Dynamic Investment and Financial Development, Application of Kaleckian, Post-Keynesian model.

Taha Chaiechi
James Juniper
Bill Mitchel

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Investment analysis at the macroeconomic level has been very extensive, ever since Keynes (1936) placed the investment function at centre stage when analysing why a market capitalist economy does not necessarily achieve full employment equilibrium. Keynesians posit that goods market demand determines labor market outcomes. Thus the idea of a hierarchy of markets is implied. In particular neo-Kaleckian hypotheses about the relation between the profit share and capacity utilisation (Bhaduri and Marglin 1990, Blecker 1999) is explored. In this study, a Kaleckian-Post-Keynesian macroeconomic investment model, which is an extended version of the Bhaduri and Marglin (1990) serves as the starting point. This study attempts to investigate the impact of financial development on domestic investment behaviour.

Keywords: financial indicators, Investment, Employment, Kaleckian growth

I. Introduction

For neoclassical economics unemployment is, in the last instance, a labor market phenomenon. It is due to high real wages, which in turn is a consequence of so-called labor market distortions, like labor market regulations and trade unions. In contrast, Post-Keynesians argue that unemployment is the result of demand deficiencies on the goods market, and that the latter result particularly from a slow down in investment. Full employment at a living wage requires high aggregate demand, which requires high net investment. High net investment signifies rapid growth and expands employment opportunity. Investment analysis at the macroeconomic level has been very extensive, ever since Keynes (1936) placed the investment function at centre stage when analysing why a market capitalist economy does not necessarily achieve full employment equilibrium. Keynesians posit that goods market demand determines labor market outcomes. Thus the idea of a hierarchy of markets is implied. In particular neo-Kaleckian hypotheses about the relation between the profit share and capacity utilisation (Bhaduri and Marglin 1990, Blecker 1999) is explored. In this study, a Kaleckian-Post-Keynesian macroeconomic model, which is an extended version of the Bhaduri and Marglin (1990) serves as the starting point.

The Aim of this paper is to examine the impact of financial development on investment behaviour in South Korea using quarterly data from 1990:1 to 2004:1 by means of a Kaleckian model of investment. In this paper, we examine the causal relationship between financial development and investment from a time series perspective. We apply the most current econometric techniques, in particular testing causality applying cointegration tests and error correction models after pre testing for unit roots in all variables in our VAR system. These tests are essential for accomplishing the appropriate implication. Further more, we use variance decompositions to estimate the relative importance of financial development for explaining changes in investment beyond the sample period.

Choosing south Korea for this investigation is mainly beasue of its growth during last four decades is widely thought to exemplify an investment- driven economy (world bank, 1993). Of course, the availibilty and quality of the data is another reason for this slecetion.

II. Theoretical Underpinning

In the post-Keynesian scenario, investment is dependent not only on the interest rate, as in the McKinnon model, but also on expectations of future demand, and investment is treated as the variable that derives growth process. The role of effective demand is emphasised which is in turn influenced by income distribution. A rise in interest rates increases the marginal propensity to save, and reduces demand which may outweigh the increased supply of credit, investment and growth caused by the interest rate rise (Baden, 1996).

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In Neoclassical growth theory, investment effectively ceases to exist in the long run, adjusting passively relative prices and output growth and coincides with the supply of savings. Contrary to this in Keynesian economics investment is understood to be determined independently from savings. Stockhammer (1999) argues This presupposes that investment is not normally constrained by the availability of savings, but the possibility of mobilising credit. Usually this analysis of the real sector is complemented by assuming a flexible financial system and an endogenous money supply. Thus, the structure of the financial systems becomes important. Unlike in neoclassical theory internal and external finance are treated asymmetrically. Especially for small firms it is often difficult to obtain credit.

Lavoie (1992) points out that the discussion of the finance frontier led to three major points. First, firms need to make profits to be able to borrow. This financial constraint introduces an additional relation between the rate of profit, the rate of interest, the rate of accumulation and the leverage ratio which is deemed reasonable. Secondly, the retention rate of firms can not be considered to be an exogenous variable once the interest payments and variations in monetary policy are taken into account. Third, when pursuing target-return pricing, firms attempt to integrate the financial constraint within their pricing procedures. The Kaleckian model incorporating finance and interest rates will help to settle the controversy which has arisen between post-classical authors with regard to the casual link between the rate of interest and the rate of profit, on the one hand, and between the are of interest and the rate of accumulation, on the other.

Schumpeter (1911) sees finance as a critical element of growth. Robinson (1952) reports that financial development follows economic growth or causation between them may be bidirectional. The relationship between financial development and economic growth has been comprehensively treated in the recent theoretical and empirical literature. (See Robinson 1952; McKinnon 1973: Shaw 1973: Fry 1978 and 1988; World bank 1989; King and Levin 1993; Rajan and Zingales 1998; Sims 1972; Gupta 1984; Jung 1986; Demetriades and Hussein 1996; Demetriades and Luintel 1996; Arestis and Demetriades 1997; Arestis, Demetriades and Luintel 2001; Shan, Morris and Sun 2001; and Shan and Morris 2002; Roubini and Salai-Martin 1992; Murinde and Eng 1994; Neusser and Kugler 1996; Berthelemy and Varoudakis 1998; Ram 1999; Sinha and Macri 2001; and Shan, et al. 2001).

II.1 Theoretical Model

The model presented here has a long line of ancestors: it goes back to Kalecki (1971) and Steindl (1952), and was reformulated by Rowthorn (1982) and Dutt (1984) Taylor (1985) and Blecker (1989). The version presented here is based on Marglin and Bhaduri (1990) which is a more general formulation of earlier neo_kaleckian models. Marglin and Bhaduri (1990)'s model allows for profit-led as well as for wage led growth regimes. This generality borrows itself to the decomposition of the profit rate into the profit share, capacity utilisation and (technical) capital productivity. Then, for the sake of simplicity,

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authors assumed that technical capital productivity is constant, the rate of accumulation, which is the ratio of new investment to the stock of capital, can be formulated as a function of the past values of the profit share.

The key difference of Kaleckian models to Robinson type model is variable capacity utilisation. Robinson assumes full capacity utilisation in the long run, while the Kaleckian model has capacity utilisation as an endogenous variable. Marglin (1984) claims that the impacts of monetary variables have rarely been considered to be relevant for the equilibrium solution in the post-Keynesian and Kaleckian models of growth and distribution after Keynes.

In the Kaleckian/Steindlian model, distribution is determined by mark-up pricing in incompletely competitive goods markets, and utilisation of productive capacity determined by the capital stock is variable also in the long run. Therefore, there is not necessarily an inverse relation between the real wage rate and the rate of profit, nor between the real wage rate and the rate of capital accumulation in the long run.

II.2 The Structure of Financial System

Government restrictions on banking system through interest rate ceiling on deposits and high reserve requirements create a shortage of funds and reduce the efficiency of capital-factors that are essential for economic growth (Abubader, 2005). Government ownership of banks is another form of intervention in financial systems which may have adverse impact on financial development. Government owned banks provide politicians the power to allocate credit to incompetent enterprises to advance their political interests in the cost of productive private investment (Demetriades and Andrianova, 2004). La Porta et al (200) examined the relationship between government ownership of banks, financial development and economic growth using a cross section data and found that such ownership has significant negative consequences on financial development and economic growth.

As different economies have different financial histories and have reached various stages of financial development, their financial structures are quite different naturally. Traditionally, a distinction is made between bank-based and market-based systems. In countries with bank based systems, financial funds are primarily provided by banks, while in market-based systems bond and equity finance plays a much greater role. Bank-based financial system (e.g. South Korea financial system in this case study) encourages long-term finance which is dedicated to long- term productive investment that reduces speculative activities. Thus bank-based financial system promotes financial stability and helps implement economic policies successfully. In bank-based financial system, financial and industrial capitals are so related that speculative finance can not influence real economic activity as it does in capital-market-based financial system. Bank-based financial system may help implement expansionary monetary and industrial policy, given the relationship between financial and industrial firms (Arestis and Demetriades, 1996).

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III. Financial Sector Development in East Asia

Demetriades and Luintel (2001b) note that the case of South Korea contradicts the assertion of the McKinnon-Shaw hypothesis that interest rate ceilings and other financial restraints are deleterious to economic growth. They suggest a positive association between financial development, on the one hand, and the degree of state control over the banking system combined with mild repression of lending rates, on the other. They predict that severe financial repression negatively affects financial deepening, as in the case of India for 1961–91 (Demetriades and Luintel, 1996b, 2001a). Their empirical results for 1956–94 in South Korea (Demetriades and Luintel, 2001b) show that government intervention in the financial system had positive effects on financial deepening. These results confirm the neo-Keynesian and neo-structuralist view that government intervention in the financial sector can enhance economic growth by positively affecting financial development.

In terms of the composition of external finance, Asia relies less on bond markets than other emerging regions; the share of bonds is a bit more than half that of Latin America and Emerging Central Europe. Again, these generalisations disguise considerable variation among countries. For well-known historical reasons, the banking sector is particularly important for external finance in China, South Korea, and Thailand. The stock market is important only in Hong Kong, Malaysia and Singapore, where the authorities have aggressively promoted it. The bond market is the least important of these three sources of finance in virtually every country (and exception being Thailand, where it is approximately the same size as the stock market). Bonds are least important in total external finance in Hong Kong and most important in Malaysia and South Korea (See, Eichengreen, 2004).

IV. Empirical Methodology, Model, and Data

Our approach is to use a time series Vector Autoregression (VAR) methodology. A VAR is a multivariate simultaneous equation system, in which each variable under study is regressed on a finite number of lags of all variables jointly considered. The method focuses on deriving a good statistical representation of the interactions between variables.

In the set of regressions, we look at whether investment move more closely with financial development indicators, thus based on the foregoing discussion, the Kaleckian investment equation used in this study is expressed as follows:

$$INVY = \alpha_0 + \alpha_1 MR + \alpha_2 QY + \alpha_3 R + \alpha_4 IR + \varepsilon$$

Where INVY is the ratio of Gross Capital formation over GDP, MR and QY are financial development indicators, R is profit rate and IR is inetesrt rate which is the logarithm form of Deposit rate plus 1 divided by inflation rate plus 1.

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Data Sources

The data were obtained from the various issues of the International Financial Statistics, IFS-IMF, International Labour Organisation (ILO), and World Bank Database and Asian Development Bank (ADB) for the period of 1990Q1 to 2004Q4 for South Korea.

Financial Development Indicators

Financial development is usually defined as a process that marks improvements in quantity, Quality and efficiency of financial intermediary services. In this study we employ 2 commonly used measures of financial development.

The first is Monetisation Ratio, MR, which represents the ratio of Broad money (includes M1, plus savings and small time deposits, overnight repos at commercial banks, and non-institutional money market accounts) or simply the stock of M2, to Nominal GDP. MR has been used as a standard measure of financial development in numerous studies (Glen 1989; World Bank 1989; King and Levin 1993; Calderon and Liu 2003; Wood 1993; Murinde and Eng 1994; Lyons and Murinde, 1994; Berthelemy and Varoudakis 1995; Arestis and Demetriades, 1997; and Agung and Ford, 1998). The monetisation ratio reflects the relative size and Depth, of financial market, (King and Levine 1993). An increase in this ratio indicates further expansion in the financial intermediary sector to the rest of the economy. While monetization ratio does not accurately gauge the effectiveness of the financial sector in ameliorating information asymmetries and diversifying risk, it can be viewed as a general measure of overall financial development.

According to Demetriades and Hussein (1996), this indicator accords well with McKinnon‘s outside money model where the accumulation of lumpy money balances is necessary before self financed investment can take place. However, it conflicts somewhat with the debt intermediation approach developed by Gurley and Shaw (1995) and the endogenous growth literature, because a large part of the broad money stock in developing countries is currency held outside banks. As such, an increase in the M2/GDP ratio may reflect an extensive use of currency rather than an increase in bank deposits, and for this reason this measure might be less indicative of the degree of financial intermediation by banking institutions. Financial intermediaries serve liquidity services; this could be relevant for promoting investment and consequently growth. For this reason, Demetriades and Hussein (1996) proposed to subtract currency outside banks from M2 and to take the ratio of M2-Currency to GDP as a proxy for financial development.

Juttner (1994), in arguing against the use of monetary aggregates to measure financial development, noted that “credit creation does not necessarily entail money creation and vice versa” [p.110]. This suggests that M2/GDP and M3/GDP are not appropriate measures of financial development if the researcher is seeking to investigate how financial development might bring about economic growth. Levine and Zervos (1998)

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argued that M3/GDP only measures financial depth and "does not measure whether the liabilities are those of banks, the central bank or other financial intermediaries, nor does this financial depth measure identify where the financial system allocates capital" [p. 542]. In other words, they suggest that increases in M3/GDP are not necessarily associated with increases in credit, and credit is clearly one of the aspects of financial development that might generate economic growth.

Profit Rate

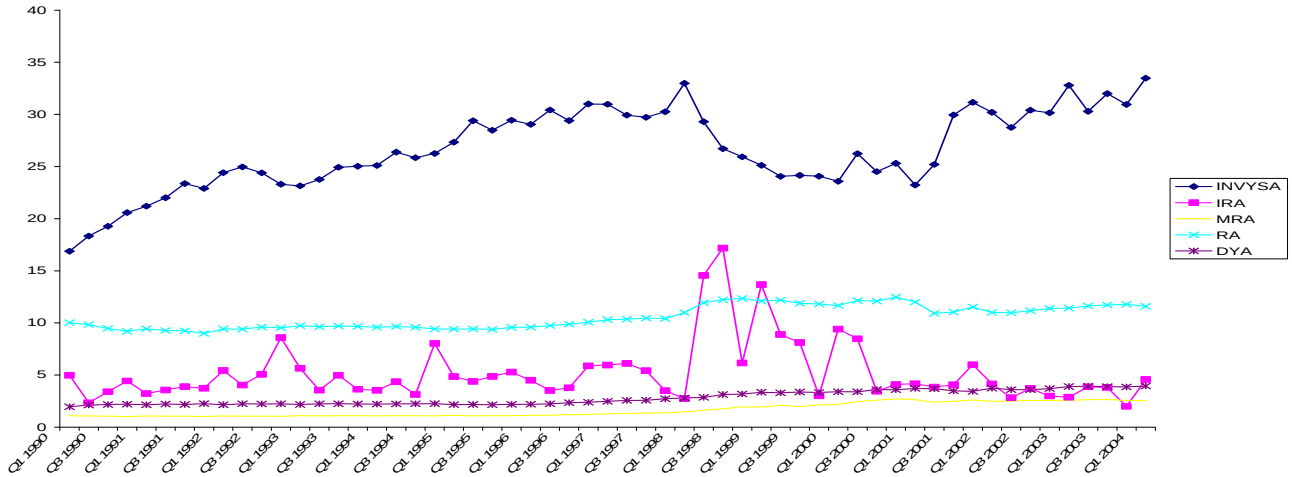
We follow Rowthorn (1981) and Dutt (1990), who in turn follow Kalecki (1971) and Robinson (1962), in assuming that desired investment depends positively on the profit rate. considering the negative dependence of desired investment on the real interest rate, which measures the cost of capital, we follow Dutt (1994) to measure profit rate.

The rate of profit can be expressed as; $r = (1-Va)\,u$, where V is the real wage rate and $(1-Va)$ is the share of profits in income, a is the ratio of labor to GDP, and $u=\square K/Y$ is the actual capacity utilisation. Since we assumed that capacity output is proportional to the capital stock, we can identify capacity utilisation with the capital-output ratio. It clears that when the rate of capacity utilisation is considered to be exogenous in the long run and there is no technical change, a higher rate of profit requires a lower real wage.

V. Estimation Sterategy and Data Examination

In this section, the estimates for various tests, namely Unit root, Johansen Multivariate coinetgration, Causality in Granger sense, variance decomposition and impulse responses analysis are employed and discussed. We know that East Asia recived a major financial shock in 1997 and we will expect the distruption to the data series to show up in our modelling, particularly in terms of instability of parameters and the over all relationships between macroeconomic variables. The following graph showes the time series for the seasonally adjusted varibales during the period of study.

Figure 1 Graphical examination of Data



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IRA = Seasonally adjusted interest rate
RA= Seasonally adjusted Profit rate
MRA= seasoanlly adjusted monetisation ratio
QYSA= seasonally adjusted (M2-Currency)/GDP
INVYSA= Seasonally Adjusted investment ratio

The falls in interest rate occured in first quarter 1998 indicates the highest level of investment. Interest rate raise at late 1998 and early 1999 follows by a decline in investment expenditures. According to graph we could see that the variables move together in a positive relationship , an exception for interest rate which moves negatively in terms of change in the level of investment. And general pattern looks linear.

Examing the time series

Befor estimation of the econometric model, testing for stationarity of the time series ensures us that the variables used in the regression are not subject to spurious correlation. In general, economic time series are non-stationary process. Many macroeconmic variables show trending behaviour over time. In the presence of non-stationary variables, there might be what Granger and Newbold (1974) call a spurious regression. For most economic time series, staionarity is acheveid by an appropriate degree of differencing (Engle and Granger 1999).

To test for the stationarity characteristics of the data, Augmented Dickey Fuller (ADF) unit root test, was conducted for each of the variable the levels as well as in fisrt diffenerce under two hypothesis of intercept with trend and intercept with trend variable. The pre-requisite of the cointegration is that all variables must integrate to same order. As it is observed from table 1 the test result indicates that the null hypothesis of a unit root could not be rejected for all the variables in levels. However, this hypothesis was easily rejected for all variables in the first difference. In other words, varibales were found to be I(1).

Table 1 unit root test result

Variables	Level No trend	Level with trend	F.D no Trend	F.D with Trend
INVYSA	-2.152744	-2.463385**	-8.104529*	-8.030594*
IRA	-4.725273*	-4.692971*	-8.853634*	-8.805116*
RA	-0.835403	-2.148688	-5.339578*	-6.274432*
MRA	0.175711	-1.893091	-6.467761*	-6.467955*
QYSA	-0.014116	-1.838799	-6.513990*	-6.572416*

* significant at 1%
** Significant at 10%

Coinetgration

The concept of coinetgration was introduced by Granger (1981) and is used in econometrics to discuss long-run economic relation. A necessary condition for the existence of coinetgration is that all the variables must be integrated of the same order.

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As we found that our series are integrated of first order, then we could now proceed from unit root to cointegraion test. The coinetgration approach developed by Johansen (1988) and Johansen and Juselius (1990) is applied in this study to test for the existence of stable relationship between the level of investment, the state of financial development, profit rate and interest rate.

The cointegration test, which is the pre condition for estimating VECM, is tested under the assumption of unrestricted linear intercept with and without trend including 2 lags interval. It is observed that there are at least one coinetgration relation to be incorporated in the investment equation.

Table 2 Johansen Cointegration Test Results for

No of CE	Eigenvalue	Trace	Critical V at 5%	Prob
None *	0.440	79.012	69.818	0.007
At most 1	0.347	47.674	47.856	0.052
At most 2	0.244	24.645	29.797	0.174
At most 3	0.159	9.488	15.494	0.322
At most 4	0.001	0.081	3.841	0.775

The evidence of Johansen test shows that the variables included in the equation are tied up together by long run equilibrium relationship. The estimated coefficients of all the variables (i.e., financial development indicators, interest rate and profit rate) included in the model are significant and have the correct signs. This result confirms the theoretical concept of Kaleckian-post Keynesian argument that, interest rate and the rate of profit are complementary in the investment growth process.

Lag length Selection

It is important to choose an approperiate length of lag to incorporate in the model before testing for the casuality . The length chosen should be sufficinetly large to make serial correlation of the residuals unlikely. However, the longer the length, the greater the number of parameters to be estimated and fewer the degree of freedom. Therefore, there is a need for us to determine the lag lenghts that trdas off the reduction in bias due to long lag lengths for increased efficiency from short lags. In this study the sample size is limited to 52 observations after adjusting the end points with four variable in the model. Khim and Liew (2004) claim that Akaike's information criterion (AIC) and final prediction error (FPE) are superior to the other criteria in the case of small sample (60 observations and below), in the manners that they minimise the chance of under estimation while maximising the chance of recovering the true lag length. Based on AIC and FPE in our sample it appears that VAR (4) is optimal. To Test for stability; Roots of characteristic polynomial was applied and the result indicates that no root lies outside the unit circle and VAR satisfies the stability condition.

Table 3 VAR Lag Order Selection Criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-230.239	NA	0.004930	8.876	9.062	8.948

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1	7.363	421.408	1.62e-06	0.854	1.969*	1.283*
2	32.369	39.632	1.67e-06	0.853	2.898	1.640
3	56.639	33.885	1.83e-06	0.881	3.855	2.025
4	92.452	43.246*	1.39e-06*	0.473*	4.376	1.974

We may now wish to examine our model for signs of misspecification. Serial correlation in the errors may be evidence of serious problems with specification. In particular, we should be on guard for an excessively restrictive specification that we arrived at by experimenting with ordinary least squares. To do so, we have referred to Q-statistics correlogeram and applied the B& G test. The Breusch-Godfrey LM test proves the presence of serial correlation (Obs R^2 34.05 with effectively zero probability). The Q-statistics correlogeram has spikes at lags up to 3, and Q statistics are significant at all lags, indicating significant serial correlation in the residuals. It appeared from the correlogeram the spikes die off more or less geoetrically with increasing lag, it is a sign that a series obeys a low order autoregressive (AR) process. Q-statistics and LM test both indicate that the residuals are serrially correlated and the equation should be re-specified before using it for hypothesis tests and forecasting.

First Order Serrial Correlation

One common method of accounting for serial correlation is to include Autoregressive (AR) or moving average (MA) terms in the equation. After including AR (1) into the equation the results indicate that we cannot reject the null hypothesis of no serial correlation, (Obs R^2 0.058 with probability of 0.971295). Application of B & G LM test and Q-statistics confirms the zero autocorrelation.

Granger Causality Results

Although cointegration indicates presence or absence of Granger causality, but it does not indicate the direction of causality between variables. The F-test of the differenced explanatory variable gives an indication of the short term casual effects. Whereas the long run causal relationship is implied through the significance or otherwise of the t-test of the lagged error correction terms which contain the long-term information since it is derived from long run cointegration relationships.

Table 4 Granger Causality test results

Null Hypothesis:	Obs	F-Statistic	Probability
IRA does not Granger Cause INVYSA	52	3.377	0.012
INVYSA does not Granger Cause IRA		1.086	0.382
RA does not Granger Cause INVYSA	52	9.512	4.4E-06
INVYSA does not Granger Cause RA		1.632	0.173
MRA does not Granger Cause INVYSA	52	5.596	0.0005
INVYSA does not Granger Cause MRA		0.887	0.498
QYSA does not Granger Cause INVYSA	52	4.332	0.002
INVYSA does not Granger Cause QYSA		0.692	0.631

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The main result of the causality tests as shown in table above indicates that the null hypothesis of no causality from financial development to investment was rejected at 1% significance level. The causality was unidirectional since the other direction of causality from Investment to financial development and other explanatory variables was not observed. Our result significantly support that financial development stimulates investment either through the increasing the investment efficiency or increasing the resources for investment. This finding advocates the financial reforms and economic liberalisation under the banner of "Segyehwa" (globalisation and internationalisation), which was implemented in 1993 in South Korea, and can explain the rebound in economic performances since then and that further deepening of the financial sector was an important factor to stimulate investment and therefore long term economic growth. The result obtained from cointegration tests and Granger-Causality tests support the finance- led growth paradigm in South Korea. This result also is consistent with the Bank of Korea report that high profitability has been a key characterisitic of Korean industrialisation, even if profitability does not appear initially as high as in the advanced countries. The high profit rates eventually earned in the import-subsitution heavy industries created great hopes of substantial profit rates in later projects .

Residual Tests

In this section we would subject our model to a set of diagnostic tests. The following table has summarised the result of applied tests in the residuals.

Table 5 Residual tests results

Test	Statitsics	Probability
Normality	J-B 0.827	0.661
Serial Correlation	B&G Obs R^2 0.058	0.971
ARCH	Obs R^2 0.193	0.660
White Hetroscedasticity	Obs R^2 8.935	0.347

As it is observed from the table, applying the Jarque-Bera test proves that the residuals are normally distributed, and we can not reject the null hypothesis of normality. Based on computed Breusch-Godfrey serial correlation LM test we can not reject the null of Zero autocorrelation. Application of ARCH LM test, introduced by Engle (1982) proves that there is no evidence of homoscedastic errors in favour of ARCH residuals. This particular specification of Hetroscedasticity was motivated by the observation that in many financial time series, the magnitude of residuals appeared to be related to the magnitude of recent residuals.

White Heteroscedasticity describes as a general test for model misspecification, since the null hypothesis underlying the test assumes that the errors are both homoscedastic and independent of the regressors, and that the linear specification of the model is correct. Failure of any one of these conditions could lead to a significant test statistic. Conversely, a non-significant test statistic implies that none of the three conditions is violated. The result of White test in our model is satisfactory in terms of specification.

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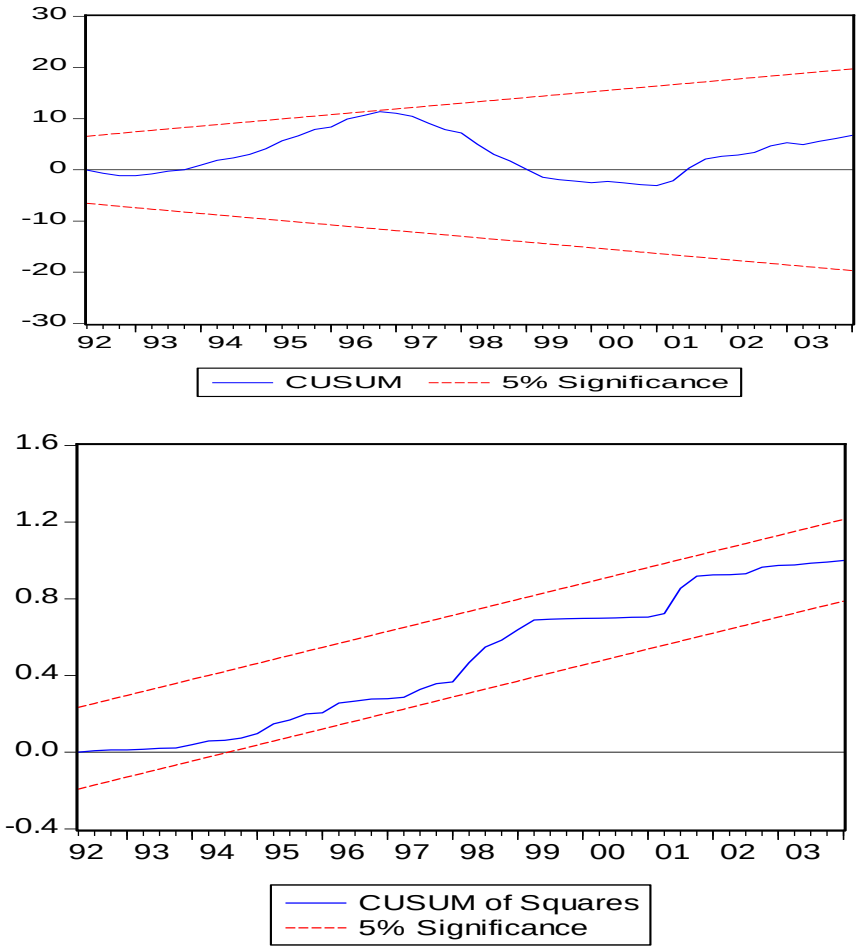
CUSUM

The CUSUM test (Brown, Durbin, and Evans, 1975) was applied on the cumulative sum of the recursive residuals. The plot shows the cumulative sum together with the 5% critical lines. The test finds parameter instability if the cumulative sum goes outside the area between the two critical lines. With regard to the applied CUSUM, The test clearly indicates full stability in the equation during the sample period.

Figure 2 CUSUM test



The CUSUM test result is suggestive of coefficients stability and the CUSUM of Square plot suggests that the cumulative of sum of squares are generally within the 5% significance line, suggesting that the residual variances are stable.

Variance Decomposition And Impulse Response Analysis

Innovation accounting (variance decomposition and impulse response function) analysis is applied to examine interrelationships between variables in the VAR system.Variance decomposition (VDCs) shows the fraction of forecast error variance for each variable that results from own innovations and also from shocks to other variables within the same

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system, or dynamic interactions among the variables in the post sample period. For brevity and convenience at no cost, the report and focus is on the percentage variance decompositions of 5 years (20 Quarters) ahead forecast errors in investment.

Table 5Variance Decomposition of Investment in order to shock or innovation in MRA

Period	S.E.	INVYSA	IRA	MRA	QYSA
1	1.063	98.110	0.000	1.889	0.000
2	1.452	78.383	1.146	7.480	2.616
3	1.663	74.905	1.288	8.409	3.585
4	1.792	70.374	1.113	11.180	4.409
5	1.887	66.021	1.015	12.193	7.192
6	1.960	62.165	0.992	13.193	9.441
7	2.020	58.829	0.968	13.726	11.626
8	2.067	56.177	0.974	13.972	13.437
9	2.105	54.223	0.993	13.940	14.887
10	2.134	52.924	1.023	13.729	15.954
11	2.156	52.157	1.058	13.462	16.641
12	2.174	51.750	1.092	13.266	17.001
13	2.189	51.526	1.123	13.257	17.097
14	2.202	51.312	1.147	13.532	17.005
15	2.217	50.973	1.163	14.149	16.803
16	2.233	50.417	1.169	15.121	16.562
17	2.253	49.614	1.164	16.417	16.337
18	2.277	48.588	1.150	17.963	16.165
19	2.305	47.411	1.128	19.659	16.060
20	2.338	46.178	1.100	21.395	16.020

In this section we determine the relative importance of monetisation ratio as financial development indicator in explaining investment behaviour. The second column of the table, labelled "S.E.", contains the forecast error of the variable at the given forecast horizon. The remaining columns give the percentage of the forecast variance due to each innovation, with each row adding up to 100.

The result of the analysis of VDCs tends to suggest that about 7 to 21 percent of the variance in financial development indicator is attributed to its own innovation throughout the entire 5-year-ahead. However investment explains approximately about 46 to 98 percent of the variance financial development indicator. That means the effect of this variable is strongly positive on investment. In line with our Granger causality findings , financial development measures explian a large portion of the forecasting error variance of investment. These results are consistent with the theoretical Prediction of the positive and strong effect of financial development as the strong source of economic growth.

Vector Error Correction Representation

A vector error correction model is a VAR that builds in coinetgration. The cointegration regression implies an error correction mechanism as the second stage using lagged residuals from long run cointegration relation. The error correction term, (ECT) measures

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short run deviation from long run equilibrium relationship. Coinetgartion represents a long run equilibruim relationship between the variables in the system. However, these variables may deviate from each other in the short run and result in diseuqilbruim in the system.

The estimates of the error correction (ECM) representation are presented in table 7. It can be seen from the table that the impact of interest rate on invetsment in the short run is negative and significant , profit rate and monetisation ratio have positive significant relainship with investment, and QYSA has the siginificant however negative elatioship with dependent variable.

Table 7 Error Correction Representation

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.516	0.217673	2.373	0.021
DIRA	-0.133	0.070493	-1.896	0.063
DRA	0.442	1.118534	0.395	0.694
DMRA	10.406	7.765641	1.340	0.186
DQYSA	-12.303	6.863	-1.792	0.079
DQYSA(-2)	-7.832	2.553	-3.067	0.003

After estimating VEC, we then constructed the error correction term from the estimated cointegrating relations and estimate a VAR in first differences including the error correction terms as regressors. The following results for error correction term obtained;

Table 8 Error Correction Term Satistics

ECT	Coefficient	Std. Error	t-Statistic	Prob.	R-squared	D.W
ECM(-1)	-0.233	0.113	-2.062	0.047	0.58	1.7

The coefficient of the ECM term is significant and has the correct signe, reflecting the joint significance of the long-run coefficients. The speed of adjustment is 0.23 implying that 23% of the previous equilibruim of investment from its long run equilibrum value will be corrected each quarter independent of the other dynamic processes that are going on.

VI. Concluding Remarks

The paper uses time series under ECM and VAR models to conduct cointegration and causality tests between investment and its explanatory variables based on Kaleckian model of investment for South Korea. Results imply that financial development and investment are positively cointegrated in the long-run and that there is one cointegrating vector, indicating a stable long-run relationship between financial development and investment. Results of causality test also suggest that there is a unidirectional causality between financial development indicators and investment running from financial development.

Cointegration and Granger Causality results confirm the theoretical concept of Kaleckian-post Keynesian argument that, interest rate and the rate of profit are

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complementary in the investment growth process. The results suggest that we should interpret the Korean development experience within a Post Keynesian growth framework. We find that the financial system would be able to extend the more facilities and accessibility to financial services to investors, hence raising the level of investment. Thus, we tentatively regard the study results as suggesting that Korea's investment behavior is due to changes in profit and interest rate and the development of financial sector.

These findings supports the theory that financial development has a role to play in the economic development of those countries by providing critical services to increase the efficiency of intermediation, leading to a more efficient allocation of resources, a more rapid accumulation of physical and human capital, and faster technological innovation, thus inducing faster long-term economic growth. This growth, in turn, induces further financial deepening.

The policy implication is that, financial reforms in South Korea should continue in parallel with the pursuit of reforms in the real sector so that both reforms will be mutually supportive to promote investment and consequently economic growth and employment.

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