An Econometric Analysis of What Determines Market Access for Developing Countries in the Sovereign Debt market

av

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Masteroppgave

Masteroppgaven er levert for å fullføre graden

Master i samfunnsøkonomi

Universitetet i Bergen, Institutt for økonomi

September 2010

UNIVERSITETET I BERGEN

Preface

I want to thank all the people that contributed to the work of my master thesis. First of all my supervisor, Rune Jansen Hagen, for introducing the topic and giving good feedback. Also, Astrid Grasdal for helping me with the econometric part of the thesis. The members of the Poverty Reduction Group at Christian Michelsen Institute (CMI) have also been very helpful with comments, guiding me through STATA and language check. These are Ivar Kolstad (my contact person at CMI), Arne Wiig, Magnus Hatlebakk, Line Tønel Skaldebø, Njård Håkon Gudbrabsen, Clare Tompsett, and Asle Høgestøl)

My warm gratitude goes to my husband Niyi, for your love and support throughout this period.

Cathrin Fløgstad Olaniyan

Cathrin Fløgstad Olaniyan, Bergen 1. september 2010

Abstract

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In this master thesis I am studying what determines market access for developing countries in the sovereign debt market. I have replicated the dataset and results of a similar study by Gelos et al. (2008). I extend their study by using a different definition of market access and I include more years in the dataset. I use both tobit and fixed effect logit models. The program I have used in the econometric analysis is STATA. I find that some of the factors that can explain market access are sensitive to how we define market access, and some determinants seem to change over different time periods. I also find some indication that capital market exclusion is not an important cost of default.

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1.0 INTRODUCTION

1.1 BACKGROUND

In this thesis I want to study the sovereign debt market. The theory of sovereign debt is influenced by the fact that there is limited international legal enforceability. Sovereigns cannot be sued in foreign courts without their consent. In the case of default, very few assets can be seized. Also, poor countries have few assets that can be used as collateral. In this situation, one should not expect to see lending unless there are costs associated with default. Eaton and Fernandez (1995) present three facts about sovereign debt. First, governments have in periods been able to borrow considerable amounts. Second, most of the debt has been repaid. Third, repayment is often complicated, and includes delay, renegotiation, public intervention and default.

Sovereign defaults tend to happen in clusters and it is not a new phenomenon. Historically, some of the default waves occurred in 1820s, 1870s, 1930s, 1980s and, more recently the late 1990s. It is also the same countries that tend to default repeatedly. For example, Spain defaulted 13 times between 1500 and 1900, and several Latin American countries[1] have defaulted between 7-9 times since 1800.[2] This can partly be explained by the cyclical pattern in the international capital market, which is characterized by periods of enormous sums being lent to emerging market economies followed by "sudden stops". When the interest rate is low in the developed world, investors tend to seek higher returns in the emerging markets which make it easy for them to borrow (Reinhart et al. 2003, Reinhart and Rogoff 2004).

It has been empirically shown that developing countries have either no access or sporadic access to the international credit market (Gelos et al. 2008, Reinhart et al. 2003). In the market for private credit, borrowers can be divided into three groups. The first consists of advanced countries; they can usually borrow continuously. The second group consists mostly of emerging markets and has partial access to private credit, but there is wide variation among these countries. The last group consists of countries that seldom have access and is mainly dependent on loans from official creditors.

There is an ongoing debate about why the sovereign debt market exists and which costs that can explain repayment of loans. Also, there is not much focus on the link between default and

[1] Ecuador, Venezuela, Mexico, Uruguay, Brazil, Colombia, Peru.

[2] Number of defaults can differ according to which definition that is used.

market access as the literature has primarily tried to explain variation in debt stocks and spreads. A study by Gelos et al. (2008) distinguishes itself by including those developing countries that are totally or partially excluded from the market, while earlier literature has focused on those countries that access the market more frequently[3]. The conclusion is that vulnerability to shocks and perceived quality of policies and institutions are important determinants of market access. In addition, they do not find long exclusion periods from credit markets following a default.

1.2 RESEARCH QUESTION

I want to look into the following question: *What determines market access for developing countries in the sovereign debt market?* I use an econometrical approach and I have copied most of the dataset used in Gelos et al. (2008). I want to take the study further by introducing a new variable to measure market access and I have extended the sample period. The new variable on market access is used in "Duration of Capital Market Exclusion: Stylized Facts and Determining Factors" by Richmond and Dias (2009). The main goals of my study are

i) To find out if determinants of market access will change when the new definition on market access is introduced.
ii) To find out if the determinants of market access have changed after 1990, when the debt crisis in the 1980s is over.
iii) To find out if capital market exclusion is an important cost of default.

1.3 RESULTS

I find that the estimates are sensitive to how we define market access and some factors that can explain market access seem to change over time. The results do not find much evidence that countries are excluded for a long time after a default crisis. I also find that important determinants of market access are perceived quality of policies and institutions, GDP per capita, concessional IMF programs and to some degree political stability. Surprisingly, measures of liquidity are strongly significant and robust, but not as expected by the theoretical literature.

[3] This study is a renewed version of a working paper at the International Monetary Fund in 2004. One of the differences is that in the 2004 version, they focus on random effects in the panel analysis, but report only fixed effects in the 2008 version.

1.4 DISPOSITION

The organization of my thesis is as follows; section two presents the conceptual framework, and section three describes the dataset. The fourth section presents the econometric models and estimation method. In section five I will present and discuss the result, and finally I will conclude.

2.0 CONCEPTUAL FRAMEWORK

In this section I will start by defining the key terms. Then, I will give a short overview of the most relevant sovereign debt models. I will also present a basic model of sovereign debt and discuss the empirical literature related to market access. Finally, I will summarize.

2.1 DEFINITION OF KEY TERMS

2.1.1 Sovereign Debt

Debt is, according to Shleifer (2003, p 2), a contract in which the borrower accepts some money and agrees to pay it back. In case the borrower does not repay, the creditor has some rights and powers (assets). Those rights and possibly some reputational concerns are the reasons why borrowers pay back their debt. Sovereign debt is thus a debt contract incurred by a sovereign entity[4]. The debt can be internal or external according to the nature of the creditor. When the creditor is a resident, typically the Central Bank in the country, the debt is referred to as internal or domestic debt. There has been a rapid growth of marketable domestic debt in emerging markets economies in the late 1990 (Reinhart et al. 2003), but there is not much focus on this kind of debt in the literature except in the latest years.

IMF (2003, p 7) defines gross external debt as

> *"the amount, at any given time, of disbursed and outstanding liabilities of residents of a country to nonresidents to repay principal, with or without interest, or to pay interest with or without principal."*

Foreign creditors are (typically) the International Financial Institutions (IFIs)[5], private commercial banks and investors, or other governments. When the IFIs are the creditors the debt is referred to as multilateral. Parts of the loans from these institutions are called "concessional" loans, which usually have lower interest rates and longer repayment periods than in the market. Debtors can be identified as the government, corporations, or private households. The public sector in a borrowing country includes the general government, monetary authorities, and those entities in the banking sector and other sectors that are public

[4] A sovereign is a supreme lawmaking authority. Countries can therefore be referred to as sovereign entities.

[5] The World Bank, International Monetary Fund and Regional Development Banks.

corporations. Any institutional units not meeting this definition are classified as the private sector (IMF 2003). Nevertheless, the distinction between a private and a public borrower is often blurred due to the existence of government guarantees and guarantees made by public export credit agencies. Export credit agencies can guarantee loans given to units in the private sector, which means that the government takes on the obligation to repay the loan if the borrower becomes insolvent. Thus, a common disaggregation is between public and publicly guaranteed debt (PPG) and nonguaranteed private debt (NPP). Although a substantial part of the publicly guaranteed debt is transferred to the government, some will remain with the private units. As a result, public and publicly guaranteed debt might overstate the actual external public debt. An overview of the components of external debt is found in figure A1 in the Appendix.

2.1.2 Market Access

Market access is defined in different ways in various papers. I will focus on the definitions that are relevant for my empirical research. Both of them assume that if a private unity can borrow from the international market it is likely that the public sector has access too. Hence, if the private sector was able to borrow and the public sector did not, it is regarded as voluntary abstention.

Richmond and Dias (2009, p 5) define market access when either of the following episodes occurs:

> *"i) positive net transfers in the form of bonds and commercial bank loans to the public or publicly guaranteed sector*
>
> *ii) positive net transfers from bonds and commercial bank loans to the private sector"*

Net transfers measure new borrowing less debt service (including principal and interest payments). Thus, it captures real resources transferred to the borrowing country and it excludes principal arrears from being considered as a positive transfer to the debtor[6]. Also, cases where a country can roll over its debt and contract new ones are excluded.[7]

[6] In the 2007-paper they use net debt flows instead of net transfers. Net debt flows measure new borrowing less principal payments. Net transfers are thus a more strict measure of market access than net debt flows.

[7] In the 1980s, commercial banks rolled over loans to developing countries rather than writing them down. This should not be considered as market access according to the authors. However, one can argue that the countries that got new loans had market access.

Gelos et al. (2008, p 5) define market access as

> *"public or publicly guaranteed bond issuances or borrowing through a private syndicated bank loan that lead to an increase in the country's indebtedness".*

They use gross debt flows, but when it is conditioned on an increase in the debt stock they also exclude cases where the country is repaying in net terms and not borrowing.

2.1.3 Default

A general explanation of default by Investopedia[8] (2010) goes as follows:

> *"the failure to promptly pay interest or principal when due. Default occurs when a debtor is unable to meet the legal obligation of debt repayment. Borrowers may default when they are unable to make the required payment or are unwilling to honor the debt."*

When the borrower refuses to acknowledge the debt contract it is called "repudiation". This is mostly seen when a new government is elected and they refuse to acknowledge the debt of earlier governments.

A number of papers use the definition from Standard and Poor's database[9] which is

> *"…the failure to meet a principal or interest payment on the due date (or within the specific grace period) contained in the original terms of a debt issue… or tenders an exchange offer of new debt with less-favorable terms than the original issue".*

This definition includes "debt restructuring", which is an arrangement between the lender and the borrower to adjust the terms of the debt contract. A default episode is usually considered to be over when a settlement is completed. With this definition the duration of default can have a downward bias because a country may be in default before the expiration of the grace period. This could be up to a year (Richmond and Dias 2009, p 8). Actually, most default episodes result in a settlement between creditor and debtor in the form of a debt exchange or restructuring.

[8] Investopedia is a digital company that has a webpage that provides investing dictionary amongst other things.

[9] Standard and Poor's is a commercial country credit rating agency.

2.2 A SHORT OVERVIEW OF SOVEREIGN DEBT MODELS

As mentioned in the introduction, there is lack of institutions that can enforce contracts with sovereigns. Thus, the theory tries to explain why governments have incentives to repay their loans and why creditors lend to them. There are many sovereign debt models, most of which are quite sophisticated. These models mostly differ in the costs they emphasize. For example; exclusion from the credit market in the future, inability to conduct trade, difficulties in borrowing in the domestic market, or loss of output (Eaton and Fernandez 1995). Bulow and Rogoff (1989a) even mention military invasions as a consequence of default but refer to this as "a thing of the past".

2.2.1 The First Models on Sovereign Debt

The influential contribution of Eaton and Gersovitz (1981) claims that if borrowing is the only option to smooth income shocks, then the threat of losing future market access is sufficient for repaying debt. Bulow and Rogoff (1989b) argued against the assumption that lending is the only option to smooth consumption. They suggest other ways to smooth consumption; storing output, purchasing insurance, or investing abroad. This will diminish the dependence on international lending and also the effectiveness of exclusion as a punishment. They claim that

> *"under fairly general conditions, lending to small countries must be supported by the direct sanctions available to creditors, and cannot be supported by a country's "reputation for repayment" "* (p 43).

Their analysis looks at two types of lending contracts; reputation contracts and cash-in-advance contracts. Their point is that if these cash-in-advance contracts are available to a defaulting country on the same terms as reputation contracts[10], then exclusion from future debt contracts is an unsatisfactory incentive to repay debt. The country will always do better by reneging on its debt contract because it can follow the same investment path as with a reputation contract and additionally increase consumption (Eaton and Fernandez 1995).

According to Panizza et al. (2009) the literature on sovereign debt models can now be roughly divided into three directions.

[10] Eaton and Fernandez (1995, p 2041) criticize some of the assumptions for this argument. First, cash in advance contracts can be costly to obtain and the rate of return on these may be smaller than the return required by the country's creditors. Second, a debtor in default is assumed not to have similar problems with its own debtors, which may need justification.

2.2.2 Sanction Models

The first direction has continued Bulow and Rogoff's line and claims that direct punishment is the reason for repayment of loans. Direct punishment is generally understood as interference with a country's current transactions, either through seizure abroad or denial of trade credit. Bulow and Rogoff (1989a) write that such sanctions can affect the debtor country's ability to transact freely in the financial and good market. Typically, renegotiation is explicitly modeled in these analyses. In Bulow and Rogoff (1989a) the proportion of a country's output that creditors can expect to extract in the renegotiation determines the amount the country can borrow. Also, loss of reputation as a punishment is not credible because it is not renegotiation proof[11].

2.2.3 Reputations Models

The second direction gives support to Eaton and Gersovitz' arguments, and argues that governments repay because they are worried about the consequence of a default on the credit market. Studies on this motivation for repayment share the common assumption, explicitly or implicitly, that a country is unable to enter another financial agreement[12] (Eaton and Fernandez 1995). Cole et al. (1995) study nineteenth century bond defaults in U.S. states and Latin American countries. They provide historical evidence that the defaulting nations typically regain market access after reaching settlement with their creditors. They argue that sanction models cannot explain this and develop a reputation model which shows that when a country settles the debt it gives signals that it wants to repay the loans in the future[13]. More recently, Wright (2002) has shown that it is possible for sovereign lending to exist in a setting with both reputation as an incentive for repayment and the assumption on insurance contracts made by Bulow and Rogoff (1989b). Then countries must be able to have a lending relationship with more than one bank at the time, which is syndicated lending. This creates an incentive for creditors to collude when punishing a defaulting country because if a bank

[11] Other contributions in this direction are Fernandez and Rosenthal (1990) and Sachs and Cohen (1982).

[12] The analyses must assume that no one will sell financial assets like stocks, bonds, and insurance contracts to a debtor in default (Bulow & Rogoff 1989a).

[13] Their model is criticized by Richmond and Dias (2007) for ignoring external economic conditions which might have contributed to a country's default in the first place.

engages in a financial relationship with a defaulting country, the bank will be excluded from syndicated lending in the future[14].

2.2.4 Domestic Costs

Finally, the third direction argues that the reason for countries to repay is that default causes broad "collateral damage" on the debtor country government or its economy. Thus, the focus is now on the domestic costs that can follow a default episode. Default can lead to reputation spillovers because it gives signal of bad credit conditions. The sovereign may in this situation try to protect domestic agents in the economy by avoiding default, or to avoid that a default spills over to a much broader range of economic problems. This possibility was first raised by Bulow and Rogoff (1989a) and later developed by Cole and Kehoe (1998). The latter show that even though there is no incentive to keep a good reputation with the lenders because of available insurance contracts or saving opportunities, there are incentives not to default to keep a good reputation in other relationships. This is because agents can change their behavior after a default. Later, several theoretical analyses[15] focused on the effects of the underlying structure in the economy and predicted that capital outflows, reduction in investment, and potentially, financial crises will follow a default. Panizza et al. (2009) argue that the evidence lends more support to these explanations for repaying loans, and limited support for theories on direct sanctions and reputation.

2.2.5 Sovereign Debt Models and Market Access

The most well-known models on sovereign debt do not say much about how a country can get new access to credit after a default. Sovereign debt models based on reputation have typically assumed permanent capital market exclusion. Eaton and Gersovitz' model suggest that renewed market access will be automatic after a predetermined period of exclusion but it could be of infinite length. However, they stressed that this assumption may be unrealistic. The argument is that both parties will gain if they restart lending which will undermine the expected punishment. Models based on direct sanctions suggest that explicit default can be avoided through new contracts so exclusion from the credit market should not occur (Cole et al. 1995). More recent models have generated renegotiation patterns with temporary capital market exclusion. According to Panizza et al. (2009), these models and empirical evidence

[14] Other contributions on reputation models include Diamond (1989), Grossman and van Huyck (1989), Cole and Kehoe (1998), and Eaton (1996).

[15] Sandleris (2008), Catao and Kapur (2006), and Kapur, Fostel, and Catao (2007).

make it clear that fear of exclusion cannot be the only or even the main reason why countries repay their debt.

2.3 A BASIC MODEL OF SOVEREIGN DEBT

Next I will present a basic model of sovereign debt which is used in a more advanced form in "Basic Analytics of Multilateral Lending and Surveillance" by Hagen (2009).

In this model, with two periods, a country wishes to borrow an amount B at interest rate r and invest amount I to maximize the utility of a representative consumer

$$U = C_1 + \varphi C_2 \qquad (2.1)$$

C_1 and C_2 are the country's consumption in period 1 and 2 respectively, and φ is a discount factor which takes the value $\varphi \in (0,1)$. Consumption in period 1 is the sum of an exogenous output (X_1) and the borrowed amount, minus investment:

$$C_1 = X_1 + B - I \qquad (2.2)$$

In period 2, the country will decide whether or not it wants to repay the loan. If the country services its debt, output is given by the total returns to investment[16]: $X_2 = (1+\kappa)I$ where κ represents the marginal return to investment. The penalty rate of default, denoted as λ, is assumed to be proportional to output in period 2, $\lambda \in (0,1)$. Thus, the consumption is given by

$$C_2 = (1-\delta\lambda)(1+\kappa)I - (1-\delta)(1+r)B \qquad (2.3)$$

where $\delta = 1$ if the country is planning to default, and $\delta = 0$ if it chooses to repay. The maximization problem to be solved is

$$\underset{\beta,I}{Max} U = C_1 + \varphi C_2 \qquad (2.4)$$

$$\text{s.t.} \quad C_1 = X_1 + B - I$$

$$C_2 = (1-\delta\lambda)(1+\kappa)I - (1-\delta)(1+r)B$$

[16] Assume constant returns to investment in borrowing country.

Solving this gives us the following first order conditions:

$$\frac{\partial U}{\partial I} = -1 + \varphi(1-\delta\lambda)(1+\kappa)$$

$$\frac{\partial U}{\partial B} = 1 - \varphi(1-\delta)(1+r)$$

If we assume $\frac{\lambda}{1+\rho} < \frac{1}{1+K} \leq \varphi \leq \frac{1}{1+\rho}$ then a country wants to borrow and invest as much as possible.

The opportunity cost of lending, i.e., the risk free rate of interest on the world market is denoted as ρ. We further assume that lenders are risk neutral and want to maximize expected profit. Since we also assume a competitive market, there will be no expected profits. The "no expected profits condition" requires that the amount borrowed to a sovereign with uncertainty of repayment is equal to what the creditor would get if the money is invested somewhere else. Mathematically:

$$(1-\delta)(1+r)B = (1+\rho)B$$

We can find the critical level of debt, which is where the borrowing country is indifferent between repaying the loan and default[17].

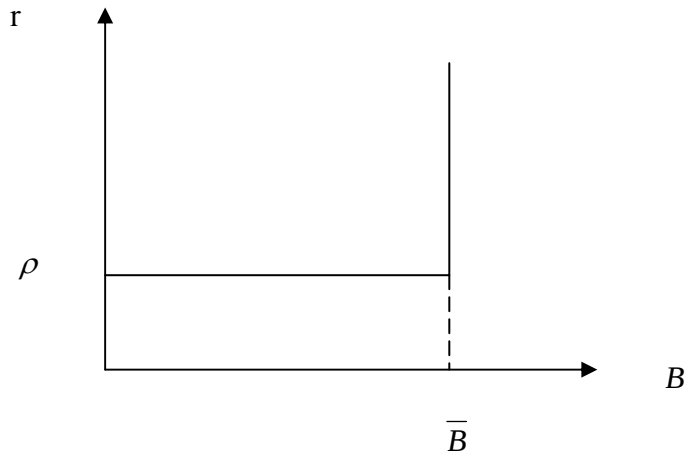
$$\overline{B} = \frac{\lambda X_2}{1+r} \qquad (2.5)$$

The country will have a potential gain following a default $((1+r)B)$ since it will keep the borrowed amount and its interest rate. The total penalty of default is given by λX_2, which means that part of the output in the second period will be lost. This will be a deadweight loss since no one will get it. Equation (2.5) shows us that if the cost of default increases, the lenders will be willing to increase the maximum level of the loan. The costs are functioning as a substitute for collateral. Because $\lambda = 0 \Rightarrow \overline{B} = 0$, the costs are also necessary for the existence of the market.

[17] $C_2^{default} = C_2^{non-default} \Leftrightarrow (1-\lambda)X_2 = X_2 - (1+r)B \Leftrightarrow \lambda X_2 = (1+r)B$

Lenders will constrain B such that the country will not default. The quantity of lending is therefore supply-determined. This is shown in figure 2.1.

Figure 2.1 Credit Constraint in the Sovereign Debt Market



We see that the interest rate of the loan is equal to the risk free rate of interest on the world market, ($r = \rho$). This is because the creditors will only borrow the maximum amount a country wants to repay with the interest rate.

To sum up, this model shows that there needs to be costs involved in the sovereign debt market. Another result is that the creditors will set a debt ceiling which depends on these costs and the interest rate the borrowing country has to pay. Also, defaults should never happen because creditors will not lend beyond a threshold level of debt at which the borrower has incentives to not repay. However, if we introduce some uncertainty about the decision to default, default might take place in equilibrium, e.g., because the country is hit by shocks or the government might be of different types.

2.4 PUSH AND PULL FACTORS

Studies on international capital inflows often differentiate between "push" and "pull" factors. The first category refers to external factors, i.e. global trends in capital flows, such as shocks and other regulatory changes in the world economy. Some specific examples would be business cycles in lending countries, changes in risk attitude of international investors and excess liquidity in the major lending countries (Agénor 1998). A common feature of these factors is that they are outside the control of borrowing countries. Lower interest rates in the

developed nations are perceived as one of the reasons why developing countries received a large amount of capital inflows in the early 1990s. Lower interest rates attracted investors to higher investment yields and improved the creditworthiness of developing countries (Calvo et al. 1996).

In the basic model, the world interest rate will affect the cost of servicing the debt stock and the temptation to default. From the assumption of a competitive capital market the interest rate of the loan will decrease when the risk-free world interest rate decreases, $\rho \downarrow \Rightarrow r \downarrow$. Given that λ and X_2 remain constant, a lower interest rate will raise the debt ceiling in equation (2.5). This is because the gain of default will decrease as a result of a lower interest rate: $(1+r_{high})B > (1+r_{low})B$. When the gain of default is lower, the creditors will be willing to lend more.

"Pull" factors refer to domestic conditions and country specific characteristics, more specifically to improvements in the domestic economy's prospects such as inflation stability and structural reform. They are related to economic policies, macroeconomic performance, investment opportunities and institutional systems of borrowing countries (Agénor 1998). A change in one of these factors may affect the marginal return of investment (κ) and the productivity (X_2) in the borrowing country. We can expect more loans to country H that has a higher marginal return to investment, than country L that has a low marginal return to investment. From equation (2.5) we know that the critical level of debt is given by

$$\overline{B}_i = \frac{\lambda_i(1+\kappa_i)I_i}{1+r_i} \qquad (2.5a)$$

$i = H$ for countries with high marginal return to investment and $i = L$ for countries with low marginal return to investment. If we differentiate between high and low marginal return to investment and $\lambda_H = \lambda_L$, $r_H = r_L$ then

$$\frac{\lambda(1+\kappa_L)I}{1+r} < \frac{\lambda(1+\kappa_H)I}{1+r} \Leftrightarrow \overline{B}_L < \overline{B}_H$$

The size of a country's output will also affect the ability to borrow according to this basic model. The potential cost of default is bigger when countries have bigger output. If $\lambda_{Small} = \lambda_{large}$ and $r_{small} = r_{large}$, then $\overline{B}_{small} < \overline{B}_{large}$ when $X_{large,2} > X_{small,2}$ in equation (2.5).

$$\frac{\lambda X_{small,2}}{1+r} < \frac{\lambda X_{large,2}}{1+r} \Leftrightarrow \overline{B}_{small} < \overline{B}_{large}$$

The bigger a country's output the larger the potential punishment through trade sanctions and collateral seizure.

The links that a country has with the rest of the world, such as trade and foreign direct investment, can affect the country's penalty rate in case of default (λ). Reputation spillovers might scare away investors as a default episode can give signals of bad economic conditions in the borrowing country. We can expect more open economies to have a higher penalty rate than less open economies, and will be able to borrow more since the cost of default is higher. If X_2 and r remain constant we can expect more open economies to have a higher debt ceiling.

$$\frac{\lambda_{open} X_2}{1+r} > \frac{\lambda_{closed} X_2}{1+r} \Leftrightarrow \overline{B}_{open} > \overline{B}_{closed}$$

Political instability can affect a country's ability to borrow. A government that does not expect to be in office for a long time has low incentives to invest to increase output in period 2. Instead, they have incentive to discount heavily on future cost of defaulting. A shortsighted government has a low discount factor, φ in equation (2.1). When consumption in period 2 is neglected there will be less investment and hence less output in period 2. Accordingly, we can expect low costs of default with shortsighted governments and creditors will lower their debt ceiling.

2.5 OTHER FACTORS AFFECTING MARKET ACCESS

2.5.1 Ability to Pay

Lenders are not just concerned about a country's "willingness to pay", but also its "ability to pay". The literature that focuses on the "ability to pay" looks into debt sustainability analysis or a country's vulnerability to liquidity constraints. Both strands seem to predict credit rationing in the form of a debt ceiling, but according to the "ability to pay" literature lenders are more concerned about a country's quality of policies and liquidity. In practice, there is no clear distinction between the two categories. There might be cases where a government could pay its debt but will not do so, because of strong political opposition or humanitarian

consequences (Gelos et al. 2004). Thus, one could argue that it is always down to "willingness to pay" because this constraint will hit the government first. Panizza et al. (2009) also argue that the distinction is not useful. Even in crises that are triggered by a bad shock the government could still repay the debt with sufficient adjustment, for example a large decline in consumption. Hence, the shock can be viewed as a "willingness to pay" crisis instead of an "ability to pay" crisis. Grossman and Van Huyck (1988) and Tomz (2007) have distinguished between "excusable" (or "expected") defaults and pure repudiation. The former is associated with implicitly understood contingencies, and the latter is seen as unjustifiable (Grossman and Huyck 1988). If it is the case that most governments choose not to repay because of bad shocks or difficult market conditions then one can argue that most defaults are in both the "willingness to pay" and the "excusable" category.

According to the "willingness to pay" literature countries that are more prone to shocks would like to maintain access to markets to credit markets to smooth consumption and be less likely to default. Contrarily, the "ability to pay" literature predicts that income variability should have a negative effect on creditworthiness because a country may not be able to pay its debt if its income falls below a certain threshold level (Gelos et al. 2004).

2.5.2 Market Perception

There are a large number of commercial credit rating agencies which evaluate a country's probability of defaulting on its debt obligations. These credit ratings are a review of the economic, financial, and political situation of an economy. The better known agencies are Moody's Investment Service, Standard & Poor's (S&P), and Fitch IBCA Inc, where Moody's and Standard & Poor's are responsible for around 80 per cent of the credit rating market (Afonso 2003). Lately, the ratings of Institutional Investor are widely used in empirical research. Haque et al. (2000) explain that these ratings are important not only for lending to developing countries, but also for other types of private capital flows, like portfolio equity. Also, many investors from developed countries require a minimum credit rating standard before investing in instruments.

2.6 EMPIRICAL LITERATURE

Since 2002, there has been a sudden increase in empirical studies on why sovereigns repay their loans, why and when countries borrow, how countries restructure and domestic debt

(Panizza et al. 2009). Few of these studies focus on the link between market access and default.

2.6.1 Duration of Exclusion and Debtor Clubs

For the last three decades the rule is that a country in default is excluded from the market but will regain access rather quickly after the conclusion of a debt restructuring. Gelos et al. (2008) found that, in the 1980s, countries were excluded from the market after settling the debt for an average of 4 years, while it has decreased to 0-2 years since 1990. Arraiz (unpublished) finds evidence that

> *"countries that defaulted in the past are excluded for a shorter period than first time defaulters"*

and argue that countries with a default history have shown the market how they can manage future defaults (Panizza et al. 2009, p 676). Richmond and Dias (2009) study what determines the duration of capital market exclusion after a default episode from 1980-2005. They find that it takes on average 5.7 years to regain partial market access and 8.4 years to regain full market access[18].

Reinhart et al. (2003) divide countries into debtor clubs. They introduce the concept "debt intolerance" as a way to quantify how quickly a country becomes vulnerable to a debt crisis as the external debt increases. It is well established in the literature that as a country's external debt goes up it becomes more vulnerable to being shut out of the international markets, i.e., to suffer a debt crisis. They argue that the level of debt intolerance can roughly be estimated as the ratio of the long term average of a country's total (public and private) external debt to an index of default risk[19].

The default risk, measured as Institutional Investor Ratings classify club A, B, C.

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[18] They consider partial reaccess as the first year in which there are positive net private creditor debt transfers to the public or private sector, while full market reaccess is defined as the first year of positive net private creditor debt transfers to the private or public sector greater than 1.5% of GDP.

[19] Default risk= 100-Institutional Investor ratings (IIR), IIR can be considered as a forward looking view of the country's macro economy and ability to service debt in the future. Long term external debt is measured as external debt scaled to either GNP or exports. The authors also recognize that the degree of dollarization, indexations to inflation or short-term interest rates and the maturity structure of a country's debt are relevant, but argue that these factors are different symptoms of the same institutional weaknesses.

Figure 2.2 Debtors Clubs in Reinhart et al. (2003)

Club A	Club B	Club C
• Average IIR from 1979-2002>67.7	• Average IIR from 1979-2002 between 24.2-67.7	• Average IIR from 1979-2002<24.2
• Continuous access to capital markets	• Intermittent access to capital market	• No access to capital markets, only sporadic opportunities to borrow
• Essentially the advanced countries	• Mostly Emerging markets	• Dependent on official loans and grants

Note: The countries in the sample are given in table A1 inn the Appendix. IIR of 67.7 equals the average plus one standard deviation, IIR of 24.2 equals the average minus one standard deviation.

For the countries in club C, their sovereign rating has fallen below a critical threshold level. Thus, they usually lose all access to capital markets and are dependent on grants and official loans. On the other side, countries in club A tend to have access to capital even during recessions and crisis. In club B, which is also the largest group, there are large variations between the countries and access to capital is volatile and depends on different external and internal factors. Kaminsky et al. (2004) highlight the fact that ratings of middle income countries tend to be more volatile than ratings of low- and high income countries.

Gelos et al. (2008) also describe debtor clubs, but the countries are divided into groups according to their success in accessing the market. The first group consist of 41 % of the sample and is characterized as the "No Access Group". Countries in this group were only able to access the market less than one third of the time. The second group, "Occasional Access Group" consists of 47 % of the sample and include countries that have been able to gain or regain access; more specifically accessed the market less than two thirds of the time. The last group only contains 12% of the sample and include countries that access the market often; more than two thirds of the time. It is called the "Consistent Access Group".

Figure 2.3 Debtor Clubs in Gelos et al. (2008)

Consistent Access Group	Occasional Access Group	No access Group
• 12 % of developing countries	• 47 % of developing countries	• 41 % of developing countries
• Access more than 2/3 of the time	• Access more than 1/3 and less than 2/3 of the time	• Access less than 1/3 of the time

Notes: The sample consists of developing countries classified by IMF, but creditor countries are excluded, total 139 countries. Period: 1980-2000

2.6.2 What Determines Market Access?

In "Debt Intolerance" by Reinhart et al. (2003), they argue that history matters. The key finding in this paper is that a country's external debt intolerance can be explained by a few variables related to repayment history, indebtedness level (especially for countries in club B and C), and inflation history[20]. According to their analysis, markets view highly debt-intolerant countries as having a higher risk of default, even at low debt ratios. On the other side, Gelos et al. (2008) found that the frequency of default does not reduce market access and there appears to be no long-lasting exclusion from credit markets following a default. In their study, a country's vulnerability to shocks and perceived quality of economic policies and institutions[21] are shown to influence the government's ability to tap the market. In Richmond and Dias' study (2009), partial market access depends mostly on external demand for risk, while full market access depends mostly on good domestic behavior and market expectations (measured by Institutional Investors Ratings). They (and Gelos et al. 2008) also found that country size matters too, which tells us that larger economies can access the market more frequently. Mody et al. (2001) find that in addition to domestic factors, external factors are

[20] They also find that debt intolerant countries are likely to be serial defaulters, have weak fiscal structures and weak financial systems. Default has a negative impact on a country's macro economy, which makes a country more vulnerable to feature default.

[21] Measured by Country Policy and Institutional Assessment (CPIA) developed by the World Bank and Investors Institutional ratings (IIR). Inflation rate and level of the fiscal deficit are used as proxies for the quality of macroeconomic policies.

important in explaining capital flows to developing countries, and Panizza et al. (2009) even argue that

> *"global credit cycle seem much more important than default history in determining market access"* (p 676).

Reinhart et al. (2003) argue that the procyclical nature of capital markets is one of the reasons why debt-intolerant countries repeatedly get new loans.

2.6.3 Procyclical Capital Markets

While the majority of the theoretical models predict countercyclical net debt flows, empirical research show a different picture. Most models on sovereign debt suggest that, through the assumption that a country wants to smooth consumption over time, borrowing should happen in bad times and repayment in good times. Levy-Yeyati (2009) finds that sovereign lending in the private market is procyclical. When net transfers to developing countries from different creditors was regressed over the recipient's output gap, the result showed that official net flows have a countercyclical pattern, but private net lending behaves procyclically[22]. More specifically, external borrowing in the private market increases in good times and falls in bad times.

A large amount of literature has shown that developing countries also tend to follow a procyclical fiscal policy (Kaminsky et al. 2004). Theoretical explanations for this pattern focus on market failure or political failure. Gavin and Perotti (1997) belong to the first category and argue that it is lack of access to international credit during recessions that is driving the procyclicality. The countries have to repay in bad times, which requires a contractionary fiscal policy. Others argue that it is a result of political failures such as conflict among interest groups, political pressure for wasteful spending, or corrupt politicians (Panizza et al. 2009). A third explanation has shown that procyclical borrowing can occur in the absence of market and political failure and is related to the nature of output shock. Aguair and Gopinath (2006) and Rochet(2006) show that a model with persistent shocks (i.e., shocks to

[22] Panizza et al. (2009) confirm this result when controlling for endogeneity. Kaminsky et al. (2004) also find that net capital inflows are procyclical.

trend growth) can generate a negative relationship between output volatility and the level of sustainable debt (procyclical borrowing)[23].

Kaminsky et al. (2004) conclude that the capital flow cycle and the macroeconomic cycle in developing countries seem to reinforce each other (the "when it rains it pours" phenomenon). They suggest that, regardless of the reasons behind the procyclical pattern, macroeconomic policies should be conducted in a more stabilizing way. Reinhart and Reinhart (2008) also study the volatility of the capital market by investigating what happens before, during, and after a capital flow bonanza. One of their main findings is that capital flow bonanzas systematically precede sovereign default episodes in developing countries. Capital inflows to developing countries have historically been mostly debt-creating flows.

2.6.4 Market Perception

In Afonso's (2003) study of the determinants of Moody's and Standard & Poor's credit ratings, he finds that GDP per capita, external debt, level of economic development, default history, real growth rate, and inflation rate are the most relevant variables. Thus, how the market perceives a country's default risk/creditworthiness seems to be highly correlated with the factors mentioned above. Although the ratings from Moody's and Standard & Poor's are quite similar, there are some differences in the ratings which might be a result of using different explanatory factors and different weights by each agency in their share of methodologies. Haque et al. (2000) find clear evidence that these ratings persist over time, that international factors influence them independently of developments in the country, and that regional considerations and a country's export profile regularly have influence on a country's rating. During the early 1980s, in the debt crisis, ratings of Institutional Investors and Euromoney declined in all regions. In the late 1980, after a period of consolidation, there was an improvement in Asia, Middle East, and Latin America, but a decline in Africa and Europe. Their empirical results also show that economic fundamentals[24] are important in determining credit ratings in developing countries, but for African countries, their credit ratings are found to be lower than is reasonable according to the fundamentals.

[23] Models with transitory output shocks predict a positive relationship between volatility and the level of sustainable debt.

[24]More specifically: the ratio of non-gold foreign exchange reserves to imports, the ratio of current account balance to GDP, the country's rate of growth, and its rate of inflation.

2.7 SUMMARY

I have presented a simple version of the basic theory of sovereign debt which predicts credit rationing in the form of a debt ceiling. The maximum amount a country can borrow depends on the costs it has to pay in case of default. There is an ongoing debate on which costs that are most relevant; exclusion, direct sanctions, or domestic costs through spillover effects.

The empirical research does not give us a clear answer[25]. There is a group of countries that can rarely borrow in the international credit market. Reinhart et al. (2003) argue that these countries are usually serial defaulters and have weak financial systems. For those that have access, exclusion after a default episode does not seem to be long lasting, and several studies find that exclusion periods are shorter after 1990. The literature also finds that external factors are important in explaining capital flows to developing countries.

[25] There are few empirical evidences that direct sanctions give incentives to repay loans. The idea that domestic costs can explain repayment is relatively new, hence there is not much empirical research on this topic (Panizza et al. 2009)

3.0 THE DATA

I have used the dataset in Gelos et al. (2008) as a basis for my own dataset. It covers developing countries from 1980-2000. I have had limited access to the data, hence I have different measurements of the following variables:

i) To measure the *quality of policies and institutions*, they use the World Bank's Country Policy and Institutional Assessment (CPIA). CPIA is an index which summarizes twenty scores in the areas of economic management, structural policies, policies for social inclusion, and public sector management and institutions. Instead, I have International Country Risk Guide's (ICRG) indicator of Quality of Government. This is a measurement of the quality of institutions. I also have the following variables: government budget deficit, inflation and current account balance. These variables give an indication of the macroeconomic situation in a country and serves as a proxy of quality of policies and institutions.

ii) To measure *market perception*, Gelos et al. (2008) use the Institutional Investor Ratings and they control for market perceptions beyond economic and political conditions. They report models with and without this variable. The other estimates do not change much when this variable is excluded from the model. I do not have these ratings, thus, I compare my results to the models where this variable is excluded.

iii) The authors have used Standard and Poor's database on sovereign defaults. I have used Reinhart and Reinhart (2008) which have listed default episodes in developing countries from 1980-2007. I complemented the list with data from Beim and Calomiris (2001), who also report default episodes in developing countries.

3.1 DATA SOURCES

My data on debt (public and publicly guaranteed net transfers from commercial banks and bonds) is collected from the World Banks' Global Development Finance database. It provides time series for 129 developing countries. Gelos et al. (2008) have data on 139 developing countries. Their source on debt flows is micro data from Capital Bondware/Loanware. This is provided by Dealogic, which is a company that provides a platform for investment banking and capital markets professionals globally. I do not have these data, but have been able to construct a dummy variable on market access based on table A2 in the Appendix of the 2004

version. The macroeconomic variables are collected from World Development Indicators and IMF's World Economic Outlook. I also have some variables from the Quality of Government database. This is provided by the QandG Institute at the University of Gothenburg. They conduct and promote research on the causes, consequences and nature of good governance (QOGInstitute 2010). A detailed list of the different data sources can be found in table A2 in the Appendix.

3.2 THE DEPENDENT VARIABLE: MARKET ACCESS

3.2.1 The Identification Problem

There is, according to Gelos et al. (2008), an identification problem when we include those countries that do not have market access in the study. This is because data on "no access" can mean a shift on the supply side, i.e., creditors does not want to lend or a shift on the demand side, i.e., a sovereign does not want to borrow. An ideal way to estimate market access would be to estimate a supply function and a demand function separately. However, this is controversial because the supply curve in credit rationing models is not linear, but usually backward bending[26]. I use the following strategy to separate actual rationing and voluntary abstention, which is also used by Gelos et al. (2008).

i) Only developing countries are included in the sample. These countries are according to neoclassical models capital scarce and should borrow from capital rich countries to increase growth (or invest without reducing current consumption).

ii) Developing countries that are classified as creditor countries by IMF's World Outlook are excluded from the sample. These are the oil producing countries Kuwait, Libya, Oman, Qatar, Saudi Arabia, and United Arab Emirates.

iii) Formerly communist/socialist countries were against borrowing from the international private market. These are included in the sample after they initiated market reforms, unless the countries have been borrowing earlier (see table A3 in the Appendix).

[26] It is possible to extend the basic model presented in section 2.3 to include uncertainty about the decision to default. Then the supply curve will be backward bending.

iv) Borrowing information is aggregated by year. It is reasonable that a country might not want to borrow in a month or in a quarter because of several reasons; it has just borrowed to a large extent or is waiting for an improvement in terms in the near future. On the other side, it is unlikely that they don't want to borrow at all within a year[27].

3.2.2 Defining Market Access

Based on the discussion in section 2.4 and 2.5, we can set up the following function where $B_{i,t}^{\max}$ is the debt ceiling for country *i* at time *t*:

$$B_{i,t}^{\max} = f(Size, Links, Volatility, PoliticalRisk, PolicyQuality, Liquidity, Defaults, GlobalFactors) \quad (3.1)$$

Equation (3.1) helps us make predictions about the ceiling of the debt stock for each country. However, to study a country's ability to access the market, I use debt flows at any given moment. We have 3 scenarios:

(1) $B_{i,t}^{\max} > B_{i,t-1}^{\max}$, the debt ceiling increases

(2) $B_{i,t}^{\max} = B_{i,t-1}^{\max}$, the debt ceiling is the same

(3) $B_{i,t}^{\max} < B_{i,t-1}^{\max}$, the debt ceiling decreases

I want to capture the case where the debt ceiling has increased because of a positive change in the country or the world. Access is the result of changes in the binding maximum credit ceiling for a country, where scenario (1) represents market access and scenario (2) and (3) represent no market access. An important drawback is that the debt ceiling is not observable. We can only observe if the debt stock has changed during an observation period. In scenario (1) it is problematic if a country actually has a debt stock below the debt ceiling. Then the data will observe an increase in the debt stock and report it as market access, but there is a possibility that the debt ceiling is the same or even decreasing. In scenario (3) it might also be the case that the debt ceiling is the same or increasing, but if a country has a debt stock below its debt ceiling and choose to repay some of the debt, the data will report it as no market

[27] As a robust check they aggregate the borrowing information over two years and do not find substantive differences in the results.

access. I assume, as Gelos et al. (2008), that countries always want to move toward their debt ceiling, although adjustments may not be instantaneous. This assumption is strong, but also necessary to avoid the problems mentioned above.

In my analysis I use two different definitions of market access. First, I use the same definition as Gelos et al. (2008) when copying their results. They define market access as positive gross debt flows but condition it on an increase in the debt stock. Then, I want to test if the results are robust using a new definition used by Richmond and Dias (2009). In their study market access is defined as positive net transfers. An overview of the different definitions is given in table 3.1 (also see section 2.1.2).

Figure 3.1 Definitions of Market Access

Market access / **Measure**	**Market access**	**No market access**
Net debt flows (Richmond and Dias 2007)	Principal<new loans	Principal≥new loans
Net transfers (Richmond and Dias 2009)	(Principal+interest)<new loans	(Principal+interest)≥new loans
Gross debt flows (Gelos et al. 2009)	New loans and debt stock ↑	No new loans or new loans and debt stock ↓

I want to capture if the debt stock has increased or decreased from a year to another. From the table we can see that this is considered by all the definitions. If new loans exceed (are less than) the principals paid, it follows that the debt stock has increased (decreased). There is, however, a case where the debt stock might have increased but the data will not report it as market access. Net transfers will be negative if *interest>(new loans-principal)*. This is a situation where the interests paid to the creditors exceed the increase in the debt stock. The country will not have any extra resources because the capital flows to the creditors are positive. For this reason, positive net transfers can be considered a strict measure of market access compared to the one that is used by Gelos et al. (2008).

Another reason why net transfers are considered a strict measure is that if a country is delaying its principal repayment, it will not be regarded as market access.[28] This will be ignored with gross debt flows as they do not give any information about debt service. Consider a simplified case where a country gets 20 US$ in new loans but were supposed to pay 40 US$ in principal. Then, according to net transfers, the country does not have market access because *(principal+interest)>new loans*. If the country only paid 10 US$ in debt service then this will be noted as market access with the definition of Gelos et al. (2008). This is because the data show that the debt stock has increased from 100 US$ to 110 US$.

In the cross sectional analysis the dependent variable is frequency of market access which is defined as

> *"the ratio of the number of years in which the sovereign is observed accessing the international credit market to the number of years in which the country is in the sample."* (Gelos et al. 2008, p 10)

In the panel analysis the variable is binary; 1 representing market access in that year and 0 representing no access.

3.3 EXPLANATORY VARIABLES

In this section I present the variables that are likely to explain market access. They are based on the "willingness to pay" and "ability to pay" literature. A detailed description of all the variables is found in table A2 in the Appendix.

The *size* of a country is measured by GDP. Alternatively, if population is highly correlated with GDP it can function as a replacement to avoid endogeneity problems. Generally, larger countries provide better investment opportunities for investors.

The ratios of exports to debt service and international reserves to months of imports are used as indicators of a country's *liquidity*. For many developing countries, exports are the main source of foreign exchange earnings that can be used to service external debt in foreign currency. It is also common practice to use short term debt to total debt as a measure of liquidity. Higher short term debt might increases the chances of a liquidity crisis.

[28] Since 1985, interest arrears on long term debt are included in the definitions of net transfers and net flows.

Income *volatility* is quantified by the standard deviation of GDP growth measured as a ten year moving average. A country's *vulnerability* to shocks is proxied by GDP per capita and the share of agriculture in GDP. Gelos et al. (2008) argue that countries with lower GDP per capita are more vulnerable to fall below a critical subsistence threshold level. One can argue that this is not a good measure because there are very few, if any, cases where GDP per capita is so low that it is close to a subsistence level. I still use this measure because I replicate their results, but will be careful to interpret the variable as a measure of volatility. Afonso (2003) use GDP per capita as a measure of the development in a country, which I regard as more reasonable.

To measure the *quality of policies and institutions*, I use International Country Risk Guide's (ICRG) indicator Quality of Government. This indicator has three components; corruption within the political system, law and order, and bureaucracy quality. It is scaled from 0-1 and higher values indicate higher quality of government. As substitutes, I use the inflation rate, government budget deficit/surplus, and current account balance to GDP.

A country's *link with the rest of the world* is captured by the share of FDI to GDP (inflows) and a commonly used measure of trade openness; the ratio of exports plus imports to GDP.

To measure *political instability* I use International Country Risk Guide's index of political risk. The political risk measure tries to capture the political stability of a country, the ability of a government to carry out its declared program and its ability to stay in office[29]. A lower score means higher political risk. This index shares some of the components with ICRG Quality of Government. Thus, I also use a residual of a regression of ICRG Quality of Government on ICRG Political Risk to remove the information that is shared in both indexes.

Gelos et al. (2008) argue that non-concessional *IMF programs* can have a positive impact on a country's ability to access the market. This is because multilateral assistance can help countries overcome liquidity problems and act as a "seal of approval" of sound economic policies. On the other side, they expect concessional programs to have a negative impact, especially since they impose limits on international borrowing from private creditors. According to Hagen (2009), the catalytic effect of IMF lending is not obvious. Many

[29] The ICRG index has the following components; government stability, socioeconomic conditions, investment profile, external conflict, corruption, military in politics, religion in politics, law and order, ethnic tensions, democratic accountability, and bureaucracy quality.

countries borrow from IMF repeatedly which might indicate that it is the countries with financial problems that requires funding. The empirical literature shows a neutral effect on the whole; a negative effect on private flows and a positive effect on official flows. The Stand-By Arrangements (SBA) and Extended Fund Facility (EFF) represent non-concessional programs. Both of them address short term balance of payment problems. The formerly called Poverty Reduction and Growth Facility (PRGF) represents a concessional program and gives medium-term support to low income countries with balance of payment problems. A more detailed description of the programs can be found in the Appendix. In the cross section analysis, I use the frequency of years in a program. This is the total sum of years where a specific type of program is operative divided by the number of years in the sample. In the panel analysis, they are equal to one when a country started the program. The intention is to capture any initial signaling effect.

Sovereign *defaults* are expected to negatively affect the ability of a country to access the market. In my analysis, a sovereign default is defined as the failure to meet a principal or interest payment on due dates. Thus, it also includes rescheduling where terms are less favorable than the original contract. In the cross sectional regressions I have two measures. One is the number of years in default which captures "being in default". The other is the number of default episodes which captures the frequency of default. In the panel regressions I have two dummy variables. The first represents the first year of a default, the other represents unresolved defaults. The former can capture any initial signaling effect of a default episode.

The following variables are used to control for *global factors* in the panel estimations; the 6-month London interbank offered rate (LIBOR) in real terms, the average GPD growth rate for the G7[30] countries or USA real growth GDP as proxies for international liquidity, and time dummies. LIBOR is the interest rate at which banks offer to lend money to one another in the wholesale money markets in London. It is a standard financial index used to set the cost of various variable-rate loans. Lenders use such an index to adjust interest rates as economic conditions change. They then add a certain number of percentage points called a margin, which doesn't vary, to the index to establish the final interest rate.

[30] G7 includes Canada, France, Germany; Italy, Japan, USA and UK.

Table 3.1 Variables Potentially Affecting Market Access

Concept	Variable	Expected sign	
		Willingness to pay	Ability to pay
Size	GDP/Population	+	+
Liquidity	Exports/debt service	n.a.	+
	Reserves	n.a.	+
	Short Term Debt	n.a.	-
Volatility/ Vulnerability	GDPperCap	+	+
	Agric/GDP	+	-
	StdGDP Growth	+	-
Quality of policies	ICRG Institutions	+	+
	Deficit	n.a.	-
	Inflation	-	-
	Current Account	-	-
Links to world	FDI inflows	+	+
	Openness	+	+
Political risk	ICRG Pol Risk	+	+
IMF programs	SBA	n.a.	n.a.
	EFF	n.a	n.a.
	PRGF	-	-
Defaults	Defaults	-	-
	Yrs in Default	-	-
Global factors	LIBOR	-	n.a.
	G7 GDP Growth /USA Growth	+	n.a.

Note: n.a. means no apriori hypothesis

3.4 DESCRIPTIVE STATISTICS

In this section I will present descriptive statistics on default episodes and market access. I will also categorize debtor clubs according to the definitions in Gelos et al. (2008) (see figure 2.3) using data on market access from Global Development Finance. A table with summary statistics on the explanatory variables can be found in the Appendix (A4).

3.4.1 Default Episodes and Market Access

In addition to the sample period in Gelos et al. (2008), 1980-2000, I want to focus on the 1990-2008 period. The debt crisis in the 1980s is over and we can expect that countries can access the market more frequently. In table 3.3 we see that the average number of years in default is almost 6 years between 1980 and 2008. Richmond and Dias (2009) find that an average default lasts for 7.3 years during the same period using Standards and Poor's definition and database. The average years in default goes down from 5.97 till 3.32 when we

exclude the 1980s. Thus, default episodes have been shorter after 1990. This is confirmed by Panizza et al. (2009) who report that the duration of the average default episode declined from about eight years in the 1970-1990 period to roughly four years after 1990. Since 1998, there has only been one case where a default lasted for more than two years, which is Argentina (2001-2005). The average number of default episodes also decreases substantially, from 0.78 till 0.27, when the 1980s are excluded.

Table 3.2 Summary Statistics on Default

Variable	Period	Mean	Std. Dev.	Min	Max
No of years in default	1980-2000	5.32	6.32	0	21
	1980-2008	5.97	7.27	0	28
	1990-2008	3.32	4.64	0	18
No of default episodes	1980-2000	0.72	0.79	0	4
	1980-2008	0.78	0.85	0	4
	1990-2008	0.27	0.55	0	3
Number of observations=5,294					

Table 3.4 presents summary statistics on market access. I show differences in the statistics between the two measures of market access, and then I show how it changes in different time periods with the data from Global Development Finance (GDF). According to the data from Bondware/Loanware, countries had on average the opportunity to borrow in 5.45 years from 1980-2000. According to data from GDF, they could borrow on average in 6.37 years in the same period. Frequency of market access is also higher according to the data from GDF; 0.34 compared to 0.29. According to the sandard deviations there seems to be more variation in the data from Bondware/Loanware. It is obvious that there are some countries that were never able to borrow from private creditors in the whole sample period. On average, developing countries can only access the market for about 1/3 of the time, also when we exclude the 1980s.

Table 3.3 Summary Statistics on Market Access

	Source	Period	Obs.	Mean	Std. Dev.	Min	Max
No of years in which a country accessed the market	Bondware/Loanw.	1980-2000	3876	5.45	6.57	0	21
	GDF	1980-2000	4914	6.37	5.10	0	18
	GDF	1980-2008	4992	9.11	6.69	0	23
	GDF	1990-2008	4992	6.52	5.46	0	17
Frequency of market access	Bondware/Loanw.	1980-2000	3876	0.29	0.34	0	1
	GDF	1980-2000	3609	0.34	0.26	0	0.9
	GDF	1980-2008	3596	0.35	0.25	0	0.89
	GDF	1990-2008	3596	0.35	0.29	0	0.89

3.4.2 Debtor Clubs

I have calculated how many countries belong to each debtor club defined by Gelos et al. (2008) to compare the two measurements on frequency of market access and to find out if there is mobility across the groups over time. This is shown in table 3.5. First, according to the data from GDF more countries belong to the "No Access Group" from 1980-2000 than with Bondware/Loanware, 53 % and 41 %, respectively. At the same time, the "Occasional Access Group" is considerably smaller. The size of the "Consistent Access Group" is almost the same, indicating that the difference is between the two groups mentioned first. Second, if I exclude the 1980s from my sample period, more countries will belong to the "Consistent Access Group" and "No Access Group". The "Occasional Access Group" lost 10 percentage points of its members. Since the "Consistent Access Group" increased more than the "No Access Group", the data confirms that it has been easier for some countries to access the market.

Table 3.4 Debtor Clubs in Different Time periods

Source	Period	Consistent Access	Occasional Access	No Access
Bondware/Loanw.	1980-2000	12 %	47 %	41 %
GDF	1980-2000	15 %	32 %	53 %
GDF	1980-2008	11 %	40 %	49 %
GDF	1990-2008	18 %	30 %	52 %

4.0 ECONOMETRIC MODELS AND ESTIMATION METHOD

I use both cross sectional and panel data methods in my analysis. The latter is important to be able to control for the procyclical pattern in the international credit market. The presentation of the econometric models are based on Verbeek (2008) and Wooldridge (2009).

4.1 CROSS-SECTIONAL METHOD

4.1.1 The Tobit Model

The tobit model can be applied when the dependent variable is censored, i.e., when the dependent variable is zero for a substantial part of the population but positive for the rest of the population. We can formulate the censoring problem as a latent variable model:

$$y_i^* = x_i^{'}\beta + \varepsilon_i \ , \quad i = 1,2,...,N, \qquad (4.1)$$

$$y_i = y_i^* \text{ if } y_i^* > 0$$

$$y_i = 0 \text{ if } y_i^* \leq 0$$

The error term ε_i is assumed to be $NID(0,\sigma^2)$ and independent of x_i [31]. Then the dependent variable will also follow a normal distribution. y_i^* represents market access and we assume that the frequency of access can be explained by a linear function of the explanatory variables in section 3.2. If y_i^* is positive, we observe country *i* access the market during the sample period. If y_i^* is negative, the values will be mapped as zero. Thus, y_i^* is a latent variable while y_i is the observable variable which takes value 0 if market access is negative. In this situation the Ordinary Least Square (OLS) estimator which is considered BLUE[32] given the Gauss-Markov assumptions might be biased.

The Tobit model describes the following:

i) The probability that $y_i = 0$ given x_i. We write this as

[31] $\varepsilon_i \sim NID(0,\sigma_2)$ is a way of saying that the error terms are independent drawings from a normal distribution with mean zero and variance σ^2. These are important assumptions for exact statistical inference.

[32] BLUE=Best Linear Unbiased Estimator. It refers to an estimator which is unbiased and has the least variance.

$$P\{y_i = 0\} = P\{y_i^* \le 0\} = P\{\varepsilon_i \le -x_i'\beta\} \qquad (4.2a)$$

Further, φ denotes the density of a standard normal distribution (snd), and ϕ denotes the cumulative density function (cdf) of the standard normal distribution[33]. Next, we use (4.2a) on standardized form and express the probability in terms of the cdf.

$$P\{y_i = 0\} = P\left\{\frac{\varepsilon_i}{\sigma} \le -\frac{x_i'\beta}{\sigma}\right\} = \phi\left(-\frac{x_i'\beta}{\sigma}\right) = 1 - \phi\left(\frac{x_i'\beta}{\sigma}\right) \qquad (4.2b)$$

ii) The distribution of y_i given that it is positive. The expectation of this truncated distribution is

$$E\{y_i | y_i > 0\} = x_i'\beta + E\{\varepsilon_i | \varepsilon_i > -x_i'\beta\} = x_i'\beta + \sigma\frac{\varphi(x_i'\beta/\sigma)}{\phi(x_i'\beta/\sigma)} \qquad (4.3)$$

(4.3) shows us why it is inappropriate to use OLS estimation. If we use OLS, we will estimate $E\{y_i | y_i > 0\} = x_i'\beta$. However, we have just shown that $E\{y_{i,t} | y_{i,t} > 0\} = x_{i,t}'\beta + \sigma\frac{\varphi(x_i'\beta/\sigma)}{\phi(x_i'\beta/\sigma)}$ with censored data. It is not reasonable to assume that $\sigma\frac{\varphi(x_i'\beta/\sigma)}{\phi(x_i'\beta/\sigma)} = 0$. Thus, with OLS there is an omitted variable problem that can lead to inconsistent estimates.

4.1.2 Estimation Method: Maximum Likelihood

Estimation of the Tobit model is usually done through the maximum likelihood method. This method provides a way of estimating a set of parameters which characterize a distribution, when we know or assume we know the distribution. Thus, we assume a distribution of the data, and determine the likelihood of observing the sample that we happen to observe. The likelihood is expressed as a function of the unknown parameters that characterize the distribution. Those values for the unknown parameters that give us the highest likelihood are chosen as the maximum likelihood estimates.

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[33] $\varphi(y) = \frac{1}{\sqrt{2\pi}}\exp\left\{-\frac{1}{2}y^2\right\}$ and $\phi\left(\frac{y-\mu}{\sigma}\right) = \int_{-\infty}^{(y-\mu)/\sigma}\varphi(t)dt$

Next, we need to define a log likelihood function for each observation and summarize them[34]. The likelihood function for an observation either equals the probability mass or the conditional density of y_i, given that it is positive, times the probability mass of observing $y_i > 0$.

$$f(y_i) = \{P(y_i = 0)\} * \left[f(y_i | y_i > 0) * \{P(y_i > 0)\} \right]$$

Then the log likelihood function is written as

$$\log L_1(\beta, \sigma^2) = \sum_{i \in I_0} \log P\{y_i = 0\} + \sum_{i \in I_1} \left[\log f(y_i | y_i > 0) + \log P\{y_i > 0\} \right] \tag{4.4}$$

$f(.)$ is a density function, I_0 and I_1 are the sets of those indices corresponding to the zero and the positive observations respectively; $I_0 = \{i = 1,..., N : y_i = 0\}$ and $I_1 = \{i = 1,..., N : y_i = 1\}$.

Since $f(y | y > c) = \dfrac{f(y)}{P\{y > c\}}$ for $y > c$, we can write (4.4) as

$$\log L_1(\beta, \sigma^2) = \sum_{i \in I_0} \log P\{y_i = 0\} + \sum_{i \in I_1} \log f(y_i) \tag{4.5}$$

When we use (4.2b) and the density function for the normal distribution[35], (4.5) can be written as

$$\log L_1(\beta, \sigma^2) = \sum_{i \in I_0} \log \left[1 - \phi\left(\frac{x_i' \beta}{\sigma} \right) \right] + \sum_{i \in I_1} \log \left[\frac{1}{\sqrt{2\pi\sigma^2}} \exp\left\{ -\frac{1}{2} \frac{(y_i - x_i' \beta)^2}{\sigma^2} \right\} \right] \tag{4.6}$$

We get the maximum likelihood estimates by maximizing (4.6) with respect to β and σ^2. Given that our model is correctly specified, we get consistent and asymptotically efficient estimators for both β and σ^2.

4.1.3 Marginal effects

The coefficients in the tobit model can be interpreted in several ways.

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[34] It is more practical to use the natural logarithm of the likelihood function, which is just a monotonic transformation of the likelihood function.

[35] $f(y) = \dfrac{1}{\sqrt{2\pi\sigma^2}} \exp\left\{ -\dfrac{1}{2} \dfrac{(y - \mu)^2}{\sigma^2} \right\}$

(1) The marginal effect upon the latent variable.

$$\frac{\partial E\{y_i^*\}}{\partial x_k} = \beta_k$$

(2) The marginal effect on the expected value of y_i.

$$\frac{\partial E\{y_i\}}{\partial x_{ik}} = \beta_k \phi\left(\frac{x_i'\beta}{\sigma}\right)$$

(3) The marginal effect of a change in x_{ik} upon the probability of observing a zero outcome.

$$\frac{\partial P\{y_i = 0\}}{\partial x_{ik}} = -\varphi\left(\frac{x_i'\beta}{\sigma}\right)\frac{\beta_k}{\sigma}$$

I report the first alternative in my analysis.

4.1.4 Specification test

If the distributional assumptions on ε_i are not violated, we will get consistent and efficient estimators for σ^2 and β. Thus, it is important to test for non-normality when using the tobit model. This is usually done through the "conditional moment test". Then the null hypothesis is that the errors have a normal distribution. We do not reject this if the test statistic has a lower value than the critical value.

4.2 PANEL DATA METHODS

Cross-sectional analysis does not explain the dynamics of market access, nor does it allow us to control for time-varying factors. Panel data includes repeated observations over the same units collected over a number of periods. It lets us specify and estimate more complicated and more realistic models than is feasible with a single cross section or a single time-series. In my analysis I use the fixed effect logit model. This is a non-linear model with limited dependent variable. Non-linear models in combination with panel data may complicate the analysis because it can be difficult to argue that different observations on the same unit are independent. In the fixed effect model this can be solved by using an alternative strategy called "conditional maximum likelihood".

4.2.1 The fixed effect logit model and estimation

Binary choice models are typically formulated in terms of a latent model:

$$y_{it}^{*} = \alpha_i + x_{it}^{'}\beta + u_{it} \qquad u_{it} \sim IID\left(0, \sigma_u^2\right) \tag{4.5}$$

We observe $y_{it} = 1$ if $y_{it}^{*} > 0$ and

$y_{it} = 0$ otherwise

Therefore, $y_{it} = 1$ if country *i* has market access in year *t*. α_i represent country components which are time invariant and homoskedastic. In the fixed effect model we treat these as country-specific intercept terms and they capture all unobservable time-invariant differences across countries. With the regular log likelihood function we can only get consistent estimators if the number of time periods goes to infinity[36]. To solve this problem we can use the "conditional maximum likelihood", where the likelihood function is conditioned on a set of statistics t_i such that a country's likelihood contribution no longer depends upon α_i but still depends on β. In this model, $t_i = \bar{y}_i$ is a sufficient statistic for α_i .

$$f(y_{i1},...,y_{iT}|t_i, \alpha_i, \beta) = f\left(y_{i1},...,y_{iT}|\alpha_i, \beta_i\right)$$

Consider the case with $T = 2$. Thus, we condition upon $t_i = 1/2$. As a result, we restrict the sample to the observations where y_{it} changes. The two possible outcomes are $(0,1)$ and $(1,0)$. The conditional probability of the first outcome is

$$P\left\{(0,1)|t_i = 1/2, \alpha_i, \beta\right\} = \frac{P\left\{(0,1)|\alpha_i, \beta\right\}}{P\left\{(0,1)|\alpha_i, \beta\right\} + P\left\{(1,0)|\alpha_i, \beta\right\}}$$

We use the fact that

$$P\left\{(0,1)|\alpha_i, \beta\right\} = P\left\{y_{it} = 0|\alpha_i, \beta\right\} P\left\{y_{i,2} = 1|\alpha_i, \beta\right\}$$

and

[36] $\log L\left(\beta, \alpha_1,...,\alpha_N\right) = \sum_{i,t} y_{it} \log F\left(\alpha_i + x_{it}^{'}\beta\right) + \sum_{i,t}\left(1 - y_{it}\right)\log\left[1 - F\left(\alpha_i + x_{it}^{'}\beta\right)\right]$

$$P\{y_{i,2} = 1|\alpha_i, \beta\} = \frac{\exp\{\alpha_i + x_{i2}^{'}\beta\}}{1 + \exp\{\alpha_i + x_{i2}^{'}\beta\}}$$

to obtain the conditional probability for the first outcome:

$$P\{(0,1)|t_i = 1/2, \alpha_i, \beta\} = \frac{\exp\{(x_{i2} - x_{i1})'\beta\}}{1 + \exp\{(x_{i2} - x_{i1})'\beta\}} \qquad (4.6)$$

(4.6) shows that the conditional probability no longer depends on α_i. Likewise, for the second possible outcome:

$$P\{(1,0)|t_i = 1/2, \alpha_i, \beta\} = \frac{1}{1 + \exp\{(x_{i2} - x_{i1})'\beta\}} \qquad (4.7)$$

These results illustrate that the conditional distribution of (y_{i1}, y_{i2}), given t_i and α_i, is independent of the individual specific effects.

Hence, we can estimate the fixed effect logit model for $T = 2$ using a standard logit with $x_{i2} - x_{i1}$ as explanatory variables and the change in y_{it} as the endogenous event. If T is larger than 2, it can be overwhelming to derive all the necessary conditional probabilities but it is in principle an extension of the case presented here.

4.2.2 Fixed effect vs. random effect

The choice between the fixed effect and random effect approach is not obvious. An important difference is that the fixed effect approach considers the distribution of y_{it} given α_i, where the α_i's can be estimated. Thus, it is common to use this approach if the countries are "one of a kind" and not a random draw from a population. For this reason the fixed effect approach might be an appropriate choice in my analysis. However, with this approach the estimators are only identified through the "within-dimension" of the data. Hence, only individuals that change status at least once are relevant for estimating β. Countries that do not change status are unnecessary in the estimation as they do not give any information about β. Consequently, countries that always or never had access will be excluded. We have seen that this is a substantial part of the sample when we use the dependent variable with data from Capital Bondware/Loanware. Also, explanatory variables that do not vary over time will be omitted. To avoid this problem, the random effect might be an alternative choice, but then we have to make assumptions that can be considered unrealistic. Consistent estimators in the random

effect approach requires that the unobserved country effects and the explanatory variables are uncorrelated, $E\{x_{it}\alpha_i\} = 0$. We do not need to make this assumption in the fixed effect approach as α_i will be eliminated from the model. In my analysis I should not ignore that there can exist country-specific characteristics that are correlated with the explanatory variables which I am not able to control for[37]. These will then be captured by α_i and can lead to inconsistent estimators in a random effect approach.

We can compare the two estimators in a Hausman test. Under the null hypothesis both estimators are consistent, but the random effect is efficient. Under the alternative hypothesis the random effect is inconsistent while the fixed effect is consistent. In practice, we test if there are systematic differences between the estimators. An important reason why those two estimators would be different is the existence of correlation between α_i and x_{it}.[38]

$H_0 : E(x_{it}^{'}\alpha_i) = 0$. Both estimators are consistent. Random effect estimator is efficient.

$H_1 : E(x_{it}^{'}\alpha_i) \neq 0$. Random effect estimator is inconsistent while fixed effect estimator is consistent.

The test statistic goes as follows:

$$\xi_H = (\hat{\beta}_{FE} - \hat{\beta}_{RE})'\left[\hat{V}\{\hat{\beta}_{FE}\} - \hat{V}\{\hat{\beta}_{RE}\}\right]^{-1}(\hat{\beta}_{FE} - \hat{\beta}_{RE})$$

The $\hat{V}$s denote estimates of the true covariance matrices. Under the null hypothesis the test statistic has an asymptotic Chi-squared with K degrees of freedom and is equivalent to the number of explanatory variables in fixed effect estimation. If $\xi_H >$ the critical value, we reject H_0 and should use the fixed effect approach.

Gelos et al. (2004) have focused on the random effect estimators in the first version of the study but in 2008 they reported the fixed effect estimators. The argued in 2004 that the Hausman test did not reject the random effect estimators, while in 2008 they write that

[37] I do not have data on market perceptions which is most likely correlated with the explanatory variables in my analysis. However, the ratings that reflect market perception can vary over time.

[38] There might be other misspecifications that can cause different estimators.

> *"the Hausman specification test rejects the random effect estimators when we restrict our analysis to those countries that switch in and out of the credit market"*(p 16)

In my analysis I ran regressions with random effects and performed a Hausman test to compare them with fixed effects. The test rejected the null hypothesis, which lends support to the fixed effect estimators. Therefore, I have chosen only to report fixed effects in my analysis.

4.3 ECONOMETRICAL PROBLEMS

4.3.1 Missing data

If the panel data set has certain years or periods of data that are missing for some cross-sectional units, we have an *unbalanced panel*. Then there is less variation in the data. Usually regression packages will adjust for this loss. The critical question is why the panel is not balanced. If the reason for missing data for some units is uncorrelated with the idiosyncratic errors (u_{it}) there is not a problem with the unbalanced panel. Conversely, if the reason why some units leave the sample is correlated with unobserved factors that change over time and affect the dependent variable, the estimators might be biased. (Wooldridge 2006)

4.3.2 Autocorrelation

If the idiosyncratic errors are correlated over different time periods $Corr(u_t, u_s) \neq 0$ for all $t \neq s$, then the errors suffer from *autocorrelation*. This can also generate problems in panel data since it is a combination of time series and cross section data. Autocorrelation can lead to standard errors and test statistics that are not valid, and therefore complicates statistical inference. Often, autocorrelation in the errors of a dynamic model indicate that the model is not correctly specified. This can be solved by including lagged variables (ibid).

4.3.3 Multicollinearity

Multicollinearity refers to a situation where independent variables are too highly correlated. High correlation between two or more independent variables can lead to large variance which means less precise estimates (ibid).

5.0 RESULTS

In my analysis I begin with a replication of the results of Gelos et al. (2008). Then I extend the study in the following ways:

i) I introduce a new dependent variable.

ii) My sample period is extended from 1980-2000 to 1980-2008, enabling me to test if determinants of market access change over time. I have chosen to focus on 1990-2008, when the debt crisis in the 1980s is over. In the 1990s the international capital market expanded and borrowing was easier according to Gelos et al. (2008).

iii) In the panel regressions, I add Average GDP Growth in the G7 countries as a proxy for international liquidity and the LIBOR rent as a measure of the international interest rate. Time dummies alone will capture unobservable changes in the global economy, while regressions with G7 GDP Growth and LIBOR will shed light on more specific factors and test if these factors are important determinants of market access.

5.1 TOBIT REGRESSIONS

The estimates of the Tobit regressions are reported in table 5.2[39]. Specification (1) is the results of Gelos et al. (2008) and shows that the size of a country, the GDP per capita, the CPIA index and the measures of volatility enter significantly with the expected sign. The number of sovereign default episodes is not significant, but number of years in default is as the authors expected. In addition, they find that the coefficient on market perceptions is significant and improves the fit of the regression. I do not report the regressions with market perception since I do not have data on this variable.

Specification (2) has market access measured as positive net transfers as the dependent variable. When we compare it with specification (1) we see that several estimates change in both significance and size. Population, GDP per capita, FDI to GDP, and Years in Default are no longer significant, while ICRG Political Risk[40] is now significant. This indicates that the results are sensitive to how we define market access, but the difference can also be a result of

[39] A full table that shows replication of Gelos et al. (2008) is found in table A5 in the Appendix.

[40] ICRG Political Risk is expected to have a positive sign because a higher score means lower political risk.

different data sources on the dependent variable. However, it is more likely that it is the definitions that give effect on the differences. This is because Gelos et al. (2008) also use data from GDF in addition to the data from Capital Bondware/Loanware. The variables on volatility and quality of policies are still significant and quality of policies has increased in magnitude. Gelos et al. (2008) also find that perceived quality of economic policies and institutions appear to influence the government's ability to tap the markets.

Specification (3) also has market access measured as positive net transfer as the dependent variable but the time period is extended and the 1980s are excluded[41]. The determinants of market access also change when we focus on this more recent time period. As expected, quality of policies still has a positive effect on market access, but it is now much stronger than in model (1) and (2)[42]. The two measures of liquidity, Exports to Debt Service and Short Term to Total Debt, are significant, but do not have the anticipated signs according to the "ability to pay" literature. This finding corresponds with the results in Gelos et al. (2008), and their conclusion is that liquidity does not help much in explaining market access.

The conditional moment tests show that the test statistics are lower than the critical values (see table 5.1) in both model (2) and (3). We do not reject the null hypothesis that the errors are normally distributed and we can expect that the estimators are consistent and efficient.

Table 5.1 Conditional Moment Test of Tobit Regressions

		Critical Values		
Model (2)	CM	10 %	5 %	1 %
	18.899	20.89	25.65	40.43
Model (3)	CM	10 %	5 %	1 %
	9.151	22.24	31.79	44.09

[41] There are only 3 and 9 censored observations in model (2) and (3), respectively. I ran OLS estimation on these regressions but there were not any major changes in the coefficients.

[42] I have also used narrower measures of quality of policies and institutions like the inflation rate, the budget deficit, and the current account, but these variables were not significant.

Table 5.2 Tobit, Dependent Variable: Market Access

		1	2	3
Concept	**Variable**	**1980-2000**	**1980-2000**	**1990-2008**
Size	Population	0.00046***	0.00021	0.000012
		(2.71)	(1.27)	(0.07)
Vulnerability/ Volatility	GDPperCap	0.000061**	-0.000035	-0.00002
		(1.99)	(-1.09)	(-0.73)
	StdGDPgrowth	-0.027**	-0.023**	-0.0034
		(2.61)	(-2.29)	(-0.24)
Links	Openness	-0.075	-0.038	-0.093
		(0.68)	(-0.43)	(-1.01)
	FDIinflow	2.631*	0.00026	0.010
		(1.95)	(0.06)	(1.53)
Quality of policies	ICRGInstitutions	##0.180***	0.465**	1.127***
		(2.99)	(2.14)	(3.07)
Political Risk	ICRG Pol risk#	-0.0025	0.070***	0.012
		(0.64)	(3.02)	(0.34)
Liquidity	Exp/Debtservice	-0.000032	0.000025	-0.001*
		(0.48)	(0.07)	(-1.75)
	Reserves	-0.020	0.003	-0.013
		(1.82)	(0.25)	(-1.25)
	Short/total debt	0.0061**	0.0043	0.012***
		(2.31)	(1.27)	(3.02)
Default History	Defaults	0.002	0.011	0.00036
		(0.06)	(0.31)	(0.01)
	Yrs in default	-0.010**	-0.0029	-0.008
		(2.24)	(-0.63)	(-1.26)
IMF programs	EFF	0.328	0.316	0.289
		(1.29)	(1.42)	(1.23)
	SBA	0.117	0.216	0.257*
		(0.89)	(1.44)	(1.69)
	PRGF	-0.576***	-0.341**	-0.184
		(2.77)	(-2.24)	(-1.52)
	No of observations	87	79	77
	No of cencored obs.	-	3	9
	Prob>chi2	-		0.0000
	CM-test: Prob > chi2	-	0.00008	0.010

Notes: (1) Tobit results of Gelos et al. (2008) from 1980-2000. (2) Tobit results with net transfers as dependent variable from 1980-2000. (3) Tobit results with net transfers as dependent variable from 1990-2008. The explanatory variables are calculated as averages of the sample period. The t-statistics are given in parentheses. A * denotes significant at 10 percent; ** significant at 5 percent; *** significant at 1 percent. # the ICRG Pol Risk index is replaced by the residual of a regression of ICRG Institutions on ICRG Pol Risk. ## The estimate of CPIA index.

5.2 PANEL DATA REGRESSIONS

With the tobit approach I have found country characteristics that determine the frequency of market access. However, the variables represent the average over the time periods. The advantage with the panel data analysis is that it shed light on the dynamics of market access. It can give us information about whether changes within countries over time improve or worsen access to the markets.

In the panel regressions I include the lagged stock of debt as an explanatory variable (in analogy to partial adjustment models for investment according to Gelos et al. 2008, p 16). To solve potential endogeneity problems I use lagged values of the explanatory variables, except for the variable measuring whether a country is currently in default (Unresolved default). The variables on default history are now dummies. Default equals one in the year a country defaulted and Unresolved Default equals one as long as a country is in a default episode. The variables on IMF programs are also dummies and are equal to one in the first year a country started a program.

Table 5.3 shows the fixed effect estimators with time dummies[43]. The results of Gelos et al. (2008) are shown in model (4). They find that Unresolved Default is significant and negative while Default is not. They interpret this as "being in default" has a negative impact on market access. Again, they find that Quality of Policies, Market Perception and GDP per Capita are significant and have positive effects on market access.

When I use the new definition on market access (shown in model 5), I get almost the same results as in the Tobit regressions. GDP per Capita and Quality of Policies are still significant with the expected sign. What is unusual, but which match up with my Tobit results, is that Political Risk and PRGF are now significant and have a negative impact on market access. None of the variables on Default History are significant with the new definition of market access, while measures of Liquidity enter significantly but not with the expected sign.

Model (6) shows the estimates for the period after 1990 and provides some surprising results. Now Default, which is a dummy for a default in the previous year, is significant and strongly negative, while Unresolved Default still is not significant. Quality of Policies is no longer significant, but GDP per Capita Growth is. Still, PRGF program is negative and significant, and again liquidity measures are significant but not with the expected sign. These results

[43] A full table is presented in the Appendix (table A6).

indicate that determinants of market access have changed over time, but some variables still remain important: Vulnerability, PRGF program and measures of Liquidity.

Table 5.3 Fixed Effects with Time Dummies, Dependent Variable: Market Access

		4	5	6
Concept	**Variable**	**1980-2000**	**1980-2000**	**1990-2008**
Indebtedness	Public Debt	-0.116**	-0.0001***	-0.0001***
		(2.52)	(-2.90)	(-3.79)
Vulnerability	GDPperCap	0.0007***	0.001***	0.0003
		(2.66)	(3.75)	(1.54)
	GDPCapGrowth	-0.023*	0.025	0.058**
		(1.73)	(1.09)	(2.29)
Links	Openness	0.357	0.623	0.835
		(0.27)	(0.78)	(0.94)
	FDI/GDP	-2.238	0.052	0.0081
		(0.28)	(0.41)	(0.25)
Quality of policies	ICRGinstitutions	##1.188***	1.735*	0.145
		(3.69)	(1.73)	(0.13)
Liquidity	Reserves	-0.300***	-0.051	-0.0117
		(2.82)	(-0.81)	(-0.19)
	Export/DebtService	-0.003	-0.023	-0.030**
		(0.75)	(-1.05)	(-1.99)
	Short/Total Debt	0.059**	0.074***	0.068***
		(2.44)	(3.32)	(3.32)
Political Risk	ICRG Pol Risk#	0.043*	0.151**	0.20
		(1.67)	(1.99)	(0.25)
Default history	Default	-1.690	-0.600	-1.768**
		(1.56)	(-1.03)	(-2.19)
	Unresolved Default	-0.920*	-0.251	-0.260
		(1.93)	(-0.91)	(-0.81)
IMF programs	EFF	-1.796*	0.712	0.708
		(1.89)	(1.42)	(1.15)
	SBA	-0.003	0.168	0.083
		(0.01)	(0.65)	(0.29)
	PRGF	1.124	-1.110***	-0.787**
		(1.31)	(-2.42)	(-2.06)
	Prob>chi2	-	0.0000	0.0000
	No of observations	514	806	856

Notes: (4) The fixed effect results of Gelos et al. (2008). (5) The fixed effect results with net transfers as dependent variable. (6) The fixed effect results with net transfers as dependent variable. The z-statistics are given in parentheses. A * denotes significant at 10 percent; ** significant at 5 percent; *** significant at 1 percent. # the ICRG Pol Risk index is replaced by the residual of a regression of ICRG Institutions on ICRG Pol Risk. ## The estimate of CPIA index. The regressions include time dummies.

5.2.1 Global Factors

I also test whether the results change as I include explanatory variables that represent global factors. The results are found in table A7 and A8 in the Appendix. I found that running these regressions with or without time dummies had little effect on the coefficients. LIBOR is only significant with the expected sign when time dummies are added and in 1990-2008. G7 GDP Growth is only significant in the same time period, and only when time dummies are excluded. Thus, it is not clear whether these variables can explain market access. Apriori, it is reasonable to argue that the time dummies should be included since they capture unobservable factors. Also, it is not a surprice that the international interest rate is statistically significant in the 1990-2008 period according to earlier literature (Calvo et al. 1996). The new regressions confirm some of my earlier findings. Again, GDP per capita, PRGF and Liquidity (Short Term to Total Debt) enters significantly in most regressions. Default is still significant and has a strong negative impact on market access after 1990. Quality of policies does not seem to be important after 1990 according to the panel data regressions.

5.3 SUMMARY OF THE RESULTS AND DISCUSSION

My analysis shows that the determinants of market access change when we use a new definition of market access. My results also show that the importance of several determinants tend to change over time. After 1990, perceived quality of policies and institutions is significant in the tobit model, but not in the panel data regressions. This can be a result of different estimation methods. In the tobit model we are not able to control for global factors, but earlier literature has shown that external factors were important in the beginning of the 1990s. If the creditors care less about domestic factors when there are good conditions in the global credit market, then it is reasonable that this variable will not be significant in the panel data regressions after 1990.

My results do not support the finding in Gelos et al. (2008) that “being in default” has a negative impact on market access. The variables Years in Default and Unresolved Default are not statistically significant in my regressions, but the dummy variable representing a default in the previous year is repeatedly significant and strongly negative after the 1980s.

A question of whether the two variables on default history represent the same arises. Is it likely that a country that has defaulted many times also spent many years in default? Or is it only in a few cases that a country will spend decades in default? If the two variables on

default history are close substitutes, then including them in the same regression can lead to estimates of unexpected sign and magnitude. The correlation coefficient between Years in Default and Defaults is 0.644 in 1980-2000, but only 0.227 in 1990-2008. This indicates that after the 1980s there is a much weaker relationship between the length of a default episode and the number of defaults. Given the correlation coefficients mentioned above, it should not be problematic to include the variables in the same specification, especially in the 1990-2008 period. Nor in the panel data regressions since the correlation coefficient between the variables on default history is only 0.247.

Why does a default in the previous year have a strong negative impact after 1990 whilst "being in a default" does not? This indicates that a debt crisis will scare away creditors but not for a long period. I have included more lags on this variable but the result is that a default two or three years previously is not statistically significant. According to earlier literature a country is usually excluded while being in default and for a short period after a restructuring has ended. Therefore the exclusion period should be at least 3-4 years, since I find that an average default episode lasts for 3.32 years in 1990-2008. However, Panizza et al. (2009) mention that

> *"most countries that defaulted in the 1980s received several reschedulings as well as "new money" lending from both private and official creditors. In this sense, capital market exclusion was not complete even during the renegotiation period. The same is true for more recent renegotiation periods, during which debtors typically both had access to official credit, and sometimes were able to issue domestic debt-including to international creditors-before a debt restructuring agreement has been concluded."* (p 675)

It is possible that my results support the statement that capital market exclusion has not been complete. If so, I do not find that capital market exclusion is an important cost of default.

Some of the variables remain significant throughout the analysis. Quality of policies and GDP per capita, seem to be very important determinants of market access. This is also one of the main conclusions in Gelos et al. (2008). They interpret GDP per capita as a measure of

vulnerability to shocks[44], but I have argued that it is more likely that it is an indicator of the development in a country.

Contrary to Gelos et al. (2008), I find that being in a PRGF program appears to negatively affect market access. There are several explanations for this. First, the programs impose strict limits on international borrowing in the private market. Second, participation in a IMF program can send signals of bad credit conditions and unstable macroeconomic performance. If so, it is only concessional programs that have this effect, since the non-concessional programs, EFF and SBA, are not statistically significant. Another reason for entering this program is if a country has had a bad shock. It is also possible that the PRGF variable is an indicator of countries that are dependent on official assistance. I also find some indication that Political Risk has a negative impact on market access which is not found in Gelos et al. (2008).

My results are also showing that liquidity is an essential determinant of market access, although not as the theory predicts. The findings are robust and coincide with the results in Gelos et al. (2008). Unfortunately, this is a variable that is not included in the "willingness to pay" literature which is the center of attention in my study. The argument in the "ability to pay" literature is that a higher level of short term debt increases the chances of a liquidity crisis, hence private lenders will be reluctant to give credit. I find that higher short term debt relative to total debt increases the chances of getting credit in the private market. A possible hypothesis is that if the ratio of short term debt to total debt decreases because the total debt has increased (i.e., the country borrowed more long term debt and/or IMF credit) then it diminishes the chances of getting new long term loans with private creditors. In other words, prioritizing repayment of long term debt or IMF credit might increase the chances of accessing the market. Another explanation for a positive relationship between short term debt to total debt and market access might be that countries with a high level of short term debt borrow more, simply because the debt is paid off quickly and new loans can be contracted. It is possible that creditors prefer those countries that repeatedly access the market because they have a well established reputation in the market. Gelos et al. (2004) mention in their first study, that short term debt can have, a priori, an ambiguous effect on market access. They

[44] They also have Agriculture to GDP as a measure of vulnerability but this variable is not used in the final specifications in their study.

argue that it can increase the likelihood of a liquidity crisis, but also make it more likely that a country will have to borrow at any given moment in time.

The ratio of exports to debt service is expected to positively affect market access according to the "ability to pay" literature because export earnings in foreign currency can be used to service the debt. My results show a negative relationship between this ratio and market access. This indicates that an increase in export earnings or a reduction in debt service reduces market access. The first does not seem reasonable. The second possibility is more intuitive because a reduction (increase) in debt service can worsen (improve) the creditworthiness of a country.

My results also raise the question of whether the measures of liquidity are suitable. It might be that the measures that I have used do not really reflect the liquidity situation in the country and therefore do not enter with the expected signs in the regressions.

6.0CONCLUSION

The goal of this thesis is to study the determinants of market access in the sovereign debt market. The theoretical literature on sovereign debt is trying to explain why countries have incentives to repay their loans in the absence of institutions that can enforce contracts with a sovereign. The "willingness to pay" literature has an ongoing debate on potential costs that will follow a default as explanations for repayment. The focus in my thesis is to analyse if exclusion after a default can give countries incentives to repay their loans. If so, then we can expect default history to negatively affect market access. However, it is a challenge to answer this question because of global factors that also influence whether a country can contract new loans.

The main findings in my analysis are

i) What determines market access is sensitive to how we define market access.
ii) Some determinants of market access change over time. I find that perceived quality of institutions and policies are not important after 1990 when I control for global credit cycles.
iii) I do not find that capital market exclusion is a strong punishment for default. Earlier literature shows that countries are excluded from the market during a default episode and for a short period after the fact. My results give an indication that there is even a weaker relationship between a debt crisis and market access in the 1990-2008 period.

In addition, I find that GDP per capita, perceived quality of policies and institutions, and PRGF programs are important determinants of market access. Obviously, lenders are concerned about the economic performance in a borrowing country and whether there are sound institutions and policies. These results do not distinguish themselves from earlier literature. Gelos et al. (2008) also conclude that vulnerability and quality of policies and institutions are important determinants. Reinhart et al. (2003) argue that countries with weak financial systems usually lose access to international capital markets.

A shortcoming in this study is the lack of data on market perceptions. Most literature finds that this is an important factor of market access. On the other side, this variable is also determined by those factors that can explain market access.

My results raise some interesting topics that can be studied further. First, I found that how we define market access has an impact on the estimates. Thus, further research on how to define market access is needed. This is not surprising as the literature is in its infant stage. Second, I found that measures of liquidity are significant and robust but not according to the theoretical hypothesis. Therefore, one might need to review the theory, or question the way we measure this variable. Lastly, further research is needed on which costs that follow a default. This can lead to a better understanding of the sovereign debt market.

APPENDIX

Table A1 Debtor Clubs by Countries in Reinhart et al. (2003)

Club A	Club B		Club C
Unites States	Malaysia	Turkey	Dominican
Japan	South Korea	Philippines	Jamaica
Canada	Portugal	Argentina	Bolivia
Norway	Saudi Arabia	Morocco	El Salvador
Singapore	Thailand	Jordan	Mali
Sweden	Greece	Egypt	Tanzania
Australia	Czech Republic	Paraguay	Ethiopia
Finland	Hungary	Panama	
Denmark	Chile	Poland	
Italy	South Africa	Romania	
Spain	India	Kenya	
Ireland	Indonesia	Costa Rica	
New Zealand	Mexico	Sri Lanka	
Hong Kong	Colombia	Ecuador	
	Israel	Nigeria	
	Venezuela	Peru	
	Algeria	Pakistan	
	Ghana	Swaziland	
	Brazil	Zimbabwe	
	Uruguay	Nepal	
	Papa New Guinea		

Table A2 Variable Descriptions and Data Sources

Concept	Variable	Description	Source
Size	GDP	Gross Domestic Product, current US$ (in billions)	WDI
	Population	Population (in millions)	WDI
Liquidity	Exports/debt service	Exports to debt service	WDI/GDF
	Reserves	International Reserves to month of imports	GDF
	Short Term Debt	Short term debt to total debt (percent)	WDI
Volatility/ Vulnerability	GDPperCap	GDP per capita, US$	WDI
	Agric/GDP	Share of Agriculture to GDP (percent)	WDI
	StdGDP Growth	Standard Deviation of GDP growth (10 yrs moving avg)	WDI
Quality of Policies and Institutions	ICRG Institutions	ICRG indicator of Quality of Government	QofG
	Deficit	Government Budget Deficit to GDP (percent)	QofG
	Inflation	Inflation, CPI (annual percent)	WDI
	Current Account	Current account balance to GDP (percent)	WDI
Links to world	FDI inflows	FDI net inflows (percent of GDP)	WDI
	FDIoutflows	FDI net outflows (percent of GDP)	WDI
	Openness	Openness (Exports+Imports /GDP)	WDI
Political risk	ICRG Pol Risk	ICRG Index of Political Risk	The PRS Group
IMF programs	SBA	=1 if in a program	IMF
	EFF	=1 if in a program	IMF
	PRGF	=1 if in a program	IMF
	SBAsign	=1 first year in program	IMF
	EFFsign	=1 first year in program	IMF
	PRGFsign	=1 first year in program	IMF
	SBAFr	Frequency of years in program	IMF
	EFFFr	Frequency of years in program	IMF
	PRGFFr	Frequency of years in program	IMF
Default History	Default	=1 first year in default	Reinhart&Reinhart (2008) Beim&Calomiris (2001)
	Unsolved Default	=1 during default episode	
	Defaults	Number of default episodes	
	Yrs Default	Number of years in default	
Global Factors	G7 GDP Growth	The average GDP growth rate of G7	WEO
	LIBOR	6 months LIBOR in real terms	WEO
	USA Growth	USA real growth in GDP	WEO

WDI=World Development Indicators, WEO= World Economic Outlook, GDF=Global Development Finance, IMF=International Monetary Fund, QofG= Quality of Government Dataset, WB= The World Bank

Table A3 Countries in the Sample

Countries in the Sample (Year of inclusion in sample)			
Afghanistan (1980)	Czech Republic (1993)	Korea Rep. (1980)	Samoa (1980)
Angola (1980)	Djibouti (1980)	Lao PDR (1992)	Sao T. & Principe(1980)
Albania (1990)	Dominica (1980)	Lebanon (1980)	Senegal (1980)
Algeria (1980)	Dominican Rep. (1980)	Lesotho (1980)	Serbia (1980)
Antigua & Barbuda(1980)	Ecuador (1980)	Liberia (1980)	Seychelles (1980)
Arab Rep. (1980)	Egypt Arab Rep.	Lithuania (1991)	Sierra Leone (1980)
Argentina (1980)	El Salvador (1980)	Latvia (1991)	Slovak Rep. (1993)
Armenia (1991)	Equatorial Guinea (1980)	Macedonia (1992)	Slovenia (1991)
Azerbaijan (1991)	Eritrea (1992)	Madagascar (1980)	Solomon Islands (1980)
Burundi (1980)	Estonia (1991)	Malawi (1980)	Somalia (1980)
Benin (1980)	Ethiopia (1980)	Malaysia (1980)	South Africa (1980)
Burkina Faso (1980)	Fiji (1980)	Maldives (1980)	St. Kitts & Nevis (1980)
Bangladesh (1980)	Gabon (1980)	Mali (1992)	St. Lucia (1980)
Bulgaria (1985)	Georgia (1991)	Mauritania (1980)	St. Vincent & the Gren.(1980)
Bahrain (1980)	Ghana (1980)	Mauritius (1980)	Sri Lanka (1980)
Bosnia & Herzegovina (1992)	Guinea (1980)	Mexico (1980)	Sudan (1980)
Belarus (1991)	Guinea-Bissau (1980)	Moldova (1991)	Suriname (1980)
Belize (1980)	The Gambia (1980)	Mongolia (1990)	Swaziland (1980)
Bolivia (1980)	Grenada (1980)	Montenegro (1980)	Tanzania (1980)
Brazil (1980)	Guatemala (1980)	Morocco (1980)	Tajikistan (1991)
Brunei Darussalam (1980)	Guam (1980)	Mozambique (1980)	Thailand (1980)
Bhutan (1980)	Guyana (1980)	Myanmar (1980)	Togo (1990)
Botswana (1980)	Honduras (1980)	Namibia (1980)	Tonga (1980)
Cambodia (1980)	Haiti (1980)	Nepal (1980)	Trinidad & Tobago (1980)
Central African Rep. (1980)	Hungary (1980)	Nicaragua (1980)	Tunisia (1980)
Chad (1980)	Indonesia (1980)	Niger (1980)	Turkey (1980)
Chile (1980)	India (1980)	Nigeria (1980)	Turkmenistan (1991)
China (1980)	Iran Islamic Rep. (1980)	Pakistan (1980)	Uganda (1980)
Cote d'Ivoire (1980)	Iraq (1980)	Panama (1980)	Ukraine (1991)
Cameroon (1980)	Israel (1980)	Papa New Guinea (1980)	Uruguay (1980)
Congo Dem. Rep. (1980)	Jamaica (1980)	Paraguay (1980)	Uzbekistan (1991)
Congo Rep. (1980)	Jordan (1980)	Peru (1980)	Vanuatu (1980)
Colombia (1980)	Kazakhstan (1991)	Philippines (1980)	Venezuela (1980)
Comoros (1980)	Kenya (1980)	Poland (1980)	Vietnam (1980)
Cape Verde (1980)	Kyrgyz Republic (1991)	Romania (1980)	Yemen Rep. (1980)
Costa Rica (1980)	Kiribati (1980)	Russian Fed. (1991)	Zambia (1990)
Croatia (1991)	Korea Dem. Rep. (1980)	Rwanda (1980)	Zimbabwe (1980)
Cyprus (1980)			

Notes: My sample consists of 149 countries. The combination of countries differs according to the dependent variable. Gelos et al. (2008) have data on 139 countries, while the data from GDF covers 129 countries. Gelos et al. (2008, p 21) have included socialist/communist countries after they initiated market reforms (see section 3.2.1). However, the classification of this group of countries is questionable. They have included countries from Europe and Africa, but it is not obvious that the ideology among these countries were the same. Nevertheless, they include the countries in the sample earlier if they observe that they have borrowed from the international market.

Table A4 Summary Statistics on Explanatory Variables

Variable	Obs	Mean	Std. Dev.	Min	Max
Population (mill)	3543	34.17	130.02	0.04	1311.80
GDPperCap	3254	1557.50	1766.03	69.12	14908.80
StdGDP growth	2753	4.86	3.91	0.48	45.35
Openness	3044	0.77	0.40	0.06	2.80
FDI/GDP	2905	3.07	9.55	-82.89	348.19
ICRGInstitutions	2227	0.453	0.166	0.042	0.944
ICRGPol Risk	1686	6.97	2.45	0.67	12
Exp/DebtService	2759	42.67	633.60	0	28964.33
Reserves	2649	3.36	2.81	-0.092	27.08
ShortTermDebt	2892	12.80	12.28	0	88.93
EFF	5403	1.22	2.29	0	9
SBA	5442	4.51	4.53	0	20
PRGF	5442	4.77	6.36	0	21
Public debt (mill)	3239	3305.01	10079.58	0	93631.41
GDPCapGrowth	3159	1.33	6.71	-50.49	90.07
LIBOR	4164	6.82	3.66	1.23	16.72
G7 GDP Growth	3596	2.26	1.08	0.31	4.77

Table A5 Tobit, Dependent Variable: Frequency of Market Access

		1	1b	2	2b	3
Concept	**Variable**	**1980-2000**	**1980-2000**	**1980-2000**	**1980-2008**	**1990-2008**
Size	Population	0.00046***	0.00044**	0.00021	0.00007	0.000012
		(2.71)	(2.33)	(1.27)	(0.52)	(0.07)
Vulnerability/ Volatility	GDPperCap	0.000061**	0.000039	-0.000035	-0.00005*	-0.00002
		(1.99)	(1.07)	(-1.09)	(-1.81)	(-0.73)
	StdGDPgrowth	-0.027**	-0.053***	-0.023**	-0.018	-0.0034
		(2.61)	(-4.18)	(-2.29)	(-1.61)	(-0.24)
Links	openness	-0.075	-0.208*	-0.038	-0.059	-0.093
		(0.68)	(-1.78)	(-0.43)	(-0.76)	(-1.01)
	FDIinflow	2.631*	0.0058	0.00026	0.007	0.010
		(1.95)	(0.86)	(0.06)	(1.35)	(1.53)
Quality of policies	ICRGInstitutions	##0.180***	0.851***	0.465**	0.823***	1.127***
		(2.99)	(3.14)	(2.14)	(3.34)	(3.07)
Political Risk	ICRG Pol risk#	-0.0025	-0.0012	0.070***	0.050**	0.012
		(0.64)	(-0.04)	(3.02)	(2.21)	(0.34)
Liquidity	Exp/Debtservice	-0.000032	0.000028	0.000025	-0.00003	-0.001
		(0.48)	(0.07)	(0.07)	(-0.20)	(-1.75)*
	Reserves	-0.020	-0.030**	0.003	-0.004	-0.013
		(1.82)	(-2.30)	(0.25)	(-0.37)	(-1.25)
	Short/total debt	0.0061**	0.0033	0.0043	0.008***	0.012***
		(2.31)	(0.83)	(1.27)	(3.09)	(3.02)
Default History	Defaults	0.002	0.014	0.011	0.009	0.00036
		(0.06)	(0.36)	(0.31)	(0.34)	(0.01)
	Yrs in default	-0.010**	-0.012**	-0.0029	-0.005	-0.008
		(2.24)	(-2.35)	(-0.63)	(-1.54)	(-1.26)
IMF programs	EFF	0.328	0.645**	0.316	0.547**	0.289
		(1.29)	(2.54)	(1.42)	(2.21)	(1.23)
	SBA	0.117	-0.096	0.216	0.411***	0.257*
		(0.89)	(-0.57)	(1.44)	(2.78)	(1.69)
	PRGF	-0.576***	-0.798***	-0.341**	-0.213*	-0.184
		(2.77)	(-4.11)	(-2.24)	(-1.74)	(-1.52)
	No of obs.	87	79	79	80	77
	No of sencored obs.	-	17	3	3	9
	Prob>chi2	-	0.0000	0.000	0.0000	0.0000

Note: The t-statistics are given in parentheses. The explanatory variables are calculated as averages of the sample period. A * denotes significant at 10 percent; ** significant at 5 percent; *** significant at 1 percent. # the ICRG Pol Risk index is replaced by the residual of a regression of ICRG Institutions on ICRG Pol Risk. ## The estimate of CPIA index. (1) is a copy of Gelos et al. (2008). (1b) is my replication of their results. (2) Tobit results with net transfers as dependent variable from 1980-2000. (2b) Tobit results with net transfers as dependent variable from 1980-2008 (3) Tobit results with net transfers as dependent variable from 1990-2008.

Table A6 Fixed Effect with Time Dummies, Dependent Variable: Market Access

		4	4b	5	5b	6
Concept	**Variable**	**1980-2000**	**1980-2000**	**1980-2000**	**1980-2008**	**1990-2008**
Indebtedness	Public Debt	-0.116**	0.0002	-0.0001***	-0.0001***	0.0001***
		(2.52)	(1.37)	(-2.90)	(-3.95)	(-3.79)
Vulnerability	GDPperCap	0.0007***	0.002***	0.001***	0.001***	0.0003
		(2.66)	(4.12)	(3.75)	(3.90)	(1.54)
	GDPCapGrowth	-0.023*	0.026	0.025	0.038	0.058**
		(1.73)	(0.77)	(1.09)	(1.91)*	(2.29)
Links	Openness	0.357	2.202	0.623	1.509**	0.835
		(0.27)	(1.61)	(0.78)	(2.43)	(0.94)
	FDI/GDP	-2.238	-0.002	0.052	0.037	0.0081
		(0.28)	(-0.04)	(1.41)	(1.20)	(0.25)
Quality of policies	ICRGinstitutions	##1.188***	1.207	1.735*	1.666**	0.145
		(3.69)	(0.17)	(1.73)	(2.03)	(0.13)
Liquidity	Reserves	-0.300***	0.040	-0.051	-0.044	-0.0117
		(2.82)	(0.40)	(-0.81)	(-0.90)	(-0.19)
	Export/DebtService	-0.003	-0.0004	-0.023	-0.035***	-0.030**
		(0.75)	(-0.14)	(-1.05)	(-2.63)	(-1.99)
	Short/Total Debt	0.059**	0.018	0.074***	0.061***	0.068***
		(2.44)	(0.80)	(3.32)	(3.74)	(3.32)
Political Risk	ICRG Pol Risk#	0.043*	0.263**	0.151**	0.092	0.20
		(1.67)	(2.31)	(1.99)	(1.45)	(0.25)
Default history	Default	-1.690	-0.654	-0.600	-0.644	-1.768**
		(1.56)	(-0.95)	(-1.03)	(-1.26)	(-2.19)
	Unresolved Default	-0.920*	-0.214	-0.251	-0.472**	-0.260
		(1.93)	(-0.52)	(-0.91)	(1.96)	(-0.81)
IMF programs	EFFstart	-1.796*	0.828	0.712	0.518	0.708
		(1.89)	(1.17)	(1.42)	(1.09)	(1.15)
	SBAstart	-0.003	0.177	0.168	0.023	0.083
		(0.01)	(0.52)	(0.65)	(0.10)	(0.29)
	PRGFstart	1.124	-0.077	-1.110***	-0.734**	-0.787**
		(1.31)	(-1.16)	(-2.42)	(-2.15)	(-2.06)
	Prob>chi2	-	0.0000	0.0000	0.0000	0.0000
	No of observations	514	549	806	1143	856

Notes: The z-statistics are given in parentheses. A * denotes significant at 10 percent; ** significant at 5 percent; *** significant at 1 percent. # the ICRG Pol Risk index is replaced by the residual of a regression of ICRG Institutions on ICRG Pol Risk. ## The estimate of CPIA index. (4) is a copy of Gelos et al. (2008). (4b) is my replication of their results. (5) The fixed effect results with net transfers as dependent variable, 1980-2008. (5b) The fixed effect results with net transfers as dependent variable, 1980-2008. (6) The fixed effect results with net transfers as dependent variable, 1990-2008.

Table A7 Fixed Effect: Robust Test on Global Factors, with Time Dummies

Dependent Variable: Market Access Measured by Net Transfers

		7	8	9
Concept	**Variable**	**1980-2000**	**1980-2008**	**1990-2008**
Indebtedness	Public debt	-0.0001***	-0.0001***	-0.0001***
		(-2.90)	(-3.95)	(-3.73)
Vulnerability	GDPperCap	0.0009***	0.0006***	0.0003**
		(3.75)	(3.90)	(1.54)
	GDPCapGrowth	0.025	0.038*	0.058
		(1.09)	(1.91)	(2.29)
Links	Openness	0.623	1.509**	0.835
		(0.78)	(2.43)	(0.94)
	FDI/GDP	0.052	0.037	0.008
		(1.41)	(1.20)	(0.25)
Quality of policies	ICRGInstitutions	1.735*	1.666**	0.145
		(1.73)	(2.03)	(0.13)
Liquidity	Reserves	-0.051	-0.044	-0.012
		(-0.81)	(-0.90)	(0.19)
	Exp/DebtService	-0.023	-0.035***	-0.030**
		(-1.05)	(-2.63)	(-1.99)
	Short/Total Debt	0.074***	0.061***	0.068***
		(3.32)	(3.74)	(3.32)
Political Risk	ICRGPol Risk#	0.015**	0.092	0.020
		(1.99)	(1.45)	(0.25)
Default history	Default	-0.598	-0.644	-1.768**
		(-1.03)	(-1.26)	(-2.19)
	UnresolvedDefault	-0.251	-0.472**	-0.260
		(-0.91)	(-1.96)	(-0.81)
IMF programs	EFFstart	0.712	0.518	0.708
		(1.42)	(1.09)	(1.15)
	SBAstart	.0168	0.023	0.083
		(0.65)	(0.10)	(0.29)
	PRGFstart	-1.110**	-0.734	-0.079**
		(-2.42)	(-2.15)**	(-2.06)
Global Factors	LIBOR	0.060	0.091	-0.270***
		(0.36)	(-0.93)	(-2.71)
	G7 GDPgrowth	-0.080	0.187	0.134
		(-0.32)	(1.36)	(0.57)
	Prob>chi2	0.0000	0.0000	0.0000
	No of observations	806	1146	856

Notes: The z-statistics are given in parentheses. A * denotes significant at 10 percent; ** significant at 5 percent; *** significant at 1 percent. # the ICRG Pol Risk index is replaced by the residual of a regression of ICRG Institutions on ICRG Pol Risk.

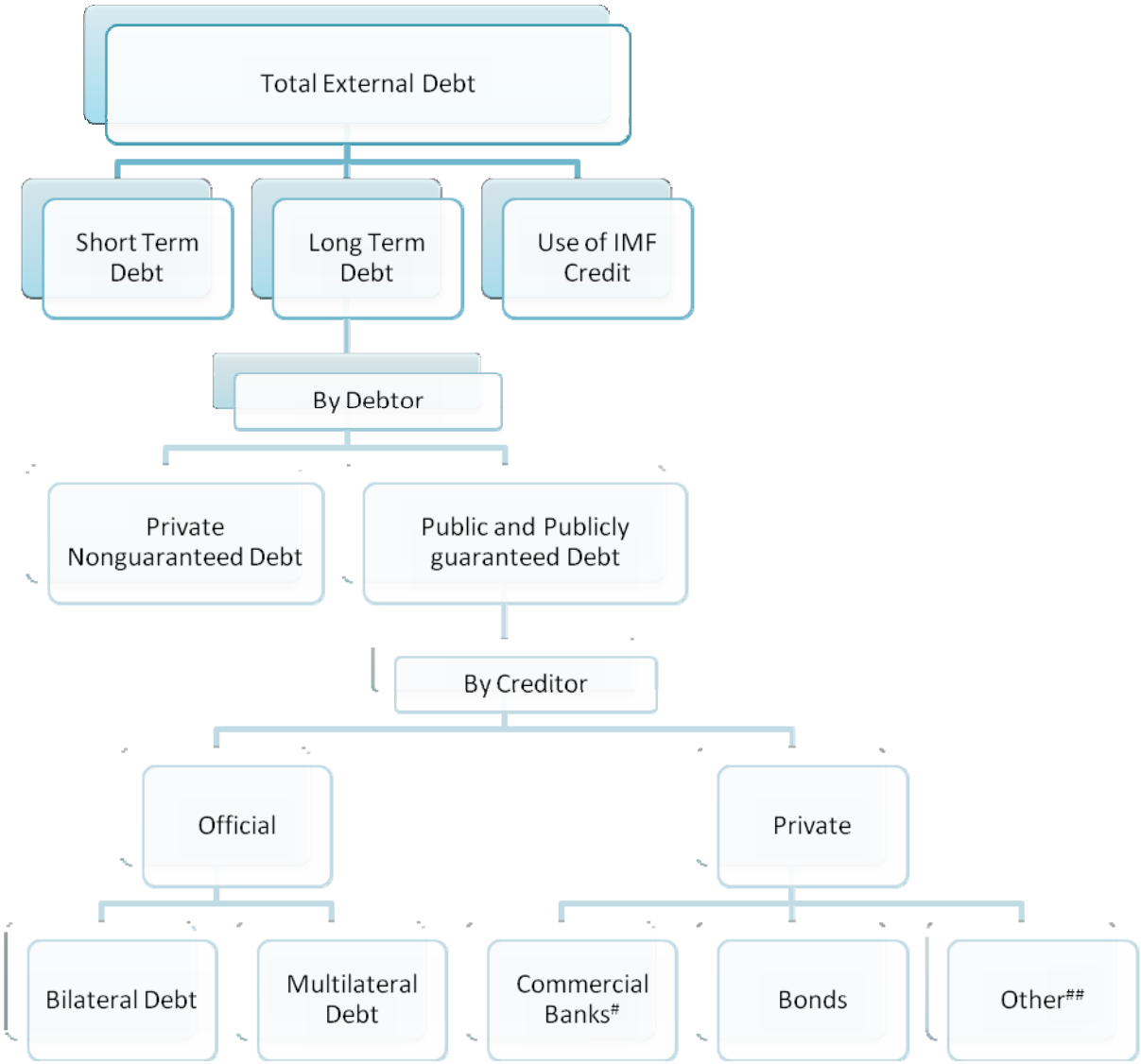
Table A8 Fixed Effect: Robust Test on Global Factors, without Time Dummies

Dependent Variable: Market Access Measured by Net Transfers

		10	11	12
Concept	**Variable**	**1980-2000**	**1980-2008**	**1990-2008**
Indebtedness	Public debt	-0.0001***	-0.0001***	-0.00009***
		(-3.22)	(-4.10)	(-3.59)
Vulnerability	GDPperCap	0.0009***	0.0007***	0.0004**
		(4.13)	(4.3)	(2.07)
	GDPCapGrowth	0.035	0.058***	0.083***
		(1.55)	(3.00)	(3.37)
Links	Openness	0.642	1.367**	0.993
		(0.84)	(2.35)	(1.22)
	FDI/GDP	0.040	0.034	0.002
		(1.07)	(1.15)	(0.06)
Quality of policies	ICRGInstitutions	1.793*	1.336*	-0.061
		(1.94)	(1.82)	(-0.06)
Liquidity	Reserves	-0.056	-0.027	0.025
		(-0.91)	(-0.58)	(0.42)
	Exp/Debt Service	-0.034	-0.014	-0.009
		(-1.50)	(-1.43)	(-0.86)
	Short/Total Debt	0.068***	0.055***	0.064***
		(3.20)	(3.56)	(3.17)
Political Risk	ICRG Pol Risk#	-0.003	-0.070	-0.112**
		(-0.05)	(-1.56)	(-2.16)
Default history	Default	-0.783	-0.706	-1.603**
		(-1.34)	(-1.41)	(-2.12)
	UnresolvedDefault	-0.133	-0.360	-0.243
		(-0.51)	(-1.58)	(-0.81)
IMF programs	EFFstart	0.749	0.601	0.832
		(1.51)	(1.30)	(1.36)
	SBAstart	0.170	0.054	0.136
		(0.67)	(0.25)	(0.48)
	PRGFstart	-1.036**	-0.553*	-0.615*
		(-2.30)	(-1.68)	(-1.67)
Global factors	LIBOR	-0.049	-0.034	-0.078
		(-0.58)	(-0.62)	(-1.18)
	G7 GDPgrowth	-0.008	0.088	0.239*
		(-0.07)	(0.86)	(1.72)
	Prob>chi2	0.0000	0.0000	0.0000
	No of observations	806	1146	865

Notes: The z-statistics are given in parentheses. A * denotes significant at 10 percent; ** significant at 5 percent; *** significant at 1 percent. # the ICRG Pol Risk index is replaced by the residual of a regression of ICRG Institutions on ICRG Pol Risk.

Figure A1 Components of External Debt



Source: "External Debt Statistics: A Guide for Compilers and Users (2003). # include private banks and other private financial institutions. ## include private credits from manufacturers, exporters, and other suppliers of good and bank credits covered by a guarantee of an export credit agency.

IMF lending programs

A Stand-by Arrangement (SBA) is designed to help countries to address short term balance of payment problems and lasts for 12-24 months. Repayment is due within 3¼-5 years of disbursement and disbursements are made conditional on meeting the targets of the program. The SBA has existed since 1952 when the IMF was created, but was upgraded in 2009 to be more flexible and responsive to the needs of member countries. The Extended Fund Facility (EFF) was established in 1974 and aims at helping countries address longer terms balance of

payment problems which requires fundamental economic reform. Thus, arrangements usually last for 3 years and repayment is due within 4½-10 years from date of disbursement. The Poverty Reduction and Growth Facility (PRGF) was first established as the Structural Adjustment Facility (SAF) in 1987. Then it was enlarged and extended in 1994, and further strengthened in 1999 when it was called PRGF. These facilities provide medium-term support to low income countries with balance of payment problems. Currently it carries a zero interest rate, with a grace period of 5½ years and a final maturity of 10 years. They support country-owned programs aimed at achieving a sustainable macroeconomic position in line with strong and durable poverty reduction and growth. PRGF was succeeded by the Extended Credit Facility (ECF) in January 2010 (IMF 2010).

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