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Determinants of Private Sector Investment: Evidence from Mauritius, 1981-2014

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Abstract

Studies on private sector investments abound, yet few ever investigate the impact of corporate governance on private sector investment. Consequently, this study looks into the long-run determinants and short-run dynamics of domestic private sector investment during the period 1981-2014 in Mauritius and assesses the impact of corporate governance on such investments. For this purpose, we employ the Auto-Regressive Distributed Lag (ARDL) approach to cointegration as the time series econometric technique to examine the long-run determinants, deciphering the short-run dynamics of those determinants by means of an error correction mechanism within the corresponding ARDL framework. The results reveal that corporate governance reforms in the long run determine the Gross Domestic Product (GDP) level, the real interest rate, financial development, inflation, real exchange rate, domestic savings, and private sector investment. Moreover, the short-run dynamics indicate that the real interest rate, financial development, inflation, savings, and corporate governance reforms in the short run convincingly influence private sector investment. Given its unique microeconomic conditions, this study contributes to an understanding of private sector investment in Mauritius and is of significance to policy makers. It further shows the significance of corporate governance on private sector investment. We also discuss areas for future research and study limitations.

Key words: corporate governance; private sector investments; Mauritius

JEL classifications: C50; E22; E69; G30

1. Introduction

It is an undeniable fact that countries reap several benefits from private sector investments and even more so for emerging countries (Hayes, 2017). Accordingly, the International Monetary Fund (IMF) provides that investment from dynamic

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private sectors is a crucial catalyst for sustainable economic growth. The IMF also adds that private sector investment is vital for development, because it fuels the level of productivity, thus contributing significantly to job creation, new technologies, poverty reduction, and a higher standard of living. Indeed, Ndambiri et al. (2012) reveal that private sector investment stimulates economic growth in Sub-Saharan Africa.

Private sector investments in the major economic sectors have been vital for Mauritius to graduate from a low-income mono-crop economy to an export-oriented middle-income country. However, the national accounts of the Central Statistical Office (CSO) report low real growth rates in private investment, dropping from 4.2% in 2013 to 3.9% in 2014. Furthermore, when measured as a share of GDP, private sector investment has been decreasing since 2009 from 19.8% to 14.2% in 2014 compared to its historical high figure of 20.5% in 2008. This in turn has had an impact on economic growth with growth rates of 3.2% and 3.4% in 2014 and 2015, respectively. In spite of several economic reforms in the past couple of years, the trend in the growth rate of private sector investment remains sluggish. The World Bank (2015) even observes that there has been weakened capital productivity, decreasing by 7% from 2002 to 2012, and that the 'social contract' connected with the welfare state between the private and public sectors is no more efficient.

To the best of our knowledge, most studies empirically investigating the determinants of private sector investment concentrate on samples of developing countries and employ cross-sectional time series datasets. Likewise, Luintel and Mavrotas (2005) look into private investment heterogeneities using a dynamic panel of 24 developing countries classified as low-income and middle-income economies including Mauritius and note that the factors determining private sector investment in those countries are seemingly country-specific, where specific macroeconomic conditions are distinctly crucial. Given that Mauritius is a middle-income African country, it has its own unique macroeconomic environment. Hence, it is believed that the empirical outcomes of previous studies may not be similar in the context of Mauritius. Second, previous empirical studies on private sector investment concentrate on GDP, real interest rate, financial development, inflation, public sector investment, and real exchange rates. While savings and the level of corporate governance influence private sector investments, there is a paucity of evidence with respect to these factors. For instance, the literature does document the impact of good governance on economic growth (e.g. Claessens, 2006). In addition, financiers are now better informed and will only invest if they are certain of getting a return. Shleifer and Vishny (1997) support this fact, pointing out that "*Corporate governance deals with the ways in which suppliers of finance to corporations assure themselves of getting a return on their investment*". Hence, corporate governance is an important factor that investors consider before investing. Therefore, there is a need to assess whether these factors impact positively on private sector investment. As such, this study examines the determinants that drive private sector investment in Mauritius and also considers whether public sector investment crowds-in private sector investment. The findings of the study should provide support for the

formulation of strategies and recommendation of policies to enhance private sector investment and promote economic growth.

2. Literature Review

The empirical literature on the determinants of private investment in developing countries begins with Greene and Villanueva (1991). They study the macroeconomic determinants of private investment by estimating a pooled panel regression model. Real interest rate, economic growth rate, public investment, inflation, and public external debt represent determinants of private sector investment in a panel of 23 developing countries for the period 1975-1987. By applying OLS (ordinary least square) regression method, they find that economic growth and public investment positively affect private investment. Nonetheless, the find that public external debt, inflation, and real interest rate impede private investment. The results support the neoclassical view on the relationship between interest rate and private investment.

Oshikoya (1994) studies private sector investments on a sample of middle-income and low-income African countries during the period 1970-1988, using a panel dataset with four middle-income countries (Morocco, Mauritius, Cameroon, and Tunisia) and three low-income countries (Kenya, Malawi, and Tanzania). That research employs annual time series data and estimates an econometric model for private investment by employing OLS on pooled data distinctly for both sets of countries. Credit availability to private sector, real GDP, public investment, inflation, external debt, real exchange rate, and terms of trade represent independent variables. Real GDP, public investment, and credit availability reveal themselves to be boosting factors for private investment, whereas external debt and terms of trade impede it in both set of countries. Although inflation has a strong negative impact in the low-income countries, it exerts a positive significant effect on private investment in middle-income countries. Moreover, real exchange rate enhances private sector investment in middle-income countries.

Serven (2002) explores the nexus between real exchange rate uncertainty and private investment under a panel dataset of 61 developing countries for the period 1970-1995. That study uses a dynamic equation based on the difference Generalized Method of Moments (GMM) estimator and GARCH-based measure of real exchange rate volatility. Empirical results reveal a significant negative relationship between real exchange rate volatility and private investment when relative price of capital, credit flow to private sector, and real interest rate are control variables. Serven (2002) also observes that this nexus follows the 'threshold effects' whereby differences in financial development and level of openness are critical to decipher the extent to which exchange rate volatility affects private investment in developing economies.

Luintel and Mavrotas (2005) provide further evidence of private sector determinants in low- and middle-income countries. They examine the determinants of private investment in a dynamic panel of 24 low-income and middle-income

countries using annual time series data from 1981-2000. They estimate a dynamic autoregressive equation for private investment and a dynamic heterogeneous panel equation to model cross-country heterogeneities by considering real per capita income, real interest rate, inflation, financial development, public investment, real exchange rate, and outstanding debt stock as independent variables. The GMM is their econometric technique. Results reveal that public investment, public external debt, and inflation significantly hinder private investment, while financial development proxied by credit flow to private sector significantly boosts private investment. A negative but insignificant impact of real exchange rate and real interest rate on private investment does arise, but the findings are more likely confirmed to be country-specific.

While Erden and Holcombe (2005) also use a sample of developing countries in their study, they specifically investigate the effects of public investment on private investments, using a panel consisting of 19 developing economies for 1980-1997. They develop a dynamic econometric equation based on the flexible accelerator theory and apply pooled OLS, fixed effect, random effect, and the system two-stage least squares tests. Credit availability to private sector, real GDP, real interest rate, economic freedom, inflation, real exchange rate, and GDP growth rate are the control variables. Their robust results point out that public investment significantly crowds-in private investment in developing economies, thereby supporting the findings of Greene and Villanueva (1991) and Oshikoya (1994).

Salahuddin and Islam (2008) offer more attestation for the determinants of private sector investments in developing countries. They study the long-run determinants of private investment for the period 1973-2002 in a panel of 97 developing countries. Their regression model consists of real GDP per capita, real interest rate, trade openness, domestic savings, foreign aid, and public external debt. They apply two-step difference GMM econometric instruments. Results show that growth of real GDP per capita, trade openness, domestic savings, and foreign aid significantly stimulate private investment in the long run, while public external debt and real interest rate appear as insignificant hindering factors.

Fowowe (2011) evaluates the connection between financial sector reforms and private investment by using a panel dataset of 14 Sub-Saharan African (SSA) countries from 1980-2006. That study develops an index of financial reforms by summing all reform measures in any given year considering the period under study. Real GDP growth, public investment, and inflation are control variables. By employing the fixed effect estimator and the GMM estimator as econometric methods to better address endogeneity problems in the regression model, findings therein show that financial liberalization underpinning the development of financial intermediaries significantly boosts private sector investment in the selected countries.

The above literature review shows that the determinants of private sector investments from the samples of developing countries are quite widespread. Country-specific studies on private sector determinants, however, are few. Below, we provide a review on country-specific studies.

To assess factors affecting private sector investment in Ghana, Frimpong and Marbuah (2010) use annual time series data for the period 1970-2002. They develop a comprehensive private investment econometric model after considering the accelerator, neoclassical, and uncertainty theories. Real interest rate, public investment, real GDP, credit availability, external debt, inflation, real exchange rate, trade openness, and constitutional regimes are the independent variables. Contradicting the methodologies employed in previous studies and after applying unit root tests, they conduct the ARDL bounds test for cointegration coupled with a dynamic short-run error correction model (Rossiter, 2002). With real GDP boosting private investment only in the long run, results reveal that along with real exchange rate and real interest rate, inflation also stimulates private investment both in the short run and long run. Still, public external debt and trade openness appear to be significant hindering factors in the long run. Moreover, results show that constitutional regimes and public investment are stimulating factors in the short run.

Using annual time series data from 1970-2010, Ajide and Lawanson (2012) look into the determinants of private investment in Nigeria. They employ a similar model to that of Frimpong and Marbuah (2010) FDI is an independent variable. The ARDL bound testing approach helps analyze the cointegrating parameters. They find in the long run that real interest rate, real GDP, real exchange rate, credit to availability, and constitutional regimes are significant stimulating determinants while public investment and external debt are slackening significant factors. The result for public investment is in contrast with that in Erden and Holcombe (2005). Trade openness and inflation, though positive, are insignificant. Nevertheless, in the short run only public investment, real GDP, and terms of trade prove to be significantly boosting factors.

Ribeiro and Teixeira (2001) examine the determinants of private sector investment in Brazil during the period 1956-1996 using annual time series data. They estimate a vector-autoregressive (VAR) model for private investment with GDP, real interest rate, real exchange rate, public investment, external debt, credit availability and inflation as independent variables. The Johansen (1988) cointegration approach is run after carrying out unit root tests. They apply the Engle and Granger (1987) method to verify the cointegration hypothesis. The results reveal a positive significant impact from public investment, GDP, and credit availability in the long run. Likewise, real exchange rate and inflation hinder private investment both in the long run and short run. Using similar econometric techniques for Argentina over 1970-2000, Acosta and Loza (2005) confirm these results.

Khalid and Scholar (2014) utilize an ARDL econometric technique similar to that employed by Frimpong and Marbuah (2010) and Ajide and Lawanson (2012). They investigate the long-run and short-term dynamics of private investment in Pakistan from 1973-2013. Their econometric investment model consists of financial development (proxied by money supply to GDP ratio), real GDP, public investment, real exchange rate, credit availability to private sector, remittances, and external debt. While real GDP, real exchange rate, and credit availability are significant positive determinants in both the short run and long run, real interest rate and external debt

appear to be impeding factors. Though not significant in the short run, public investment significantly crowds-out private investment in the long run. Moreover, albeit having an insignificant opposing relationship in the long run, the level of financial development significantly depresses private investment in the short run. On the other hand, Kandil (2009) demonstrates that variations in government expenditure have a crowding-out effect on more developed countries as compared to developing countries.

Nainggolan et al. (2015) analyze the determinants of private investment in Indonesia using annual time series data from 1980-2011. They develop a long-run equation in addition to a dynamic error correction model for private investment, in which GDP growth, public investment, investment credit rate, exchange rate, inflation rate, and a dummy used to capture the effect of economic crises are all independent variables. After applying unit root tests and testing for cointegration to check for long-term relationships, they find in the long run that GDP growth, exchange rate, and investment credit boost private investment, whereas public investment, interest rate, and inflation impede it. However, they see in the short run that, aside from GDP growth (which increases private investment), interest rate, investment credit, and inflation have negative coefficients.

Rossiter (2002) investigates the relationship between private and public investment in the U.S. Contrary to other studies, that study includes spending on computer software and infrastructures in the computation of public and private investments. Employing a structural cointegration approach, the results therein show that public investment spending crowds-out private investment, but there is a weak crowding-in effect when there is public expenditure on infrastructure.

Our review of literature shows that most studies take samples of developing countries to investigate the determinants of private sector investments by using cross-sectional time series data. In addition, scant research has focused on a sample of emerging African countries or specific emerging markets. The review also demonstrates that real interest rate, public investment, inflation, and real exchange rate as determinants of private sector investment are equivocal. Real GDP and credit to private sector have mostly positive relationships with private sector investment, while external government debt is convincingly in the opposite direction.

We also note few country-specific studies confirm that savings rate triggers private investment. On the other hand, classical economists believe that aggregate investment is a function of aggregate savings, which consecutively is contingent on the level of income, changes in interest rate, and profit made by the private sector. Peterson and Estenson (1996) argue that the decision to reduce current expenditure in order to save for future investment activities correlates to fluctuations in the interest rate. Moreover, McKinnon (1973) and Shaw (1973) present that developing countries suffer from ‘financial repression’ and that with a government laying emphasis on the adoption of economic policies pertaining to financial liberalization, the level of the real savings rate would rise following a subsequent increase in inflation-adjusted interest rate where people would be more willing to save, which in

turn would eventually boost the amount of loanable funds made available to the private sector to finance investment activities.

Claessens (2006) describes that corporate governance is vital for economic advancement and good macro-level corporate governance reforms are the ingredients that build credibility, trust, and confidence among domestic investors. For instance, one study suggests that the right economic climate and infrastructure will build investor confidence and boost investment (Barua and Naym, 2017). Claessens (2006) also observes that definitions of corporate governance tend to be extensively broad. Still, at the macro-level he defines governance as the structures underpinning the rules of law under which firms are operating, disclosure and accounting rules, the judicial system, capital market rules, and ownership structures. In this context, successfully implementing good corporate governance reforms increases confidence among domestic institutional investors to further invest in a country. Claessens (2006) also asserts that these governance reforms at the macro-level lead to better firm valuations, shortened risks of financial crises, enhanced allocation of resources, improved mutual agreements with stakeholders, and a more efficient management that is consistent with wealth maximization, thus translating into more investment. North (1991) asserts that the refinement of political and governance institutions promotes efficiency and improves the investment climate of an economy. Likewise, Aysan et al. (2006) argue that educational attainment entails better governance institutions, which in turn positively trigger private investment. Alonso and Garcimartín (2013) define institutional quality as the capacity to facilitate easy adaptation of corporate governance reforms and a continuous reduction in corruption in addition to rent-seeking activities, and that the presence of corrupt politicians not fulfilling their roles in a transparent way would pave the way for unenthusiastic investment.

There are also scant studies on the effect of savings on private sector investment. In addition, prior studies rarely capture the effect of corporate governance on private sector investment. Consequently, this study addresses this issue by including these two variables as further determinants of private sector investment.

3. Research Methodology

3.1 Model Specification

Drawing from the comprehensive empirical investment functions of Frimpong and Marbuah (2010) and Ajide and Lawanson (2012), we use an improved model that could better reflect the determinants of domestic private sector investment in Mauritius. This model should be more relevant and adaptable to the case of Mauritius. In addition, it attempts to close the gap that remains in previous country-specific empirical works. The model runs as follows:

$$PSI = f(GDP, RROI, FD, INF, RER, GOVINV, SAV, DCGR) \quad (1)$$

Here, PSI designates private sector investment, GDP represents gross domestic product, $RROI$ represents the real interest rate, FD is financial development, INF is the rate of inflation, RER indicates the real exchange rate, $GOVINV$ designates public sector investment, SAV indicates domestic savings, and $DCGR$ portrays a dummy variable capturing the effect of corporate governance reforms.

After examining the statistical suitability of the independent variables in the economic model via equation (1), we reformulate an econometric model as follows:

$$\begin{aligned} \ln PSI_t = {} & \beta_0 + \beta_1 \ln GDP_t + \beta_2 \ln RROI_t + \beta_3 \ln FD_t + \beta_4 \ln INF_t \\ & + \beta_5 \ln RER_t + \beta_6 \ln GOVINV_t + \beta_7 \ln SAV_t \\ & + \beta_8 DCGR_t + \varepsilon_t \end{aligned} \tag{2}$$

We execute a logarithm to both dependent and independent variables, with the exception of the dummy variable, with a view to minimize the issue of heteroskedasticity (Gujarati, 2004). Thus, equation (2) designates a log-linear multiplicative model,[1] which correspondingly represents the natural logarithm of the variables. This reduces the complexities in deciphering the coefficients of the parameters in the econometric model. In the model, t represents time, ε_t is the error term, and β_0 is the constant term.

3.2 Description of Data

We provide a description of the data in Table 1 below.

3.3 Data Sources

This study employs secondary annual time series data, which we collected from the website of the World Bank's Development Indicators database and the Mauritian Central Statistical Office via its historical macroeconomic data archives. Reforms relating to corporate governance are from the website of the Mauritius government. The timeframe of research work spans 1981-2014 due to the availability of data for all variables considered herein.

3.4 Methodology

Empirical establishments pertaining to the evolution of time series econometric techniques indicate that one should conduct unit root tests so as to establish the degree to which the time series variables are integrated. Accordingly, based on the results of the unit root tests (discussed in the next section) this study employs an Auto-Regressive Distributed Lag bound testing approach for cointegration, following Pesaran and Shin (1999) and Pesaran et al. (2001), so as to model the long-run relationship and short-run dynamics with regards to the macroeconomic determinants of private sector investment in Mauritius. Prior studies also use a similar approach (Rossiter, 2002).

Table 1. Summary of Variables

Variable	Measure	Description	Data Source	Relevant Literature
PSI (DV)	Private Sector Investment	Private Gross Domestic Capital Formation (% of GDP)	Central Statistical Office, Mauritius	Oshikoya, 1994
GDP	Gross Domestic Product	GDP at market prices	Central Statistical Office, Mauritius	Jorgensen, 1967 and 1971
RROI	Real Interest Rate	Lending Interest Rate	World Bank	McKinnon, 1973; Shaw, 1973
FD	Financial Development	Money and quasi money (M2) (% of GDP)	World Bank	Jahan and McDonald, 2011; Shaw, 1973
INF	Rate of Inflation	Inflation Rate, consumer prices	World Bank	Serven and Solimano, 1992
RER	Real Exchange Rate	Real Effective Exchange Rate	World Bank	Serven, 2002; Serven and Solimano, 1992
GOVINV	Public Sector Investment	Public Gross Domestic Capital Formation (% of GDP)	Central Statistical Office, Mauritius	Serven and Solimano, 1992; Oshikoya, 1994
SAV	Domestic Savings	Gross Domestic Savings (% of GDP)	World Bank	
DCGR	Corporate Governance Reforms	Dummy (Reform=1, No Reform=0)	Government Web Portal, Mauritius	

3.5 Unit Root Test

The literature employs the Augmented Dickey-Fuller (ADF) test and the Phillips-Perron (PP) test, which is more vigorous to heteroskedasticity,[2] to look into the univariate peculiarities of time series variables. Pesaran et al. (2001) assert that the dependent variable in the ARDL model must be stationary at first difference; i.e. I(1) as well as none of the regressors should be integrated of order two; i.e. I(2), in the interest of estimating a dynamic model that behaves in a proper way so as to avoid biased and spurious regressions.

3.6 ARDL Bound Testing Approach to Cointegration

The ARDL bound test verifies if there is any long-run relationship between the variables. Unlike prior econometric methodologies, this approach can be practiced by using a combination of I(0) and I(1) time series variables while still deciphering coefficients that are consistent and valid, thereby giving less ambiguous importance

to unit root tests (Pesaran, 1997). Moreover, this method acknowledges that there may not be the same immediate response of all the underlying regressors and allows the designation of different lag lengths for different regressors (Pesaran et al., 2001). The ARDL approach to cointegration still yields excellent results with small sample datasets (Haug, 2002).

One carries out the ARDL approach to cointegration by initially estimating an ARDL unrestricted error correction regression model using appropriate lag length criteria.[3] The unrestricted ARDL model is:

$$\begin{aligned}\Delta \ln PSI = {} & \alpha_0 + \sum_{i=1}^{q} \alpha_1 \Delta \ln PSI_{t-i} + \sum_{i=1}^{q} \alpha_2 \Delta \ln GDP_{t-i} + \sum_{i=1}^{q} \alpha_3 \Delta \ln RROI_{t-i} \\ & + \sum_{i=1}^{q} \alpha_4 \Delta \ln FD_{t-i} + \sum_{i=1}^{q} \alpha_5 \Delta \ln INF_{t-i} + \sum_{i=1}^{q} \alpha_6 \Delta \ln RER_{t-i} \\ & + \sum_{i=1}^{q} \alpha_7 \Delta \ln GOVINV_{t-i} + \sum_{i=1}^{q} \alpha_8 \Delta \ln SAV_{t-i} + \lambda_1 \ln PSI_{t-1} \\ & + \lambda_2 \ln GDP_{t-1} + \lambda_3 \ln RROI_{t-1} + \lambda_4 \ln FD_{t-1} + \lambda_5 \ln INF_{t-1} \\ & + \lambda_6 \ln RER_{t-1} + \lambda_7 \ln GOVINV_{t-1} + \lambda_8 \ln SAV_{t-1} + \mu_t \end{aligned} \tag{3}$$

In equation (3), ln represents natural logarithms, Δ is equal to the first difference of a variable, α_0 is the constant, q indicates the maximum lag order, I is the time trend, α_1 to α_8 represent the short-run coefficients, λ_1 to λ_8 represent the long-run coefficients, and μ_t is the white noise error.

The ARDL bound test for cointegrationis primarily concerns the testing of the joint null hypothesis ($H_0 : \lambda_1 = \lambda_2 = \lambda_3 = \lambda_4 = \lambda_5 = \lambda_6 = \lambda_7 = \lambda_8 = \lambda_9 = 0$) of no long-run relationship against the alternative hypothesis ($H_1 : \lambda_1 \neq \lambda_2 \neq \lambda_3 \neq \lambda_4 \neq \lambda_5 \neq \lambda_6 \neq \lambda_7 \neq \lambda_8 \neq \lambda_9 \neq 0$) of a long-run relationship among the variables. In that view, one may compute an F-statistic and compare it with two sets of critical values[4] depending on the number of regressors. One set considers that all variables in the ARDL model are I(0), while the other set of critical values considers that all variables are I(1).

If the calculated F-statistic is higher than the upper bound critical value, then the null hypothesis is rejected in favor of the alternative one at a given level of significance, thereby confirming the existence of a long-run level relationship among the variables. If the calculated F-statistic is below the lower bound critical value, then the null hypothesis is generally agreed upon. If the F-statistic is within the lower and upper bound critical values, then the result is inconclusive.

If cointegration is confirmed, then we can decipher the long-run and short-run coefficients. Following Pesaran and Pesaran (1997), we perform the cumulative sum of recursive residuals (CUSUM) and the cumulative sum of recursive residuals of square (CUSUMSQ) tests to detect if indeed the estimated regression coefficients are valid and free from systematic changes. It is noted that all econometric tests specified in this section are conducted by using the Eviews 9 econometric package.

4. Analysis of Data and Interpretation of Findings

4.1 Unit Root Tests

Table 2 below discloses the results for the ADF and PP unit root tests. The ADF and PP tests, revealing rather similar results, demonstrate that *PSI* , the dependent variable, along with *RROI* , *FD* , *RER* , and *SAV* as underlying regressors are I(1), whereas *GDP* , *INF* , and *GOVINV* are I(0) variables. The existence of I(0) and I(1) variables in the set of regressors signifies the application of the ARDL bound testing approach of Pesaran et al. (2001) in contrast to the cointegration approach of Johansen (1988; 1991), which would have been applicable for all variables I(1). Similarly, the ADF and PP tests also uncover that none of the regressors are I(2) and that the dependent variable is I(1).

Table 2. Results of the Unit Root Tests

Variable	Augmented Dickey-Fuller (ADF)		Phillips-Perron (PP)	
	Intercept	Trend & Intercept	Intercept	Trend & Intercept
	T-statistic	T-statistic	T-statistic	T-statistic
PSI	-1.76114	-1.25449	-1.92098	-1.68605
GDP	-5.38974***	0.369187	-5.38974***	0.369187
RROI	-1.33326	-1.49527	-1.55518	-1.40159
FD	-1.41093	-1.63564	-1.5301	-1.29576
INF	-4.04039***	-4.61802***	-3.95219***	-3.91761**
RER	-2.33321	-2.25101	-2.30161	-2.22613
GOVINV	-0.80804	-4.18373**	-3.89068***	-4.38162***
SAV	-0.85691	-2.60238	-0.73870	-2.13461
Δ*PSI*	-4.13735***	-4.41577***	-4.15503***	-3.73217**
Δ*GDP*	-3.36466**	-4.533201***	-3.22701**	-32.1347***
Δ*RROI*	-4.47276***	-4.61985***	-4.35179***	-5.70948***
Δ*FD*	-5.16964***	-5.75010***	-5.17503***	-8.43813***
Δ*INF*	-3.99217***	-3.90406**	-11.3742***	-10.8946***
Δ*RER*	-7.86453***	-7.79705***	-7.6577***	-7.59787***
Δ*GOVINV*	-6.31317***	-6.54231***	-12.9378***	-13.1051***
Δ*SAV*	-3.94786***	-3.93645***	-3.80599***	-4.33297***

Notes: ***, **, and * denote the rejection of the null hypothesis of unit root existence at the 1%, 5%, and 10% levels of significance, respectively. Δ indicates the first difference of a variable. The ADF test adopts Schwarz Information Criterion (SIC) as the automatic lag length criterion to correct for serial correlation, hypothetically because it selects the minimum lag lengths as compared to the Akaike Information Criterion (AIC). The PP test adopts the Newey-West bandwidth.

4.2 The Estimated ARDL Model and Residual Diagnostics Tests

Given that we employ annual time series data with 34 observations, the lag length is restricted to one ($n = 1$). Accordingly, we use both the AIC and SIC model

selection criteria. We then estimate an AIC-based ARDL (1, 1, 0, 1, 1, 1, 0, 0) model and an SIC-based ARDL (1, 1, 0, 1, 0, 1, 0, 0) model together with their respective forecast and prediction percentage errors. Thus, the estimated ARDL model is based on AIC since it turns out to be a better model with lesser prediction errors. Furthermore, the results of performing the Breusch-Godfrey Serial Correlation LM Test and the White Heteroskedasticity Test on the AIC-based ARDL model confirms that they do not suffer from serial correlation and heteroskedasticity, respectively.

4.3 ARDL Bounds Test for Cointegration and Long-Run Estimates

Table 3 reports the cointegration results for the bound test. Since the calculated F-statistic of 4.707038 is higher than the critical value bounds at each given levels of significance, the result strongly rejects the joint null hypothesis of no cointegration, which confirms that there is a long-run relationship between private sector investment in Mauritius and its determinants.

Accordingly, we estimate the long-run parameters and show the results in Table 4.

Table 3. ARDL Bounds Test for Cointegration

Test Statistic	**Value**	**k**
Calculated F-statistic	4.707038	7
Critical Value Bounds		
Significance	**I(0) Bound**	**I(1) Bound**
10%	2.03	3.13
5%	2.32	3.5
2.5%	2.6	3.84
1%	2.96	4.26

Table 4. Estimated Long-Run Coefficients

ARDL (1, 1, 0, 1, 1, 1, 0, 0) selected based on Akaike Information Criterion (AIC)			
Dependent Variable: PSI			
Dynamic Regressors	**Coefficient**	**Standard Error**	**T-Ratio**
GDP	5.927640**	2.522023	2.350352
RROI	-0.226203***	0.055719	-4.059687
FD	0.584034***	0.165615	3.526446
INF	0.277885***	0.067548	4.113872
RER	1.584666*	0.886082	1.788397
GOVINV	0.126761	0.121586	1.042564
SAV	0.528766**	0.211435	2.500842
DCGR	0.097397**	0.035246	2.763359
C	-3.849770*	1.946262	-1.978033

Note: *, **, and *** denote the significance level at 10%, 5% and 1%, respectively.

We note that GDP appears to be significantly positive, thus corroborating the accelerator mechanism effect. A 1% rise in GDP leads to a 5.93% increase in private

sector investment. Innovative developments in production activities, which augment domestically produced goods and services from 1981-2014, appear to have a convincing long-run effect on private sector investment in Mauritius. This finding is consistent with that of Ribeiro and Teixeira (2001), Frimpong and Marbuah (2010) and Ajide and Lawanson (2012) for Brazil, Ghana, and Nigeria, respectively, together with that of Oshikoya (1994) for seven African countries.

The real interest rate looks to have a negative significant impact on private sector investment, which in turn corroborates with the neoclassical theory of investment in the context of Mauritius, where a 1% increase in real interest rate dampens private investment by 0.23%. While this finding is consistent with that of Khalid and Scholar (2014), it nevertheless contradicts the finding of Frimpong and Marbuah (2010). The private sector has therefore been constantly facing finance constraints due to high interest rates, potentially explaining the huge private sector projects being put on hold or given up as well as the continuous decline in the development of small- and medium-sized enterprises (SMEs) in Mauritius.

Financial development turns out to be a significant long-run stimulating determinant of private sector investment in Mauritius. We can reasonably infer that the private sector is reliant on the financial sector institutions for bank lending and for the facilitation of its other transactions. Accordingly, a 1% expansion in Mauritius' money supply relative to its GDP significantly lifts private sector investment by 0.58%.

Surprisingly for Mauritius, a 1% increase in the inflation rate significantly encourages private sector investment by 0.28% in the long run. Albeit contradicting the findings of Luintel and Mavrotas (2005), this result is in fact consistent with the findings of Oshikoya (1994) and Frimpong and Marbuah (2010). Rising prices of commodities translate into increased revenue and profit for the private sector, which in turn enhance economic transactions and investing activities. This results in more firms setting up in the private sector, which trigger further investment activities (Frimpong and Marbuah, 2010).

The impact of the real exchange rate is positive at the 10% level of significance in the long run. This result, albeit contradicts the finding of Serven (2002), is in fact consistent with that of Oshikoya (1994). This positive coefficient does explain that the abolition of exchange controls followed by depreciation of the Mauritian Rupee relative to other international currencies has been and still remains beneficial in the long run for private sector investment in the country.

The insignificant positive coefficient of public sector investment addresses a weak crowding-in effect in Mauritius. This weak relationship may be explained by the fact that not enough tax incentives are provided to the private sector. In addition, business incentives in the form of new infrastructure are lacking from the government.

Domestic savings, which fueled the domestic private investment rate in the 1980s and 1990s, appear to have a decisively significant long-run positive relationship with private sector investment, where a 1% increase in savings raises private sector investment by 0.53%. This finding is consistent with Salahuddin and

Islam (2008) for developing economies. Even though interest rate fluctuations significantly follow the neoclassical theory, this result nevertheless demonstrates that savings from already established private firms in Mauritius translate into lesser debt sustainability issues and thus into more investment, mainly in real estate ventures.

The various reforms pertaining to corporate governance in Mauritius seem to have convincingly served as wake-up calls in the private sector. This has increased firms' confidence to further invest in new ventures in the long run. The significant positive coefficient of the dummy variable proves that the reforms, which are indeed reflected in the Mo Ibrahim Index of African Governance, significantly boost the confidence of private investors in Mauritius.

4.4 Short-Run Dynamics

We model the short-run relationship between private sector investment and its determinants in Mauritius through an error correction mechanism in the estimated ARDL model. The error correction term (ECM) is expected to be statistically significant and negative so as to strongly back the existence of a long-run relationship (Banerjee et al., 1998). Accordingly, the coefficient of the ECM should be within -1 and 0 with a view to reveal the pace at which the short-run dynamics are converging towards the long-run equilibrium; whereby the more closer it is to -1, the quicker the convergence is (Pesaran et al., 2001).

Table 5. Estimated Short-Run Dynamics (Error Correction Mechanism)

ARDL (1, 1, 0, 1, 1, 1, 0, 0) selected based on Akaike Information Criterion (AIC)
Dependent Variable: Δ*PSI*

Dynamic Regressors	Coefficient	Standard Error	T-Ratio
Δ*GDP*	0.654063	0.382673	1.709196
Δ*RROI*	-0.089118***	0.030596	-2.912708
Δ*FD*	-0.742136***	0.255127	-2.908891
Δ*INF*	0.082021***	0.018217	4.502556
Δ*RER*	0.139626	0.329097	0.424271
Δ*GOVINV*	0.049941	0.052238	0.956015
Δ*SAV*	0.208320**	0.097628	2.133808
Δ*DCGR*	0.038372***	0.009062	4.234495
ECM (-1)	-0.393975***	0.128377	-3.068900

$$ECM = PSI - (5.9276RGDP - 0.2262RROI + 0.5840FD + 0.2779INF + 1.5847RER + 0.1268GOVINV + 0.5288SAV + 0.0974CGR - 3.8498$$

The short-run dynamics reported in Table 5 demonstrate that the coefficient of ECM is negative and highly significant at the 1% level, conforming to the findings in Banerjee et al. (1998). This implies that approximately 39% of any deviation between private sector investment and its relative determinants from the long run as a result of short-run shocks are corrected within one year.

As far as the impacts of the determinants are concerned, GDP, though having a positive sign, is insignificant in the short run. This is indeed true in the Mauritian context, because whenever there are increments in output, established private firms that already have short-term debt obligations weigh their investment decisions carefully before fully engaging in additional investing activities. Furthermore, the real interest rate maintains its dominant and significant negative influence in the short run as well and demonstrates that a 1% increase cuts off private sector investment by 0.09%.

The coefficient of financial development is interestingly negative and highly significant in the short run. We observe similar findings in the studies of Nowbutsing (2012) and Khalid and Scholar (2014), who also use M2 as a proportion of GDP as a proxy. A 1% increase in financial development dampens private sector investment by 0.74%, which explains that the opening up of the financial system exposes the weaknesses of Mauritian financial institutions. The institutions become more vulnerable to price shocks, which prompt the government to adopt macroeconomic deflationary policies to mitigate those risks in the short run thereby dampening investment through a reduction on the return-on-assets (Ghosh, 2005).

Inflation maintains its dominant positive effect at the 1% significance level in the short run as well. Moreover, movements in the real exchange rate, having an insignificant positive coefficient, explain that private sector investment is sensitive to fluctuating exchange rates, but only up to a certain extent in the short run. Public sector investment remains insignificantly positive in the short run, confirming again a weak crowding-in effect. Furthermore, domestic savings, which hold a positive sign, are again significant. Corporate governance maintains its significant positive impact in the short run as well further explains that increments in investment to a very large extent are attributed to the good business environment that has resulted through corporate governance reforms.

4.5 Tests for Stability of the Long-Run and Short-Run Estimates

The results of performing the CUSUM (Figure 1) and the CUSUMSQ tests (Figure 2) conform to the assertion of Pesaran and Pesaran (1997) that if the plots of the CUSUM and CUSUMSQ lie within the 5% critical bounds, then the null hypothesis that all coefficients are stable will not be rejected. This confirms that that the model along with its short-run and long-run coefficients is indeed stable.

5. Conclusion

This study has examined previous relevant theories of private investment to identify the macroeconomic determinants of private sector investment in the context of Mauritius by using annual time series data for the period 1981-2014. By means of the Auto-Regressive Distributed Lag (ARDL) approach to time series econometric modeling, this study applies the ARDL Bounds test to delve into the long-run estimates. Accordingly, we are able to decipher the short-run dynamics via the error-correction form of the ARDL model.

The empirical results for the long-run analysis reveal that GDP, real interest rate, financial development, inflation, real exchange rate, savings, and corporate governance are significant and crucial determinants of private sector investment. Nonetheless, public sector investment, though positive, is an insignificant determinant. Results are in line with the neoclassical view in that the real interest rate significantly impedes private sector investment. Other factors have significant positive effects on domestic private capital formation.

Figure 1. Plot of Cumulative Sum of Recursive Residuals (CUSUM)

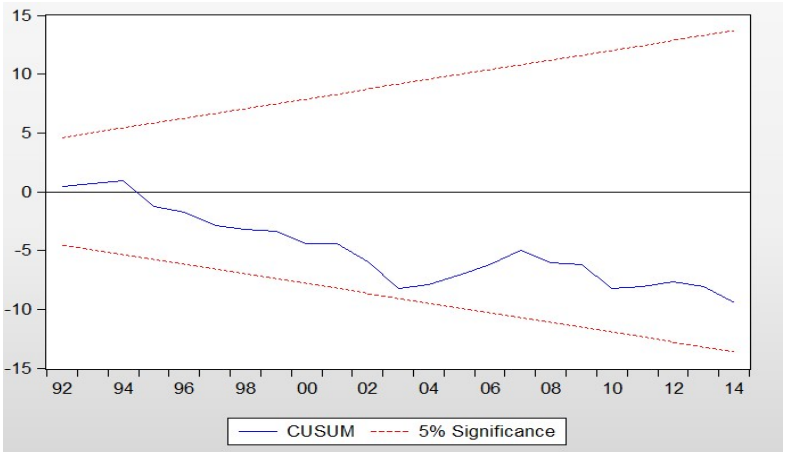
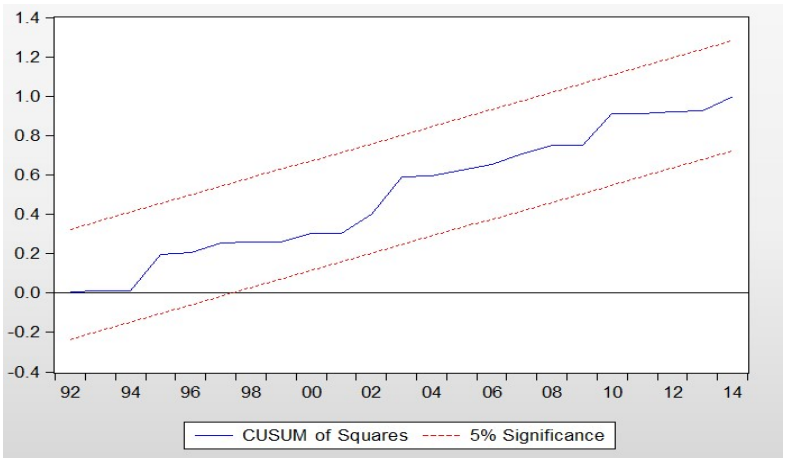


Figure 2. Plot of Cumulative Sum of Recursive Residuals of Square (CUSUMSQ)



The short-run dynamics reveal that real interest rate, inflation, savings, and corporate governance are consistent with the long-run results. However, GDP, real

exchange rate, and public domestic investment, though holding positive effects on private sector investment, are insignificant determinants in the short run. Thus, we present a weak crowding-in effect between public and private domestic capital formation for the case of Mauritius both in the short run and long run. Moreover, we find that financial development has a significant negative influence on domestic private sector investment in the short run. Supplemented by a highly significant and negative error correction term, the short-run dynamics indicate that the determinants are indeed more crucial for private sector investment in the long run in contrast to that in the short run. We confirm that both the long-run and short-run results are stable through the findings of the CUSUM and CUSUMSQ tests.

6. Policy Recommendations

Recommendations pertaining to policy strategies are in fact numerous following the empirical results in this study. The results show that financial development stimulates private investments in the long run. Primarily, the government should thus reduce the excessive dependence of the private sector on commercial banks for bank lending. Alternative lending institutions such as insurance markets could be used to finance investment activities. This would in turn stimulate investments through the expansion of money supply. If the goal is to boost private sector investment, then there is a need to maintain further financial developments. Hence, stability in exchange rates and inflation rates is desirable to enhance private sector investment in Mauritius.

The government should also formulate strategies to encourage domestic savings, which are vital for enhancing private sector investment. The Monetary Policy Committee (MPC) should aim towards a steady repo rate rather than periodic increases or decreases. Furthermore, incentives such as rebates on interest earned on domestic savings could encourage more people to save, which in turn can be used for private investments.

As shown by the results, corporate governance is a significant determinant of private sector investment. Rules of law, disclosure and accounting rules, the judicial system, capital market rules, and ownership structures, as suggested by Classens (2006), are important benchmarks through which one can assess the quality of governance. The government should continue further corporate governance reforms so that more trust is established among existing and potential entrepreneurs. Although corporate governance reforms in emerging markets tend to be slow due to their own specificities (Bhasa, 2004), strong legal reforms can provide a good solution to build more trust among domestic investors.

Tax incentives can also be provided to large private firms in addition to greater infrastructural-driven development. However, the government should ensure that fiscal deficits do not rise above a reasonable threshold so as not to impose debt overhangs on the private sector in the long run. Moreover, the government should invest intelligently in human capital. It should furthermore renovate and modernize the manufacturing sector, including Export Processing Zones, in order to increase

output and consequently GDP. This is because better GDP can significantly boost private sector investment in the long run.

7. Limitations of the Study

The findings in this study may run conversely to previous country-specific empirical evidence, simply because this study considers a different time period. Furthermore, the variables considered herein depend on their statistical suitability in the econometric model. We only test a total of seven independent variables plus a dummy as determinants with an endeavor to provide unbiased empirical attestations. In addition, the availability of time series data limits us to 34 annual observations for the period 1981-2014. In assessing the macroeconomic determinants of private sector investment in Mauritius, more variables such as human capital, trade openness, FDI, government external debt, and credit to private sector could be considered in future research.

Notes

1. See Graver and Boren (1967) for a thorough analysis on the noteworthy features of the multiplicative regression model.
2. Please refer to Phillips and Perron (1988)
3. This study follows the reasoning in Shrestha and Chowdhury (2005) and thus uses criteria with lesser prediction errors, while considering the Akaike Information Criterion (AIC) and Schwarz Information Criterion (SIC).
4. The sets of critical values are cited from Pesaran et al. (2001).

References

Acosta, P. and A. Loza, (2005), "Short and Long Run Determinants of Private Investment in Argentina," *Journal of Applied Economics*, 8(2), 389-406.

Ajide, K. B. and O. Lawanson, (2012), "Modelling the Long Run Determinants of Domestic Private Investment in Nigeria," *Asian Social Science*, 8(13), 139-152.

Alonso, J. A. and C. Garcimartín, (2013), "The Determinants of Institutional Quality. More on the Debate," *Journal of International Development*, 25(2), 206-226.

Aysan, A. F., M. K. Nabli, and M. A. Véganzonès-Varoudakis, (2006), "Governance and Private Investment in the Middle East and North Africa," *Policy Research Working Paper*, World Bank, No. 3934.

Banerjee, A., J. Dolado, and R. Mestre, (1998), "Error-Correction Mechanism Tests for Cointegration in a Single-Equation Framework," *Journal of Time Series Analysis*, 19(3), 267-283.

Barua, S., J. Naym, and Hazera-Tun-Nessa, (2017), "Economic Climate, Infrastructure and FDI: Global Evidence with New Dimensions," *International Journal of Business and Economics*, 16(1), 31-48.

Bhasa, M. P., (2004), "Understanding the Corporate Governance Quadrilateral," *Corporate Governance: The International Journal of Business in Society*, 4(4), 7-15.

Claessens, S., (2006), "Corporate Governance and Development," *The World Bank Research Observer*, 21(1), 91-122.

Engle, R. F. and C. W. J. Granger, (1987), "Co-Integration and Error Correction: Representation, Estimation, and Testing," *Econometrica*, 55(2), 251-276.

Erden, L. and R. G. Holcombe, (2005), "The Effects of Public Investment on Private Investment in Developing Economies," *Public Finance Review*, 33(5), 575-602.

Fowowe, B., (2011), "Financial Sector Reforms and Private Investment in Sub-Saharan African Countries," *Journal of Economic Development*, 36(3), 79-97.

Frimpong, J. M. and G. Marbuah, (2010), "The Determinants of Private Sector Investment in Ghana: An ARDL Approach," *European Journal of Social Sciences*, 15(2), 250-261.

Ghosh, J., (2005), "The Economic and Social Effects of Financial Liberalization: A Primer for Developing Countries," *DESA Working Paper*, United Nations, No. 4.

Graver, C. A. and H. E. Boren, (1967), *Multivariate Logarithmic and Exponential Regression Models*, Rand Corporation.

Greene, J. and D. Villanueva, (1991), "Private Investment in Developing Countries: An Empirical Analysis," *Staff Papers*, 38(1), 33-58.

Gujarati, D. N., (2004), *Basic Econometrics*, 4th edition, McGraw-Hill.

Haug, A. A., (2002), "Temporal Aggregation and the Power of Cointegration Tests: A Monte Carlo Study," *Oxford Bulletin of Economics and Statistics*, 64(4), 399-412.

Hayes, N., (2017), "Public-Private Partnerships in Emerging Markets," *Papers*, LSE International Development.

Jahan, S. and B. McDonald, (2011), "A Bigger Slice of a Growing Pie," *Finance and Development*, 48(3), 16-19.

Johansen, S., (1988), "Statistical Analysis of Cointegration Vectors," *Journal of Economic Dynamics and Control*, 12(2-3), 231-254.

Johansen, S., (1991), "Estimation and Hypothesis Testing of Cointegration Vectors in Gaussian Vector Autoregressive Models," *Econometrica*, 59(6), 1551-1580.

Jorgenson, D., (1967), "The Theory of Investment Behaviour," *Determinants of Investment Behaviour*, R. Ferber, ed., New York: National Bureau of Economic Research, 129-188.

Jorgenson, D. W., (1971), "Econometric Studies of Investment Behavior: A Survey," *Journal of Economic Literature*, 9(4), 1111-1147.

Kandil, M., (2009), "Public Spending and the Macroeconomy: Evidence from Developing and Developed Countries," *International Journal of Business and Economics*, 8(2), 133-158.

Khalid, A. and M. P. Scholar, (2014), "The Significant Determinants of Private Investment: A Case Study of Pakistan (1972-2013)," *Middle-East Journal and Scientific Research*, 22(3), 395-400.

Luintel, K. B. and G. Mavrotas, (2005), "Examining Private Investment Heterogeneity: Evidence from a Dynamic Panel," *WIDER Working Paper*, World Institute for Development Economic Research (UNU-WIDER), DP No. 2005/11.

McKinnon, R. I., (1973), *Money and Capital in Economic Development*, The Brookings Institution.

Nainggolan, P., R. Ramli, M. Daulay, and R. Rujiman, (2015), "An Analysis of Determinant on Private Investment in North Sumatra Province, Indonesia," *Journal of Management Research*, 7(1), 38-57.

Ndambiri, H. K., C. Ritho, S. I. Ng'ang'a, P. C. Kubowon, F. C. Mairura, P. M. Nyangweso, E. M. Muiruri, and F. H. Cherotwo, (2012), "Determinants of Economic Growth in Sub-Saharan Africa: A Panel Data Approach," *International Journal of Economics and Management Sciences*, 2(2), 18-24.

North, D. C., (1991), "Institutions," *Journal of Economic Perspectives*, 5(1), 97-112.

Nowbutsing, B., (2012), "Capital Formation and Economic Growth in Mauritius: Does FDI Matter," Mauritius: University of Technology.

Oshikoya, T. W., (1994), "Macroeconomic Determinants of Domestic Private Investment in Africa: An Empirical Analysis," *Economic Development and Cultural Change*, 42(3), 573-596.

Peterson, W. C. and P. S. Estenson, (1996), *Income, Employment, and Economic Growth*, 8th edition, New York: W. W. Norton.

Pesaran, M. H., (1997), "The Role of Economic Theory in Modelling the Long Run," *The Economic Journal*, 107(440), 178-191.

Pesaran, M. H. and B. Pesaran, (1997), *Working with Microfit 4.0: Interactive Econometric Analysis; [Windows Version]*, Oxford: Oxford University Press.

Pesaran, M. H. and Y. Shin, (1999), "An Autoregressive Distributed Lag Modelling Approach to Cointegration Analysis," in *Econometrics and Economic Theory in the 20th Century: The Ragnar Frisch Centennial Symposium*, S. Strom, ed., Cambridge: Cambridge University Press, 371-413.

Pesaran, M. H., Y. Shin, and R. J. Smith, (2001), "Bounds Testing Approaches to the Analysis of Level Relationships," *Journal of Applied Econometrics*, 16(3), 289-326.

Phillips, P. C. B. and P. Perron, (1988), "Testing for a Unit Root in Time Series," *Biometrika*, 75(2), 335-346.

Ribeiro, M. B. and J. R. Teixeira, (2001), "An Econometric Analysis of Private-Sector Investment in Brazil," *Cepal Review*, 74, 153-166.

Rossiter, R., (2002), "Structural Cointegration Analysis of Private and Public Investment," *International Journal of Business and Economics*, 1(1), 59-68.

Salahuddin, M. and M. R. Islam, (2008), "Factors Affecting Investment in Developing Countries: A Panel Data Study," *The Journal of Developing Areas*, 42(1), 21-37.

Serven, L. and A. Solimano, (1992), "Private Investment and Macroeconomic Adjustment: A Survey," *The World Bank Research Observer*, 7(1), 95-114.

Serven, L., (2002), "Real Exchange Rate Uncertainty and Private Investment in Developing Countries," *Policy Research Working Paper*, Washington DC: World Bank, No. 2823.

Shaw, E. S., (1973), *Financial Deepening in Economic Development*, New York: Oxford University Press.

Shleifer, A. and R. W. Vishny, (1997), "A Survey of Corporate Governance," *The Journal of Finance*, 52(2), 737-783.

Shrestha, M. B. and K. Chowdhury, (2005), "ARDL Modelling Approach to Testing the Financial Liberalisation Hypothesis," *Economics Working Papers*, University of Wollongong, No. 121, 05-15.

World Bank, (2015), "Mauritius - Systematic Country Diagnostic," Washington, D.C.: World Bank Group.