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Impact of Pension Privatization on Foreign Direct Investments: a Study of the Latin American Experiment

Christopher Reece* and Abdoul G. Sam**

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*PhD student in the Department of Sociology, University of Pennsylvania.

**Assistant professor in the Department of Agricultural, Environmental, and Development Economics at the Ohio State University. Correspondence: Abdoul G. Sam, Agricultural Administration Building, Room # 238, The Ohio State University, 2120 Fyffe Rd, Columbus, OH 43210, Email: sam.7@osu.edu, Phone: (614) 247-8647, Fax: (614) 292-7710.

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Abstract

We explore the causal effect of market-oriented pension reform on net foreign direct investment (FDI) inflows in Latin America, which has experienced a wave of pension privatization and FDI in the last two decades. With our balanced panel of 17 countries over the 1991-2006 period, we implement fixed effects models, controlling for the endogenous decision to enacted full or partial privatization of the public pension system and several other covariates whose choice is informed by the rich empirical literature on FDI. Our econometric results indicate that privatization triggers a significant increase in net FDI inflows within a year of reform implementation and that the effect does not wane over time. We estimate that privatization increases FDI as a percentage of GDP by between 41 and 47%, *ceteris paribus*.

1. Introduction

In 1981, the military dictatorship of Augusto Pinochet unveiled the centerpiece of its dramatic neoliberal agenda: the privatization of Chile's national pension system. With this globally unprecedented act, the government closed the public pension system--its largest public program--to new workers, redirecting the revenues into a system of individualized retirement accounts. In the subsequent decade, Chile experienced high growth rates while most Latin American countries stagnated (Kurtz 1999). Moreover, the solvency of the public pension system was seriously jeopardized in several countries due, among other factors, to a continual decline of the workers to pensioners' ratio, increase longevity, cost-of-living adjustments, high evasion rates spurred by high payroll taxes, and built-in weaknesses of the public system (Kay 2000a).¹ Together, the apparent success of the Chilean privatization initiative and the looming bankruptcy of several public pension programs provided a strong impetus for reform. Peru implemented a privatization scheme in 1993, followed in 1994 by Argentina and Columbia. In 1994, the World Bank launched an international campaign in support of a market-oriented 'three pillar model' for pension reform, based on the Chilean example. Free technical assistance was offered to any client willing to adopt the measure. By 2005, 25 governments worldwide had adopted some form of pension privatization; 10 of these were in Latin America (Brooks 2007a).²

Chile's pioneering experiment and the World Bank's advocacy for similar pension reform have spurred an active debate among scholars about the macroeconomic effects of pension privatization (e.g., Feldstein 1995, Orszag and Stiglitz 1999, Catalan et

¹ For example, it was estimated that for the Argentinean PAYGO system to pay the benefit rates of 1995 at the legal 70% replacement rate, it would require an increase of the participant workforce by 159% (Schulthess and Demarco, 1993: p 123).

² Argentina, Bolivia, Chile, Columbia, Costa Rica, Dominican Republic, El Salvador, Mexico, Peru, and Uruguay.

al. 2000; Kay 2000; Catalan 2004). For example, some economists argue that by channeling savings into domestic securities markets, privatization can develop capital markets, attract foreign capital (Kay 2000) and stimulate growth (Feldstein 1995, Catalan 2004). Indeed, Catalan et al. (2000) find a positive empirical correlation between the changes in the ratio of pension funds to gross domestic product (GDP) and the ratio of stock market capitalization to GDP for several countries.

In this paper, we concern ourselves with an important facet of this debate which pertains to the relationship between privatization and Foreign Direct Investments (FDI). The literature on the determinants and effects of FDI is one of the most active in International Economics. Of particular interest to us, a number of empirical papers find evidence of salutary effects of FDI on growth (Borensztein et al. 1998; Xu 2000; Alfaro et al. 2003, Blomstrom and Kokko 2003) and productivity (see Lipsey 2002 for survey) for host countries. Yet to our best knowledge, no previous work has sought to empirically ascertain the effects of pension privatization on FDI flows. We confine our empirical analysis to Latin America where both pension reform and FDI inflows have been intense over the last two decades. Of the 18 countries that adopted pension privatization between 1980 and 2000, half are in Latin America (Brooks 2005). Over the same period, the average annual FDI flows into Latin American and Caribbean countries grew almost 9-fold, from \$5.96 billion (0.78% of GDP) in the 1980s to \$52.16 billion in the 1990s (2.52% of GDP).

Academics have advanced a number of arguments suggestive of a positive causal link between pension privation and FDI flows. First, unlike public or Pay-as-You-Go (PAYGO) systems which are characterized by large contributions from employers, privatization was generally accompanied with reductions in employer tax rates, much to

the delight of investors (Dion 2006). Second, pension reform may ease fears from foreign investors that social security tax rates would be increased in the future to maintain solvency of the PAYGO system. Third, pension privatization may be a way to send a favorable signal to foreign investors, as it demonstrates a commitment to fiscal responsibility and market-friendly reform (Maxfield 1997, Kay 2000a). On the other hand, privatization has a significant transition cost in the short to medium terms since the state must continue to fund existing pensioners while forfeiting revenues that were previously used for this purpose (Brooks 2007, Cuevas 2008).³ The state must finance this transition cost through some combination of debt and inflation, which in turn could spur capital flight as leery international investors divest. This argument suggests a negative link between pension privation and FDI flows.

In light of this discussion, the purpose of this research is to test the empirical validity of these competing claims. Among the countries that chose to privatize, was privatization associated with less FDI thanks to the hefty transition costs? Or, did foreign investors respond favorably to the policy change, seeing beyond the transition costs and recognizing it as a favorable signal? To answer these questions, we gather a balanced panel data of 17 Latin American countries from 1991 to 2006 and implement panel data econometric methods, controlling for the effects of privatization and other relevant covariates from the literature. We use two variables to control for the effects of pension reform on FDI flows. The first is a dummy variable which captures the decision to privatize. The second is a continuous variable which measures the intensity of

³ The transition period can be very long and costly; for example, Chile's transition costs average about 6% of GDP over the 1981-1999 period and are expected to reach 4.3% of GDP from 1999 to 2037 (Kay 2006; Devesa-Carpio and Vidal-Melia 2002) in large part because of a minimum pension program for individuals who, over 20 years or more of contribution, fail to accumulate a state-determined minimum pension fund. In Argentina, transition costs were responsible for almost half of the increase in public debt between 1993 and 2000 (Mitijascic and Kay 2006).

privatization. This measure of intensity is desirable due to substantial variation among those countries that chose to enact privatization; some countries dismantled the public pension system altogether, while others left a substantial public component in place. In our model, intensity is measured as the percentage of pension income that is derived from an average pensioner's private account following the enactment of reform. For this measurement, we use a simulation carried out by Brooks (2009) which weighs an average worker's projected public benefits against her projected payments from her private account. In countries where *full* privatization is enacted and the public system is dismantled entirely, the intensity measure is 100%, as pensioners must rely exclusively on private accounts. We use country-invariant effects as well as instrumental variables to account for the endogeneity of privatization in our econometric specifications. Our period of study encompasses the timing of pension privatization for all countries included in the model.

Our analysis reveals that pension privatization spurs a statistically and economically significant boost to FDI inflows; we also find that while this impact occurs in the immediate aftermath of privatization, it does not vanish over time. That pension privatization is another avenue to attract FDI inflows is important policy-wise given the empirical evidence that FDI inflows positively impact growth and productivity.

The paper is structured as follows. In section 2, we provide a brief literature review of pension privatization and discuss its effects on FDI inflows. In section 3, we present the hypotheses tested in the paper and the econometric model. In section 4 we present descriptive statistics of our data. Section 5 presents the results of the econometric estimation; section 6 concludes.

2. Background and Hypotheses

2.1 Background

The PAYGO model remains the prevailing form of public pension provision, and thus, the object of market-oriented pension reform. Under the PAYGO system, current workers make regular payroll contributions to a public pension fund, managed by the government, which is used to support current retirees. Under “three pillar model” for reform recommended by the World Bank, this public fund is dismantled and mandated worker contributions are redirected into individualized accounts. These accounts are invested in stocks and bonds under the care of independent fund managers, and used to support their respective owners upon retirement. This private system comprises the most prominent pillar of the three pillar model. The second pillar is a modest welfare fund to mitigate old age poverty, and the third is a savings plan for those individuals who wish to make additional contributions beyond those mandated by the first pillar (World Bank 1994). Latin American states have shown considerable variation in the implementation of this model. In some countries, such as Mexico, the private scheme has replaced the public fund entirely, while in others, such as Argentina and Uruguay, a private accounts system has been established alongside the preexisting public fund, and some workers have been allowed to choose remain under the public system (Brooks 2009).

According to the World Bank (1994) and other advocates (see e.g., Orszag and Stiglitz 1999 for a review), privatization offers three types of potential advantages over the PAYGO system. First, privatization may improve the financial performance of pension schemes and the reliability of old-age benefits. Performance may be improved in two respects: administrative costs are reduced and private portfolio accounts yield potentially higher earnings (Palacios and Whitehouse 1998). Reliability is improved by

removing the fiscal challenges associated with demographic flux as the retiree-to-worker ratio increases.

Second, by linking each individual's contributions to the benefits she will receive, the World Bank (1994) claims that privatization eliminates the "perverse redistributions"—both intragenerational and intergenerational—of the PAYGO model. Intergenerational redistributions become problematic when demographic flux forces a relatively small number of workers to support a relatively large number of pensioners; intragenerational redistributions can cause labor-market distortions, such as an increased demand for jobs in the informal sector, where payroll taxes may be avoided.

Third, proponents argue that pension privatization may spur economic growth. By redirecting the flow of retirement savings into local securities markets, pension reform stimulates financial innovation at the local level, leading to increases in both the aggregate supply of capital and the efficiency of its use (Gill 2005). These conditions facilitate growth (World Bank 1994; Feldstein 1995) as an empirical link between capital market development and economic expansion is well-established in the literature (see, e.g., Levine and Zervos, 1998; Beck and Levine, 2001). An increased supply of domestic investment also reduces dependence on foreign capital, decreasing a country's vulnerability to global economic shocks (Vittas 2000). Catalan et al. (2000) find empirical evidence of positive link between the ratio of pension funds to GDP and the ratio of stock market capitalization to GDP for several countries.

Skeptics have challenged many claims about the purported macroeconomic benefits of pension privatization. In particular, Orszag and Stiglitz (1999) refute many of these alleged privatization benefits which they call "myths". Among others, their list of

ten “myths” includes (i) the notion that privatization spurs higher national savings and that (ii) private pension accounts earn a higher rate of return than the PAYGO system.

2.2 Hypotheses

In the 1980s, the Latin American debt crisis triggered widespread structural reform and an end of protectionist policies which in turn pressured employers to cut soaring wage costs in the face of in ever more competitive markets. Liberalization of trade and capital accounts also resulted in increasingly volatile capital flows (Brooks 2007a) with international investors chasing after high return opportunities. Pension privatization became viewed as a way to reduce wage costs and deter capital flight (Kay 2000a). Whereas the PAYGO systems required large contributions from employers, privatization brought reductions in employer tax rates (Dion, 2006).⁴ Even if would-be direct investors were not deterred by the present rates, the looming insolvency of several PAYGO systems produced fears that rates would be increased in the future; pension reform was viewed as a way to alleviate these concerns. Furthermore, pension privatization was seen as a way to send a strong favorable signal to foreign investors as it demonstrated a commitment to fiscal responsibility and market-friendly reform (Maxwell 1997; Kay 2000a). We therefore posit that countries that enacted pension reform should have experienced higher FDI inflows in the short term, hence our key hypothesis:

H1: Pension Privatization prompts increased net FDI inflows

While acknowledging that pension privatization brought compelling incentives to foreign investors, Brooks (2007a) notes that such reform is also extremely costly in the short-term. Upon implementation, the state must continue to fund existing pensioners who rely

⁴ In Chile, the employer share of payroll taxes were eliminated as part of pension reform; payroll taxes for the employer were also lowered in Uruguay (Kay 2000a).

on the previous system while forfeiting the revenues that were previously used for this purpose, as they are redirected into the new private accounts (Cuevas 2008). In the absence of a large fiscal surplus, the state must finance this transition cost through some combination of debt and inflation—a highly unfavorable recourse in the eyes of foreign investors. Large fiscal deficits brought about by pension reform and resultant economic shocks could in principle both deter capital inflows and trigger capital flight, as leery investors turn elsewhere. If so, pension reform could reduce net FDI inflows, contrary to our main premise. We therefore consider a competing hypothesis:

H2: Pension Privatization prompts decreased net FDI inflows

However, the potential for capital flight following privatization may be tempered by a final consideration: domestic policymakers may strategize in order to limit the economically disruptive effects of reform. Based on a series of case studies, Brooks (2007a) concludes that the decision of whether to privatize was driven by a cost-benefit analysis, where long-term benefits were weighed against the policy's transition costs. In cases where these costs presented an unacceptably large fiscal shock, governments chose to retain the PAYGO model. Where short-term costs were high but not prohibitive, policy-makers chose to privatize, but limited the degree of privatization in proportion to the magnitude of transition costs. In these cases, a large public fund was often maintained alongside the new individual accounts (Brooks 2007a). Finally, in cases where a pre-existing budget surplus could readily provide for short-term costs, policy-makers chose to enact more comprehensive forms of pension privatization.

3. Data and Descriptive Statistics

We gather a panel data with annual observations for 17 Latin American countries from 1991-2006.⁵ Allowing for lagging, we have a balanced panel of 17 countries and 15 observations per country for a total of 255 observations. Table 1 displays the countries used in the study, indicating the year of reform for those countries that have enacted privatization. The countries considered in our analysis that have adopted privatization did so within the time span of the dataset; consequently they appear in the data first as non-privatized. We have two sources of identification of the “treatment” effect; pre-reform data for nine countries that ultimately privatized, and data on eight countries that chose not to privatize. In addition, for the privatized countries, the table displays the intensity of reform, measured as the percentage of an average worker’s pension income derived from her private account. A 100% in this column indicates full privatization and the complete dismantling of the public pillar.⁶ Descriptive statistics are presented in Tables 2a and 2b. Table 2a displays mean values of FDI as a percentage of GDP and the seven control variables for privatized and non-privatized countries, while Table 2b displays mean values before and after the enactment of privatization only for countries that have privatized. In a statistical sense, most of the variables have significantly different means for privatized than for non-privatized countries. In particular, the sample average of FDI inflows as a percentage of GDP is larger for reformers than for non-reformers. A similar difference appears in Table 2b, with privatized countries experiencing a higher average FDI/GDP after privatization has been enacted.

⁵ Chile is excluded from our list of countries because of the lack of variability in the pension privatization variable; Chile implemented its reform in 1981--10 years prior to the start of our dataset.

⁶ We are grateful to Sarah Brooks for generously providing us with her dataset on pension reform in Latin America.

In addition, as shown in table 2a, privatized and non-privatized countries have significantly different mean values for several control variables, with privatized countries experiencing a lower average level of debt service, a lower average level of trade openness, a higher average GDP per capita, a lower average level of inflation, and a higher number of per-capita telephone lines. In sum, a coarse look at our data provides some preliminary confirmation of our conjecture in Hypothesis 1, but more importantly, motivates a more careful econometric analysis of the data, a task to which we now turn.

4. Econometric Model

We examine the impact of pension privatization on FDI by estimating the following reduce form equation

$$Y_{it} = \beta_1 P_{it} + \beta_2 X_{it} + u_i + \varepsilon_{it}$$

where the dependent variable is net FDI inflows as a percentage of GDP as commonly done (Asiedu 2002). As a net figure, the dependent variable may be negative; it is possible for de-investment outflows to outweigh investment inflows in a given year. However, this is not frequently the case in our dataset; the overwhelming majority the figures carry positive values, indicating net inflows of FDI in most years. P_i is a measure of pension privatization, X_i is a vector of covariates anticipated to explain FDI flows, β_1 and β_2 are model parameters, ε_{it} is an error term, and u_i represent omitted country-invariant effects. We capture the effects of privatization in two ways. First, we include a binary variable (PRIVATE) set equal to one for a given observation if a country has implemented some form of pension privatization by the given year of the observation. Second, we use the degree of privatization (INTENSITY) which allows us to examine whether the relationship between pension reform and FDI, if any, is subject to the degree

of privatization enacted. This variable measures the projected percentage of pension income that will be derived from the average pensioner's private account following the implementation of reform. Because pension reform effects may wane over the course of time, we attempt to distinguish between short term and mid-to-long-term effects of privatization. This is done by constructing four privatization variables that measure the annual incremental effect of privatization on FDI within the first three years of implementation (short term) and the incremental effect afterward.⁷

In addition to the effects of pension reform we include several additional covariates whose choice is informed by a rich empirical literature on FDI (see e.g., Asiedu 2002, Biswas, 2002; Amaya and Rowland, 2003). First, previous empirical work includes GDP per capita as an explanatory of FDI inflows; we do likewise. This variable serves as a proxy for both economic development and market size (as GDP per capita is highly correlated with GDP).⁸ Empirical evidence on the impact of per capita income is mixed; Schneider and Frey (1985) Tsai (1994), Lipsey (1999), Root and Ahmed (1979) Amaya and Rowland (2003) find that a higher GDP per capita spurs FDI inflows--

⁷ Let P_{it} be the privatization dummy variable for country i in year t (taking a value of zero for all years other than t and countries other than i), then we construct our four regressors as follows:

$$\text{PRIVATE } \tau = \sum_{t=\tau}^{2005} P_{it}, \tau = 1, 2, 3, \text{ and } 3 \text{ where } \tau = 1 \text{ represents the first year of implementation of}$$

pension reform. Defined as such, the variable PRIVATE1 captures the change in net FDI inflows (as a percentage of GDP) that occurred in the first year of implementation that is attributable to pension reform; similarly PRIVATE2 (PRIVATE3) measure the change in net FDI inflows that occurred in the second (third) year of implementation while PRIVATE4 measures the average annual change in FDI from four years into implementation to 2005, the end of time series that is attributable to pension reform.

⁸ In our data, the correlation coefficient between GDP per capita and GDP is 0.57.

suggesting that foreign investors prefer larger, more developed economies--while Asiedu (2002), Edwards (1990), and Japersen et al. 2000 find the opposite.⁹

Second, in addition to a high level of development and market size, foreign investors stand to reap higher returns in a growing economy. Amaya and Rowland (2003) and Edwards (1990) find a positive relationship between GDP growth and FDI; we therefore control for the effects of economic growth on FDI by including GDP growth as an annual percentage.

Third, researchers and analysts commonly use inflation as a proxy for macroeconomic stability (Grosse 1997a; Amaya and Rowland, 2003, Asiedu 2002) and for wage costs (Grosse 1997a). As high inflation rates are associated with a low level of macro-economic stability and increase in wage costs, we expect inflation to be negatively correlated with FDI. We note, however, that empirical studies have generally not found inflation to be a significant predictor of FDI (Gross 1997a; Amaya and Rowland 2003; Asiedu 2002).

Fourth, investors are also said to evaluate a state's commitment to maintaining macro-economic stability. For this reason, the fiscal deficit is often included in models of FDI, on the assumption that a commitment to low inflation is evidenced by low deficits (Grosse 1997a). Empirically, the relationship between deficits and FDI has been found to be both negative (Grosse, 1997a) and insignificant (Amaya and Rowland, 2003). Given a lack of available data on fiscal deficits for the countries in our study, we instead use debt service (annual interest on the public debt as a percentage of GDP) because debt service and fiscal deficits are highly correlated (Brooks 2005). Furthermore, a low public debt

⁹Asiedu (2002) argues that the return on capital is lower in high per capita income countries--where capital is abundant--than in less developed countries which suggests an inverse relationship between GDP per capita and FDI.

seems an equally accurate indicator of a government's commitment to macro-economic stability.

Fifth, a high level of integration into the global trade system makes for a more favorable investment climate and should correlate positively with FDI. Past models measure trade openness as the total value of imports and exports as a percentage of GDP, and we have done likewise. The relationship between FDI and openness has been found to be both positive (Edwards 1990) and insignificant (Wheeler and Moody, 1992; Amaya and Rowland 2003).¹⁰

Sixth, previous work has sought to control for political risk factors such as regime type, contract repudiation, and government corruption as determinants of FDI based on the hypothesis that investors heed political risk. For example, Biswas (2002) finds countries with institutions that protect property rights are more able to attract FDI. In the same realm, Jensen (2003) finds that countries with democratic institutions attract as much as 70% more FDI than countries without. However, Kolstad (2008) reports an insignificant relationship between political risk and FDI. Following these studies, we use the ICRG risk rating constructed by the PRS group (ICRG) to assess the impact, if any, of political risk on FDI. The ICRG rating is a popular commercial index used by investors to assess country risk, and it accounts for a variety of factors such as regime type, ethnic tension, and political corruption. The index ranges from one to 100, with a high score indicating a low level of risk.

¹⁰ The relationship between Trade openness and FDI could be negative or positive depending on the type of FDI undertaken. Export-oriented foreign investors are likely more attracted to more open economies with fewer trade restrictions (lower transaction costs); if so a positive causal link between openness and FDI would emerge. On the other hand, in the presence of significant trade barriers (low level of trade openness), market-seeking companies may have no choice but to invest in the host county in order to obtain market share; if so, FDI and openness would be negatively correlated (Asiedu 2002).

Finally, following Asiedu (2002) and Biswas (2003) and for lack of a better control, we include the number of telephones per 100 inhabitants as a proxy of availability of infrastructure. Better infrastructure is expected to positively affect FDI as it facilitates the conduct of business operations.

Two issues arise on the econometrics. First, pension privatization may be thought of as a treatment, with the treatment group comprising those countries that have implemented privatization schemes. However, a country's decision to privatize is likely endogenous because there may be unobserved factors simultaneously affecting the privatization decision and FDI flows. Political will is an example of an unobserved characteristic (Vreeland 2002); a government with the discipline and cohesiveness that is necessary to pass comprehensive pension reform may also be more likely to successfully attract FDI, but this character trait is very difficult to control for. Given the panel nature of the data, sample selection effects can be mitigated by including country fixed effects in the regressions in order to control for omitted time-invariant characteristics that may be correlated with the decision to privatize (see e.g., de Janvry et al. 2006; Sanyal and Menon 2005; Duffalo 2005). However, endogeneity may also emanate from the omission of time *and* country-varying random factors that impact both the decision to privatize and FDI flows. We therefore use an instrumental variable approach to account for the endogeneity of the privatization variables within our fixed effects framework. The first-stage model predicts a country's likelihood of implementing pension privatization or intensity of privatization--depending on the privatization variable used; the second-stage fixed effects model includes both the privatization variable and the residual from the first-stage regression to control for sample selection bias. The choice of instrumental variables in the first-stage model is informed by investigations by Brooks (2005, 2007,

2009) that explain the decision to enact pension privatization. We consider the following three time-varying variables as instruments: the percentage of the population over age 65, the amount of debt owed to the International Bank for Reconstruction and Development (IBRD), and the number of Latin American countries that have enacted privatization. As the ratio of pensioners-to-workers grows, the fiscal obligations of the PAYGO system become increasingly difficult to meet, and the need to reform the system becomes pressing. Thus, as a country's population ages, the state should grow more receptive to pension privatization. The variable OVER65 is therefore expected to carry a positive coefficient in the first-stage model, indicating that an increase in population aging increases the likelihood/intensity of privatization.

Moreover, a growing body of political science literature on institutional reform advocates the importance of peer adoption as a means of policy diffusion across regions (e.g., Brooks 2005). For a given state, as the number of states in the same region that have implemented a certain policy increases, the uncertainty associated with the policy decreases, and the state becomes more receptive to the policy. Our PEERS variable measures the number of Latin American countries--excluding the country of interest--that have enacted some form of privatization by the given year of the observation. We expect it to carry a positive coefficient per the discussion above.

While the World Bank never used conditional loans to impose privatization on client states, prior research suggests that it still exerted considerable pressure (Weyland 2004; Brooks 2005). We therefore include a country's volume of outstanding IBRD loans as a percentage of GDP (IBRDLOANS) to gauge the magnitude of a state's involvement with the World Bank. As involvement increases, the likelihood of adopting privatization is expected to increase, as the Bank is more able to exert pressure upon

heavily indebted clients. The first-stage models also include many of the second-stage control variables listed above. Given the argument that economic stability makes the short-term costs of reform more bearable, thus increasing the likelihood of privatization, we hypothesize that the likelihood of privatization will increase as inflation and country risk decrease, and as GDP per capita and GDP growth increase. Furthermore, we hypothesize that trade openness and the likelihood/intensity of reform will be positively related, as a higher degree of economic integration will increase the incentives to enact market-friendly reform.

A second econometric issue is that the causal links between pension reform and several of our remaining regressors such as trade openness may be bi-directional. To circumvent potential reverse causality bias, we lag all of our regressors. Implementing the Wooldridge test for autocorrelation in panels (Wooldridge 2002, Drukker 2003), we fail to reject the null of no autocorrelation in our models at all conventional levels, lending support to our lagging procedure. We correct standard errors for heteroscedasticity and cross-sectional correlation (Beck and Katz 1995)

5. Regression Results

Tables 3a, 3b, and 3c presents the results of a Probit (model 1) and linear probability models (LMP) (models 2 and 3) to explain a country's decision to privatize its pension system. For ease of comparison, we present the marginal effects of the Probit instead of the regression coefficients. Standard errors are corrected for heteroscedasticity. Model 3 adds a time trend and country fixed effects to model 2. All three instruments (OVER65, IRBDLOANS, and PEERS) are statistically significant predictors of the decision to privatize with the expected signs per models 1 and 2. We also note that the magnitude of

the marginal effects generated by the Probit (model 1) and the LPM (model 2) are quite similar for the three instruments. However, when time trend and country effects are controlled for (model 3) PEERS, becomes insignificant while the time trend is significant. Given the high correlation between the time variable and PEERS (.95), it seems that PEERS is picking up the trend effect in models 1 and 2 instead of policy diffusion effects as posited. Furthermore, inclusion of the fixed effects raises the R^2 from 0.31 to 0.75; we therefore confine our interpretation of the remaining coefficients to the model 3 results. Both GDP per capita and trade openness correlate positively and significantly with the likelihood of pension reform, indicating that higher levels of economic development/market size and economic integration imply a greater openness to the preferences of global economic actors, and therefore a greater likelihood of enacting market-friendly reform. GDP growth carries a negative and significant sign, suggesting that countries with higher growth rates are less inclined to implement pension reform. This may be because economic growth impels higher levels of fiscal stability, reducing both the budgetary challenges associated with the PAYGO system and the incentives for reforming it. This finding conforms to our data; the average growth rate of pension reformers before reform is 3.27% vs. 3.61% for countries that chose not to undertake reform.

The residuals of the first state regression (model 3) are included in our main equation (1) in order to remove endogeneity bias stemming from the omission of time and country varying random factors that affect both privatization decisions and FDI inflows.¹¹ We present the results of 9 variants of our reduced-form equation in order to (i)

¹¹ While we present the results of a Probit model, we opt for the LPM (model 3) to generate the residual for the second stage for two main reasons. First, the Probit does not lend itself well to the inclusion of fixed effects because such effects cannot be removed (Greene 2003). Adding fixed

account for the endogeneity of pension reform, (ii) ascertain the robustness of the results, (iii) distinguish between short-term and longer-term effects of pension reform, and (iv) test whether FDI flows are related not only to the decision to privatize, but also to the *degree* of privatization enacted. All models include country-fixed effects as well as a time trend.¹² Results in tables 4a-5c are obtained by using the privatization dummies (single dummy in tables 4a-c and incremental effects in tables 5a-c) to capture the effects of pension reform. In both tables, model 1 assumes a linear influence of the regressors on FDI flows; model 2 adds the square of each variable in model 1 to explore potential nonlinear relationships; finally model 3 supplements model 2 with the residual from the first stage regression of pension reform on a set of covariates to account for potential endogeneity of reform not captured by the country dummies (see discussion above). In all of our estimations, the Wald test strongly rejects the null that all slope coefficients are equal to zero with p-values close to zero. Furthermore, the F-test for no country fixed effects is rejected all models, indicating that the inclusion of fixed effects is appropriate.

Several important findings emerge from tables 4a-c. In all three models, four of the eight control variables carry significant coefficients: pension privatization, trade openness, GDP per capita, and debt service. Both trade openness and GDP per capita are positively related to the dependent variable, indicating that foreign investors prefer more developed and more open economies. We note, however that per model 2, these positive effects are subject to diminishing returns with the squares of both variables carrying negative and statistically significant coefficients. Nonetheless the marginal effects,

effects in the first stage is important in our analysis since we do so in the second stage regressions to control for year and country-invariant omitted factors that may be correlated with our regressors. Second, if a Probit model is used, consistency of the second stage parameters hinges on the correctness of the assumed normal distribution for the first-state error (Angrist and Kureger 2001); distributional misspecification is not a concern with the LPM.

¹² Including the time trend instead of time dummies has the advantage of saving degrees of freedom which is crucial given our relatively small sample analysis.

evaluated at the sample means of the variables, are positive.. Debt service is also nonlinearly related to FDI per models 2 and 3 with a predicted negative linear effect which, however, weakens as the ratio of public debt service to GDP increases; taken together, the coefficients on debt service as a percentage of GDP imply a negative marginal impact of debt service on FDI for values below 5.22% and positive marginal impact for values that are higher. In our data, five countries have debt service to GDP ratios (%) that exceed 5.22%.¹³ There is an explanation for why debt service may positively correlate with FDI. During the period of high international liquidity in the 1970s, when commercial bank loans were readily available to developing countries, the importance of FDI as a source of development finance was diminished (Biswas 2002). However, when international credit markets tightened in the 1980s, many states increased efforts to attract FDI as an alternative source of capital (Biswas 2002). This was particularly true among heavily indebted countries for which the procurement of commercial loans became especially difficult due to the risks associated with their debt (Chakrabarti 2001). Thus, the intensity of efforts to attract FDI was greatest where public debt was high.¹⁴ Assuming that such efforts were at least partially successful, this may explain a positive relationship between debt service and FDI. Nonetheless, the marginal effect of debt service, taken at the overall sample mean of 4.58% is negative (-0.094), yielding an elasticity of -0.13.

Turning to the effects of our key variable, our results indicate that pension reform has a statistically significant and positive effect on net FDI inflows, lending support to

¹³ These are Ecuador (5.8%), Guyana (10.5%), Honduras (6.3%), Panama (8%), and Uruguay (5.3%).

¹⁴ Efforts to attract FDI have occurred at both general and specifically targeted levels. Examples of specifically targeted efforts include special tax incentives and the establishment of export-processing zones. Examples of general efforts include privatization and deregulation (for an extended discussion, see Oman, 2000).

our hypothesis H1; the privatization effect is quite robust across models and economically impressive; on average privatization, full or partial, increased the share of FDI as a percentage of GDP by an additional 0.89 (per model 1) to 1.04 (per model 2) percent. Given a mean of the FDI/GDP for the “treatment” countries before privatization of 2.2%, the marginal effect implies that pension reform increased FDI inflows as a share of GDP by between 41 and 47%. These empirical findings reinforce our coarse statistics presented in Table 2 which indicate that pension reform is associated with an increase in FDI inflows of 50% on average. The coefficient on the first-stage residual is statistically insignificant, suggesting that endogeneity of the decision to privatize may be driven by country-fixed effects which are already controlled for. Allowing for nonlinear effects of our regressors improves the fit of our model, raising the R^2 from .55 for model 1 to .66 for models 2 and 3.

In tables 5a-c, we investigate the timing of this observed impact by replacing the privatization dummy with four dummies designed to capture incremental effects of privatization as explained in footnote 7. We find that most of the impact of reform was realized in the very short-term; only the first year effect (PRIVATE1) carries a statistically significant coefficient. The incremental effects of the second (PRIVATE2), third (PRIVATE3), and remaining years (PRIVATE4) are insignificant at all conventional levels, indicating that while no additional FDI inflows ensued as a result of privatization in subsequent years, the positive impact observed in the first year was sustained. These results are also consistent with our data; the sample average of the FDI as a percentage of GDP jumped to 3.70 % for reforming countries in the first year reform was implemented, up 68% from average in pre-reform years; however the average dropped to 3.3% in years following the first year of implementation, down 9.5%,

suggesting that pension reform only provided a short-term boost to FDI inflows. The estimated coefficient of pension reform in the first year translates to a proportional marginal effect of 56% per model 2.¹⁵ The coefficients for GDP per capita, trade openness, and debt service are similar to their tables 5a-c counterparts both in magnitude and statistical significance, and as before, the first-stage residual is not found to significantly explain FDI.

Foreign investors may not only respond to pension reform, but also to the intensity of privatization, defined as the post-reform percentage of an average pensioner's income that derives from her private account. Of the 10 Latin American countries that privatized their pension systems, only four opted for full privatization (see Table 1). We examine the relationship between the degree of privatization (INTENSITY) and FDI in Table 6a-c. In all three models, the degree of privatization is significant and positive. The privatization coefficient taken from the model 2 implies that full privatization (100% redirection of PAYGO revenue) boosts net FDI inflows as share of GDP by an additional 1.26% which translates to a proportional marginal impact of full privatization of 57%, a larger effect than found in table 4c. The results mirror those in tables 4 and 5 for our remaining controls both in statistical significance and size of coefficients, with GDP per capita, trade openness, and debt service nonlinearly related to FDI.

6. Conclusion

Our econometric results provide robust evidence in support of hypothesis 1: pension privatization is associated with a sizable and statistically significant boost in FDI flows.

¹⁵ The proportional marginal impact is found by dividing the marginal impact of privatization 1.24% (per model 2), by the 2.2% average of FDI/GDP*100 for pension reformers before they enacted reform.

More specifically, the results presented in table 5 suggest that FDI flows respond to privatization in the short term and with remarkable immediacy. This lends support to the hypothesis that privatization acts as a policy signal: investors appear to respond to the decision itself, rather than to its potentially favorable economic and fiscal concomitants, which take time to materialize. Our results are also congruent with Brook's finding that countries do not enact privatization when doing so would substantially increase the risk of capital flight. Finally, the results presented in our table 6a-c suggest that the *degree* of privatization matters—more comprehensive privatization schemes appear more effective in boosting FDI inflows.

We expect that these results will be relevant to two broader discussions. First, policymakers who confront the problem of pension reform may consider the potentially positive relationship between privatization and FDI inflows as an additional incentive to consider the measure. Second, our findings suggest that specific policy decisions matter to foreign investors—a finding with important implications for the ongoing academic discussion around the determinants of FDI.

References

- Amaya and Rowland, C. A., & Rowland, P. (2003). "Determinants of investment flows into emerging markets." Banco De La Republica, Borradores de Economia No. 313.
- Asiedu, Elizabeth. 2002. "On the Determinants of Foreign Direct Investment to Developing Countries: Is Africa Different?" *World Development*, vol 30 (1).
- Beck, T., Demirguc, A., & Levine, R. (2001). "Stock markets, banks and growth: Correlation or causality?" World Bank Policy Working Research Paper, (2670)
- Biswas, Romita (2002). "Determinants of Foreign Direct Investment." *Review of Development Economics*. Volume 6, No. 2, pp 494-504.

- Brooks, S.M. (2005) "Interdependent and Domestic Foundations of Policy Change: The Diffusion of Pension Privatization Around the World." *International Studies Quarterly*. 49: 273-294.
- Brooks, S.M. (2007a). "Globalization and pension reform in Latin America." *Latin American Politics & Society*. 49(4), 31-62.
- Brooks, S.M. (2007b). "When Does Diffusion Matter?" *The Journal of Politics*. 69(3):701-715.
- Brooks, S.M. (2009). *Social Protection and the Market in Latin America: The Transformation of Social Security Institutions*. Cambridge: Cambridge University Press.
- Catalan, Mario. 2004. "Pension Funds and Corporate Governance in Developing Countries: What do We Know and What do We Need to Know?" *Journal of Pension Economics and Finance*.
- Catalan, Mario, G. Impavido, and A. Musalem. 2000. "Contractual Savings or Stock Market Development-Which Leads?," *Journal of Applied Social Science Studies*
- Chakrabarti, A. (2001). "The determinants of foreign direct investment: Sensitivity analysis of cross country regressions." *KYKLOS*, 54(1), 89-114.
- Corona, Pedro. "Reform Proposals throughout the World" International Federation of Pension Funds Administrations (FIAP)
- Cuevas, A., Gonzalez, M., Lombardo, D., & Lopez-Marmolejo, A. (2008). "Pension privatization and country risk." IMF Working Paper,
- de Janvry, A., Finan, F., Sadoulet, E., & Vakis, R. (2006). Can conditional cash transfer programs serve as safety nets in keeping children at school and from working when exposed to shocks. *Journal of Development Economics*, 79, 349–373.
- Dion, Michelle. (2006). Globalizacion, democratizacion, y reforma del sistema de Seguridad social en Mexico, 1988-2005. *Foro Internacional* 183, 1: 51-80.
- Duffalo, E. Empirical methods. http://web.mit.edu/14.771/www/emp_handout.pdf.
- Duran, Jose E. (1999), Los Determinantes de la IED en los Paises de America Latina y el Caribe: Su impacto sobre el Comercio y la Intergracion Regional." ECLAC. Mimeo.
- Edwards, S (1990). "Capital Flows, Foreign Direct Investment and Debt-Equity Swaps in Developing Countries." National Bureau of Economic Research, Working Paper No. 3497.
- Feldstein Martin. 1997. "The Case for Privatization," *Foreign Affairs*

FIAP, 2001 "Paises de Europa Central y del Este Emprenden Reformas a los Sistemas de Pensiones" Serie de Estudios, Numero 7, Mayo 2004, p2.

Gill, I. S., Packard, T., & Yermo, J. (2005). *Keeping the promise of social security in Latin America*. Washington, DC: World Bank.

Grosse, R. (1997a). "Foreign direct investment in Latin America." In R. E. Grosse (Ed.), *Generating savings for Latin American development* (pp. 135). Coral Gables, Fla.: North-South Center Press, University of Miami.

Grosse, R. E. (1997b). "Building and channeling savings in Latin America." In R. E. Grosse, & University of Miami (Eds.), *Generating savings for Latin American development* (pp. 169). Coral Gables, Fla.: North-South Center Press, University of Miami.

Holzmann, Robert and Richard Hinz 2005. *Old Age Income Support in the 21st Century* Washington, D.C. The World Bank.

International Country Risk Guide (2008). The PRS Group. Statistics retrieved September 15, 2008.

James, Estelle. (1998, August). "New systems for old age security: Theory, practice and empirical evidence." *World Bank Research Observer*, 13(2), 271-301.

Kay, S. (2000a) "Recent Changes in Latin American welfare states: is there social dumping?" *Journal of European Social Policy*, 10(2), 185-203.

Kay, S. (2000b). "Privatizing pensions: Prospects for Latin American reforms." *Journal of InterAmerican Studies and World Affairs*. 42(1), 133-143.

Kay, S. J. (1999). "Unexpected privatizations: Politics and social security reform in the southern cone." *Comparative Politics*, 31(4), 403-422.

Kennedy, Peter (2008). *A Guide to Econometrics*. Malden, M.A.: Blackwell Publishing.

Kolstad, Ivar and Espen Villanger. (2008) "Determinants of foreign direct investment in services." *European Journal of Political Economy*, 24, 518-533.

Kurtz, M. J. (1999). "Chile's neo-liberal revolution: Incremental decisions and structuralTransformation, 1973-89." *Journal of Latin American Studies*, 31(2), 399-427.

Kutner, M., Nachtsh, C., & Neter, J. (2004). *Applied Linear Regression Models*. New York: McGraw-Hill.

Levine, R., & Zervos, S. (1998). "Stock markets, banks, and economic growth." *The American Economic Review*, 88(3), 537-558.

Liljeblom, E., & Loflund, A. (2005). "Determinants of international portfolio investment flows to a small market: Empirical evidence." *Journal of Multinational Financial Management*, 15.

Mawell, Sylvia (1997). *Gatekeepers of Growth: Central Banking in Developing Countries*. Princeton, NJ: Princeton University Press.

Miles, D.K. (1993). "Testing for short-termism." Bank of England Working Paper. 4.

Nelson, J. 2004. "External Models, International Influence, and the Politics of Social Sector Reforms, in Weyland, K (Ed). *Learning fro Foreign Models in Latin American Policy Reform*. Woodrow Wilson Center Press: Washington DC, pp 35-52.

Oman, Charles (2000). *Policy Competition for foreign direct investment: A study of Competition among governments to attract FDI*. OECD Publishing.

Orszag P. R. and J. E. Stigitz. (1999) "Rethinking Pension Reform: Ten Myths About Social Security System," working paper presented at the World Bank Conference: "New Ideas About Old Age Security".

Roldos, J. (2007). "Pension reform and macroeconomic stability in Latin America." IMF Working Paper. 7(108).

Root, F.R. and A.A. Ahmed (1979). "Empirical Determinants of Manufacturing Foreign Direct Investments." *Economic Development and Cultural Change*. 27: 751-67.

Sanyal, P., & Menon, N. (2005). Labor disputes and the economics of firm geography: A study of domestic investment in India. *Economic Development and Cultural Change*, 53, 825-854

Schmitz, A. and J Bieri (1972). "EEC Tariffs and U.S. Direct Investment. *European Economic Review*. 3: 259-270.

Tsai, P. (1994). "Determinants of Foreign Direct Investment and Its Impact of Economic Growth." *Journal of Economic Development*. 19: 137-164.

Vella, Francis (1998). "Estimating Models with Sample Selection Bias: A Survey." *Journal of Human Resources* 33:127-69.

Vittas, D. (2000). "Pension reform and capital market development: 'feasibility' and 'impact' preconditions." World Bank Policy Working Research Paper, (2414).

Vreeland, James Raymond (2002). "The Effects of IMF programs on Labor." *WorldDevelopment*. 30: 121-139.

Weyland, K. (2004). *Learning from Foreign Models in Latin American Policy Reform*. Washington, D.C.: Woodrow Wilson Institution and Johns Hopkins University Press.

Wheeler D. and A. Mody (1992). "International Investment Location Decisions: The case for U.S. Firms." *Journal of International Economics*. 33: 77-86.

World Bank. (1994). *Averting the old age crisis: Policies to protect the old and promote growth*. New York: Oxford University Press.

World Development Indicators Online. World Bank. (2008). Statistics retrieved September 2, 2008.

Table 1: Countries included in the Study with year and intensity of privatization if applicable

Country	Current Status of Pension System	Year of Implementation	Intensity of Privatization
Brazil	PAYGO	N/A	N/A
Ecuador	PAYGO	N/A	N/A
Guatemala	PAYGO	N/A	N/A
Guyana	PAYGO	N/A	N/A
Honduras	PAYGO	N/A	N/A
Panama	PAYGO	N/A	N/A
Paraguay	PAYGO	N/A	N/A
Venezuela	PAYGO	N/A	N/A
Argentina	Privatized	1994	54%
Bolivia	Privatized	1997	92%
Colombia	Privatized	1994	100%
Costa Rica	Privatized	2001	20%
Dominican Rep	Privatized	2003	100%
El Salvador	Privatized	1998	100%
Mexico	Privatized	1997	91%
Peru	Privatized	1993	100%
Uruguay	Privatized	1996	48%

Table 2a: Mean values for privatized and non-privatized countries

Variable	Average Value, Non-Privatized Countries	Average Value, Privatized Countries	Significance of t-test for equality of means (equal variance assumed)
FDI (% of GDP)	3.23	3.39	.104
Public Debt Service (% of GDP)	4.99	3.75	.000
Trade Openness	83.3	49.5	.000
GDP per capita	\$2421	\$3863	.000
GDP growth	3.57	3.16	.473
Inflation	113.9	11.0	.004
Risk Rating	64.32	67.79	.071
Landlines	8.87	15.4	.000

Table 2b: Mean values for countries who have privatized, pre- and post-reform

Variable	Average Value, Pre-Privatization	Average Value, Post-Privatization	Significance of t-test for equality of means (equal variance assumed)
FDI (% of GDP)	2.00	3.39	.067
Public Debt Service (% of GDP)	3.51	3.75	.712
Trade Openness	57.6	49.5	.136
GDP per capita	\$2767	\$3863	.002
GDP growth	4.48	3.16	.746
Inflation	194.4	11.0	.001
Risk Rating	65.63	67.79	.020
Landlines	9.30	15.4	.000

Table 3a: model 1 (Probit)				
variable	dy/dx	s.e.	z	P>z
OVER65	0.0437693	0.01816	2.41	0.016
PEERS	0.0376594	0.01534	2.46	0.014
IBRDLOANS	1.461525	0.77073	1.9	0.058
TRADE OPENNESS	-0.0064891	0.00132	-4.9	0.000
ICRG RISK RATING	0.0121011	0.00589	2.05	0.040
GDP GROWTH	0.001603	0.00798	0.2	0.841
GDP PER CAPITA	0.0000141	0.00002	0.56	0.572
INFALTION	-0.0025626	0.00161	-1.59	0.112

Table 3b: model 2 (LPM)				
variable	Coef.	s.e	z	P>z
OVER65	0.0452001	0.0098466	4.59	0
PEERS	0.0314974	0.0074781	4.21	0
IBRDLOANS	1.350535	0.3027813	4.46	0
TRADE OPENNESS	-0.0040763	0.0006486	-6.28	0
ICRG RISK RATING	0.0073143	0.0051734	1.41	0.159
GDP GROWTH	0.0023364	0.0070467	0.33	0.741
GDP PER CAPITA	0.0000277	0.0000137	2.02	0.043
INFALTION	-0.000229	0.0001774	-1.29	0.197
cons	-0.4493115	0.2861228	-1.57	0.116

Table 3c: model 3 (LPM)				
variable	Coef.	s.e	z	P>z
OVER65	0.1580441	0.068972	2.29	0.022
PEERS	-0.0188699	0.0191537	-0.99	0.325
IBRDLOANS	1.365596	0.4613209	2.96	0.003
TRADE OPENNESS	0.0035991	0.0007113	5.06	0
ICRG RISK RATING	0.0007189	0.0023673	0.3	0.761
GDP GROWTH	-0.0127515	0.0047043	-2.71	0.007
GDP PER CAPITA	0.0000951	0.0000194	4.9	0
INFALTION	0.00014	0.0000552	2.54	0.011
TIME	0.0292729	0.0144355	2.03	0.043
Argentina	0.5964176	0.2192697	2.72	0.007
Bolivia	1.587341	0.5910293	2.69	0.007
Brazil	0.6946515	0.5134898	1.35	0.176
Colombia	1.767076	0.5676196	3.11	0.002
Costa Rica	0.9257479	0.5272417	1.76	0.079
Domonican Republic	1.051407	0.5613871	1.87	0.061
Ecuador	0.8209904	0.5420592	1.51	0.13
El Salvadore	1.306608	0.5014696	2.61	0.009
Guatemala	1.084279	0.6214477	1.74	0.081
Guyana	-0.08654	0.5405432	-0.16	0.873
Honduras	0.7675396	0.6225321	1.23	0.218
Mexico	1.16352	0.5397106	2.16	0.031
Panama	0.2450837	0.5224612	0.47	0.639
Paraguay	0.8158179	0.5875892	1.39	0.165
Peru	1.861779	0.5670918	3.28	0.001
Venezuela	0.780778	0.5851004	1.33	0.182
cons	-60.4503	28.30831	-2.14	0.033

Table 4a: model 1				
Variable	Coef.	s.e	z	P> z
PRIVATE	0.9664045	0.546281	1.77	0.077
DEBT SERVICE	0.552271	0.123062	4.49	0
TRADE OPENNESS	0.048245	0.016628	2.9	0.004
ICRG RISK RATING	0.0156774	0.025477	0.62	0.538
GDP GROWTH	0.0398316	0.038501	1.03	0.301
GDP PERCAPITA	0.0004665	0.000169	2.76	0.006
INFATLION	-0.0002932	0.000506	-0.58	0.562
TELEPHONES PER 100	-0.0039484	0.071147	-0.06	0.956
TIME	-0.012855	0.070925	-0.18	0.856
Argentina	2.686095	3.993147	0.67	0.501
Bolivia	6.503496	4.046169	1.61	0.108
Brazil	5.111056	4.259244	1.2	0.23
Colombia	3.461588	3.975921	0.87	0.384
Costa Rica	1.753035	3.348719	0.52	0.601
Domonican Republic	3.318501	3.42177	0.97	0.332
Ecuador	3.19847	3.593028	0.89	0.373
El Salvadore	2.356586	3.676461	0.64	0.522
Guatemala	3.586481	3.782307	0.95	0.343
Honduras	0.7252949	2.859721	0.25	0.8
Mexico	1.534089	3.396394	0.45	0.651
Panama	-0.6008844	2.323824	-0.26	0.796
Paraguay	0.9271522	3.01432	0.31	0.758
Peru	4.597781	3.953705	1.16	0.245
Uruguay	0.6748824	3.871901	0.17	0.862
Venezuela	2.269049	3.601778	0.63	0.529
cons	17.83888	140.7734	0.13	0.899

Table 4b: model 2

Variable	Coef.	s.e	z	P> z
PRIVATE	1.04629	0.542689	1.93	0.054
DEBT SERVICE	-0.5633897	0.199923	-2.82	0.005
DEBT SERVICE^2	0.0558517	0.011316	4.94	0
TRADE OPENNESS	0.0930736	0.046151	2.02	0.044
TRADE OPENNESS^2	-0.0003677	0.000198	-1.86	0.063
ICRG RISK RATING	-0.368924	0.318784	-1.16	0.247
ICRG RISK RATING^2	0.0029057	0.002623	1.11	0.268
GDP GROWTH	0.0096751	0.040653	0.24	0.812
GDP GROWTH^2	-0.001388	0.004464	-0.31	0.756
GDP PER CAPITA	0.0016242	0.000658	2.47	0.014
GDP PERCAPITA^2	-1.43E-07	5.36E-08	-2.66	0.008
INFLATION	-0.002848	0.002195	-1.3	0.195
INFLATION^2	8.10E-07	1.00E-06	0.81	0.419
TELEPHONE	0.0083868	0.152962	0.05	0.956
TELEPHONE^2	0.000419	0.003524	0.12	0.905
TIME	-0.0667116	0.074125	-0.9	0.368
Argentina	-6.162455	3.065164	-2.01	0.044
Bolivia	-1.637878	3.164382	-0.52	0.605
Brazil	-4.468841	2.938733	-1.52	0.128
Colombia	-5.205369	2.836169	-1.84	0.066
Costa Rica	-7.694883	2.94926	-2.61	0.009
Dominican Republic	-6.776585	2.99652	-2.26	0.024
Ecuador	-4.451128	2.819436	-1.58	0.114
El Salvador	-7.402499	2.928583	-2.53	0.011
Guatemala	-6.410226	2.941974	-2.18	0.029
Honduras	-6.033481	2.868693	-2.1	0.035
Mexico	-7.519911	2.883157	-2.61	0.009
Panama	-5.139248	2.452453	-2.1	0.036
Paraguay	-7.176898	2.846603	-2.52	0.012
Peru	-4.345694	2.822668	-1.54	0.124
Uruguay	-8.141062	2.990284	-2.72	0.006
Venezuela	-6.46938	2.939321	-2.2	0.028
cons	147.3851	143.006	1.03	0.303

Table 4c: model 3				
Variable	Coef.	s.e	z	P> z
PRIVATE	1.210459	0.515463	2.35	0.019
DEBT SERVICE	-0.56537	0.207245	-2.73	0.006
DEBT SERVICE^2	0.058779	0.011715	5.02	0
TRADE OPENNESS	0.110387	0.048111	2.29	0.022
TRADE OPENNESS^2	-0.00034	0.000208	-1.66	0.097
ICRG RISK RATING	-0.3919	0.305871	-1.28	0.2
ICRG RISK RATING^2	0.003133	0.002522	1.24	0.214
GDP GROWTH	-0.06242	0.06248	-1	0.318
GDP GROWTH^2	-0.00104	0.004362	-0.24	0.812
GDP PER CAPITA	0.001936	0.000719	2.69	0.007
GDP PERCAPITA^2	-1.22E-07	5.26E-08	-2.32	0.021
INFLATION	0.00224	-0.86	0.392	-0.00631
INFLATION^2	9.79E-07	0.77	0.444	-1.17E-06
TELEPHONE	0.002111	0.14883	0.01	0.989
TELEPHONE^2	0.000542	0.003411	0.16	0.874
RESID	-6.36666	4.266992	-1.49	0.136
TIME	0.138294	0.154338	0.9	0.37
Argentina	1.50463	5.86569	0.26	0.798
Bolivia	6.913597	6.574845	1.05	0.293
Brazil	-1.00315	3.613156	-0.28	0.781
Colombia	4.288833	6.869957	0.62	0.532
Costa Rica	-2.61669	4.440962	-0.59	0.556
Dominican Republic	-1.6881	4.611231	-0.37	0.714
Ecuador	-0.56426	3.834081	-0.15	0.883
El Salvadore	0.122311	5.854	0.02	0.983
Guatemala	-2.24523	4.088677	-0.55	0.583
Honduras	-2.85418	3.672595	-0.78	0.437
Mexico	-1.06902	5.081408	-0.21	0.833
Panama	-4.33363	2.543694	-1.7	0.088
Paraguay	-4.04156	3.613918	-1.12	0.263
Peru	5.746682	7.263225	0.79	0.429
Uruguay	-1.24515	5.303249	-0.23	0.814
Venezuela	-3.37173	3.563175	-0.95	0.344
cons	-267.284	310.0343	-0.86	0.389

Table 5a: model 1				
Variable	Coef.	s.e	z	P> z
PRIVATE1	1.262705	0.750548	1.68	0.092
PRIVATE2	-0.10548	0.943129	-0.11	0.911
PRIVATE3	0.160327	0.952698	0.17	0.866
PRIVATE4	-0.97297	0.720101	-1.35	0.177
DEBT SERVICE	0.563272	0.121755	4.63	0
TRADE OPENNESS	0.048935	0.016617	2.94	0.003
ICRG RISK RATING	0.013607	0.025501	0.53	0.594
GDP GROWTH	0.035444	0.038731	0.92	0.36
GDP PER CAPITA	0.000485	0.000174	2.79	0.005
INFLATION	-0.00012	0.000515	-0.24	0.809
TELEPHONE	0.02354	0.076787	0.31	0.759
TIME	-0.00161	0.073282	-0.02	0.982
Argentina	2.900718	4.018675	0.72	0.47
Bolivia	7.042879	3.989127	1.77	0.077
Brazil	5.070992	4.285349	1.18	0.237
Colombia	3.824616	3.96603	0.96	0.335
Costa Rica	1.640418	3.38015	0.49	0.627
Dominican Republic	3.493854	3.4074	1.03	0.305
Ecuador	3.342857	3.583746	0.93	0.351
El Salvador	2.741323	3.640063	0.75	0.451
Guatemala	3.885733	3.757068	1.03	0.301
Honduras	0.968819	2.84231	0.34	0.733
Mexico	1.796527	3.386163	0.53	0.596
Panama	-0.65353	2.327081	-0.28	0.779
Paraguay	1.213942	2.987617	0.41	0.685
Peru	5.271541	3.91132	1.35	0.178
Uruguay	0.636192	3.921992	0.16	0.871
Venezuela	2.330678	3.607048	0.65	0.518
cons	-5.04087	145.4118	-0.03	0.972

Table 5b: model 2				
Variable	Coef.	s.e	z	P> z
PRIVATE1	1.224308	0.749818	1.63	0.103
PRIVATE2	0.123405	0.923702	0.13	0.894
PRIVATE3	-0.22157	0.937232	-0.24	0.813
PRIVATE4	-0.53654	0.686134	-0.78	0.434
DEBT SERVICE	-0.56027	0.201232	-2.78	0.005
DEBT SERVICE^2	0.055924	0.011393	4.91	0
TRADE OPENNESS	0.090942	0.046326	1.96	0.05
TRADE OPENNESS^2	-0.00036	0.000199	-1.8	0.071
ICRG RISK RATING	-0.32289	0.315663	-1.02	0.306
ICRG RISK RATING^2	0.002538	0.002595	0.98	0.328
GDP GROWTH	0.006943	0.041237	0.17	0.866
GDP GROWTH^2	-0.0013	0.004497	-0.29	0.773
GDP PER CAPITA	0.001557	0.000665	2.34	0.019
GDP PERCAPITA^2	-1.35E-07	5.51E-08	-2.45	0.014
INFLATION	0.002141	-1.26	0.208	-0.00689
INFLATION^2	9.82E-07	0.81	0.42	-1.13E-06
TELEPHONE	0.014753	0.154752	0.1	0.924
TELEPHONE^2	0.000836	0.003636	0.23	0.818
TIME	-0.05397	0.074985	-0.72	0.472
Argentina	-5.98211	3.108621	-1.92	0.054
Bolivia	-1.32118	3.173923	-0.42	0.677
Brazil	-4.49246	2.969595	-1.51	0.13
Colombia	-4.91629	2.868545	-1.71	0.087
Costa Rica	-7.64864	2.986012	-2.56	0.01
Dominican Republic	-6.58526	3.018891	-2.18	0.029
Ecuador	-4.32705	2.839138	-1.52	0.127
El Salvador	-7.07233	2.949119	-2.4	0.016
Guatemala	-6.22511	2.962316	-2.1	0.036
Honduras	-5.86192	2.891383	-2.03	0.043
Mexico	-7.22979	2.909852	-2.48	0.013
Panama	-5.00547	2.469819	-2.03	0.043
Paraguay	-6.96729	2.870635	-2.43	0.015
Peru	-3.87614	2.859094	-1.36	0.175
Uruguay	-8.1186	3.039062	-2.67	0.008
Venezuela	-6.34214	2.964659	-2.14	0.032
cons	120.4302	144.8132	0.83	0.406

Table 5c: model 3				
Variable	Coef.	s.e	z	P> z
PRIVATE1	1.319477	0.730421	1.81	0.071
PRIVATE2	0.10661	0.904488	0.12	0.906
PRIVATE3	-0.16215	0.917788	-0.18	0.86
PRIVATE4	-0.41158	0.66887	-0.62	0.538
DEBT SERVICE	-0.56281	0.207668	-2.71	0.007
DEBT SERVICE^2	0.058567	0.011733	4.99	0
TRADE OPENNESS	0.107231	0.048257	2.22	0.026
TRADE OPENNESS^2	-0.00034	0.000208	-1.64	0.102
ICRG RISK RATING	-0.35474	0.30583	-1.16	0.246
ICRG RISK RATING^2	0.002832	0.002522	1.12	0.261
GDP GROWTH	-0.05795	0.062652	-0.92	0.355
GDP GROWTH^2	-0.00101	0.00441	-0.23	0.819
GDP PER CAPITA	0.001857	0.000733	2.53	0.011
GDP PERCAPITA^2	-1.18E-07	5.39E-08	-2.19	0.029
INFLATION	0.002206	-0.86	0.392	-0.006
INFLATION^2	9.63E-07	0.77	0.442	-1.15E-06
TELEPHONE	0.007272	0.151055	0.05	0.962
TELEPHONE^2	0.000847	0.0035	0.24	0.809
RESID	-5.78818	4.312088	-1.34	0.179
TIME	0.12927	0.156276	0.83	0.408
Argentina	0.946144	5.90416	0.16	0.873
Bolivia	6.374728	6.590228	0.97	0.333
Brazil	-1.33407	3.63672	-0.37	0.714
Colombia	3.644671	6.899203	0.53	0.597
Costa Rica	-3.04156	4.456783	-0.68	0.495
Dominican Republic	-2.00625	4.616129	-0.43	0.664
Ecuador	-0.82381	3.836599	-0.21	0.83
El Salvadore	-0.31254	5.857556	-0.05	0.957
Guatemala	-2.48427	4.092751	-0.61	0.544
Honduras	-3.01465	3.674666	-0.82	0.412
Mexico	-1.436	5.086396	-0.28	0.778
Panama	-4.30586	2.548157	-1.69	0.091
Paraguay	-4.16928	3.614601	-1.15	0.249
Peru	5.182964	7.278645	0.71	0.476
Uruguay	-1.85236	5.344851	-0.35	0.729
Venezuela	-3.55649	3.565624	-1	0.319
cons	-249.935	313.5855	-0.8	0.425

Table 6a: model 1				
Variable	Coef.	s.e	z	P> z
INTENSITY	0.01277	0.006783	1.88	0.06
DEBT SERVICE	0.553452	0.122977	4.5	0
TRADE OPENNESS	0.047634	0.016617	2.87	0.004
ICRG RISK RATING	0.013542	0.025341	0.53	0.593
GDP GROWTH	0.037389	0.037941	0.99	0.324
GDP PER CAPITA	0.000471	0.000167	2.83	0.005
INFLATION	0.000476	-0.44	0.663	-0.00114
TELEPHONE	0.025546	0.065845	0.39	0.698
TIME	-0.03105	0.07115	-0.44	0.663
Argentina	2.508665	4.001607	0.63	0.531
Bolivia	6.38615	4.038752	1.58	0.114
Brazil	4.791927	4.238294	1.13	0.258
Colombia	2.972498	3.980181	0.75	0.455
Costa Rica	1.628455	3.346074	0.49	0.626
Domonican Republic	3.175098	3.423754	0.93	0.354
Ecuador	3.096473	3.58943	0.86	0.388
El Salvadore	2.093439	3.677348	0.57	0.569
Guatemala	3.597114	3.784072	0.95	0.342
Honduras	0.786616	2.864724	0.27	0.784
Mexico	1.203842	3.398918	0.35	0.723
Panama	-0.73902	2.313948	-0.32	0.749
Paraguay	1.002694	3.017285	0.33	0.74
Peru	4.29195	3.954897	1.09	0.278
Uruguay	0.468453	3.87935	0.12	0.904
Venezuela	2.092997	3.593051	0.58	0.56

Table 6b: model 2				
Variable	Coef.	s.e	z	P> z
INTENSITY	0.013408	0.006205	2.16	0.031
DEBT SERVICE	-0.56975	0.199556	-2.86	0.004
DEBT SERVICE^2	0.055827	0.011294	4.94	0
TRADE OPENNESS	0.092737	0.046088	2.01	0.044
TRADE OPENNESS^2	-0.00037	0.000198	-1.85	0.064
ICRG RISK RATING	-0.3767	0.319481	-1.18	0.238
ICRG RISK RATING^2	0.002987	0.002633	1.13	0.257
GDP GROWTH	0.006832	0.04043	0.17	0.866
GDP GROWTH^2	-0.0015	0.004465	-0.34	0.737
GDP PER CAPITA	0.001616	0.00065	2.49	0.013
GDP PERCAPITA^2	-1.41E-07	5.30E-08	-2.65	0.008
INFLATION	0.002185	-1.3	0.195	-0.00712
INFLATION^2	1.00E-06	0.81	0.419	-1.15E-06
TELEPHONE	-0.04607	0.147371	-0.31	0.755
telephone^2	0.00253	0.003108	0.81	0.416
TIME	-0.06884	0.07502	-0.92	0.359
Argentina	-6.01597	3.053472	-1.97	0.049
Bolivia	-1.84804	3.143587	-0.59	0.557
Brazil	-4.54024	2.927563	-1.55	0.121
Colombia	-5.38445	2.823675	-1.91	0.057
Costa Rica	-7.6172	2.943798	-2.59	0.01
Dominican Republic	-6.86179	2.982198	-2.3	0.021
Ecuador	-4.43262	2.807405	-1.58	0.114
El Salvador	-7.63088	2.913568	-2.62	0.009
Guatemala	-6.50677	2.924603	-2.22	0.026
Honduras	-6.11897	2.855041	-2.14	0.032
Mexico	-7.66725	2.871222	-2.67	0.008
Panama	-5.11127	2.448688	-2.09	0.037
Paraguay	-7.30376	2.831832	-2.58	0.01
Peru	-4.68859	2.812246	-1.67	0.095
Uruguay	-8.08377	2.993744	-2.7	0.007
Venezuela	-6.43818	2.929318	-2.2	0.028
cons	152.1585	144.8004	1.05	0.293

Table 6c: model 3				
fdigdp	Coef.	s.e	z	P> z
INTENSITY	0.015983	0.005887	2.72	0.007
DEBT SERVICE	-0.57349	0.207316	-2.77	0.006
DEBT SERVICE^2	0.059036	0.011711	5.04	0
TRADE OPENNESS	0.111563	0.048147	2.32	0.02
TRADE OPENNESS^2	-0.00034	0.000209	-1.63	0.103
ICRG RISK RATING	-0.40338	0.30519	-1.32	0.186
ICRG RISK RATING^2	0.003252	0.002521	1.29	0.197
GDP GROWTH	-0.07257	0.062067	-1.17	0.242
GDP GROWTH^2	-0.00112	0.004357	-0.26	0.797
GDP PER CAPITA	0.001952	0.00071	2.75	0.006
GDP PERCAPITA^2	-1.17E-07	5.20E-08	-2.26	0.024
INFLATION	0.002221	-0.82	0.413	-0.00617
INFLATION^2	9.76E-07	0.76	0.445	-1.17E-06
TELEPHONE	-0.06308	0.144579	-0.44	0.663
TELEPHONE^2	0.003046	0.00306	1	0.32
RESID	-6.97522	4.268145	-1.63	0.102
TIME	0.154956	0.153958	1.01	0.314
Argentina	2.390692	5.90032	0.41	0.685
Bolivia	7.45144	6.568324	1.13	0.257
Brazil	-0.76424	3.643291	-0.21	0.834
Colombia	4.954051	6.87399	0.72	0.471
Costa Rica	-2.04685	4.479048	-0.46	0.648
Dominican Republic	-1.31928	4.627291	-0.29	0.776
Ecuador	-0.18235	3.860473	-0.05	0.962
El Salvadore	0.545371	5.854857	0.09	0.926
Guatemala	-1.97588	4.104575	-0.48	0.63
Honduras	-2.66231	3.68572	-0.72	0.47
Mexico	-0.6465	5.099521	-0.13	0.899
Panama	-4.22192	2.551586	-1.65	0.098
Paraguay	-3.90273	3.6253	-1.08	0.282
Peru	6.269151	7.251337	0.86	0.387
Uruguay	-0.53056	5.354943	-0.1	0.921
Venezuela	-3.04668	3.589805	-0.85	0.396
cons	-300.403	309.2272	-0.97	0.331