VALIDITY OF F-H PUZZLE IN PAKISTAN ECONOMY: A TIME SERIES STUDY

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Abstract

Purpose:The objective of this paper is to examine the validity of F-H puzzle in the context of Pakistan. In this study the Feldstein-Horioko puzzle investigated in Pakistan which states that the existence of relationship between saving and investment is the indication of capital immobility.
Methodology:The data of gross domestic product saving, capital formation and current account from 1980 to 2016 collected from State Bank of Pakistan, IMF outlook data base and Economic Survey of Pakistan.The ADF and PP test used to find out the stationarity of the variables. Famous Johansen cointegration used to check the long run relationship between saving and investment and between current account and investment.
Findings:The results of unit root test indicate that all the variables are stationary at their first difference. The empirical results of cointegration test shows that there is no long run relation exist between saving and investment and long run relationship exist between current account and investment which does not support the findings of F-H puzzle and shows that capital is perfectly mobile in case of Pakistani economy.

Key Words: F-H Puzzle, Feldstein-Horioko puzzle, cointegration

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INTRODUCTION

1.1 Overview:

In 1980 Feldstein and Horioko examine the relationship between saving, investment and current account in 52 developed economies and come to know that there is high correlation between saving and investment and no relation between investment and current account which shows that the capital is immobile and all the investment comes from domestic saving. The finding of F-H is against the economic theories which believes that capital is perfectly mobile.

Current account balance is the difference between total income and total expenditure. Current account surplus indicate that country's savings is more than its investment, on the other hand, current account deficit shows that country's investment is more than it's saving and the additional investment comes from foreign sector which indicate the existence of capital mobility.

The theory suggest that high correlation between investment and saving and low correlation between current account and investment indicate capital immobility, whereas low correlation between saving and investment and high correlation between current account and investment shows capital mobility.

In this paper, time series data from 1980 to 2016 on gross domestic product, capital formation, saving and current account used to check the validity of F-H puzzle in the context of Pakistan.

1.2 Background of Research

Feldistein and Horioko investigate the relationship between saving, investment and current account in order to check the existence of capital mobility in 1980. They found the high correlation between saving and investment and low correlation between current account and investment. Therefore they conclude that capital is internationally immobile. Their findings contradict the modern theories on capital mobility.

In 1993 Baxter and Crucini revisit the F-H puzzle and criticised that the finding of Feldistein and Horioko (1980) was not a puzzle. They believed that the high relation between saving and investment was not the indication of capital mobility.

The finding of Baxter and Crucini (1993) build the new foundation of second school of thought which believe that high correlation between saving and investment does not indicate the capital immobility.

1.3.1 Objectives of the Research:

The objective of this research is to check the validity of famous F-H puzzle in the context of Pakistan economy.

1.4 Hypothesis of the Research:

H1: There is a significant relationship exist between saving and investment.

H2: There is a significant relationship exist between investment and current account

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REVIEW OF LITERATURE

Nell & Santos (2008) extended the study of Coakley et al (1996). They used Johansen's Likelihood ratio (LR) test to check the co-integration and long-run causality between saving and investment. Their studies depend on the six OECD countries for different time periods. They found that investment and saving are correlated with each other in case of UK and USA and they also found a causal relationship between saving and investment. They argued that F-H puzzle is a useful to examine the relationship between saving and investment but their justifications are incomplete.

Eng & Habibullah (2006) examine the relationship between saving and investment in East Asian economies by analysing the financial integration and international capital mobility. They used panel data approach to analyse the relationship between saving and investment proposed by Pesaran et al (1999). They took the more advantage of cross-country variation in data by using panel data (combination of time series and cross-sectional data). They used Panel Autoregressive Distributed Lag (PARDL) approach to analyse the relationship between saving and investment. They also used Mean Group (MG) and the Pooled Mean Group (PMG) which are newly developed technique to estimate the parameter of pooled data. They divided the data in to two periods from 1970 to 1996 and 1997 to 2000. The reason of this division was to check the effect of financial crises on the estimators. They found the evidence that data is heterogeneous by using Hausman specification so that they used PMG approach to obtain the estimators. They found the evidence that the long run relation between saving and investment is due to the insolvency constraint. The capital is internationally mobile because they found low level of correlation between saving and investment in short run.

Sinha & Sinha (1993) established the hypothesis that saving and investment are co integrated with each other. To check this hypothesis they used the model which is developed by Feldstein (1983) and also used by Coakley et.al (1995). They implied this model on the Indian economy for the period of 1950-1992. As their study depend on the time series data, they first checked the stationarity in the data by using Phillips-Perron (1988) unit root test. The result of unit root test showed that saving and investment series are non-stationary in their level form but are stationary in their difference form. Then they used the Johansen-Juselius (1981) test of co integration to check the co integration between saving and investment. They results showed that saving and investment are correlated with each other in the long run.

Kollias et.al (2004) investigates the relationship between saving and investment for Greece form the period of 1962-2002 by using F-H (Feldstein & Horioko) model. They analysed the relationship before and after EU-accession. They used basic measure of saving as defined by Baxter and Crucini (1993). They also used ratio of gross capital formation to output as a measure of change in investment instead of using investment to output ratio.

Payne & Mohammadi (2006) investigate the link between saving and investment for 26 transition economies for the period of 1991 to 2002. They used panel data to examine this relationship. They used the four different techniques which are Cross-sectional (CS) approach, Fixed Effect (FE) approach, Random effect (RE) approach and Mean group (MG) approach.

Genberg & Swoboda (1992) argue that the basic equation of relationship between saving, investment and current account which is capital account is equal to difference between saving and investment is not a simple relationship. Lot of previous studies on relationship between

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saving and investment showed that there must be something more than relationship. There are three methods to measure the current account in literature. These methods are elasticity method, income-absorption method and saving and investment method.

Murphy et.al (1995) investigates the relationship between saving and investment for 24 OECD (Organization for Economic Co-operation and Development) countries. They obtained the data of 24 OECD countries for the period of 1960 to 1968. They first check the time series properties for each and every 24 countries. They used the most popular Augmented-Dickey Fuller (ADF) test to check the existence of stationarity in the series. They found the evidence that all the series have stationarity at their level one. After that they used the commonly used Johansen-Juselius framework to check the co integration between saving and investment. They found the evidence that there were a very low level of correlation between saving and investment in 14 OECD countries (Australia, Austria, Germany, Greece, Italy, Japan, Luxembourg, Netherland, New Zeeland, Spain, Switzerland, Turkey and United States). They found very few evidence in favour of high correlation between saving and investment and many evidence in favour international capital mobility. They also found that the rate of saving determines the level of investment and there is no casual relationship between saving and investment.

Monadjemi (1990) first introduce the direct and indirect approach to examine the relationship between saving and investment for six OECD countries. They used quarterly data in order to include the cyclical movement in the model. In direct approach they used the equation which defined the interest rate parity condition to check the relationship between inflation rate and interest rate. In the indirect approach he used the two equations. In the first equation he checked the relationship between rate of investment and rate of saving. In the second equation he checked the relationship between current account to output ratio and investment to output ratio. They found the evidence that both approaches reject the extreme cases. The result showed that the capital mobility is less than perfect.

Hejazi & Georgopulos (2005) argue that all the massive literature on Feldstein & Horioko puzzle missed the existence of home biasness such as barriers to international trade, transportation cost, trade biasness etc and it decreases with the increase in the financial development and integration. They test this hypothesis for 28 OECD countries. They used annual data from the period of 1970-2000.

DATA& METHODOLOGY

3.1 SOURCES OF DATA:

The data of gross domestic product saving, capital formation and current account from 1980 to 2016 collected from State Bank of Pakistan, IMF outlook data base and Economic Survey of Pakistan.

3.2 METHODOLGY:

The ADF and PP test used to find out the stationarity of the variables. Famous Johansen cointegration and Error Correction Model (ECM) used to check the long run and short run fluctuation in the model.

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3.3 Empirical Findings:

The results of augmented dickey fuller test in table.1 showed that all the series are non-stationary at their level form but stationary at their first difference. The stationary of the variable at their first difference make it possible to apply Johansen co-integration technique to find out the long run relationship between saving, investment and capital mobility.

Table 1: Results of ADF test with intercept

Variable	Level	First Difference	Conclusion
S/Y	-0.826	-5.440***	Stationary at first difference
CF/Y	0.098	-3.234**	Stationary at first difference
CA/Y	-2.205	-4.707***	Stationary at first difference

***1% level of significance

**5% level of significance

The results of Johansen co-integration test shows in table 2 and 3. Table.2 represents the outcome of co-integration rank test which concluded that there is no relationship exist between saving and investment.

Table 2: Result of Johansen co-integration Trace Test between saving and Investment

Null hypothesis	Trace Statistics	Critical Values
None	11.038	15.494
At Most	0.463	3.841

Table.3 represents the outcome of Johansen cointegration maximum eigenvalue test which also support the results of trace test i.e. there is no relationship exists between saving and investment in context of Pakistan.

Table 3: Result of Johansen co-integration Maximum Eigenvalue between saving and Investment

Null hypothesis	Trace Statistics	Critical Values
None	10.575	15.494
At Most	0.463	3.841

Table 4: Result of Johansen cointegration Trace Test between Current account and Investment

Null hypothesis	Trace Statistics	Critical Values
None	10.575	14.264
At Most	0.463	3.841

The result Johansen cointegration rank test and maximum eigenvalue test showed in table 3 and 4 respectively. The results of both test suggest that there is a long run relationship exist between current account and investment.

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Table 5: Result of Johansen cointegration Maximum Eigenvalue Test between Current account and Investment

Null hypothesis	Trace Statistics	Critical Values
None	15.419*	14.264
At Most	0.228	3.841

The results of Johansen cointegration for both the model support the findings of Feldstein and Horioko (1980) puzzle. There is no long run relationship exists between saving and investment but there is a long run relationship exists between current account and capital mobility.

CONCLUSION:

In this research the validity of Feldstein and Horioko (1980) puzzle that high correlation between saving and investment implies international capital immobility is investigated. Previous studies in relationship between investment and saving also found that capital is highly mobile and the correlation between saving and investment is very low in developing economies. The basic model of relationship between rate of saving and rate of investment proposed by Feldstein and Horioko (1980) and model of relationship between capital account and rate of investment proposed by Baxter and Crucini (1993) is used to investigate the previous findings on relationship between saving, investment and capital mobility in context of Pakistan.

To find out the long run relation between saving, investment and capital mobility famous Johansen cointegration is used for the period of 1980 to 2016. The evidence suggest that there is no long run relationship exist between saving and investment but there is a long run relationship exist between current account and investment which indicate the existence of capital mobility in Pakisatn.

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