

## Saving, Investment, and Growth: A Causality Test

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### Abstract

In the second half of the last century, tremendous efforts were devoted to identifying sources of economic success by a few countries and causes of failure by most. In this process a voluminous literature ranging from the neo-classical to Marxist, neo-Marxist, and dependency theories has been developed to answer the question of disparity among different countries of the north vis-à-vis those of the south. They all agree that accumulation of capital (social, human, and physical) was, is, and will remain one of the most significant problems of the third world countries —the south- for economic growth.

Traditionally we have assumed that risks and profits drive investment, investment drives growth, and growth, in turn, is the driving force behind saving. More income leads to more savings. In this study, using Iranian data, a causality test has been performed to ascertain whether this sequence is true. We found it is not the case, and saving precedes investment. If so, macroeconomic policies must be directed as increasing saving to foster further investment and economic growth and not the other way around.

**Key words:** saving, investment, growth, causality.

### 1- Introduction

Why have not all countries succeeded in achieving economic growth and development?<sup>1</sup> In the second half of the last century, tremendous efforts were devoted to identifying sources of success by a few countries, albeit by ebb and

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1- Development necessarily requires creation of social capital (formal and informal socio-political institutions) as well as economic capital (physical and human). Please see Hamid Hosseini, 2003, for a discussion of requirements and distinctions between economic growth and economic development. For theories of economic growth, see, e.g., David N. Weil, 2005.

flow and by crisis management,<sup>1</sup> and causes of failure by most other countries. All these efforts have failed to lead to a universally acceptable, malleable, and understandable framework of analysis for all to use. Nevertheless, even though the theorists have different ideological and methodological viewpoints, they all converge to the ability or inability of different countries to accumulate capital (social, physical, and human) and, as a result, different degrees of growth and, eventually, different development levels are attained.

This paper is divided into five sections. After the introductory section I, a brief theoretical background is given in section II. Section III discusses capital accumulation. Section IV is used for a discussion of empirical results. The final section is used to summarize the discussion and provide some implications of the findings.

## **II- Theoretical Background**

The neo-classical models have advocated free trade and open markets<sup>2</sup> on the basis of the belief that these leads to division of labor, specialization, expansion of output, and increase in collective economic welfare.<sup>3</sup> In this

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- 1- Samir Amin enumerated OPEC, former USSR, industrialized nations, environmental concerns, degradation of mores as the potential villains responsible for the capitalist system's "crisis," Samir Amin, 1982. p. 9. However, today, we need to add terrorism and individual freedom and liberties as new culprits. Samir Amin and his collaborators, however, believed that the "world capitalist system" itself is crisis-prone and the cause of "crisis" in the capitalist system.
  - 2- See, for example, Dollar, 1992, pp. 523-44. For positive impacts of openness on development, see Zaki Eusufzai, 1996: pp/ 333-338. For opposing views on openness and growth, see Tariq Banuri, 1991. Even though he concedes that openness contributes to growth, he contends that it comes at the cost of higher poverty rates and worsened income distribution. Evidence of positive influence of openness on growth for the former Eastern Bloc countries can be found in Lucian Cernat and Radu Vranceanu, 2002.
  - 3- The neo-classical theory does not, however, predict which side is the beneficiary or which side benefits more from this extra output. This distribution of income has been the subject of many books and articles on terms of trade. Developing nations have maintained that worsening of terms of trade (relative prices of primary products that they export to those of manufactured products that they need to import) has siphoned most, if not all of the benefits of international trade and investment to the developed world. This claim was supported by the United Nation's study on the subject (see Raul Prebisch, 1950). Some contend that even though there is a correlation between openness and growth, the causality is from growth to openness and not vice versa. On this point see, Dani Rodrik, 1999.

“lifting all boats”<sup>1</sup> theoretical context, there is no distinction made between the northern and southern countries. They are all treated as the same and therefore the same rules apply to each and every one. Free trade and open markets will lead to economic growth and eventually to economic development.

The capitalist development theories, modeled mostly on the neo-classical theory, make a distinction among the developed and less developed countries. Less developed countries (LDCs) are analyzed mostly based on the “dual society” or “dual economy” concept.<sup>2</sup> The capitalist development theories maintain that LDCs lack certain characteristics necessary for capitalist economic development that are present in developed countries.<sup>3</sup> Also, there are some undesirable characteristics present in less developed countries that have contributed to their underdevelopment but which are removed or mitigated in their significance in developed countries. Therefore, LDCs need to add the desirable characteristics of the developed world while removing the undesirable ones if they want to follow in the footsteps of the wealthier and more prosperous

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1- Andrew Berg and Anne Krueger, September 2002.

2- In a dual economy, there are two separate and disconnected modern and traditional sectors that operate independently without much interaction. Therefore, in order for development to take place, the traditional sector must be transformed to emulate the modern sector, which is itself built in the image of its own global counterparts. In this process, by creating forward and backward links, the modern technology and operational methods are defused throughout the economy and thence economic growth and progress will take root. Here, one must be cognizant of ownership and conflicts. It is very possible that the capitalists who own the modern sector and those who own and operate the traditional sector of the economy be two completely separate and antagonistic groups. Traditionalist might not see their interests served by this transformation. That is, even though the capitalists’ desire for modernization of the traditional sector is self-evident, the traditional sector’s owners might see this as a serious encroachment on their wealth and prerogatives.

3- “[I]t is the European civilization that through centuries of geographical, political, and intellectual expansion has provided the matrix for economic growth.... The intellectual revolution with the introduction of science, the moral revolution with the secularization of Christo-Judaic religions, the geographical revolution with the formation of national states, all occurred within the context of European civilization, not in Asia, Africa, or the Americas.” Simon Kuznets, 1970, p. 16.

capitalist countries — i.e., they need to go through the modernization process.<sup>1</sup> That is, they need to move toward learning and acquiring modern economic, political, and social attitudes<sup>2</sup> and institution of free market,<sup>3</sup> free enterprise, entrepreneurial spirit, social and political mobility, work ethic, democracy, rule of law, civil liberties, and associated *modus operandi*.<sup>4</sup>

Development literature<sup>5</sup> also includes a large number of neo-Marxian books, articles, and monographs which maintain that not only free trade and foreign direct investment have *not* always benefited the third world countries<sup>6</sup>, but also that in a majority of cases; they probably have contributed to their poverty.<sup>7</sup> As a matter of fact, they argue that the capitalist system of trade and investments has been a hurdle to third world economic development rather than the engine that pulled the north to economic prominence.<sup>8</sup> This hurdle exists partly because profits (surplus) of international trade and investment are taken out rather than reinvested in the dependent (periphery) countries. These transfers have retarded the economy of the periphery and stimulated the core

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- 1- Of course, advocates of modernization theories do not let their adverse effects on the distribution of income explained by Baran and statistically verified by Irama Adleman and Cynthia Morris (A-M) affect their views.
  - 2- "Economic growth depends on attitudes to work, to wealth, to thrift.... There have been attempts to explain why these attitudes vary from one community to another. One can look to differences in religion...or ...in the accident of history." Arthur Lewis, 1955, p. 14.
  - 3- Charles P. Kindleberger, 1965.
  - 4- Manning Nash, 1963.
  - 5- Paul Baran, 1973, p. 402; Arghiri Emmanuel, 1972); André Gunder Frank, 1969; James Crockett, 1972); Immanuel Wallerstein, 1974; Samir Amin, 1982.
  - 6- The use of the "third world" is probably defunct at this point in time when the "second world" no longer exists. However, we use the term to refer to countries that are not in the upper echelon of economic advancement.
  - 7- This is exactly the opposite of what Marx had predicted. According to Marx, capitalists (imperialists), in search of new markets and resources, would penetrate these underdeveloped economies and transform them into industrialized capitalist economies, which, in turn, would lead to socialism.
  - 8- "It is in the underdeveloped world that the central, overriding fact of our epoch becomes manifest to the naked eye: the capitalists system once a mighty engine of economic development, has turned into a no less formidable hurdle to economic advancement." Paul Baran, Op. Cit., p. 402.

countries.<sup>1</sup> The new theoretical construct, dependency theory, celebrated the demise<sup>2</sup> of the orthodoxy and introduction of a new paradigm in development analysis.<sup>3</sup>

The dependency and the world system theories have been unsuccessful in explaining the evolutionary or revolutionary dynamics of economic underdevelopment. That is, they have not clarified whether it is a transitional or a permanent state. But by arguing that the periphery (satellite) changes to accommodate the core (metropolis) but does not crack the glass ceiling of underdevelopment, they imply that it is a permanent state of affairs. In order to break out of this impass, or the only way to break out of the underdevelopment rut, a country needs to become independent and sever its relationship with the dominant imperialist forces in the core (metropolis) that have blocked its development — that is, the only way to prosperity is to engage in an independent and autonomous development.<sup>4,5</sup> But they have not enumerated the process of development and sources of development capital and technology.

What, then, is the real problem of the third world countries? All agree to the answer, i.e., they agree that accumulation of social and economic capital (physical and human) was, is, and will remain the most significant problem of

1-One, therefore, needs to distinguish between the “Marxist” and “neo-Marist” who divides the countries into two groups: the “center” and the “periphery.” The capitalists in the periphery are dependent capitalist (comprador bourgeoisie) and therefore, they do not behave in the same manner as the dynamic capitalists in the center. This distinction is crucial to the understanding of underdevelopment theories and their logical conclusions.

2- See, for example, Duddley Seers, p. 712; Deepak Lal, 1983, p. 109.

3- Interestingly enough, Samir Amin, et. al., op. cit., argue that it is only possible to analyze individual states within the context of the “world capitalist system” and compartmentalization of political, social, and economic aspects of the analysis is not feasible. Therefore, one needs to analyze a country as a part, and within the context of the political economy of the “world capitalist system.”

4-There are several points that one needs to be cognizant of. One, it suggests, in contradiction to Marxist arguments, that the transnational bourgeoisie is not interested in their development, which would be illogical because the transnational bourgeoisie must be interested in their enrichment so they could extract a larger surplus value from these countries. Second, it reduces the class conflict to a conflict between domestic and international bourgeoisie and disregards the contradiction internal class conflict. Therefore, it presents the domestic bourgeoisie as the savior and the progressive elements that would lead the country to the Promised Land.

5- Samir Amin, 1990.

the third world countries - the south. From the economic point of view they cannot accumulate capital (social, human, and physical) because of low-income levels, which in turn, leads to low saving and hence low investments. But low saving and hence low investments are responsible for low income. A catch-22 problem exists for the third world countries that are badly in need of solutions.

### **III- Capital Accumulation**

Since economic capital (social, physical and human) accumulation and physical/capital deepening are for the sake of higher economic growth, what we need to establish is the direction of causality between saving, investment, and economic growth. Therefore, the question to be answered is whether saving is the driving force behind economic growth or is it investment that drives economic growth and saving will follow economic growth? The answer determines the proper fiscal and monetary policies necessary for economic growth. If the determining factor is investment, we need fiscal and monetary policies to spur investment and, if it is saving that jump-starts the process, policies that include incentives to save are required.

From previous studies we know that there are high correlations between saving and income as well as between saving and investment.<sup>1</sup> But there are fewer consensuses on causality among them. That is, which one(s) is (are) the determining factor(s). Traditionally we have assumed that risks and profits drive investment, investment drives growth, and growth, in turn, is the driving force behind saving. But, it is maintained that without domestic saving,<sup>2</sup> investment will not materialize.

### **IV- Empirical Results**

#### ***A- The data***

The data used for regressions are Iranian data extracted from the International Monetary Fund's International Financial Statistics electronic files.

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1- See Martin Feldstein and Phillippe Bacchetta, 1991.

2- There is some evidence that international movement of capital is limited despite the low barriers against its movement. Therefore, high correlation between saving and investment must be that of domestic saving and investment. Martin Feldstein, 1994.

As is the case for most macroeconomic data, these data are non-stationary.<sup>1</sup> However, using the Dickey-Fuller test<sup>2</sup>, as is shown in the following table, the first differences are stationary at 1% level.

| Name of the variable                           | D-F test statistic | C.V. at 1% |
|--|--------------------|------------|
| <b>DRPI:</b> change in real private investment | -5.675             | -3.605     |
| <b>DRS:</b> change in real private saving      | -6.509             | -3.605     |
| <b>DRYD:</b> change in real income             | -5.277             | -3.621     |

### ***B- The Granger Test***

Econometric estimates of a relationship do not necessarily mean causality; they only imply dependence of one variable on a set of variables. In other contexts, there have been very lively discussions of causality, i.e., whether one variable, say DRPI, causes GDP to grow or GDP causes DRPI to grow.<sup>3</sup> That is, whether we can detect a one-way lead and lag relationship between the two variables. The Granger causality test purports to do just that. It assumes that the information relevant for forecasting, say GDP, is solely contained in DRPI and GDP. It is important to remember that Granger causality measures precedent and not "causation," as it is commonly understood.

$$GDP_t = \sum \alpha_k DRPI_{t-k} + \sum \beta_j GDP_{t-k} + \epsilon_{1t}$$

1-A time series is said to be stationary if its mean, variance, and autocovariances at various lags remain the same regardless of the time they are measured. A shock to the system gradually diminishes and over time it falls back to its mean value.

2- See R. S. Pindyck and Daniel L. Rubinfeld, 1998.

3- See for example, R. W. Hafer, January 1982.

$$DRPI_t = \sum \gamma_k DRPI_{t-k} + \sum \lambda_j GDP_{t-k} + \epsilon_{2t}$$

$\epsilon_{1t}$  and  $\epsilon_{2t}$  are assumed to be independent and uncorrelated. In the above specifications, GDP is assumed to depend on its own past values as well as those of DRPI. Similarly DRPI is assumed to depend on its own past values as well as those of GDP. For the existence of unidirectional causality from DRPI to GDP, we need to observe that  $\alpha_k$  to be statistically significant (i.e.,  $\sum \alpha_k \neq 0$ ) and in the DRPI equation,  $\lambda_j$  need to be statistically significant (i.e.,  $\sum \gamma_k \neq 0, \sum \alpha_k \neq 0$ ) and in the DRPI equation,  $\lambda_j$  need to be statistically significant (i.e.,  $\sum \gamma_k \neq 0$ ).

### ***C- Granger Test Results***

There are three causality hypotheses that we intend to test. In table 2 below, we present the test result for each of the hypotheses. Econometrics package *Eviews 4* was used for estimations and calculations.

It appears that we would reject 1-b and 2-b and conclude one-way Granger causalities running from savings to investment and from disposable income to investment. This is true when one or more lagged values are included as independent variable(s).

**Table 2**

|     | <b>Null Hypothesis</b>                      | <b># of obs.</b> | <b>F-Statistic</b> | <b>P-value</b> |
|-----|---|------------------|--------------------|----------------|
| 1-a | DRPI does not<br>Granger cause DRS          | 40               | 0.52570            | 0.47298        |
| 1-b | <b>DRS does not<br/>Granger cause DRPI</b>  | <b>40</b>        | <b>7.85685</b>     | <b>0.00801</b> |
| 2-a | DRPI does not<br>Granger cause DRYD         | 40               | 0.85727            | 0.36050        |
| 2-b | <b>DRYD does not<br/>Granger cause DRPI</b> | <b>40</b>        | <b>6.05189</b>     | <b>0.01868</b> |



### ***V- Observations and Implications***

There is an agreement among economists of all persuasions that the main cause of meager economic growth and development in the south is due to their inability to invest and accumulate social and economic capital (social, physical, and human). However, there is less agreement about how to go about ameliorating this problem.

Neoclassical economists, as usual, see the solution in free market, free trade, and modernization while others in the Marxist tradition find themselves arguing for political and economic independence and severance of all ties that make them dependent and exploited by the “centers.” The question that needs to be answered is under the best of circumstances and the best of intentions, what policies should policy makers pursue to accumulate capital and advance economic growth?

Traditionally we have assumed that risks and profits drive investment, investment drives growth, and growth, in turn, is the driving force behind saving. More income leads to more savings. So, if a country has to make a choice and allocate its resources to encourage saving or investment, they should encourage investment.

In this study, using Iranian data, a causality test has been performed to ascertain the direction of causation. We found saving to precede investment. In other words, saving drives investment and investment drives economic growth. That is, the Iranian data show the causation to be along a saving-investment-growth sequence and not an investment-growth-saving sequence. If so, macroeconomic policies must be directed to increase saving to foster further investment and economic growth and not the other way around.

The easiest and fastest way of increasing national saving is by balancing the government budget. Government can require individuals to create tax-deductible and portable private retirement funds and tax-deductible portable private medical accounts similar to those created in Singapore to increase private saving.

A final caveat is necessary. Economic development necessarily requires creation and accumulation of socio-political and economic capital. Therefore, to be successful and achieve higher levels of development similar to those of developed countries, socio-political institution building cannot be ignored.

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