*	-0.204*
	(0.112)	(0.113)	(0.113)	(0.113)
$FinDep_i$*$Default_{ct-1}$	-0.236*	-0.253**	-0.193	-0.209*
	(0.121)	(0.122)	(0.122)	(0.123)
$FinDep_i$*DC_{ct}/GDP_{ct} (%)	0.002	0.002	0.002	0.002
	(0.002)	(0.002)	(0.002)	(0.002)
$FinDep_i$*$\Delta(ER_{ct})$	0.000	0.000	0.000	0.000
	(0.001)	(0.001)	(0.001)	(0.001)
$FinDep_i$* $Smll..BankCr._{ct}$		0.147		0.142
		(0.143)		(0.143)
$FinDep_i$* $Smll.BankCr._{ct-1}$		0.239		0.233
		(0.157)		(0.157)
$FinDep_i$* $Syst.BankCr._{ct}$			-0.200*	-0.198*
			(0.113)	(0.113)
$FinDep_i$* $Syst.BankCr._{ct-1}$			-0.342***	-0.338***
			(0.123)	(0.123)
Observations	15,354	15,354	15,354	15,354
Adjusted R-squared	0.949	0.949	0.950	0.950

Standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%
Note: full set of country-industry, industry-time and country-time dummies used.

Table 8: Domestic Banking Crises vs. Sovereign Default

Table 8 verifies this. Small, non-systemic banking crises appear to have no significant effect on the exports of highly financially dependent sectors relative to less financing-intensive industries. Systemic banking crises do seem to reduce the exports of financially dependent sectors more strongly, but this effect does not detract from the sectoral impact of sovereign default. Interestingly, the estimated effects of systemic banking crises and default are of comparable magnitude, suggesting that the initial financial contractions faced by exporters as a result of domestic financial collapse and external default are of similar severity.

6.2.6 Establishments

In this section, I decompose the effect of default on sectoral exports into its effect on exports per establishment and on the number of establishments in a given sector. In this manner, I hope to obtain a clearer picture of how a default-induced credit contraction may affect exporting businesses.

Nicita and Olarreaga (2006) provide information on the number of establishments or enterprises in sector i of country c at time t. I will refer to it as the number of

establishments for brevity, although the distinction is important: "establishment" refers to a unit under single control engaging in predominantly one activity at a single location (e.g. a factory), while an "enterprise" is a legal entity possessing the right to conduct business in its own name. Hence, the number of establishments as defined here may not coincide with the number of firms, but the measure is the best available for the large cross section of countries in my data sample.

	(1) Dep. Variable: $lnExp_{cit}$	(2) Dep. Variable: $Ln(Exp_{cit}/No.Establ_{cit})$	(3) Dep. Variable: $LnNo.Establ_{cit}$
$FinDep_i*Default_{ct}$	-0.200*	-0.034	-0.023
	(0.112)	(0.166)	(0.048)
$FinDep_i*Default_{ct-1}$	-0.236*	-0.421**	-0.041
	(0.121)	(0.177)	(0.051)
$FinDep_i*DC_{ct}/GDP_{ct}$ (%)	0.002	-0.002	0.001*
	(0.002)	(0.003)	(0.001)
$FinDep_i*\delta(ER_{ct})$	0.000	-0.002	-0.000
	(0.001)	(0.002)	(0.000)
Observations	15,354	10,654	11,075
Adjusted R-squared	0.949	0.891	0.983

Standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%
Note: full set of country-industry, industry-time and country-time dummies used.

Table 9: Default and Exports per Establishmet/Number of Establishments

The regression in column 1 uses the log of sectoral exports as dependent variable (just like the baseline estimation), while in columns 2 and 3 the explanatory variables are regressed on the log of sectoral exports per establishment and the log number of establishments, respectively.

The results suggest that default reduces the exports per establishment in financially vulnerable sectors relative to less financially dependent industries, but leaves the relative number of establishments unchanged. This seems plausible as we would expect reduced credit supply to cause existing establishments to reduce their production and exports in the short term, before causing the full closure of factories and businesses. Moreover, it adds weight to the claim that the findings reflect a causal effect of default, rather than the coincidence of default with particular pattern of sectoral contraction that would be more likely to be reflected in a decline of the number of establishments in the afflicted industries.

7 Summary and Conclusions

In this paper I demonstrate empirically that sovereign default leads to a decline of the defaulting country's exports in sectors with a high degree of financial dependence relative to sectors which are less financially vulnerable. I argue that this is due to a reduction in domestic exporters' access to foreign capital. Although the evidence for this claim is indirect, it is also compelling. Firstly, the estimated impact of default on sectoral exports occurs independently of the depth of domestic credit markets or contemporaneous systemic crises among the economy's banks. Secondly, while the effect is strong and robustly estimated for the period 1980-1990, when sovereigns faced long periods of exclusion from international capital markets, it nearly vanishes when I extend my sample to the 1990s, during which they did not. Thirdly, the observed effect is the result of a decline in the relative exports per establishment in financially dependent sectors, as would be expected in the event of a temporary credit contraction. These findings suggest that the perceived "trade costs" of sovereign default may be a symptom of capital-market exclusion, rather than a cost of default in their own right.

Early proponents of the "trade costs" of default seem to have been sympathetic to the view that these were credit-related. For example, Bulow and Rogoff (1989) contend that if a country repudiates its foreign loans it will "also be blocked from normal access to trade credits." However, Rose (2005) is exemplary of much of the recent literature in that it treats them as a separate deterrent of debt repudiation. Indeed, Rose states that for practical purposes the origins of the trade costs of default are irrelevant "so long as sovereigns fear the trade effects of debt renegotiation." This is obviously correct but unsatisfactory if our aim is to understand better the economic conditions in which governments may refuse to service their foreign debt. I propose that there is a tight link between the effect of sovereign default on trade and its impact on the defaulter's access to foreign lending - and, hence, that any reasonable theory of the occurrence of sovereign default cannot treat the two as substitutes.

As a corollary of this, we are bereft of an alternative explanation of how sovereign default may be deterred if a credible threat of capital-market exclusion - on account of coordination problems among international lenders, or the nature of the debt-creditor relationship - cannot be upheld. The question why countries repay their debt is alive and well.

References

[1] Arellano, C. (2008). "Default Risk and Income Fluctuations in Emerging Economies", *American Economic Review* 98, pp. 690-712.

[2] Arellano, C. and N. Kocherlakota (2008). "Internal Debt Crises and Sovereign Defaults", University of Minnesota Working Paper.

[3] Arteta, C. and G. Hale (2008). "Sovereign Debt Crises and Credit to the Private Sector", *Journal of International Economics* 74, pp. 53-69.

[4] Beck, T. (2003). "Financial Dependence and International Trade." *Review of International Economics* 11, pp. 296-316.

[5] Borensztein, E. and U. Panizza (2006). "Do Sovereign Defaults Hurt Exporters?", Inter-American Development Bank Working Paper #553.

[6] Brutti, F. (2008). "Legal Enforcement, Public Supply of Liquidity and Sovereign Risk", Universitat Pompeu Fabra Job Market Working Paper Series.

[7] Bulow, J. and K. Rogoff (1989). "A Constant Recontracting Model of Sovereign Debt", *Journal of Political Economy* 97, pp. 155-178.

[8] Caprio, Gerard and Daniela Klingebiel (2003). "Episodes of Systemic and Borderline Financial Crises", Working Paper and Database, The World Bank.

[9] Eaton, J. and M. Gersovitz (1981). "Debt with Potential Repudiation: Theoretical and Empirical Analysis", *Review of Economic Studies*, v. XLVII, pp. 289-309.

[10] Fuentes, M. and D. Saravia (2006). "Sovereign Defaulters: Do International Capital Markets Punish Them?", Pontificia Universidad Católica de Chile, Instituto de Economía Working Paper.

[11] Gelos, G. R., R. Sahay and G. Sandleris (2003). "Sovereign Borrowing by Developing Countries: What Determines Market Access?", IMF Working Paper.

[12] Martinez, Jose V. and Guido Sandleris (2006). "Is It Punishment? Sovereign Defaults and the Decline in Trade", Columbia University Working Paper.

[13] Manova, K. (2008). "Credit Constraints, Equity Market Liberalizations and International Trade", *Journal of International Economics* 76, pp. 33-47.

[14] Mendoza, E. and V. Yue (2008). "A Solution to the Country Risk-Business Cycles Disconnect", New York University Working Paper.

[15] Mitchener, Kris J. and Marc Weidenmier (2005). "Supersanctions and Sovereign Debt Repayment", NBER Working Paper No. W11472.

[16] Nicita, A. and M. Olarreaga (2006), "Trade, Production and Protection 1976-2004", World Bank Economic Review 21(1).

[17] Nunn, N (2007). "Relationship-Specificity, Incomplete Contracts and the Pattern of Trade," *Quarterly Journal of Economics*, Vol. 122, No. 2, pp. 569-600.

[18] Rajan, R. and L. Zingales (1998). "Financial Dependence and Growth.", *The American Economic Review* 88, pp. 559-586.

[19] Rose, Andrew K. (2005). "One Reason Countries Pay Their Debts: Renegotiation and International Trade", *Journal of Development Economics*, Vol. 77, Issue 1 (January), pp. 189-2006.

[20] Sandleris, G (2006). "Sovereign Defaults: Information, Investment and Credit", Johns Hopkins University Working Paper.

[21] Standard & Poor's (2003), "Sovereign Defaults: Heading Lower Into 2004", S&P's Sovereigns, RatingsDirect.

[22] Sturzenegger, F. and J. Zettelmeyer (2007). *Debt Defaults and Lessons from a Decade of Crises*. Cambridge: MIT Press.