Foreign Direct Investment in Zimbabwe: The Role of Institutional Factors

Farayi Gwenhamo [1][2]

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[1] School of Economics, University of Cape Town, email: farayi.gwenhamo@uct.ac.za
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Abstract

The purpose of the paper is to examine the impact of property rights on foreign direct investment (FDI) in Zimbabwe for the period 1964-2005. While the macroeconomic determinants of FDI have been analysed to a considerable extent in past empirical work, the role of institutional factors such as the protection of property rights and the efficiency of the legal system has been underexplored. Using a multivariate cointegration framework, the paper employs a newly constructed *de jure* property rights index for Zimbabwe to determine the impact of property rights on FDI. The empirical evidence shows that property rights are consistently an important explanatory variable of FDI in Zimbabwe, even after controlling for periods when there are no significant new foreign capital inflows. Other significant explanatory variables of FDI in Zimbabwe are the real gross domestic product (GDP), capital intensity, the external debt to GDP ratio, political instability as well as the educational levels.

KEY WORDS: Foreign Direct Investment (FDI), Property rights, Cointegration and Zimbabwe

JEL Codes: F21, K11

1 Introduction

Most African countries face a shortage of funds to meet their investment needs. This is attributed to the low levels of private savings that these countries face. The United Nations Conference on Trade and Development (UNCTAD) (2000) estimated that in order to reach a sustainable economic growth rate of 6% per annum, the domestic investment rate levels in the Sub Saharan Africa (SSA) region have to increase to about 25% from the levels reached during the 1990s of less than 20%. Foreign capital inflows are therefore considered important for plugging the domestic resource gap in these countries.[1]

It is then often advised that developing and emerging economies should direct their efforts towards attracting FDI, which is seen as an important vehicle of technical progress. By introducing advanced technology, management practices and improved production techniques, it is argued that FDI can improve productivity (Borensztein *et al.* 1998). Furthermore, FDI is viewed as relatively stable during financial crises when compared to short-term foreign capital inflows (Prasad *et al.* 2003). The growth-enhancing effects of FDI, however, depend on the absorptive capacity of the recipient country, which in turn depends on educational levels and the development of the financial markets, among other factors.[2]

*School of Economics, University of Cape Town, *e-mail*: f.gwenhamo@uct.ac.za

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[1] See, for example, the dual gap analysis in Chenery and Bruno (1962) and Chenery and Strout (1966).

[2] See, for example, Borensztein *et al* (1998).

An important related question is what are the key determinants of FDI in developing countries and SSA, in particular? While the macroeconomic determinants of FDI to developing countries have been analysed to a considerable extent[3], there has been a recent shift of focus to the role of the host country's institutional environment. The FDI-institutions link debate borrows from the broader analysis of the impact of institutions on economic development. The New Institutional Economics (NIE) literature asserts that rules and regulations, which define and enforce property rights, enhance economic performance because they reduce transaction costs and uncertainty. In line with this argument, Benassy-Quere *et al* (2007) proposed that institutions affect FDI through their influence on productivity prospects, investment-related transaction costs and uncertainty.

Zimbabwe presents an interesting case to test the role of property rights in the determination of FDI. Post-1990, the Zimbabwean government undertook several changes to the legislation governing access to land and land resources. From the international investors' point of view, these legislative changes posed a serious threat to the institution of private property. In contrast, during an earlier period (between 1980 and 1990), the government adopted a market-based land reform programme. This entailed the government purchasing land for purposes of resettlement from white commercial farmers and transnational companies (TNCs) at the market prices and on a willing-buyer, willing-seller basis.

The market-based land reform was entrenched for the first ten years of independence in accordance with the provisions of the Lancaster House Constitution adopted at independence in 1980. The lapsing of the ten-year constitutional protection of private property in 1990 enabled the government to abandon the market based system for a government-led compulsory land acquisition programme. The first phase of reforms (1990 - late 1990s) saw the government enacting laws that removed the willing-buyer, willing-seller basis for compulsory acquisition. However, compensation was still guaranteed for all land acquired by the government.

In the late 1990s, the government embarked on the second phase of reforms which was more radical. To set up the legal framework for the second phase, the government undertook several legislative reforms which removed compensation for the acquired land. The new property laws allowed the government to easily expropriate privately owned land for redistribution purposes without compensating the private owners. More recently, the government also approved legislative reforms allowing the nationalisation of foreign firms in all sectors of the economy.[4] While the Zimbabwean government argues that the changes are aimed at correcting the historically skewed access to productive resources inherited from the colonial regime, it is plausible that the resulting high expropriation risk among other factors negatively impacted on FDI inflows which fell from a record high level of US$ 444 million in 1998 to an annual average of less than US$ 100 million in the subsequent years.[5]

The objective of this paper is to undertake an empirical investigation of the impact of property rights on FDI in Zimbabwe for the period 1964 to 2005. An empirical investigation of this nature faces the classical problem of how to measure the status of property rights. Although there are several property rights indices such as those produced by the Fraiser Institute and the Heritage Foundation, their time coverage is too short for any meaningful use in country-specific time-series studies. To overcome this constraint, we make use of newly constructed *de jure* property rights index in Gwenhamo *et al* (2008). The index tracks the changes in legislation governing property rights and its' time coverage is sufficient for the purposes of this study.

The rest of the paper is organised as follows. Section two provides a brief background to foreign capital in Zimbabwe. Section three presents the theoretical framework underlying our empirical model. This is followed by a review of empirical literature in section four. Section five provides a description of the econometric

[3] See, for example, Kravis and Lipsey (1982), Schneider and Frey (1985), Singh and Jun (1995) and Asiedu (2002, 2005).

[4] In May 2008, the government passed the Economic Empowerment Act facilitating nationalisation of foreign owned firms for redistribution purposes.

[5] See, for example, arguments in Richardson (2006).

methodology employed. The estimation results and analysis are presented in section six. Section seven concludes the paper with some policy implications.

2 A Brief Overview of FDI in Zimbabwe in the Post-Independence Era.

At the time of independence in 1980, the new Zimbabwean government adopted a highly controlled and inward looking economy. Foreign capital constituted about 70% of the total capital stock and FDI dominated foreign capital inflows (Clarke, 1980). In the first ten years of independence, the new government continued with highly interventionist economic policies inherited from the colonial regime. The business environment was highly regulated through a system of price controls, labour market restrictions and investment control procedures. Approvals of foreign investors' proposals involved an excessively long process. Foreign firms were required to get permission from the Foreign Investment Centre for the development of any new enterprises in Zimbabwe. Ownership restrictions in some sectors required at least 30% local participation in an enterprise. Policies on repatriation of profits also remained restrictive. Because of the policy environment, which was unfavourable to foreign investors, FDI inflows were very low during the first decade of independence. This occurred despite secure property rights prevailing in Zimbabwe at that time.

As the government came to grips with persistently low levels of fixed capital formation in the late 1980s, the attitude and policies towards foreign investors began to change. In 1989, a new investment code was adopted. The result was to increase the proportion of after-tax profits that Multinational Companies (MNCs) could repatriate from 50% to 100%. In 1990, the government adopted the IMF-funded Economic Structural Adjustment Programme (ESAP) designed to eliminate economic policies of controls and restrictions. Promotion of FDI was one of the key areas and policy was designed to achieve increased inflows of FDI.

[Insert table 1 about here]

In 1992, as part of the structural reform, the Zimbabwe Investment Center (ZIC) was established as a one stop shop for investment approvals. Tariff and tax exemptions were also offered to encourage foreign capital investments, transfer of technology, the utilisation of local raw materials, the development of rural areas and the use of labour-intensive production techniques. Foreign firms geared towards exporting also benefited from the export processing zones incentives in the form of tax holidays and customs free trade. The return to a liberal economy and enthusiastic promotion of FDI resulted in the surge of FDI inflows averaging above US$50 million per year between 1990 and 1997. In 1998, FDI inflows reached a record high of US$ 444 million, as shown in figure 1.

[Insert figure 1 about here]

The sharp surge in FDI inflows in 1998 was partly driven by the privatisation and liberalisation wave in the Zimbabwean economy. This saw substantial flows of foreign capital particularly from South African firms into various sectors of the Zimbabwean economy. Table 2 gives the details of some of the major transactions that took place in 1998.

[Insert table 2 about here]

In the late 1990s, the country began to experience political instability and macroeconomic imbalances. Investor confidence was further rattled in 2000 when compulsory farm acquisitions enabled by an Act of parliament began. The sudden reversal of FDI flows coupled with falling domestic investment had depressing effects on the gross fixed formation which fell from a record high of 25% of GDP in 1995 to only 17% of GDP by 2005.

3 Theoretical Framework

The paper adopts the Fedderke (2002) portfolio theoretical model to underpin the interaction between FDI and property rights. The core drivers of FDI fall into two classes of determinants namely the rate of return and risk factors. There are positive responses to the rates of return and negative responses to risk. The model defines the expected return on a portfolio of capital assets faced by an agent as

$$E\left(R\right) = D^R - D^C + F^R - F^C \tag{1}$$

where D^R and D^C are the expected return on domestic and foreign capital assets respectively and F^R and F^C are the cost of adjustment of domestic and foreign asset holdings respectively. Costs of adjustment arise due to information and transaction costs associated with altering the composition of the capital asset portfolios. Returns to domestic assets are distinguished from returns to foreign assets by having a non-zero probability of "expropriation" denoted by π_D.

Expropriation include factors such as nationalisation of assets, periods of domestic instability which might lower the returns to domestic investment, capital controls, and direct or implicit taxes faced by foreign and domestic investors. The functional forms for the expected returns on assets are given by

$$D^R = \left[\alpha\left(K^d\right) - \beta\left(K^d\right)^2\right]\left(1-\pi_D\right), 0 \leq \pi_D \leq 1; \alpha, \beta > 0 \tag{2}$$

$$F^R = \left[\gamma\left(K^f\right) - \delta\left(K^f\right)^2\right], \gamma, \delta > 0 \tag{3}$$

where K^d and K^f denote domestic and foreign capital asset holdings respectively. For adjustment costs, the model assumes that the cost of adjustment is increasing in the magnitude of capital.

$$D^C = \left[a\left(K^{d'}\right) - b\left(K^{d'}\right)^2\right], a, b > 0 \tag{4}$$

$$F^C = \left[c\left(K^{f'}\right) - d\left(K^{f'}\right)^2\right], c, d > 0 \tag{5}$$

All of a, b and π_D might be affected by policy intervention that raises the friction cost of moving capital assets across international boundaries. The net present value of the expected return on a portfolio of capital assets over an infinite time horizon is

$$N\left[K^d, K^f\right] = \int_0^\infty E\left(R\right) e^{-\rho t} dt \tag{6}$$

The two state variables in the optimisation problem are K^d and K^f whose solutions are given by

$$K^{d^*}\left(t\right) = \left(K_0^d - \bar{K^d}\right) e^{\frac{1}{2}\left(\rho - \left(\rho^2 + \frac{4\beta\left(1-\pi_D\right)}{b}\right)^{\frac{1}{2}}\right)t} + \frac{\left(1-\pi_D\right)\alpha - a\rho}{2\beta\left(1-\pi_D\right)} \tag{7}$$

$$K^{f^*}\left(t\right) = \left(K_0^f - \bar{K^f}\right) e^{\frac{1}{2}\left(\rho - \left(\rho^2 + \frac{4\delta}{d}\right)^{\frac{1}{2}}\right)t} + \frac{\left(\gamma - c\rho\right)}{2\delta} \tag{8}$$

K_0^d and K_0^f are the initial holding of domestic and foreign capital assets respectively. Equations 7 and 8 characterise the intertemporal equilibrium for both the foreign and domestic capital assets. An important point to note is that the optimal assets holdings as characterised by the intertemporal equilibria are asymmetrical between domestic and foreign assets by virtue of the presence of expropriation risk on domestic asset holdings. Our concern is with the mix of foreign and domestic assets in the portfolio of agents in the intertemporal equilibrium.

The mix of the foreign to domestic assets in the portfolio of agents in the intertemporal equilibrium can be readily identified from the ratio of the two particular integrals in the solutions to the euler equations for K_0^d and K_0^f. ϖ_K is defined as the ratio of the stock of foreign to domestic capital holdings after agents have adjusted to optimal capital holdings:

$$\varpi_K = \frac{\bar{K^f}}{\bar{K^d}} = \frac{\beta\left(\gamma - c\rho\right)\left(1 - \pi_D\right)}{\delta\left[\left(1 - \pi_D\right)\alpha - a\rho\right]} \tag{9}$$

According to equation 9, the portfolio mix is a function of marginal rate of return, marginal costs of adjustment and expropriation risk factors. To the extent that our interest lies in the impact of the host (domestic) country's property rights on FDI, our focus must be on the condition $\frac{\partial \varpi_K}{\partial \pi_D} > 0$. The condition has important implications for the FDI- institutions link question. It shows that rising expropriation risk, which is synonymous to weak property rights, will in equilibrium reduce the host country's assets in the international investors' portfolio. This is because expropriation negatively affects the marginal returns to investment thereby reducing the competitiveness of a country in attracting FDI inflows.

4 A Review of Empirical Literature

4.1 Institutional Determinants of FDI

While theory predicts that investor friendly institutions enhance a country's ability to attract FDI, empirical work is inconclusive. This is attributed to the differences in the institutional indicators used in empirical work. Several studies investigated the impact of property rights on FDI using different measures of property rights. While some studies showed that secure property rights strongly affect the levels of FDI positively, other studies found an insignificant effect.

Gastanaga *et al* (1998) conducted an investigation of the impact of a number of institutional variables on FDI. The study used a panel of 22 less developed countries over the period 1970 to 1975. The Business Environmental Risk Intelligent (BERI) nationalisation risk index was used to proxy for property rights. The index is rated on a 0 to 4 scale with higher scores representing higher levels of institutional efficiency. They found a positive and significant relationship between the FDI-GDP ratio and the BERI nationalisation risk index demonstrating that low levels of nationalisation risk promote FDI inflows.

Stein and Daude (2001) used the International Country Risk Guide (ICRG) index of expropriation of private property to proxy for property rights. The index is rated on a 0 to 10 scale, with lower ratings given to countries where expropriation of private investment is a likely event. They obtained a positive and significant relationship between FDI inflows and the expropriation index. Again, their results suggest that more secure property rights increase FDI inflows.

The Li and Resnick (2003) study on the effect of political democracy on FDI yielded important results for the FDI-property rights link question. The study used Ordinary Least Squares (OLS) with Panel Correlated Standard Errors for a sample of 53 developing countries for the period 1982 to 1995 to investigate their theoretical proposition that democratic political institutions affect FDI inflows to developing countries via two competing causal links. Using the Knack and Keefer (1995b) property rights index constructed from the ICRG dataset, they found that increases in democracy yield improved property rights which in turn encourage FDI inflows to developing countries. Besides this positive indirect link, democracy is found to have a negative direct effect on FDI inflows.

Another study linking FDI and property rights is by Fedderke and Romm (2006). The study undertook an investigation of the determinants of FDI inflows in South Africa over the period 1956 to 2003. They

controlled for property rights and political instability using South Africa's time-series institutional indices constructed in Fedderke *et al.* (2001). Using the Johansen Vector Error Correction Modelling (VECM) technique, they found that stronger property rights significantly affect real FDI stocks positively.

More recently, Benassy-Quere *et al* (2007) argued that most empirical studies linking FDI and institutions do not account for the problem of endogeneity. Endogeneity arises when the existence or absence of FDI puts pressure on governments to improve institutions causing a reverse causality. They estimated a gravity equation for bilateral FDI stocks which takes into account the role of institutions in the host country as well as the source country. The problem of endogeneity was tackled by the use of a three-stage procedure for instrumentation and orthogonalisation. Using the Fraser Institute property rights index, estimations were done for a panel of 41 transition countries for the period 1985 to 2000 as well as a cross-section of the same countries for the year 2000. Their findings showed that property rights protection is only significant and positive in the panel estimations but not significant in the cross-sectional estimations.

With the exception of the Fedderke and Romm (2006) study on South Africa, all of the above studies use either cross country or panel data in their empirical work. The major reason for the limited country-specific empirical evidence on the impact of property rights on FDI is that existing institutional indicators are only available for short time periods and therefore not useful in country-specific studies.

4.2 Non-Institutional Determinants of FDI

The literature on FDI has proposed various macroeconomic determinants of FDI. The relationship between such variables and FDI depends on whether the FDI is horizontal or vertical. Horizontal FDI occurs when Multinational Corporations (MNCs) have headquarters at home and production plants at home and abroad that produce the same good. The major motive for horizontal FDI is to expand the MNCs markets. Vertical FDI, on the other, hand occurs when MNCs fragment different stages of production by having headquarters at home and production plants in different foreign countries that produce different intermediate or final goods. Vertical FDI is driven by the MNCs' search for efficiency in production, particularly lower input costs.

The market size of the host country, usually measured by real GDP, is considered an important determinant of horizontal FDI and is consistently statistically significant in empirical work.[6] The theoretical linkage emanates from the fact that a larger market allows firms to benefit from economies of scale that arise from low distribution costs and bulk-buying of inputs, among other things.

Openness of the domestic economy is also seen as an important determinant of FDI. Openness is influenced by direct FDI restrictions as well as trade barriers. FDI restrictions clearly raise barriers to FDI and are likely to influence the choice that MNCs make with regards to investment location. Two views of the motives for FDI give contradictory predictions regarding the effects of trade liberalisation on FDI. The view of FDI and trade being substitutes sees tariff-jumping as the motive for FDI, and hence trade liberalisation should negatively affect FDI. In a liberalised trade environment, exporting goods from the home country is relatively more attractive than FDI as a way to serve the regional market. The alternative view sees FDI and trade as complements. This applies, in particular, to vertical FDI where a liberal trade environment is a prerequisite for international division of labour at the firm level.[7]

The link between the capital intensity of the host country's industries and FDI has also generated interest in recent studies. Most transition and developing economies are presumed to have a comparative advantage in the production of goods that are relatively labour-intensive. If FDI is motivated by MNCs' search for

[6] See Globerman and Shapiro (1999) and Sethi *et al* (2003) for evidence on Canada, 17 West European countries and 11 Asian countries that receive investments from U.S MNCs, Morisset (2000) for evidence on African countries and Asiedu (2005) for evidence on 22 African countries.

[7] See the discussion in Nicoletti et al (2003). See also Globerman and Shapiro (1999), and Blomstrom and Kokko (1997).

lower labour costs, then FDI will flow into industries that have relatively low capital-labour ratios. This normally holds for vertical FDI searching for low labour costs. By contrast horizontal FDI tends to flow into capital intensive sectors. The the link between FDI and the host country's capital intensity is therefore ambiguous depending on the whether vertical or horizontal FDI dominates FDI inflows.[8]

Several studies consider the quality of human capital in the host country. The absence of educated and healthy workers can pose a significant deterrent to MNCs entry. This is especially the case with efficiency-seeking FDI where access to a highly skilled workforce is essential. Some studies have shown that a more highly educated and skilled workforce is essential to FDI.[9] While the quality of human capital is an important determinant of FDI, the general labour market conditions will determine the MNCs' ability to tap into the labour resources of the host countries. It is argued that labour market conditions that impose extra costs on investors tend to curb FDI inflows. For example, strict employment protection legislation and high labour tax wedges impact negatively on FDI returns thereby discouraging FDI inflows. In addition, strict employment protection legislation makes it more difficult for MNCs to respond to supply and demand shocks, thus increasing the variability of FDI returns and the risk that investors face in the host country.[10]

Other common explanatory variables of FDI are the host country's corporate tax rates and the availability of infrastructure. With regards to the corporate tax rates, results have not been consistent.[11] The availability and quality of infrastructure (transportation, communications and energy supply) affects FDI positively because good infrastructure lowers transaction and production costs and increase the attractive of a country as an investment destination.[12]

The choice of our empirical model in equation 10 draws upon our theoretical framework. Other explanatory variables of FDI are adopted from the past empirical literature.

$$LFDI = f\left(\underset{+}{LPROPERT}, \underset{+}{LGDP}, \underset{+/-}{OPEN}, \underset{+/-}{LRATIO}, \underset{-}{LEDEBT}, \underset{+}{LEDUC}\right) \tag{10}$$

The variables are defined in appendix A. We use FDI stocks rather than FDI flows as the dependant variable for two reasons. First, stocks are much less volatile than flows which are sometimes dependent on one or two large takeovers, especially in relatively small countries. Secondly, the long term contribution of FDI to domestic investment (and therefore policy stance towards FDI) may be better reflected in accumulated FDI stock data (Read, 2007).

A priori, we expect that secure property rights have a positive effect on FDI. This is in line with the NIE theoretical argument that strong institutions are key to reducing uncertainty and transaction costs that arise in economic exchange. This in turn would enhance the host country's ability to attract FDI. The market size of the host country is expected to have a positive effect on FDI. This would be in support of the market size hypothesis that larger markets are a source of economies of scale which enhances returns to investment leading to more FDI. The effect of trade openness could either be positive or negative depending on whether horizontal or vertical FDI dominates as explained in the above section. The link between the host country's industries' capital intensity and FDI is also ambiguous. It can either be positive or negative depending on the whether labour-intensive (vertical) FDI or capital-intensive (horizontal) FDI dominates.

The ratio of external debt to GDP is expected to carry a negative coefficient because when the government's external debt burden increases, the likelihood of a balance of payments crisis also increases. This may attract the imposition of restrictions on profit and dividend remittances by the host country's government

[8] See for example Fedderke and Romm (2004) for evidence in South Africa.
[9] See for example Mody and Srinivasan (1998) , Globernan and Shapiro (2002) and Asiedu (2005).
[10] See for example Sethi *et al* (2003) and Nicoletti *et al* (2003).
[11] While Gastanaga *et al*(1998), and Wei (2000) show that taxes and tariffs have a negative and significant effect on FDI, Wheeler and Moody (1992) find an insignificant relationship.
[12] See Wheeler and Moody (1992) , Loree and Guisinger (1995) and Globerman and Shapiro (2002).

in order to curb outflows of foreign capital. MNCs facing the risk of being unable to remit profits to their mother companies will be discouraged. Lastly, human capital is expected to have a positive effect of FDI by providing the skills required by MNCs.

5 Econometric Methodology

We employed the standard Johansen estimation technique[13] for multivariate cointegration to estimate the long-term determinants of FDI. In its general form, an unrestricted VAR is specified as follows:

$$Z_t = A_1 Z_{t-i} + A_m Z_{t-m} + \mu + \delta_t \tag{11}$$

Where Z_t is an n x 1 matrix of endogenous variables, m is the lag length, μ is the matrix of deterministic terms and δ is a Gaussian error term. Reparametrisation provides the VECM specification:

$$\triangle Z_t = a_0 + a_1 t + \Pi Z_{t-i} + \sum_{i=1}^{p-1} \Gamma_i \triangle Z_{t-i} + \varepsilon_t, t = 1, 2...n \tag{12}$$

The existence of r cointegrating relationships amounts to the hypothesis that:

$$H_1(r) : \Pi = \alpha\beta^{'} \tag{13}$$

Where Π is a p x p matrix, α is a p x r matrix of the speed of adjustment to equilibrium and β is also p x r matrix of long run coefficients. α and β are assumed to be of full rank. Therefore, $H_1(r)$ is the hypothesis of reduced rank of Π. When r > 1, that is, when we have more than one cointegrating relationship, issues of identification arise[14] and should be resolved by means of restrictions on the loading matrix (α), the matrix representing short run dynamics and the cointegration space.(β).[15]

Following Pesaran and Shin (1995b), we take a theory-guided approach to impose just-identification restrictions shown in equation 14.[16]. While our theoretical framework suggests the existence of a long run relationship between FDI and its institutional and macroeconomic determinants, we expect a strong feedback effect from FDI to output (GDP). The theoretical hypothesis is that FDI possesses some technological spill over effects through the introduction of more advanced technology and management practices. This in turn is expected to enhance productivity and output in the host country (Borensztein *et al.* 1998). Theory therefore supports the existence of two long-run relationships, one explaining FDI and the other explaining

[13] Johansen and Juselius (1990, 1991, 1992).

[14] Wickens (1996), Johansen (1990, 1992), Pesaran and Shin (1995a), Pesaran, Shin and Smith (1996).

[15] Greenslade et al (1999).

[16] The choice of this restriction is based on the fact that Zimbabwe's major trading partner is South Africa and the two countries have always enjoyed an open trade regime even when Zimbabwe has been isolated from the rest of the world. In this regard, changes in the trade policy of the country are not expected to yield any direct significant impact on foreign capital inflows. A more relevant measure would be one that captures openness to foreign capital

GDP. Over-identifying restrictions are tested using a χ^2.test statistic.

$$Z_{t-k+1} = \begin{bmatrix} \alpha_{11} & \alpha_{11} \\ \alpha_{21} & \alpha_{22} \\ \alpha_{31} & \alpha_{32} \\ \alpha_{41} & \alpha_{42} \\ \alpha_{51} & \alpha_{52} \\ \alpha_{61} & \alpha_{62} \\ \alpha_{71} & \alpha_{72} \end{bmatrix} \begin{bmatrix} 1 & -\beta_{12} & +\beta_{13} & \beta_{14} & 0 & -\beta_{16} & -\beta_{17} \\ -\beta_{21} & 1 & -\beta_{23} & 0 & -\beta_{25} & -\beta_{26} & -\beta_{27} \end{bmatrix} \begin{bmatrix} LFDI \\ LGDP \\ LRATIO \\ LDEBT \\ OPEN \\ LEDUC \\ LPROPERTZ \end{bmatrix}_{t-k+1} \tag{14}$$

The estimates of the long-run parameters β_{ij} contain no information about the speed of adjustment of the variables to deviations from the equilibrium. Instead, the size and signs of each error correction term (ECT), α_{ij} represents the direction and speed of adjustment of the system to its long run equilibrium after a shock.

In estimating equation 14, issues of endogeneity arise. We cannot rule out *a priori* that institutions (property rights in this case) are endogenous to FDI. Daude and Stein (2007) noted that endogeneity arises between FDI and institutions because when investors are located in a foreign country, they might become a constituency that demands better institutions. This creates feedback effects from FDI to institutions. If estimation proceeds in the presence of endogeneity, the resulting parameter estimates will be biased. It is therefore necessary to determine the directions of association between the variables in our model.

We employ the Pesaran, Shin and Smith (PSS henceforth) F-test to determine the directions of associations between the variables in our empirical specification. According to Pesaran, Shin and Smith (2001), the VECM specification in equation 12 can be, reparametrised by partitioning the Z-matrix as $\mathrm{Z}_t = \left(y_t, x_t^{'}\right)$, the error term as $\varepsilon_t = \left(\varepsilon_{yt}, \varepsilon_{xt}^{'}\right)^{'}$ and the long-run multiplier matrix as $\Pi = \begin{pmatrix} \pi_{yy} & \pi_{yx} \\ \pi_{xy} & \Pi_{yx} \end{pmatrix}$. Then under the assumption $\pi_{xy} = 0$, it follows that:

$$\triangle x_t = a_{x_0} + a_{x_1} t + \Pi_{xx} x_{t-1} + \sum_{t-1}^{p-1} \Gamma_{xi} \triangle Z_{t-i} + \varepsilon_{xt}, t = 1, 2...n \tag{15}$$

$$\triangle y_t = c_o + c_1 t + \Pi_{yy} y_{t-1} + \pi_{yx.x} x_{t-1} \sum_{t-1}^{p-1} \Psi_i^{'} \triangle Z_{t-i} + \omega^{'} \triangle x_t + u_t, t = 1, 2...n \tag{16}$$

The specifications of c_0, c_1, ω and Ψ are defined in Pesaran, Shin and Smith (2001). From equation 15, it is clear that when $\pi_{xy} = 0$, there is no feedback from the level of y_t to x_t in the long run. In other words, $\{x_t\}_{t=1}^{\infty}$long-run forces $\{y_t\}_{t=1}^{\infty}$. However, the possibility that $\{y_t\}_{t=1}^{\infty}$Granger causes $\{x_t\}_{t=1}^{\infty}$ in the short run still remains.

The PSS F-test is based on the hypothesis that $\pi_{yx} = 0$ under the sequential treatment of all variables in the specification as the outcome variable. Acceptance of the hypothesis establishes the absence of a level relationship, hence weak exogeneity for the y-variable specified under the test.

To operationalise the PSS F-test, we consider the Conditional Autoregressive Distributed Lag (ARDL)

error correction model of our empirical specification given by:

$$\begin{aligned}\triangle LFDI = \varphi_o + \varphi_1 t + \sum_{i=1}^{2}\beta_i \triangle LGDP_{t-i} + \sum_{i=1}^{2}\delta_i \triangle LRATIO_{t-i} + \sum_{i=1}^{2}\mu_i \triangle LEDEBT_{t-i} + \sum_{i=1}^{2}\theta_i \triangle LEDUC_{t-i} \\ + \sum_{i=1}^{2}\alpha_i \triangle OPEN_{t-i} + \sum_{i=1}^{2}\lambda_i \triangle LPROPERT_{t-i} + \varphi_3 LFDI_{t-1} + \varphi_4 LGDP_{t-1} + \varphi_5 LRATIO_{t-1} \\ + \varphi_6 LEDEBT_{t-1} + \varphi_7 LEDUC_{t-1} + \varphi_8 OPEN_{t-1} + \varphi_9 LPROPERT_{t-1} + v_t\end{aligned}$$

The order of augmentation is determined by the need to render the error term free of systematic variation, in order to extract the long run relationship. The null of no long run relationship ($H_0 : \varphi_3 = ... = \varphi_9 = 0$) is tested against the alternative by means of the F-test. This test statistic has a non-standard distribution irrespective of whether the variables are I(0) or I(1). Pesaran and Pesaran (1997) provide two asymptotic critical values. The upper bound denoted F_U assumes that all variables are I(1) and the lower bound denoted F_L assumes that all variables are I(0).

Where the estimated $\widehat{F} > F_U$, we reject the null hypothesis and conclude that a long run relationship is present between the dependant variable and all the other variables in the model. If $\widehat{F} < F_L$ then the null of no long run relationship cannot be rejected. When $F_L < \widehat{F} < F_U$, result of the inference is inconclusive. The PSS F-test does not require the pretesting of the variables in the model for unit roots, an advantage it enjoys over the Johansen VECM approach.

6 Findings

In accordance with the requirements of the VECM technique, the top panel of table 3 reports the results of the ADF test for unit roots.

[Insert table 3 about here]

The results confirm that all of the variables in the model except LRATIO are I(1). Regarding the variable LRATIO, the ADF tests would not reject the null hypothesis of a second unit root. An examination of the plot of the first difference of LRATIO in appendix B, figure (d) proves instructive. It shows that around 1974, the variable LRATIO was affected by an exogenous shock which would not be realizations of the underlying data generation process. This is not surprising given that 1974 marks the beginning of intensified political instability related to the war in Zimbabwe. The surge in political instability in 1974 is shown by the political instability index obtained from Gwenhamo *et al.* (2008) and reproduced in appendix B, figure (f).

To test this hypothesis, we made use of the test proposed by Perron (1989) which allows for a shift in the intercept and/or the slope of the trend function. We apply the Perron (1989) model B (i.e. the changing growth model). The results shown in the lower panel of table 3 allow us to clearly reject the existence of a second unit root, so that we conclude that LRATIO is an I(1) variable. Other variables that seem to have been subjected to substantial structural breaks are FDI in 1998, EDUC in 1985, EXDEBT in 1998 and OPEN in 1999. Upon the examination of the first differences of the variables in appendix B, it is clear that LDEBT and OPEN are stationary after the first difference even in the presence of structural changes but it is not so obvious that LFDI and LEDUC are stationary after the first difference. We therefore subject LFDI and OPEN to the Perron(1989) test. The results cornfirm that all these varibles are I(1) subject to the existence of structural breaks.

The results of the PSS F-test are shown in table 4. At the 5% level of significance, we reject the null hypothesis of the absence of a level relationship when LFDI, LGDP and LEDUC are dependent variables. This implies that LFDI, LGDP and LEDUC are endogenous or outcome variables. We however fail to

reject the null hypothesis of the absence of a level relationship when LDEBT, OPEN and LPROPERT are independent variables and conclude that LDEBT, OPEN and LPROPERT can be treated as long-run forcing or weakly exogenous variables. The result that LPROPERT is weakly exogenous rules out the problem of simulteneity between FDI and institutions (property rights). The results are inconclusive in the case of the varible LRATIO.The existence of more than one endogenous variables renders a single equation approach inappropriate for estimating the parameters of our model. The Johansen multivariate approach is more suitable.

[Insert table 4 about here]

We now turn to the Johansen test for cointegration. Table 5 reports the trace and maximal eigenvalue test-statistics for the number of cointegrating vectors under the assumption of unrestricted intercepts and restricted trends.[17] Given our small sample size, we follow the maximal eigenvalue statistic indicating two cointegrating vectors. This result concurs with our a priori theory-guided expectation.

[Insert table 5 about here]

We now turn to the interpretation and discussion of the long-run parameter estimates reported in table 6. The two equilibrium relationships in the baseline over-identified model in column B can be represented as follows:

$$LFDI = \underset{(3.71)}{0.01}t + \underset{(2.08)}{1.01}LGDP_t - \underset{(2.56)}{1.68}LRATIO_t - \underset{(2.99)}{0.26}LEXDEBT_t + \underset{(1.92)}{0.66}LEDUC_t + \underset{(2.05)}{1.09}LPROPERT_t \tag{17}$$

$$LGDP = \underset{(2.61)}{0.07}t + \underset{(3.25)}{0.65}LFDI_t - \underset{(4.48)}{0.66}LRATIO_t - \underset{(1.88)}{0.77}LEDUC_t + \underset{(2.55)}{1.42}OPEN_t \tag{18}$$

The error correction terms in column B of table 7 represent the short run dynamics for each equilibrium relationship. The error correction term $ECT1_{t-1}$ for the LFDI vector in equation 17 is -0.02. Equation 18, the LGDP vector has an error correction term $ECT2_{t-1}$ of -0.09. Since, both error correction terms are between zero and minus two and statistically significant, it indicates that the estimated relationships are potentially stable dynamically. Although statistically significant, the error correction (adjustment) terms indicate a very slow adjustment to the long run equilibrium.

We start off by interpreting the coefficients in the LFDI vector. LPROPERT has a positive and statistically significant effect with an elasticity of 1.09. LPROPERT is a *de jure* property rights index rated on a 0 to 100 scale with higher scores representing more secure formal property rights. The positive coefficient therefore implies that an improvement (deterioration) in the rating of *de jure* property rights in Zimbabwe is associated with an increase (decrease) in FDI. This supports the theoretical proposition by the NIE that secure property rights encourage FDI by reducing risks, transaction costs and uncertainty.

A plausible transmission mechanism is that the enactment of laws which affect security of private property directly influence the risk ratings of a country which in turn influence foreign investors location decisions. For example, between 2000 and 2003, when the Zimbabwean government enacted several laws allowing compulsory acquisition of land with no compensation to the landowners, the World Bank risk premium on investment in Zimbabwe jumped from 3.4% to 153.2%. Earlier studies by Gastanaga *et al* (1998), Li and Resnick (2003), Fedderke and Romm (2006) and Asiedu (2005) also found a positive link between FDI and secure property rights.

[Insert table 6 about here]

LRGDP has a positive and significant effect with implied elasticity of 1.01. This confirms the market size hypothesis which says that larger markets are a source of economies of scale. This enhances returns to

[17] See for example Mafusire (2004) for the same assumption on the relationship between FDI, trade and GDP in Zimbabwe.

investment thereby attracting FDI. Our result is similar to that of Mafusire (2004) who obtained a positive and significant relationship between GDP and FDI inflows in Zimbabwe for the period 1967 to 1994. The finding also confirms Asiedu's (2005) results of a positive relationship between FDI and GDP for a group of 22 African countries, including Zimbabwe.

LEDEBT has a negative and statistically significant long-run coefficient of -0.26. This supports the notion that increasing government external debt burden results in uncertainty regarding future policy towards foreign capital, which will discourage FDI. Besides, a high government external debt burden may be an indication of weak macroeconomic policies by the Zimbabwean Government. Ramirez (2005) also obtained a negative and statistically significant relationship between Chile's external debt burden and FDI stock.

LRATIO has a negative and statistically significant coefficient of -1.66. This suggests that FDI inflows are biased towards sectors with low capital intensity. The direct implication of this finding is that FDI is dominated by vertical FDI searching for low labour costs. LEDUC has a positive and significant coefficient of 0.65 indicating that human capital acts as pull factor of FDI by providing necessary skills for efficient production.[18]

Regarding the political instability dummy variables, LINVERSION has a negative and statistically significant coefficient of -0.02. and 70sWAR is statistically insignificant. The negative link between LFDI and political instability is consistent with results of Schneider and Frey (1985) who found that political instability reduces FDI inflows for a group of middle-income and low-income countries.

We now turn to the LGDP vector represented in equation 27. Although the LGDP vector is likely to be underspecified, all variables carry the a priori expected signs. LFDI and LEDUC have positive and significant effects of 0.65 and 0.77 on LGDP respectively. This supports the Borensztein et al (1998) notion that FDI has productivity-enhancing effects when the host country absorptive capacity, measured by its stock of human capital, is high. As expected, capital intensity (LRATIO) and trade openness (OPEN) contribute positively to GDP with coefficients of 0.66 and 1.42 respectively.

The dummy variables, LINVERSION and 70sWAR, have negative and statistically significant coefficients equal to -0.169 and -0.092 respectively. The impact of LINVERSION outweighs that of 70sWAR.This implies that the war-time political instability was less detrimental to output when compared to land inversion which occurred between the end of 1999 and 2003.

We now check for the robustness of the long-run parameter estimates. First, we include a dummy variable which takes a value of one between 1976 and 1992, a period during which no significant new foreign capital inflows were realised. We assume the same just-identifying and over-identifying restrictions as in the baseline model. The parameter estimates are shown column C of table 6. Our earlier results are robust to the inclusion of this dummy variable. In the cointegrating vector of interest, the LFDI vector, LPROPERT carries a positive and significant effect on LFDI. All other variables maintain the signs they had in the baseline model. Changes only occur in the magnitudes of the estimates.

Secondly, we use an alternative property rights index denoted LPRFH instead of LPROPERT to proxy for property rights. LPRFH is the log of the property rights index in the freehold tenure system in which all MNCs own their properties, including farms and mines. The difference between LPRFHZ and LPROPERT is that the latter only tracks formal laws governing property rights in the freehold tenure system, whereas the former tracks formal laws regulating ownership in all tenure systems including those that are not necessarily market-based. The results are reported in column D of table 6. Again, the just-identifying and over-identifying restrictions are the same as in the baseline model.

The results in the LFDI vector show that property rights have a positive and significant effect on FDI with an elasticity of 0.65. The magnitude of the impact is, however, lower than that of the original property rights index. All other variables in the LFDI vector maintain their signs as in the baseline model but, the

[18] See, for example, Globernan and Shapiro (2002) and Asiedu (2005) for the same result.

magnitudes of impacts are slightly lower when compared to the baseline model. In the LGDP vector, only the magnitude of the variables changed but all signs are maintained as in the baseline model.

7 Conclusion

The paper sets out to examine the impact of property rights on FDI in Zimbabwe for the period 1964 to 2005 using the Johansen VECM technique. For this purpose, the study employs the variables identified by the literature as important in explaining FDI together with a newly constructed *de jure* property rights index obtained from Gwenhamo *et al* (2008) to proxy property rights in Zimbabwe.

An extensive study of the literature was carried out to inform the specification of the long-run relationships to be estimated. The *a priori* specification was complemented by the PSS F-test to test for the forcing and outcome variables. Following this, the Johansen methodology was used to test for the number of cointegrating relationships and to estimate the long-run parameters and adjustment parameters for the Zimbabwean FDI function. Robustness checks for the long-run parameter estimates were also carried out.

There are two salient features emanating from the empirical investigations of this paper. Firstly, the results indicate that secure property rights significantly affect FDI positively. The finding is robust to the use of an alternative *de jure* property rights index. Even after controlling for periods of no significant new foreign capital inflows, property rights were consistently an important explanatory variable of FDI in Zimbabwe.

However, the study does not find evidence of feedback effects from FDI to the *de jure* property rights index. This resolves the concerns raised by Benassy-Quere *et al* (2007) that most studies do not account for the problem of endogeneity which arises when there is reverse causality between institutions and FDI.

Secondly, non-institutional determinants of FDI were also found to be important. It was shown that GDP has a positive impact on FDI. Results also supported the presence of feedback effects from FDI to GDP confirming the notion that FDI has some productivity-enhancing effects in the host country. In addition, the external debt burden, capital intensity and political instability have negative and statistically significant effects on FDI. Human capital positively affects both FDI and the GDP.

Overall, the study suggests that property rights, political instability and macroeconomic variables jointly affect the levels of FDI stocks. The main policy implication of the study is that the political elite should ensure that the institutional structure protects the property rights of the broad cross-section of the society so as to promote FDI. Another policy suggestion is that neither institutional reforms nor macroeconomic adjustment alone can effectively induce FDI. Rather, policy should be aimed at achieving macroeconomic, institutional and political stability to improve the attractiveness of the country to foreign investors.

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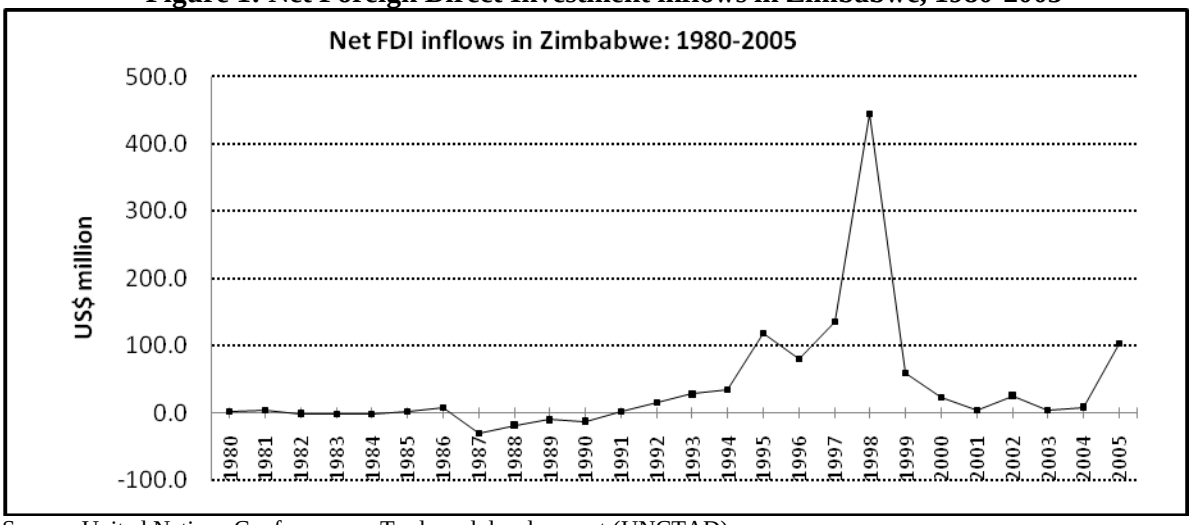
Figures and Tables

Figures

Figure 1: Net Foreign Direct Investment inflows in Zimbabwe, 1980-2005



Source: United Nations Conference on Trade and development (UNCTAD)

Tables

Table 1: Foreign Direct Investment Inflows Indicators

	Net Total Foreign Direct Investment Inflows		
Year	Net total inflows in US$	% of Gross Fixed Capital Formation	% of GDP
1970-1979	18.47	3.35	0.59
1980-1989	-4.88	-0.40	-0.06
1990	-12.22	-0.76	-0.14
1991	2.79	0.16	0.03
1992	19.00	1.26	0.18
1993	38.00	2.45	0.58
1994	41.00	2.78	0.60
1995	117.70	6.73	1.66
1996	80.90	5.24	0.95
1997	135.10	8.88	1.60
1998	444.30	35.55	7.32
1999	59.00	7.46	0.99
2000	23.20	2.66	0.31
2001	3.80	0.31	0.08
2002	25.90	1.16	0.08
2003	30.00	2.94	0.38
2004	60.00	7.44	1.28
2005	102.80	9.80	3.06

Source: UNCTAD.

Table 2: Major Sources of FDI inflows in Zimbabwe in 1998

Target Company	Source Country	Value of transaction US $ million
Commercial Bank of Zimbabwe	South Africa	16
J.Pelham	South Africa	22
Hunyani Holdings	South Africa	7
Eureka Gold Mine	Australia	24
Indarama Gold Mine	Canada	15
Pickstone-Pearless Gold Mine	Canada	4,25
Standard Chartered Bank Zimbabwe	United Kingdom	10.9

Source: Makola (2003)

Table 3: ADF and Perron Unit Root Tests.

ADF Unit Root Tests.						
Variable	**Levels**		**First Differences**		**Second Differences**	
	τ_μ	τ_τ	τ_μ	τ_τ	τ_μ	τ_τ
LFDI	1.42	-0.52	-4.44*	-4.68*		
LGDP	-2.26	-0.48	-3.68*	-4.46*		
OPEN	-2.53	-2.49	-7.07*	-6.98*		
LEDEBT	-1.87	-3.05	-3.02*	-4.21*		
LPROPERTZ	-1.54	0.59	-5.19*	-6.22*		
LPRFHZ	-0.15	-1.02	-4.96*	-5.91*		
LEDUC	-1.65	-2.27	-3.34*	-3.46*		
LRATIO	-3.51	-2.23	-1.32	-2.32	-5.95*	-5.86*
Perron Unit Root Test with Structural breaks						
LRATIO		-2.02		-3.82*		
LFDI		-1.49		-4.12*		
LEDUC		-o.93		-4.89*		

Notes: * denotes the rejection of the null of non-stationarity at the 5% level of significance.

Table 4: PSS F- Tests

Dependant Variable	F-statistic	Interpretation
$\hat{F}_{LFDI}$	4.66*	Outcome variable
$\hat{F}_{LGDP}$	4.98*	Outcome variable
$\hat{F}_{LRATIO}$	3.02†	Inconclusive
$\hat{F}_{LDEBT}$	1.50	Forcing variable
$\hat{F}_{LEDUC}$	4.80*	Outcome variable
$\hat{F}_{LOPEN}$	1.80	Forcing variable
$\hat{F}_{LPROPERT}$	1.26	Forcing Variable

Notes: 1) Asymptotic critical value bounds are obtained from Pesaran and Pesaran (1997: 478) case III: Intercept and trend for k=7. At 5% significance level: $F_L = 2.272$ and F_u=3.883.

2) * denotes the rejection of the null of no long run relationship at the 5% levels of significance respectively and † denotes inconclusive results.

Table 5: Maximal Eigenvalue and Trace Statistics for Cointegration

Unrestricted intercepts and no trends, Order of the VAR = 2				
Null	**Alternative**	**Max Eigen Value**	**90% Critical Value**	**95% Critical Value**
r = 0	r = 1	82.553*	46.970	44.010
r<= 1	r = 2	41.606*	40.890	37.920
r<= 2	r = 3	31.383	34.700	32.120
r<= 3	r = 4	14.676	22.160	9.790
Null	**Alternative**	**Trace Value**	**90% Critical Value**	**95% Critical Value**
r = 0	r = 1	198.8936*	128.7900	123.3300
r<= 1	r = 2	116.3406*	97.8300	93.1300
r<= 2	r = 3	74.7347*	72.1000	68.1300
r<= 3	r = 4	43.3525	49.3600	46.0000

Notes:* denotes rejection of null at the 5% level of significance

Table 6: Long-run and Short-run Parameter Estimates

	(A)		(B)		(C)		(D)	
Long-run Parameter Estimates								
Dependant Variable	**LFDI**	**LGDP**	**LFDI**	**LGDP**	**LFDI**	**LGDP**	**LFDI**	**LGDP**
LFDI	-1	0.736 (1.61)	-1	0.651* (3.25)	-1	0.644** (1.74)	-1	0.679* (2.02)
LGDP	1.015* (2.12)	-1	1.014* (2.08)	-1	1.076** (1.95)	-1	0.294 (1.01)	-1
LRATIO	-1.666* (2.59)	0.693* (2.85)	-1.679* (2.56)	0.663* (4.48)	-1.677* (2.58)	0.671* (4.13)	-1.107* (4.20)	0.693* (4.18)
LEDEBT	-0.257* (2.99)	0.000	-0.261* (2.99)	0.0000	-0.256* (3.01)	0.0000	-0.169* (6.05)	0.0000
LEDUC	0.655** (1.81)	0.788** (1.78)	0.66** (1.92)	0.773** (1.88)	-0.674** (1.76)	0.863 (1.32)	0.372* (2.34)	0.749 (1.43)
OPEN	0.000	1.502** (1.88)	0.000	1.422* (2.55)	0.000	1.497** (1.92)	0.000	1.591* (2.24)
LPROPERTZ	1.074* (2.02)	0.055 (0.15)	1.093* (2.05)	0.0000	1.046* (2.03)	0.0000	----	----
LPRFHZ	----	----	----	----	----	----	0.654* (3.26)	0.0000
TREND	0.081* (2.99)	0.074** (2.16)	0.081* (3.17)	0.071* (2.61)	0.079* (3.19)	0.071** (1.97)	0.081* (5.16)	0.076* (2.23)
LR Test of restrictions	----	----	$\chi^2(1)$ = 0.265[0.871] **Accepts restriction**		$\chi^2(1)$ = 0.001[0.974] **Accepts restriction**		$\chi^2(1)$ = 0.205[0.651] **Accepts restriction**	
Short-run Parameter Estimates								
$ECT1_{t-1}$	-0.029* (3.98)	0.059 (1.48)	-0.029* (3.98)	-0.060 (1.51)	-0.027* (3.82)	0.074** (1.78)	0.045* (3.74)	0.085 (1.18)
$ECT2_{t-1}$	-0.042* (5.92)	-0.094* (2.46)	-0.043* (5.86)	-0.09* (2.48)	0.035* (4.99)	-0.111* (2.77)	-0.039* (5.28)	-0.073** (1.79)
LINVERSION	-0.02** (1.89)	-0.169** (2.70)	-0.022** (1.89)	-0.169* (2.72)	-0.028* (2.55)	-0.157* (2.48)	-0.022** (1.77)	-0.161* (2.32)
70sWAR	0.009 (1.37)	-0.092** (2.37)	0.009 (1.38)	-0.092* (2.37)	0.013 (1.27)	-0.102* (2.58)	0.014** (1.85)	-0.071 (1.71)
Structural break dummy variables	D98 DU74 DEDUC		D98 DU74 DEDUC		D98 DU74 DEDUC		D98 DU74 DEDUC	
Other Dummy Variables	----		----		1976-1992		----	

Notes:1) Figures in round and square brackets are absolute t-statistics and p-values respectively. 2) * and ** denotes significance at 5% and 10% respectively.

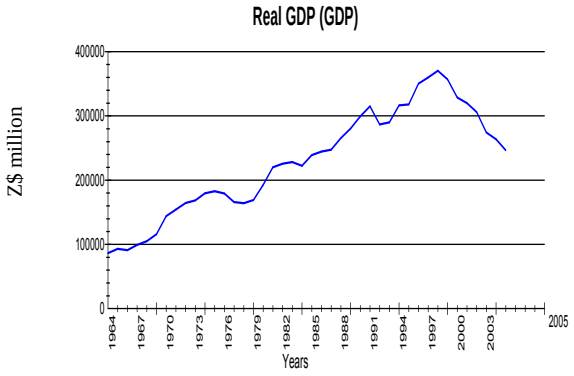
Appendix: Description of Variables, Data Sources and Time Series Plots of Variables

A. Variable Description and Data Sources

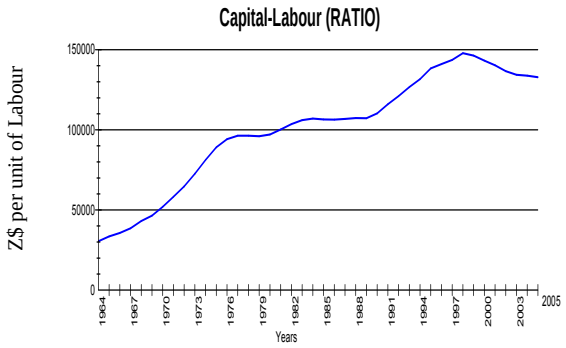
Variable	Description	Source
LFDI	Log of Real FDI Stocks at 2000 prices	See Appendix C for details
LRGDP	Log of Real Gross Domestic Product at 2000 prices	World Bank Indicators
LRATIO	Log of the Capital-Labor Ratio	See Appendix D for details
LEXDEBT	Log of the ratio of external debt to GDP	World Bank Indicators
OPEN	$\frac{\text{Exports+Imports}}{\text{GDP}}$	IMF International Financial Statistics
LEDUC	Log of the Barro and Lee's proportion of the population above 25 years with completed post-secondary education.	The Barro and Lee (1993) Educational Attainment Data Base
LPROPERTZ	Log of the Property Rights Index for Zimbabwe	Gwenhamo *et al* (2008)
LINVERSION	Dummy variable for the socio-political unrests during the illegal land inversions between 2000 2003.	
70sWAR	Dummy for the war-time political instability between 1974 and 1979.	
D98	Dummy for the once-off surge in FDI stocks in 1998.	
DU74	Dummy for the stagnant fixed capital formation between 1974 and 1988.	
DEDUC	Dummy for the structural change in the educational attainment index taking the value of one between 1985 and 1990.	

B. Time-series Plots of Variables

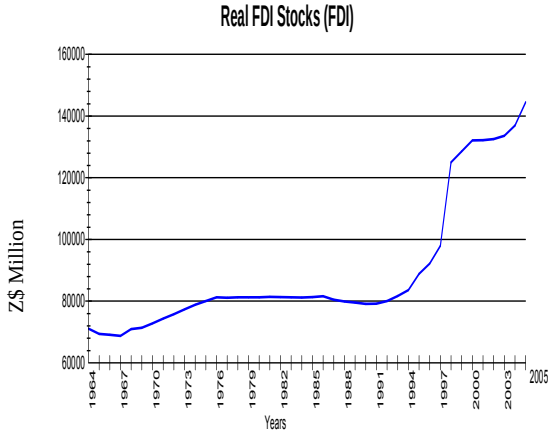
(a)



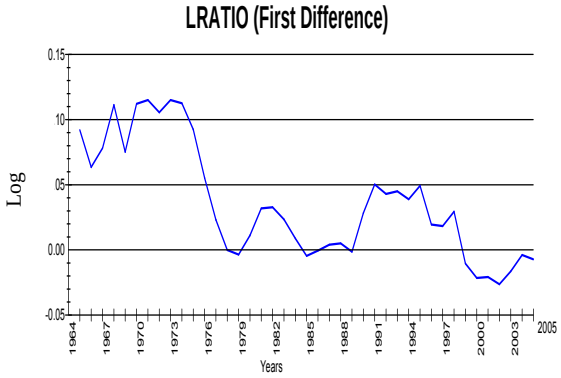
(b)



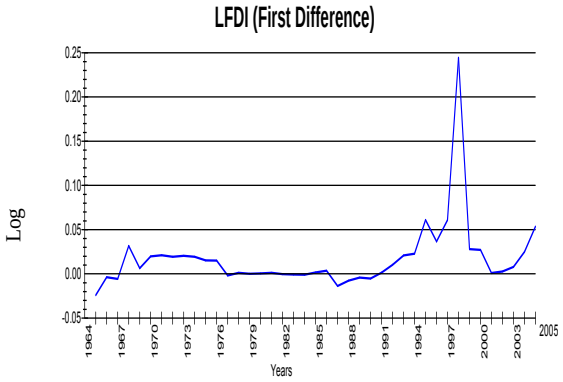
(c)



(d)



(e)



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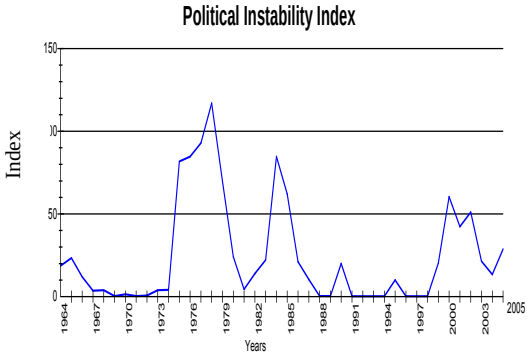
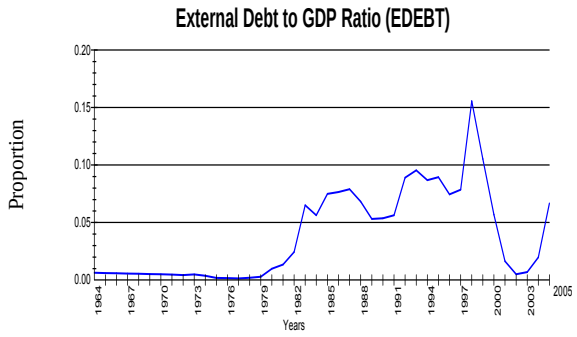
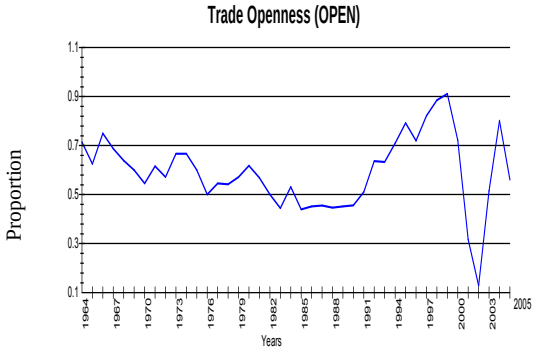


Time-series Plots of Variables

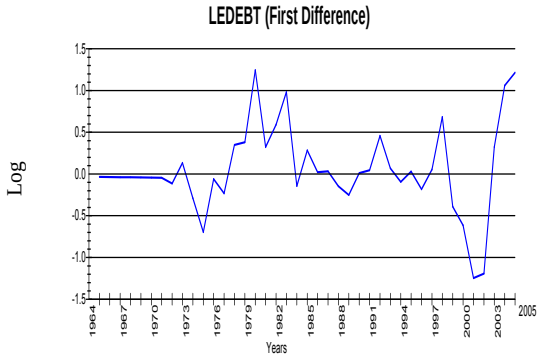
(g)



(h)



(i)



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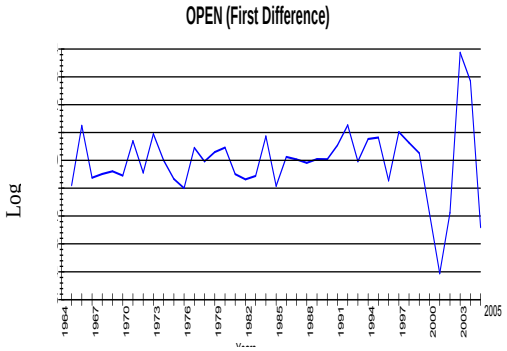
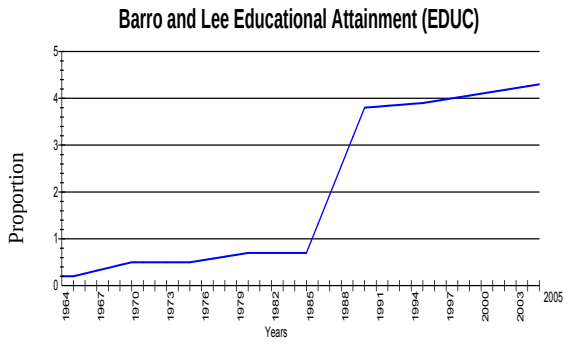
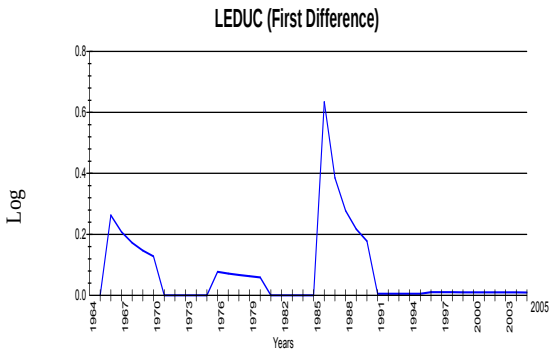


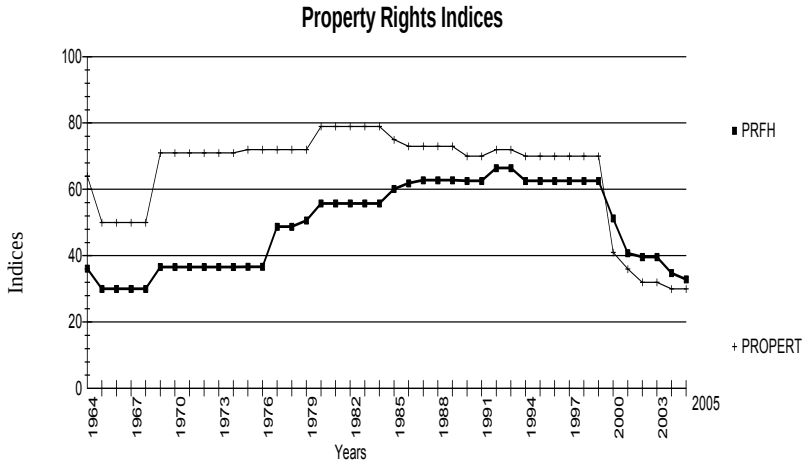
(k)



(l)



(m)



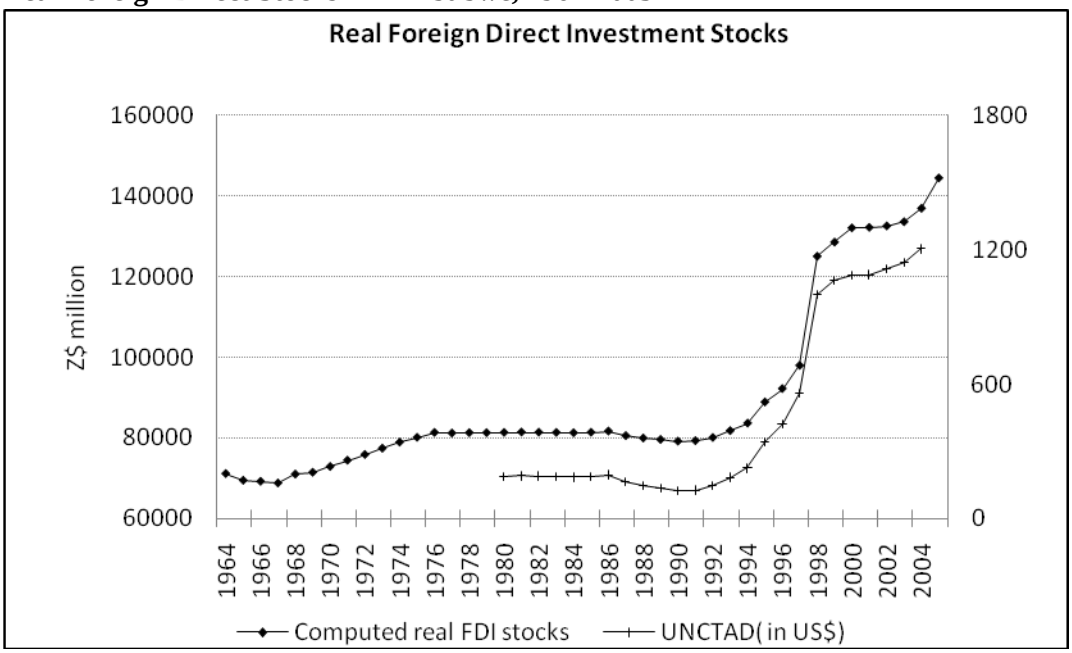
C. Construction of the Real FDI Stocks for Zimbabwe, 1964 to 2005

The UNCTAD data set on FDI stocks starts in 1980 and is inadequate for the purposes of this study. We generated the real FDI stocks in Zimbabwe million dollars for 1964 to 2005 using the standard perpetual inventory model[1] of the following form $k_t = k_{t-1} + I_t - \delta k_{t-1}$, where k_{t-1} is the stock of capital at time t-1, I_t is the flow of investment during the period t and δ is the rate at which the capital depreciates.

We used the annual FDI inflows adjusted for remittances of profits and dividends. The net FDI inflows data is obtained from the UNCTAD FDI data base which covers the period 1970 to 2005. The 1964 to 1969 FDI inflows data is obtained from the Balance of Payments (BOP) data extracted from the Economic Surveys of Southern Rhodesia and published in McKinnell (1969) and Stoneman (1976). The initial stock of FDI in 1963 is obtained from Stoneman's computation based on the 1963 Central Statistical Office (CSO) survey of the external corporate investments in Southern Rhodesia and published in Clarke (1980).

The FDI net inflows as well as the initial FDI stock are converted to the Zimbabwe dollar using the World Bank conversion factor and deflated by the GDP deflator with 2000 as the base year. Following the UNCTAD practise, δ is assumed to equal zero so that no depreciation is allowed for. The resulting index of the FDI stocks is shown below. The surge in FDI stocks in 1998 resulted from the liberal reforms brought about by the Economic Structural Adjustment Programme (ESAP) of 1990.

Real Foreign Direct Stocks in Zimbabwe, 1964-2005



[1] See Ramirez (2000, 2005) for a similar approach in the cases of Mexico and Chile.

D. Construction of the Capital-labour Ratio for Zimbabwe, 1964 to 2005

The capital-labour ratio is computed by dividing the total physical capital stock by the size of the labour force. The capital stock is computed using the above explained standard perpetual inventory approach. Real GFCF is used for investment data. Although it would have been ideal to use private sector GFCF, available data sources do not distinguish between private and state capital. The initial capital stock is estimated by aggregating the real GFCF in the period 1960 to1963. In the subsequent years, δ is assumed at 5%. We divide the real capital stock by total labour force to obtain the capital-labor ratio. The labour force data is obtained the World Bank Development Indicators online database. The diagram below shows the resulting capital-labour ratio.

Capital Labour-Ratio in Zimbabwe, 1964-2005