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The Impact of Business Regulatory Quality on Private Sector Investment in Botswana

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ABSTRACT

A market-friendly regulatory environment is key for private sector investment. In this paper, we examine the impact of business regulatory quality on private sector investment in Botswana. The paper finds that the business regulatory environment stimulates private sector investment in the long term and this phenomenon occurs when the quality of bureaucracy improves, among other factors. Other critical factors affecting private sector investment examined in this paper include; corporate credit, output and public infrastructure investment. Private sector investment responds positively to increases in corporate credit in the short term but not responsive in the long term. Economic activities support private sector investment positively but weak. On the other hand, public infrastructure investment crowds in(out) investment in the short and long term respectively. Policy wise, Botswana should further deepen its efforts towards creating a market-friendly regulatory environment and also consider how business regulatory quality interact with other policy variables for better investment and growth outcomes.

Keywords: Botswana, Private sector, Investment, Regulation, structural factors, Vector Autoregressive Model(VECM)

JEL Classification Codes : E22, O16, O43

1. INTRODUCTION

Private sector investments[1] play an important role in the economic development process of any country as it provides a source of output, income and employment (Khan and Reinhart,1990; World Bank, 2005; and Jongwanich and Kohpaiboon, 2008). According to Richardson and Amhed (1987), countries that have shown the most impressive and sustained higher rate of economic performance are those in which the private sector predominates. This is so because private entities tend to produce goods and services efficiently. Faced with the new realism that the private sector investment could play a significant role in economic development, resource-driven and public-led economies in Sub-Saharan Africa (SSA) are increasingly adopting longer term of structural adjustment programs and sectoral reforms to create more appropriate incentives and a framework for private-sector development as the basis for achieving sustainable economic growth (Richardson and Amhed,1987; Oshikoya, 1994; and Altenburg and Drachenfels, 2008). To date, to many SSA countries, increasing private sector investments remain a policy objective.

Thus far, private sector investment rates in SSA are still low when compared with other countries of a similar level of economic development. According to IMF (2018), it averaged 15% of GDP between 2010 and 2016, compared to 22% for developing economies in Asia,18 % in Europe and 17% in Latin America. Oshikoya (1994) and Ndikumana (2002), among others, have thus, conducted empirical studies to inform policy on what explains the level of private investment in Sub-Saharan countries. Yet, there is little empirical research on country- specific case studies, of which policy makers can make most of, to address specific economic circumstances in their countries.

This paper, therefore, consider the case of the Botswana economy. Like many other developing countries, Botswana underscores the importance of private sector investment in its economic diversification process, economic growth and in creating employment (BOCCIM et al., 2008; Republic of Botswana, 2016b, 2018, 2019). The private sector investment and development is recognised as the main vehicle of inclusive growth. From its early stages of development, the country implemented various policy instruments to stimulate private sector investment and one remarkable achievement so far, has been its prudent macroeconomic management. Although macro policies are unquestionably important, there is a growing consensus that the regulatory environment also play a major determinant of private sector investment and economic growth in Botswana (Republic of Botswana, 2009a,2009b,2016,2019). However, little or no empirical research has analysed their impact on economic outcomes such as growth, productivity and investment. It is therefore, worthwhile to find out the extent at which the business regulatory quality can drive private sector investment in Botswana.

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1   'Private investment' measures investment in physical assets, for example, equipment and structures, as well as intellectual property products, by the private sector in the economy. It is an indicator of the private sector's willingness to expand production capacity (Kopp (2018)). Throughout this paper, 'private sector investment' refers to fixed investment by private investment.

In this paper, we thus examine this link, using data from 1984 to 2016. We further investigate whether the regulation-investment link in Botswana varies with the quality bureaucracy, given that the quality of regulation is profoundly affected by the institutional context in which it is imposed. We control for the macroeconomic and other structural factors. Ideally, the paper would like to separate business regulatory reforms into specific-regulatory reforms, but data limitations do not allow us to do so. The findings of the paper provide policy options for Botswana and other developing countries. It also adds to the existing literature on the determinants of private sector investment behaviour.

The rest of the paper is organised as follows. Section 2 discusses the evolution of Botswana's private sector investment as well as government policies and strategies towards growing private sector investment. Section 3 lay out a basic theoretical framework for understanding how regulations affect investment while section 4 briefly discusses existing empirical literature on factors affecting private investment decisions in developing countries, with a special focus on the role of business regulatory reforms. Section 5 is the methodology and Section 6 presents the empirical regression results. Concluding remarks are in section 7.

2. PRIVATE INVESTMENT TRENDS AND POLICY IN BOTSWANA

Botswana at independence in the mid-1960s, followed a pragmatic approach to development, with a mixture of state intervention and openness to market forces (Raphael et al,1984; Mmusi,1998; Conteh, 2008). This approach led to high economic growth rates, particularly in the 1980s, due to increased mining activities in the country (Kgage,2002). Thus, from its early stages of development, Botswana has always encouraged private sector participation in the country's capital accumulation process. Botswana also persistently engaged in active development of the private sector and in implementing pro-private sector policies to create a conducive investment environment. It maintained a remarkable record in its practice of prudent economic management, particularly its macroeconomic indices (conteh,2008), of which Kgakge (2002), Devarajan et al., (2003) and Lesotlho (2006) posit it stimulates private sector investment growth in Botswana.

Policy reforms and initiatives beyond macroeconomic policies towards stimulating private investment in Botswana include; (i) the industrial and trade policies and strategies; (ii) a significant allocation of the development budget towards economic infrastructure development to reduce private sector's production costs; (iii) the establishment of various development finance institutions in the late 1970s and early 1980s such as the Botswana Development Corporation (BDC) and the Financial Assistance Policy(FAP) to address market failures in the financial system; (iv) deregulation of the economy to create a space for the private sector to play its role of being the engine of growth; and the (v) liberalisation of the financial sector to mainly attract foreign direct investment.

Through its National Development Plans (NDPs) (9, 10 and 11), which outline the country's development priorities and implementation strategies, the government emphasised, among other structural reforms, the need to create a regulatory framework that promotes ease of doing business. So far, a number of business regulatory reforms have been implemented, particularly in the past 5 years. The 2009 Doing Business Reforms Roadmap and Action plan, among other strategies has and continues to provide guidance in the implementation of regulatory reforms while the National Doing Business Committee provides the oversight. To ensure that regulation is impactful, Botswana, in recent times, has also adopted the Regulatory Impact Assessment Strategy (RIA) which is a tool used to prepare, consult and assess impacts of proposed regulation. Besides the government, the private sector has been also influential in creating a conducive investment environment through policy advocacy and its participation in the national policy formulation process.

On the evolution of investment in Botswana, as depicted in Appendix 1(a), it is evident that the aggregate investment remained well below the envisaged target of 40% (Republic of Botswana, 2009). The private sector investment fluctuated; as its ratio moved from the highest point of 32% to the lowest point of 10% in 1985 and to an average of 23% in recent years (2005-2016). With the exception of 1971,1979,1985 and 2012, investment growth rates realised were generally low (Appendix 1(b)). The high investment growth rates realised during 1979, 1989 and 2012 occurred concurrently with the acquisition of assets during prospecting of mineral resources, expansion of mining production and the relocation of the Diamond Trading Company to Botswana respectively, suggesting the private sector investment remain linked to the mining activities as trends mirrors the sector's growth.

In summary, Botswana has had unsustainable investment growth rates, characterised by expansions followed by contractions. This is so in spite of the government's active role in the development of the private sector and in implementing pro-private sector policies. Nonetheless, given that government increased its efforts towards revamping the regulatory framework, without negating macroeconomic and other structural factors, may lead to better outcomes in the subsequent years.

3. THEORETICAL FRAMEWORK

Coase (1937), Peltzman (1989) and Stigler (1971), among others, define regulation as instruments for setting rules and norms for areas that affect the economic and social life. OECD (1997) defines it as the diverse set of instruments that governments use to impose requirements on enterprises. These regulations include laws, formal and informal orders and subordinate rules issued by all levels of government, and rules issued by non-governmental or self-regulatory bodies to which government have delegated regulatory power.

Following the success of market liberalisation programmes in some developed countries, and the evidence of the failure of state-led economic planning in developing ones (World Bank, 1995), the role of government regulation has since been redefined and narrowed to that of ensuring an undistorted policy environment in which efficient markets could operate. Deregulation is widely adopted, often as part of structural adjustment programmes, with the aim of reducing the "regulatory burden" on the market economy. Nonetheless, the objectives of regulation in the context of developing countries are likely to be not simply concerned with the pursuit of economic efficiency but with wider goals to promote sustainable development and poverty reduction (Kirkpatrick, 2014).

Regulation is not without transaction costs (Coase, 1937). These costs can be classified into two: (i) the costs of directly administering the regulatory system, which are internalised within government and reflected in the budget appropriations of the regulatory bodies; and the compliance costs of regulation, which are external to the regulatory agency and fall on consumers and producers in terms of the economic costs of conforming with the regulations and of avoiding and evading them (Guasch and Hahn, 1999). Regulations, if applied effectively, reduces transactions cost and uncertainty by establishing a stable (but not necessarily efficient) environment, thereby promoting production efficiency. This in turn, facilitates investment in human and physical capital, technological innovations and advancement, private sector development, all of which contributes to economic growth. In other words, effective regulatory framework is associated with increasing levels of real income per capita since they shape overall condition for investment and growth. Executed poorly, regulation can stifle creativity and learning and limit opportunities for all citizens (Broughel,2017). Countries with good regulatory reforms enables markets to function effectively by providing a stable environment for investment and thereby sustaining the process of a market-led economic development (Kirkpatrick, 2014).

The effects of the regulatory environment on growth outcomes is profoundly affected by the institutional context in which it is imposed. Thus, the ultimate impact that regulation may have on growth outcomes is likely to be affected by the country's level of institutional development (Loayza and Serven, 2009). According to Sun (2002), these institutions include a free political environment, a competitive market mechanism, a functioning financial system, adequate transport and communication channels and efficient public services, among others.

4.   BRIEF LITERATURE REVIEW

In this section we consider the empirics on the effects regulation as well as macroeconomic and structural factors that may explain variation in Botswana's private sector investment. Macroeconomic factors are based on the conventional neoclassical investment theory (Output growth and user cost of capital) and other structural factors include public infrastructure investment, financial development and trade openness.

Literature has not fully produced a full-ledged investment model applicable to the context of the developing countries. The conventional investment theories (the simple accelerator model, the liquidity theory, the expected profits theory, the Tobin's Q Theory, and the neoclassical flexible accelerator theory) proved to be successful in explaining the aggregate investment in the industrialised economies (Ndikumana, 2000). The underlying assumptions for these models (the exclusion of the role of public investment, existence of perfect capital markets and absentia of a liquidity constraints) and lack of data made it difficult to apply these models in the context of developing countries. However, in the past three decades, following Oshikoya (1982) 's work, among others, which modified the flexible accelerator model to incorporate structural factors in the conventional investment models, a number of study has been done to explain investment behaviour in the context of developing countries.

In recent times, empirical studies using the modified accelerator model have further incorporated regulation as an explanatory variable to private sector investment. However, the literature is still thin but growing. It confirms the positive link between an effective regulatory framework and economic growth (including investment, productivity, innovation and employment) (Djankov et al., 2006; Haidar,2012; and Eifert,2009). Thus, effective and sound regulatory is a necessity for supporting the business investment.

On the role of macroeconomic environment on investment, the neoclassical theory posits that the level of economic activities captures the aggregate demand conditions in the economy. Rising demand or an economic prosperity would imply that businesses in general see rising profits, increased sales and cash flow, and greater use of existing capacity. This may lead to further growth of the economy through the stimulation of consumer incomes and purchases The accelerator effect also goes the other way: falling GDP and/ or recession hurts business profits, sales, cash flow, use of capacity and expectations. This in turn discourages fixed investment, worsening a recession by the multiplier effect. Empirical studies on the accelerator effect, shows that output growth is associated with high investment rates (Greene and Villanueva.,1991; Wai and Hong.,1982). The theory also suggest that the interest rate raises the cost of capital, which then reduces investment. In contrast to theory, the empirical tests in the context of developing countries have been less successful in establishing the negative relationship between real interest rate and private sector investment (see for instance, Kothari et al., 2014; Matsheka,1998). Several reasons on the insensitivity of real interest on investment are outlined in the work of Matsheka (1998), Ndikumana (2000), Lugo (2008), and Sharpe and Suarez (2015).

Other structural factors playing a key role in explaining investment behaviour, particularly in developing countries, include the public investment and financial development. According to Oshikoya (1994), public investment could, be either complementary or a substitute to private sector investment. For instance, public spending on infrastructure

or goods that raises productivity of private investment could be complementary[2]. On the other hand, stronger public investment while possibly beneficial to some ancillary sectors; is on balance more likely to crowd out private sector investment. The crowding out may occur when the public investment is competing for scarce physical and financial resources and for the provision of goods and services. It may also occur when the private sector finance public investment through the accumulation of debt that is not sustainable (IMF,2018). Empirical results On the role of public investment are mixed. Some studies report that public investment crowds out private sector investment (Cavallo and Daunde, 2011; and IMF, 2018) while others report that it crowds in private sector investment (Xu and Yan, 2014). Several explanations on the crowding in (out) effect of the public investment on private sector investment can be found in Narayan (2004), Xu and Yan (2014), among others.

Past work has also analysed the relation between investment and the availability of the bank credit towards the private sector. This strand tends to find that more developed capital markets and easier access to bank credit, usually captured by the private-sector credit –to-GDP ratio, tend to go hand in hand with higher level of investment (Bassanini and Tecroni., 2001; and Pelgri et al., 2002). Some studies report mixed results (Salotti et al., 2012) and that the impacts may be country-specific (Ghura and Goodwin, 2010). Another key determinant of private sector investment is trade openness. Trade openness is also crucial enabler of investment and economic growth as it provides new market opportunities for domestic firms, stronger productivity, and innovation through competition. According to Jackson (2015), there is no country, especially smaller countries, that has developed successfully in modern times without harnessing economic openness particularly to international trade and investment. Empirics shows that trade openness stimulate private sector investment.

5. DATA AND METHODOLOGY

The study uses yearly time series data from the 1984 to 2016. Data on a number of variables was sourced from the World Development Indicators, World Bank database (World Bank, 2018), Statistics Botswana (Statistics Botswana, 2018) and Bank of Botswana (BOB, 2017). All variables for the regression analysis are in logarithms expect for variables with negative figures. The definitions of the variables and the data sources are summarised in Appendix 2.

5.1. DATA AND MEASUREMENTS

Based on standard investment theories and empirical literature on the determinants of private investment in the context of developing countries as well as prevailing economic conditions in the Botswana economy. We measure the dependent

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2   Paving roads and accessibility electricity on private investment reduces the cost of production and distribution, thereby increasing the productivity of private capital.

variable, private investment (PI) by the share of gross fixed capital formation to GDP.

Our main independent variable is business regulatory reforms. Ideally, we would like to separate business regulatory reforms into specific-regulation, but data limitations do not allow us to do so. Without operationalising the broader concept of governance, we follow Jalilian et al. (2007)'s approach by using a variable that come closest to capturing the quality of regulation. The investment profile index from the International Country Risk Group(ICRG) data set is used as the proxy. The investment profile index is concerned with the existence of market-friendly business regulations and thus, it can be taken as a proxy for the quality of the outcomes of applying regulatory instruments. To capture the notion that effects of regulation on growth outcomes depends on the institutional context in which regulation they are enacted, we have a second variable for regulation, which is an interaction term. We interact the investment profile index with the bureaucracy index. The bureaucracy index measures the quality of public provision, competence of civil servants, and the credibility of government decisions, and therefore act as a proxy for the process dimensions of regulatory governance. Indexes from ICRG are widely accepted indicators in the institutional growth literature (Knack, et al., 1995; Olson et al., 2000; Seldadyo et al., 2007). They are constructed based on information gathered through wide-cross country surveys as well as expert's opinion. Unlike other datasets provided by other databases, the ICRG dataset is available for a considerable time span, allowing us to run a country-time series analysis.

Our control variables in this study include; corporate credit, Real GDP, public infrastructure investment and trade openness. Real Interest rate, though an important measure of user cost of capital, is excluded in this paper since private investment in Botswana are insensitive to the real interest rate (Matsheka,1998). Instead of adopting the commonly used measure of financial development- the aggregate credit measures which combines corporate and household credit – we follow Beck et al (2006) and disintegrate bank lending into corporate and households credit. In this study, we only assess the impact of corporate credit on investment since most theoretical models with endogenous financial intermediation focus on an enterprise in need of external finance for investment or production purposes (see Levine, 2005). Public infrastructure investment data was not readily available. To capture public infrastructure investment, we summed public investment towards the water, electricity and buildings. To capture the role of trade policy in promoting private investment, this paper uses the standard measure, being the trade openness indicator, of which is a summation of exports and imports as a share of GDP.

5.2 METHODOLOGY

Based on our discussion on the effects of regulatory reforms, macroeconomic and other structural factors on private sector investment behaviour, we specify our baseline regression equation in a log-log form as;

$$InI_t = \beta_0 + \beta_1 In(Y)_t + \beta_2 In(Pui)_t + \beta_3 In(CRE)_t + \beta_4 In(To)_t + \beta_5 In(RQ)_t + \varepsilon_t \qquad [1]$$

in which I is a share of private investment to GDP, Y is the Real GDP, Pui is share of Public Infrastructure Investment to GDP, CRE is corporate credit, To is the share of trade to GDP, while RQ is business regulatory Quality index. ε_t is the error term.

Based on the view that the effects of regulation on economic growth is likely to depend on the institutional context in which regulations are enacted, we thereafter follow Loayza and Serven (2009), and Egert (2014)'s approach and extend the baseline regression by adding an interaction term between business regulatory reforms with an index capturing the quality of institutions, namely the bureaucracy quality index. Basically, an interaction measures how the effect of the independent variable changes with the size of a moderator variable. To capture the interaction term in the model, Eq (1) is transformed to;

$$In(I)_t = \beta_0 + \beta_1 Y_t + + \beta_2 In(Pui)_t + \beta_3 In(Cre)_t + \beta_4 In(To)_t + \beta_5 In(RQ)_t + \beta_6 In(BQ)_t + \beta_7((RQ - \overline{RQ}) * (BQ - \overline{BQ}))_t + \varepsilon_t \quad [2]$$

where BQ is the quality of bureaucracy, $\overline{RQ}$ and $\overline{BQ}_t$ are arithmetic mean value of the main terms[3] (RQ_t and BQ_t), and the $(RQ - \overline{RQ}) * (BQ - \overline{BQ})_t$ is the demeaned interaction term.

To examine the relationship between business regulatory reforms and private sector investment we use the VAR framework (Sims 1980) for several reasons. In the first place, the VAR overcomes the problem of endogeneity. In the VAR system, all variables entering in the system are assumed to be endogenous. This means that all variables affect, and in turn are affected by, all variables (Xu and Yan, 2014). We start by specifying the Vector Autoregressive (VAR) model as;

$$y_t = c + \phi_1 y_{t-1} + \phi_2 y_{t-2} \cdots \cdots + \phi_k y_{t-k} + v_t \qquad [3]$$

in which y_t is a vector of all I(1) variables in the model, c is a k × 1 vector of constants, k is the lag length and ϕ is the matrix of autoregressive coefficients while v_t is the error term of the vector.

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3   The main terms are always included in the model, unless excluded by economic theory. Otherwise, the interaction effect may be significant due to left-out variable bias.

Assuming that vector (nx1) of I (1) variables are cointegrated, EQ (1) can be re-written in the form of a Vector Error Correction Model (VECM) which tests both the short-run and long run relationship simultaneously. The VECM is as follows:

$$\Delta y_t = c + \sum_{i=1}^{k-1} \Gamma_i \Delta y + \Pi y_{t-k+1} + \varepsilon_t \qquad [4]$$

where the term Δ denotes the first difference operator, ε_t is the error term of the vector, Γ is a coefficients matrices representing the short-run dynamics, Π is the long run matrix derived from (n x r) matrix and y_t include all variables of the model.

In order to test for robustness of the results, all models are subjected to various diagnostic tests to check whether there is serial correlation and multicollinearity among the variables. The paper also conducts the CUSUM test to check the stability of the long run coefficients together with the short run dynamics.

6. EMPIRICAL RESULTS AND DISCUSSION

Before examining the link between business regulatory reforms and private investment, we explore the statistical properties of our economic time series data. We assess whether the variables have a unit root using the widely used test, the Augmented-Dick-Fuller (ADF). We find that all variables are stationary at first differences, that is, they are integrated of order one (Table 1).

Table 1: Unit Root Test

Variable	Level (t-Statistics)			1st Difference* (t-statistics)		
	None	Constant	Constant +Trend	None	Constant	Constant Trend
I	0.501	-2.248	-1.863	-5.13*	-4.13*	-5.18*
Y	7.830	7.883	9.729	-2.020*	-7.271*	-3.488*
PUI	-1.660	-3.088*	-2.882*	-5.014*	-4.792*	-4.969*
CRE	-0.487	-3.300	-1.685	-4.284*	--5.549*	-4.224*
TO	-0.761	-2.059	-2.203	-5.219*	-5.143*	-5.170*
RQ	0.489	-2.316	-1.773	-3.975*	-3.870*	-3.937*

Note: Schwarz Information criterion is used for the choice of the lag. * denotes significance level of 5% level.

Having established that all variables are of order one, we then conducted the Johansen cointegration test to determine the number of cointegration relationships in EQ (1). The results for both the maximum Eigen Value and Trace statistics tests are reported in Table 2. The results suggest that there is at least one cointegrating vector.

Table 2: Johansen Cointegration Test

I,Y,ROI,PUI,CRE,TO,RQ					
Null	Alternative	λ_{Max}	Critical value	λ_{Trace}	Critical value
r = 0	r ≥1	46.685*	40.078	119.617*	95.754
r ≤ 1	r ≥2	29.446	33.878	72.931	69.818
r ≤ 2	r ≥3	17.652	27.584	43.485	47.856
r ≤ 3	r ≥4	14.171	21.132	25.834	29.798
r ≤ 4	r ≥5	9.714	14.265	11.662	15.495
r ≤ 5	r ≥6	1.948	3.841	1.948	3.841

Note: * denotes statistical significance at 5% level. λ_{Max} and λ_{Trace} refers to the Maximum Eigen Value and Trace Statistics tests respectively.

Table 3: Unrestricted Cointegration Results

I	Y	PUI	CRE	TO	RQ
Unrestricted Cointegrating Vectors					
1	0.024	-0.478	0.015	1.289	-0.016
	(-1.091)	(4.828)*	(0.155)	(6.109)*	(0.147)
Speed of adjustment Coefficients					
-0.594	-0.046	0.061	0.283	0.054	-0.186
(-3.536)	(-0.535)	(0.257)	(1.394)	(0.454)	(-1.378)

Notes: Statistic Errors are in parenthesis. The dependent variable is Private sector investment. * denotes statistical significance at 5% level.

We then proceed and estimate the impact of business regulatory quality on private investment using VECM framework since variables are cointegrated. In testing the link, we follow Ahmed (2008) and Pentecost and Moore (2006)'s approach by applying restrictions in the VECM model to test whether the system is weakly exogenous[4]. We find all variables to be weakly exogenous, suggesting that the exclusion of any of these variables cannot lead to loss of information from not modelling its determinants. All the models were tested for normality, serial correlation and heteroscedasticity and the results are displayed in Tables 4 and 5. The diagnostics indicate that the residuals are normally distributed, homoscedastic and serially uncorrelated.

The error correction term is statistically significant with the implication that private investment is converging towards its equilibrium level. The coefficient for the ECM

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4   The weak exogeneity results are conducted by the likelihood ratio (LR) test, and the results are given in appendix 2 and 5. Given that LR test was too large in the second model due to a smaller sample, we followed Pentecost and Moore (2006) approach and estimated the Small Sample Adjusted (SSRL) test. This is calculated as a product of the LR statistic and (T-K)/T, where T is the number of observation and k is the number of regressors in each equation.

of -0.594 indicates the magnitude of the adjustment between the short run and the long run. That is, 59% of the disequilibria from the long run relationship in period t-1 is eliminated in the current period. The goodness of fit for the model is 0.54 and this indicates that the explanatory variables explain 54% of the total variations in the private investment. The Durbin Watson-Statistic, which is a measure of serial correlation is close to 2 showing that errors between periods are not serial correlated.

The baseline regression results are reported in Table 4. Estimated coefficient for our main variable of study- business regulatory quality, suggests that it is negatively related to private sector investment in the short term and significant. On the other hand, private sector investment is not responsive to business regulatory reforms in the long term. These results are ambiguous in that a market-friendly business regulatory reforms should promote private sector investment activities. All the same, the institution literature indicates a number of factors/ fundamentals that should be in place for the regulatory framework to drive private sector investment. For instance, public servants or regulation implementers should have the capacity to implement and interpret the regulations and that the financial sector and infrastructure should be developed. Thus, it is important to interact business regulatory quality with these fundamentals to verify whether the impact of regulation on investment vary with these fundamentals. In the next subsequent subsection, we only interact regulation and bureaucracy quality, which captures the effectiveness of government.

Table 4: Restricted Cointegration Results

$$I = 2.434 + 0.024\,Y - 0.477\,Pui + 0.02\,Cre + 1.289\,To - 0.016\,RQ$$
$$\underset{(1.081)}{} \quad \underset{(-4.806)^*}{} \quad \underset{(0.153)}{} \quad \underset{(6.098)^*}{} \quad \underset{(0.148)}{}$$

Variable	Coefficients	t-statistics
ECT	-0.594	(-3.530)*
ΔI_{t-1}	0.072	(0.639)
ΔY_{t-1}	0.477	(1.416)
ΔPui_{t-1}	0.246	(1.419)
ΔCre_{t-1}	0.423	(2.352)*
ΔTo_{t-1}	-0.168	(-0.560)
ΔRq_{t-1}	-0.520	(-1.695)*
R^2	0.538	
$Adj-R^2$	0.397	
F-stats	3.820*	
Durbin Wat	1.927	
Residual Diagnostics		
LM test	0.192(0.900)	
Heteroscedasticity Test	0.432(0.929)	

Note: The dependent variable is private investment (% GDP). P-values for diagnostic tests in parenthesis. T-Statistic are in parenthesis. * denotes statistical significance at 5 % level.

Several other estimated coefficients in Table 4 provide some interesting insight. On the role of corporate credit on private sector investment, the estimated coefficient is positive and significant in the short term but not in the long term. These results may reflect the lending behaviour of commercial banks, in that they generally allocate financial resources to firms for working capital purposes rather than for funding long term or innovative projects. All the same, with the government rationalising or commercialising, the development financial institutions (DFIs), that could fill the long term financing gap in Botswana, it is therefore impetus for government to consider other options for fill the existing long term finance gap. To name a few; (i) fast-tracking the development of financial markets (ii) partner with commercial banks to support innovative projects; and (iii) by addressing the fundamentals (e. g., laws and regulations) to create a conductive environment for bank lending.

It is also observed from Table 4 that public infrastructure investment crowds in private sector investment in the short term and on the other hand crowds out private sector investment in long run. The results are contrary to the conventional knowledge that public investment programs cause an initial and temporary crowding-out of the private sector investment in the short term and a crowding in the long term. Nonetheless, when public spending on infrastructure is not widely deployed, it can crowd-out more productive investment (World Bank, 1994).

From the results, we also find that the estimated coefficients on economic activity, measured by the Real GDP, is positively related to private investment both in short and long term, but weak statistically. The positive results between output and private investment support the accelerator investment theory and corroborate with existing empirical evidence on Botswana (Kgakge 2002; Lesotlho,2006). Thus, it is necessary for Botswana to engage on economic activities that grows the economy in order to encourage private sector investment activities.

Business Regulatory Reforms and Policy interactions

In order to explore the interaction between the regulatory environment and bureaucracy quality, we extend the basic empirical analysis by allowing the effect of regulatory quality to vary with bureaucracy quality[5]. A significant positive estimated coefficient of the interaction term would imply that regulatory reforms stimulates private sector investment when the quality of bureaucracy improves and vice versa.

The results on business regulatory quality and bureaucracy quality indices are reported in Table 5. In a similar approach to Rajan and Zingles (1998) and others, our interpretation of these results centers around the coefficient of the interaction term, β_7. The estimated coefficient term, β_7, is positive and significant , suggesting that business regulatory

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5   Tests for this model (including unit root test, Johanneson cointegration, weak exogeneity) are reported as appendices.

reforms matters most for the private sector investment in Botswana when the quality of bureaucracy improves. These results are consistent with theoretical predictions and subsequently is an indicative to policy formulators that it is imperative to ensure that implementers have the requisite capacity to implement regulations for better outcomes.

Table 3: Restricted Cointegration Results

$$I = 1.119 + 0.094Y - 0.438Pui + 0.315Cre + 0.251To + 0.994\,RQ + 2.907\,BQ + 0.593\,INT$$
$$\underset{(3.490)^*}{\qquad} \underset{(-6.570)^*}{\qquad} \underset{(3.680)^*}{\qquad} \underset{(1.273)}{\qquad} \underset{(8.513)^*}{\qquad} \underset{(10.550)^*}{\qquad} \underset{(11.673)^*}{\qquad}$$

Variable	Coefficients	t-statistics
ECT	-0.591	(-3.648)*
ΔI_{t-1}	-0.240	(-1.568)*
ΔY_{t-1}	0.260	(0.734)
ΔPui_{t-1}	-0.138	(-0.863)
ΔCre_{t-1}	0.466	(2.764)*
ΔTo_{t-1}	0.058	(0.196)
ΔRQ_{t-1}	-0.230	(-0.903)
ΔBQ	-0.190	(-0.238)
ΔINT	-0.179	(-1.514)
R^2	0.639	
$Adj - R^2$	0.484	
F-stats	4.126*	
Durbin Wat	2.153	
Residual Diagnostics		
LM test	0.10(0.39)	
Heteroscedasticity test	0.45(0.93)	

Note: The dependent variable is Private Sector Investment (% GDP). Numbers in parenthesis are t-statistics. * denotes statistical significance at 5% level.

7.   CONCLUSION AND RECOMMENDATIONS

Increasing private sector investment remains a policy priority in Botswana due to its fundamental role in the economic development process and in reducing unemployment and poverty. However, according to the stylised facts, less has been achieved so far with the regard to increasing private sector investment level. Thus, private sector investment remains low.

From the empirics, we observed that the regulatory environment plays a significant role in boosting private sector investment when the capacity and efficiency of the administrative personnel improves. This results are in accordance with conventional knowledge that the quality of regulation is profoundly affected by the institutional context in which it is imposed. Other critical factors affecting private sector investment examined in this paper include; corporate credit, output and public infrastructure investment. Private sector investment responds positively to increases in corporate credit in the short term but not responsive in the long term. Economic activities support private sector investment

positively but to a lesser degree. On the other hand, public infrastructure investment crowds in(out) investment in the short and long term respectively. Policy wise, Botswana should further deepen its efforts towards creating a market friendly regulatory environment and also capacitate bureaucrats as they play a catalytic role in the process.

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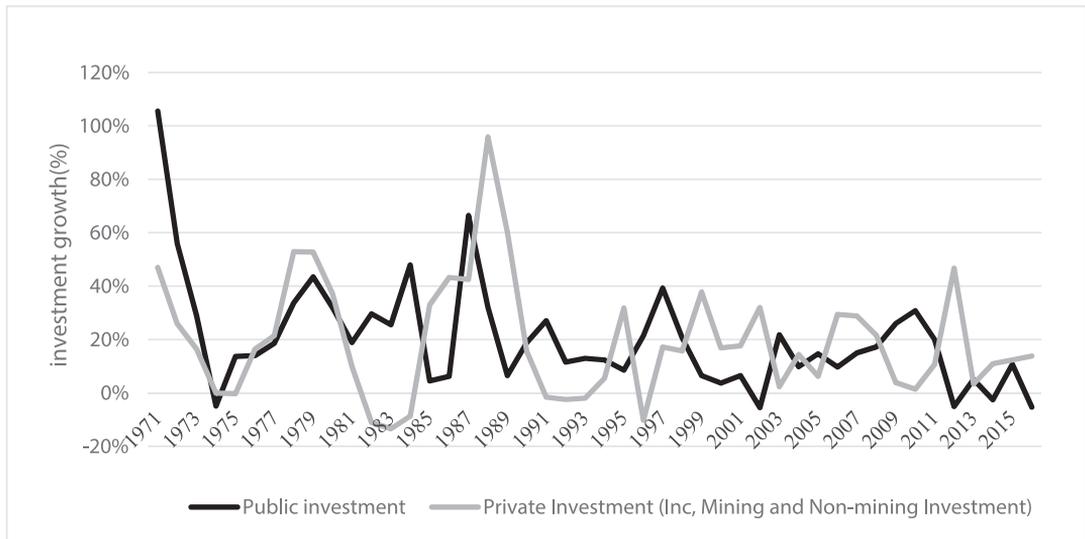
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APPENDIX 1(A): SHARE OF INVESTMENTS TO GDP
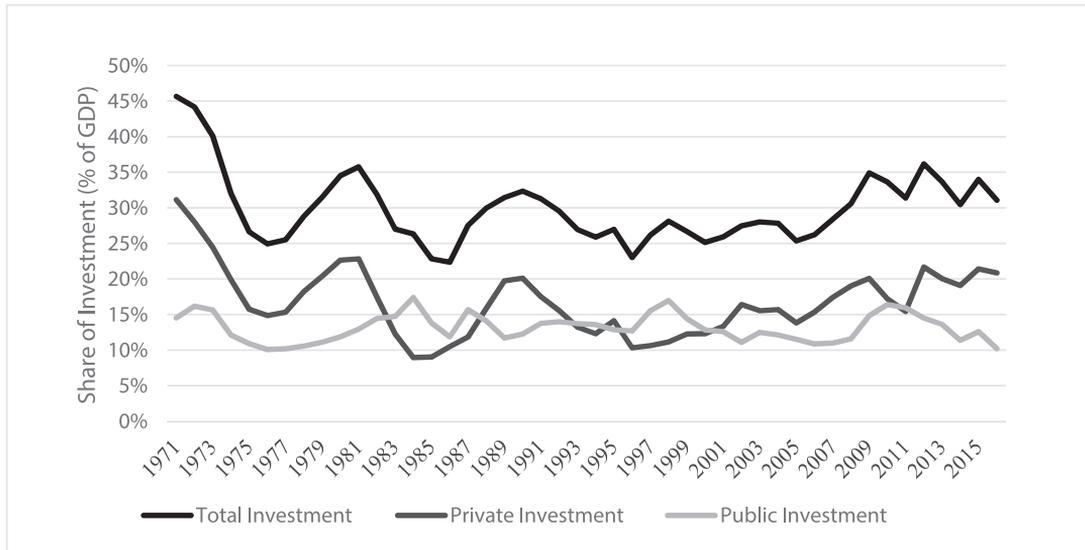
Source: Statistics Botswana, 2017

APPENDIX 1(B): INVESTMENT GROWTH RATES: 1971-2016

Source: Statistics Botswana, 2017

APPENDIX 2: DEFINITIONS AD SOURCES OF VARIABLES

Variable	Definition and Construction
Private investment	Private sector, gross fixed capital formation as a percentage of GDP. *Source*: Statistics Botswana
Regulatory Reforms	Investment profile index compiled by the International Country Group Risk (ICGR) database. It measures the improvement of the quality of the investment climate. The Index is the sum of three subcomponents, including; contract Viability/expropriation, profits repatriation and payment delays. A higher score would mean the quality of regulation has improved and vice versa.
Output	Real Gross Domestic Product, base year (=2010). *Source:* World Bank, World Development Indicators
Public Infrastructure Investment	Public infrastructure, Gross fixed capital formation (% GDP). *Source:* Statistic Botswana
Corporate Credit	Credit allocated to the corporate sector/ enterprises by the commercial banks (% of GDP). Source: Botswana Financial Statistics, Bank of Botswana
Trade	The sum of exports and imports as a percentage of GDP. *Source:* World Development Indicators, World Bank
Bureaucracy Quality	Measures the quality of public provision competence of civil servants and the credibility of government decisions. *Source*: PRS Group, International Country Group Database.
Interaction term	A product of demeaned regulatory reforms and bureaucracy quality indices. Author's calculation using data sourced from IGRC's database.

APPENDIX 3: MODEL 1: BASELINE REGRESSION-WEAK EXOGENEITY TEST

Variable	LR	Probability
Y	0.320	0.572
Pui	0.066	0.798
Cre	1.654	0.199
To	0.233	0.629
Rq	1.992	0.158

APPENDIX 4: JOHANSEN COINTEGRATION TEST: REGULATION AND BUREAUCRACY QUALITY

I,Y,PUI,CRE,TO,INT

Null	Alternative	λ_{Max}	Critical value	λ_{Trace}	Critical value
r = 0	r ≥1	84.190*	52.363	270.341*	159.530
r ≤ 1	r ≥2	70.102*	46.231	186.152*	125.615
r ≤ 2	r ≥3	45.101*	40.078	116.051*	95.754
r ≤ 3	r ≥4	28.106*	33.877	70.949	69.819
r ≤ 4	r ≥5	17.798	27.584	42.843	47.856
r ≤ 5	r ≥6	15.082	21.132	25.045	29.797
r ≤ 6	r ≥7	8.779	14.265	9.964	15.495
r ≤ 7	r ≥8	1.184	3.841	1.184	3.841

APPENDIX 5: UNRESTRICTED COINTEGRATION RESULTS: REGULATION AND BUREAUCRACY QUALITY

I	Y	PUI	CRE	TO	RQ	BQ	INT
Unrestricted Cointegrating Vectors							
1	-0.026 $(-0.239)^*$	-1.237 $(-4.632)^*$	0.200 (0.001)	-0.500 (-0.633)	4.313 $(92.069)^*$	9.160 $(8.289)^*$	2.560 $(12.568)^*$
Speed of adjustment Coefficients							
-0.083 $(-1.894)^*$	0.003 (1.134)	-0.124 $(2.321)^*$	0.010 (0.213)	-0.007 (0.242)	0.007 (0.251)	-0.003 $(-1.691)^*$	0.423 (3.006)

APPENDIX 6: WEAK EXOGENEITY TEST: REGULATION AND BUREAUCRACY QUALITY

Variable	LR	Probability	LR-adjusted
Y	0.024	0.876	0.019
Pui	5.839*	0.016	4.562
Cre	0.058	0.89	0.045
TO	0.079	0.779	0.062
RQ	0.08	0.778	0.063
BQ	2.609	0.106	2.038
INT	4.964*	0.026	3.878

Note: LR= Likelihood ratio test; Adjusted LR is a product of LR and (T-K)/T, where T=no. of observations and K=no. of regressors in each equation; Critical values with degree of freedom=1; * significant at 1% (9.2 critical value

APPENDIX 7: CUSUM TEST: BASELINE REGRESSION
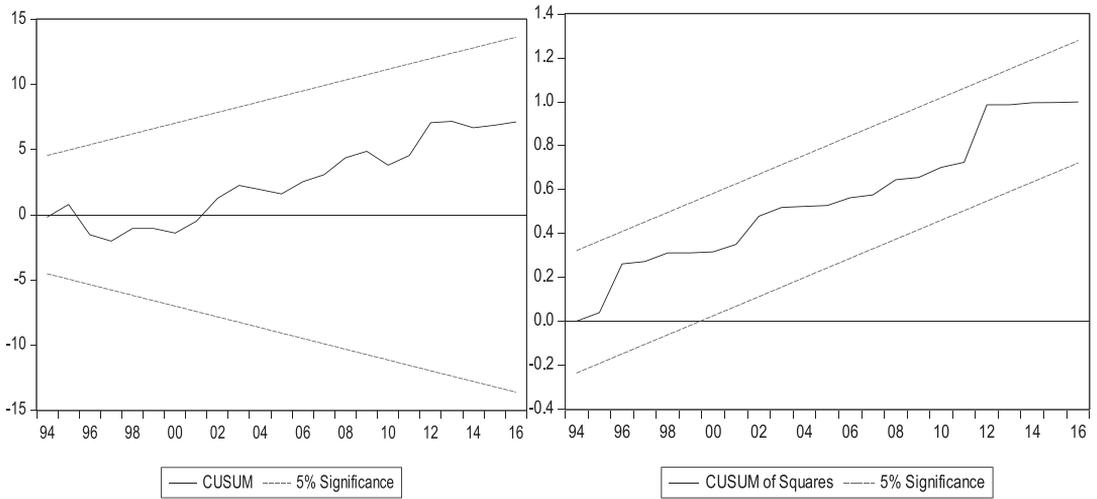
APPENDIX 8: CUSUM TEST: REGULATION AND POLICY INTERACTIONS
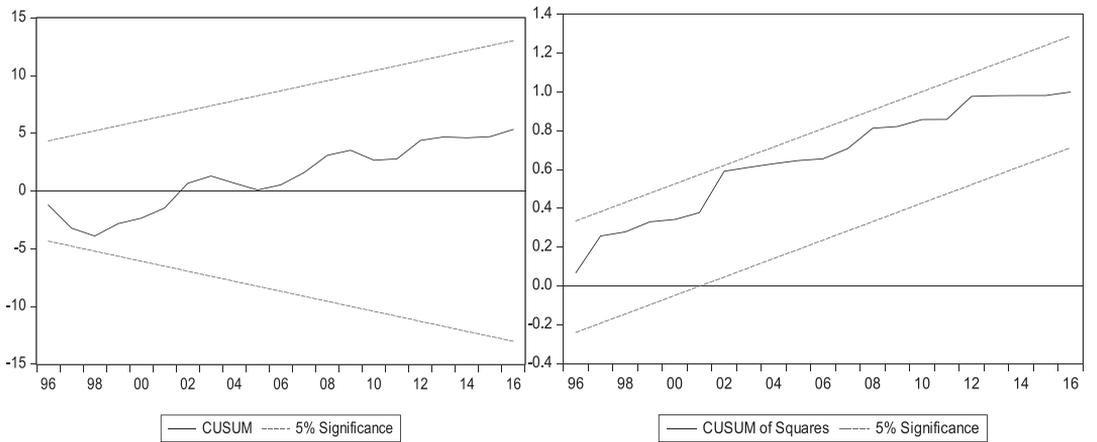
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