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The Ghanaian Savings-Investment Puzzle: A Test of the Feldstein-Horioka Hypothesis

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Abstract

The Feldstein-Horioka puzzle has sparked debate in the body of international economics to unravel the high savings retention ratio in OECD countries amidst increasing financial integration. In this paper, we investigated the puzzle of an emerging economy using Autoregressive Distributed Lags with annual data spanning from 1983 to 2018. On the contrary, our findings show that an increase in savings rate by one percent will lead to a 0.5 percentage point increase in investment. We found evidence of a benign Feldstein-Horioka Hypothesis in the Ghanaian economy which could be explained by the miniature nature of the Ghana Economy to the international financial market. This reaffirms Ghana as a small open economy with moderate capital movement due to low financial integration.

Keywords: *Feldstein-Horioka, Investment, Savings, Foreign Direct Investment, Exclusion, ARDL*

1. Introduction

A myriad of empirical research has concluded on the positive relationship between domestic savings and domestic investment. Before these findings (Feldstein and Horioka,1980) found a puzzling relationship between the two macroeconomic variables. According to their study, the correlation between domestic savings and investment should weaken as countries experience financial integration. However, they found out this has not been the case for the industrialized countries after reporting a high savings retention ratio between the two variables. This is quite puzzling since capital controls are less stringent in developed countries compared to developing ones and the conclusion of a high coefficient on savings rate signaling low capital mobility is empirically confounding since significant capital is expected to move from one country to other countries amid increasing financial globalization. This has placed the Feldstein-Horioka puzzle at the forefront of empirical studies. Surprisingly, developing countries have not been spared this paradox as empirical evidence has reported a mixed savings retention ratio. In trying to solve the puzzle, the conduct of monetary and fiscal policies by government and monetary authorities has been noted as one of the means of explaining the saving-investment behavior. The studies argued that the central government might have the policy to target a certain level of current account deficit which will consequently affect the savings ratio. Others reported that the reason for a high savings retention ratio is a result of factor price equalization given similar factor endowment between countries. That is, capital will only move from developing countries to advance countries when there is a lack of factor

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price equalization as countries resort to international trade. Moreover, Suruga and Rahman (2016) stated in their paper that, the reason for a high savings ratio in developing countries in the early 1980s was due to the debt crises which led to a significant reduction in foreign lending to developing countries. This pushed the savings ratio up as governments enact policies to embark on fiscal consolidation. In such cases, investment and savings will have an inverse relationship since investment is more sensitive to foreign capital inflows than savings.

According to Wang (2013), having a grasp of the dynamics between savings and investment is paramount for policymakers towards implementation of tax policies on savings and capital especially when economic growth is constrained by savings, hence the study of savings-investment behavior is significant in all policy aspect. To have a pictorial overview of the dynamics, we plotted a graph of savings, gross capital formation, and gross capital formation with foreign direct investment exclusion. The trend shows that savings and Investment moved together from the structural adjustment and economic recovery program in the early 1980s to somewhere in 1996. Fast forward 1997 to 2010, a significant departure between the two macroeconomic variables is observed even though on average they moved in the same direction with few exemptions in 2015-2018 and an inverse behavior evident after every election cycle; 2000, 2008, and 2016. On that note, findings from studies that employed panel analysis to explain the behavior of savings and investment are weakened since the presence of country-specific factors is likely to influence the savings-investment dynamics. Hence, the current study looks at a time series analysis of the savings-investment relationship in the short run and long run for Ghana, taking into consideration structural breaks suggested by the Bai-Perron analysis tool.

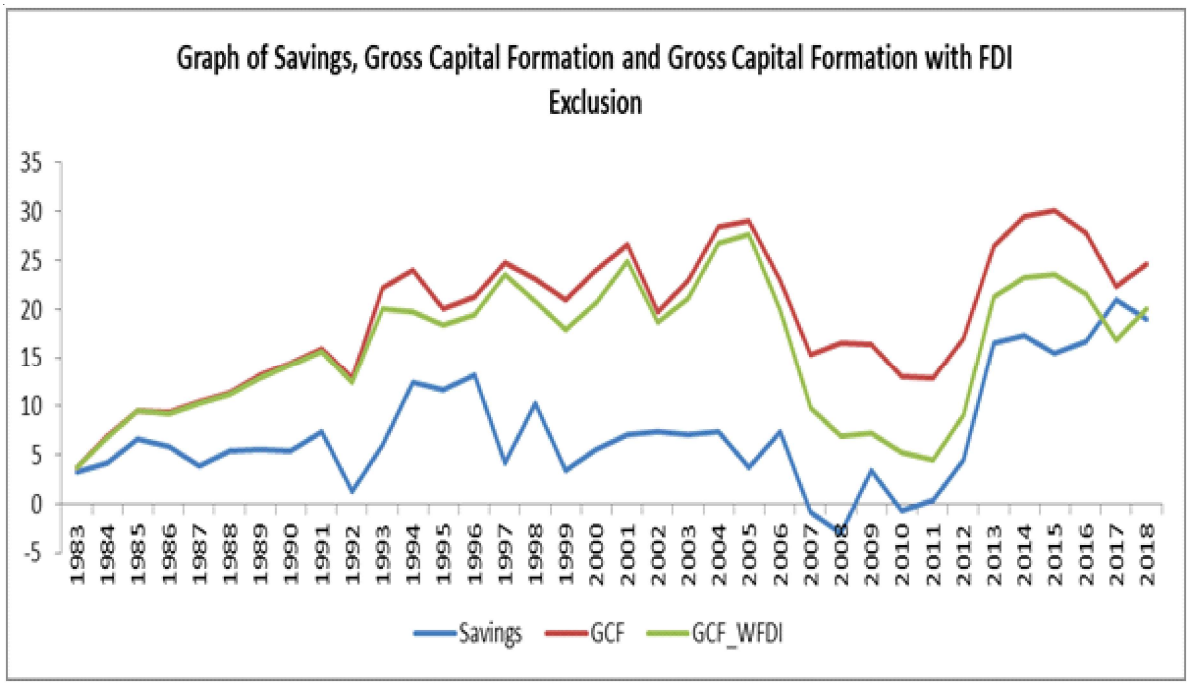

Figure 1: Trends in Savings, Gross Capital Formation, and Gross Capital Formation with FDI Exclusion

Source: Authors' own computation (2020)

A study by Younas (2009) revealed that one of the major shortfalls in the FH model is the inclusion of FDI in the pool of domestic investment. He attested that domestic investment in an open economy is financed by both local and foreign savings and argued that foreign direct investment is not financed by the savings of residents of the host country and therefore the retention ratio on savings will reflect the actual capital mobility for the FH paradox if FDI is excluded from domestic investment. Previous studies on the relationship between the two macroeconomic variables looked at the effect of domestic savings on domestic investment without excluding Foreign Direct Investment (FDI) from the domestic investment portfolios. Our study adds to the empirical literature by analyzing the savings and investment relationship with FDI exclusion as suggested by Younas (2009). The finding gives us the true sensitivity of domestic investment to domestic savings in the absence of foreign savings channeled to developing countries. In addition, from the plot in

Figure 1 shows the dynamics of savings and investment behavior changed after taking away foreign direct investment, notably from 2008 onwards, which was the end of the regime of the government in power and has also been documented as one of the remarkable peaceful transfer of power in the records of the fourth republic of Ghana.This development in the country might have improved consumer and business confidence since we witness savings strongly tracking the dynamics of investment after excluding foreign direct investment.

2. Literature Review

2.1. Theoretical and Empirical Review

The topic of the relationship between savings and investment in the field of literature is said to have its origins in a groundbreaking article by Feldstein and Horioka (1980). The authors of this seminal work focused their attention on estimating the long-run relationship between savings and investment rates, ultimately discovering a positive correlation between the two variables. To achieve this outcome, they employed a cross-country regression analysis that took the form of a model. Their research, which remains highly influential today, served as a catalyst for further investigations into the relationship between savings and investment. Over the years, numerous researchers have built upon Feldstein and Horioka's original work, using their findings as a foundation for exploring related topics and developing new ideas. Despite the significant advancements in this field, however, the literature on the topic of savings and investment is still considered to be in its embryonic stage. Nevertheless, the initial research conducted by Feldstein and Horioka in 1980 laid the groundwork for future scholars to delve more deeply into this complex and dynamic area of study. Their cross-country regression was in the form:

$$(I/Y)^t = \alpha_0 + \alpha_1(S/Y)^t + \varepsilon_t \quad \ldots(1)$$

The investment rate is denoted by $(I/Y)^t$ and the savings rate is denoted by $(S/Y)^t$. The effect of common shocks that impact the mean savings and investment rates of all countries is represented by the parameter α_0. Additionally, the coefficient of the savings rate, α_1, is used to measure the degree of capital mobility and to determine which countries save more and invest more on average. According to Bai and Zhang (2010), this coefficient provides valuable insights into the economic behavior of different nations and can be used to analyze the various factors that contribute to savings and investment rates.

Based on data collected from a sample of 16 Organization for Economic Co-operation and Development (OECD) countries between 1960 and 1974, Feldstein and Horioka concluded that the coefficient of the savings rate , was equal to 0.89. This finding suggested that there was a low degree of international capital mobility among the countries studied, indicating that most savings were being invested domestically. The researchers' work was instrumental in shaping the understanding of the relationships between savings and investment rates across countries, and their conclusion about capital mobility highlighted the importance of national policies and economic conditions in determining investment patterns.

The seminal study by Feldstein and Horioka (1980) sparked several subsequent empirical studies on international capital mobility and the relationship between savings and investment among developed countries. Following on from their findings, Feldstein (1983) conducted a study examining the relationship between investment and savings for 17 OECD countries from 1974 to 1979. This study also found a coefficient of savings rate of 0.86, which was similar to the results obtained by Feldstein and Horioka (1980). However, Summers (1987) argued that a high correlation between savings and investment did not necessarily indicate low capital mobility. According to Summers, if cross-country policies and objectives were aligned, then a high correlation would naturally exist between savings and investment across countries. Additionally, Summers (1987) highlighted that errors in measurement could lead to a downward bias in the relationship between savings and investment, particularly in middle and low-income countries where official data may not fully capture informal sector economic activities. Overall, these studies contributed to the ongoing discourse on international capital mobility and the factors that influence the relationship between savings and investment across countries. They also highlighted the need for caution when interpreting statistical relationships and the importance of considering broader economic and policy contexts when analyzing investment patterns.

Levy's (1998) study examined the level of capital mobility that existed before and after the Second World War by estimating the correlation between savings and investment in the short and long run. The results showed a stronger relationship in the long run, with a positive or negative association between savings and investment being more evident in the post-Second World War period than the pre-Second World War period.Another study by Arginon and Roldan (1994) used annual data from 1960-1988 on European Union countries to investigate the relationship between savings and investment. They found that government policies aimed at achieving a current account balance could partly explain

the relationship between savings and investment, instead of solely relying on low capital mobility as a reason for the correlation. Bayoumi (1990) also supported this argument, stating that when governments target the current account balance, it can lead to a higher relationship between savings and investment. These findings suggest that there are other factors besides capital mobility that can affect the relationship between savings and investment.

A study conducted by Dooley *et al*. (1987) suggests that foreign aid can impact the relationship between domestic investment and savings. The study used a sample of 64 countries, including 14 industrialized countries and 50 developing countries, and revealed that the capital markets are not fully integrated. This is attributed to the fact that many of the countries studied rely on foreign aid to finance their current account imbalances.Another study conducted by Vamvakids and Wacziarg (1998) looked at 83 developing countries with savings-investment co-efficient between 0.14 and 0.39. The study found that the conventional wisdom that a strong correlation exists between investment and savings rate is not applicable in developing countries. The authors attributed their findings to cross-country heterogeneity influencing capital flows according to the factor endowment theory, which implies that countries with different factor endowments should experience limited capital flows. As a result, as more countries with different factor endowments are included in the study, the relationship between savings and investment is expected to decline.Vamvakids and Wacziarg (1998) also revealed that financial and capital aid are provided to middle and low-income countries, leading to a large source of capital flow in those economies. Thus, the correlation between savings and investment is due to the provision of aid, and not necessarily low capital mobility.

Isaksson (2000) conducted a study to evaluate the level of international capital mobility among developing economies using the Feldstein-Horioka approach. The study aimed to examine whether financial market liberalization led to increased international capital mobility. In addition to the traditional Feldstein-Horioka model, Isaksson extended the model to incorporate foreign aid and measure its impact on the estimation process. Hanson (1992) and Montiel (1994) highlighted the importance of considering the effects of foreign aid when measuring the savings-investment nexus. This is because investment in many developed countries depends not only on the savings rate but also on the utilization of international assistance for investment. Failure to consider foreign aid could lead to a misspecification of the Feldstein-Horioka relationship.Furthermore, if only a portion of the foreign aid is specifically used for investment and the rest is allocated to increased consumption, the estimated savings rate will decline. As a result, the savings rate coefficient will be skewed downwards, suggesting greater capital mobility than is actually the case for different countries. Isaksson's study emphasized the need to consider the impact of foreign aid on the estimation of the savings-investment relationship and to incorporate it into the model.

3. Methodology and Data

The study employed secondary annual data from the World Development Indicators with time period spanning from 1983 to 2018. In other to avoid issues of mix order of integration we employed an Autoregressive Distributed Lags methodology to analyse the outlined objectives. On this back drop, the following ARDL (1, 4, 4, and 0) specified:

$$GCF_{kt} = \rho_1 + \beta_1 GCF_{kt-1} + \beta_2 NETODA_t + \beta_3 FDI_t + \beta_4 SAV_t + \sum_{i=1}^{4} \emptyset_i NETODA_{t-i} + \sum_{i=1}^{4} \partial_i FDI_{t-i} + \sigma_1 DUM_t + \varepsilon_{1t} \quad \ldots(2)$$

We therefore estimated the ARDL long run form model with the following specification:

$$D(GCF_{kt}) = \rho_2 + \beta_5 GCF_{kt-1} + \beta_6 NETODA_{t-1} + \beta_7 D(NETODA_t) + \beta_8 FDI_{t-1} + \beta_9 D(FDI_t) + \beta_{10} SAV_t + \sum_{i=1}^{3} \varphi_i D(NETODA_{t-i}) + \sum_{i=1}^{3} \alpha_i D(FDI_{t-i}) + \sigma_2 DUM_t + \varepsilon_{2t} \quad \ldots(3)$$

Where D(GCF_{kt})is the first difference of Gross Capital Formation representing Investment component variable with *k* representing Investment including FDI and Investment excluding FDI. GCF_{t-1} is the one period lagged value of Gross Capital Formation net of Foreign Direct Investment. $NETODA_t$ is a variable that captures the net Official Development Aid at the current period and $NETODA_{t-i}$ is the net Official Development Aid at lag *i*. FDI_t is defined as Foreign Direct Investment at time *t* whiles FDI_{t-i} represents the Foreign Direct Investment at time *t-i*. DUM_t is a fixed regressor dummy variable which captures structural break in the data series. The Bai-Perron test for multiple structural breaks was applied and reported 1997 as the only significant period with major structural changes to the economy. The variable SAV_t is the savings rate. β_1 to β_{10} , φ_i, α_i, Φ_i, ∂_i represents the coefficient of the estimated variables while ρ_1 and ρ_2 are the constant terms. ε_{1t} in Equation (2) and ε_{2t} in Equation (3) are the random unexplained error terms. All the variable in this study are expressed as a ratio of Gross Domestic Product.

4. Results

We present below the findings of the study on an emerging economy, Ghana. Ghana was chosen for the study for its attraction of Foreign Direct Investment over the past decade and also claimed by the IMF as the fastest growing economy in Africa in 2020. From the short run model, the one period lagged value of Gross Capital Formation and savings rate were significant at 1% level of significance whiles four period lagged value of net ODA was significant at 5%. The significance level of savings at 1% explains the important of savings to domestic capital formation as suggested by the capital formation model in the Solow-swan model framework. We also find that, the sensitivity of savings to investment is 0.5%. This shows, an even capital mobility existsin Ghana and as well partly confirm Ghana as a small open economy. This finding is closer to the findings of Suruga and Rahman (2016) who found a sensitivity ratio of around 0.4% from their pooled regression estimates for the South Asian region. It is however in variant with the findings of 0.89% from the advanced countries as reported by Feldstein and Horioka. From Table 1, the parameter estimate for Investment with FDI was the same as the parameter estimate for Investment with FDI exclusion. This shows that, foreign direct investment does not play significant role in the relationship between savings and investment. Our finding does not supportthe proposition by Younas (2009) that the actual savings retention ratio would be realised given that FDI is excluded from domestic investment.

Table 1: Results from ARDL Long Run Model With and Without FDI

Parameters	Coefficient	Standard Errors	*p*-Value
ρ_2	-2.997	4.067	0.470
β_5	-0.618	0.131	0.000***
β_6	1.113	0.339	0.004***
β_7	0.397	0.274	0.163
β_8	1.035	0.404	0.019**
β_9	0.490	0.624	0.442
β_{10}	0.488	0.161	0.007***
φ_1	-0.227	0.354	0.474
φ_2	-0.561	0.335	0.131
φ_3	-0.794	0.318	0.022**
			0.524
α_1	-1.003	0.558	0.088
α_2	-1.498	0.491	0.007
α_3	-0.650	0.501	0.211
Significance level	***1%	**5%	*10%

Table 2: ARDL F-Bound Test of Cointegration

Test Statistics	Value	Significance	I(0)	I(1)
F-Statistics	5.459	10%	2.37	3.2
k		5%	2.79	3.67
		2.5%	3.15	4.08
		1%	3.65	4.66

We also reported the F-bound test for cointegration among the variables. The *F*-statistics of 5.459 is above the upper bound I (1) of 3.2. Hence, we report the existence of cointegration among the variable with error correction of 0.78% in savings and investment disequilibrium corrected from the error correction model.

5. Conclusion

The main focus of the research paper was to investigate the existence of FH puzzle in an emerging economy with Ghana as the country of study. In the insight of Younas (2009) we analysed the data with FDI as part of Investment and Investment with FDI exclusion. Our findings reported same parameter coefficientestimates for both models. Showing that foreign direct investment does not influence the savings and investment relationship in Ghana. This is the first study to analyze the FH puzzle in the light of FDI exclusion though we reported insignificant difference with FDI inclusion. Even though the aim of the study is to investigate the investment and savings nexus, it is imperative to add that, current FDI and net ODA does not affect domestic capital formation. Rather, we found significant influence of their one period lagged values on investment. This could be explaining the angle of countries that have received aid or FDI and have better macroeconomic management systems which attracted foreign capital hence has higher correlation with future capital inflows.We found evidence of a benign Feldstein-Horioka Hypothesis in the Ghanaian economy which could be explained by the miniature nature of the Ghana Economy to the international financial market.

To this end, we conclude that, policy makers in Ghana who intend increasing domestic savings rate should rather leverage on technological progress as suggested by classical growth models than importation of foreign savings.

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