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Saving, Investment, and Capital markets in developing countries:

A look at Nepal and Tanzania

Mathematics and Economics

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Saving, Investment, and Capital markets in developing countries: A look at Nepal and Tanzania

Introduction

Investment plays an important role in the economic development of any country but it can be especially vital for developing countries. Investment not only directly increases the GDP but also reduces employment rates and improves both the supply side and the demand side of an economy. It also helps with the technological progress and development of human capital and thereby enhancing economic competitiveness. Investment can be derived in various ways. The role of Foreign Direct Investment (FDI) for economic growth in developing countries has been emphasized (Damijan et al., 189-204) but the role of national saving is similarly important for long-term sustainable development.

The savings of a country are translated into investment through financial intermediaries. These financial intermediaries are crucial to assess and analyze risk to make investment decisions. A strong and vibrant capital market has the potential to convert savings into productive investments and improve an economy significantly. However, there are various challenges to this. The saving and consumption behaviors of an economy, the institutional dynamics, and other factors come into play. Developing countries like Nepal and Tanzania may have institutional problems that can discourage investment (Yıldırım and Gökalp, 2016). This paper will explore mathematical models incorporating the dynamics of savings, consumption, and social utility and then the potential of developing the capital market and systemic improvement of the judicial and regulatory aspects of a country.

We will look at the Ramsey model on the optimal social saving behavior to understand the dynamics of savings rate and capital accumulation. The use of the word capital in this context is different from when we talk about capital markets. Here capital is used to mean anything used for the production of goods or services, in contrast to the monetary definition of capital. We will also use the Harrod-Domar model to interpret these dynamics in developing countries.

The Ramsey Model

The Ramsey Model seeks to find the optimal social saving rate using calculus of variations to find a way to maximize the societal utility rather than looking at the growth rate. Economic growth rate and utility do not mean the same thing; however, we can use utility to understand the economic benefit of what an economy can produce. The optimal saving rate is about the consumption decision of a society over time. More specifically, how much are people willing to delay the consumption now and how much utility derived from consumption in the future is discounted. Frank Ramsey was opposed to discounting the utility of the future generation over the current one but uses it in his analysis anyway. The model (taken from Chiang, 1992) we consider is more limited and does not face that challenge. There are a lot of limitations of the model we are going to use but it can prove valuable to interpret the role of saving and utility people get from consumption.

In this model, the population and the technological progress are assumed to be stationary and there is an absence of depreciation of capital. As for the output, it can either be consumed or saved, and what is saved results in investment. This is not the case in the real world; the assumption does not affect our analysis. However, we will talk about the efficiency of converting savings into investment later.

Now for the Ramsey Model, we have, $Q = C + S = C + K'$

$$C = Q(K, L) - K'$$

where C is consumption, Q is the output which is a function of capital and labor and S is the Savings which is the same as the change in accumulated capital K' . Social welfare is derived from consumption via social utility function $U(C)$, with a non-increasing marginal utility, $U''(C) \leq 0$. Similarly, the labor to produce goods for consumption, disutility $D(L)$ is incurred with a non-decreasing marginal disutility, $D''(L) \geq 0$. So the net social utility is given by, $U(C) - D(L)$

The social planner's objective is to maximize this function over time. Frank Ramsey came up with a way to make this a minimization problem instead of a maximization problem by considering a point of bliss B where the social utility is maximized. $F = B - U(C) + D(L)$ represents the amount by which the society falls short of at any given time. Now the objective for a social planner is to:

$$\text{Minimize} \quad \int_0^{\infty} [B - U(C) + D(L)] dt$$

$$\text{Subject to } K(0) = K_0 \text{ (} K_0 \text{ is given)}$$

We know that $C = Q(K, L) - K'$, so

$$F_L = -U'(C) \frac{\partial C}{\partial L} + D'(L) = -\mu Q_L + D'(L) \text{ where } [\mu = U'(C)]$$

$$F_{L'} = 0$$

Here μ denotes the marginal utility. And now,

$$F_K = -U'(C) \frac{\partial C}{\partial K} = -\mu Q_K$$

$$F_{K'} = -U'(C) \frac{\partial C}{\partial K'} = -\mu(-1) = \mu$$

Now using the Euler Equation for the labor variable, we get

$$F_L - dF_L/dt = 0$$

But $F_L = 0$ so,

$$F_L = 0$$

$$D'(L) = \mu Q_L \quad \text{for } t \geq 0,$$

which can be read as the disutility from labor equals to the marginal utility of consumption and the marginal product of labor.

On the other hand, the Euler Equation for the capital variable gives us

$$F_K - dF_K/dt = 0,$$

which implies

$$- \mu Q_K - d\mu/dt = 0$$

$$\text{or } \frac{d\mu/dt}{\mu} = - Q_K \quad \text{for } t \geq 0.$$

This implies that the growth rate of the marginal utility of consumption must be equal to the negative of the marginal product of capital at every point in time. This makes sense because usually, the marginal utility of consumption is negative as additional consumption reduces the additional utility. The relationship says marginal product of capital (the additional output from additional capital) must just be enough to keep up with the utility. As an economy as a whole, the marginal utility of consumption in developing countries is less than that of a developed country which is close to the production possibility frontier. The relationship suggests a consumption path.

As for the investment path, we can derive the relationship using a variation of Euler's Equation.

$$F_K - dF_{K'} / dt = 0$$

$$\text{or, } F_{K'K'}K''(t) + F_{KK'}K'(t) + F_{tK'} - F_K = 0$$

However we do not have the time variable in the integrand function, so

$$F_{K'K'}K''(t) + F_{KK'}K'(t) - F_K = 0,$$

which can be rewritten as

$$\frac{d(K'F_{K'} - F)}{dt} = 0$$

$$\text{or } K'F_{K'} - F = b, \text{ for some constant } b$$

$$\text{or } K'\mu - [B - U(C) + D(L)] = b \text{ for all } t \geq 0.$$

The social planner's goal is to reach the point of "bliss", which happens when the marginal utility comes to 0. So at as time $t \rightarrow \infty$, $[B - U(C) + D(L)]$ needs to come to 0 and when that happens the marginal utility, μ , will be 0. Hence the constant b equals zero.

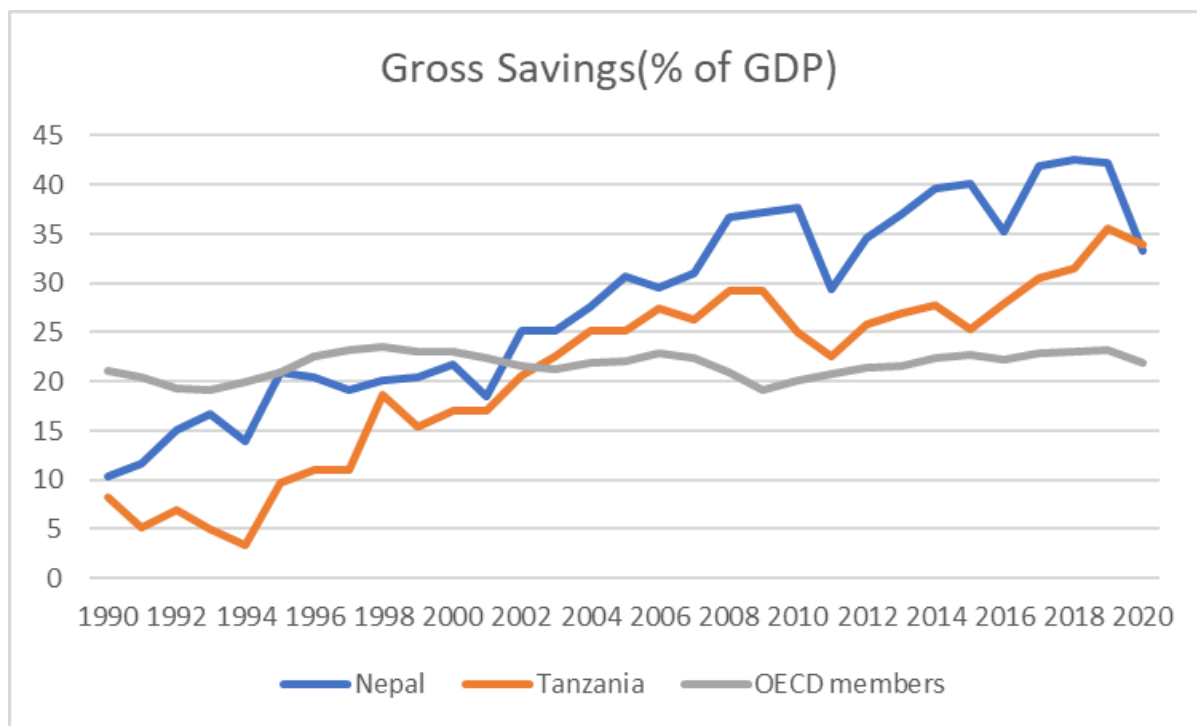
$$K'\mu - [B - U(C) + D(L)] = 0$$

$$\text{or, } K'^* = \frac{B - U(C) + D(L)}{\mu}$$

This is the rate of capital accumulation/saving (or investment because we have assumed all the savings will be put into an investment) required. The required savings path is determined by the shortfall of the utility and the marginal utility, which we found needs to equal the negative marginal product of capital at all times. The marginal product of capital can be thought of as the efficiency of the capital or the economy. Similar to the marginal utility of consumption, the marginal product starts high and decreases as the capital stock reaches the optimal level.

Developing countries like Nepal and Tanzania do not have efficient financial sectors needed to process savings into investments that best improve labor and capital productivity. To offset this, less developed countries need to save more until the financial intermediaries are mature enough to relocate savings to productivity growth and technological progress more efficiently (Levin et al., 1999). From the pattern seen in the OECD countries, we can expect a hump-shaped graph (detrended graph) where higher savings is required until the saving rate can finally come down (Antràs, 2001). The hump-shaped behavior of the savings rate observed in most OECD countries in the period 1950 to 1990 shows us some insight into what direction developing countries might take.

As the graph of gross savings shows, the average weighted gross savings rate as a percentage of GDP for the OECD countries, an organization with mostly rich countries, is moderately stable between 18% to 24%. On the other hand, the gross savings follows an increasing trend for Nepal and Tanzania. These countries have a higher marginal product of capital than the more developed countries, probably because they have not reached the optimal capital stock. To reach that optimal level, a higher savings rate is required until the investments become more efficient. The financial intermediaries can play a significant role in helping an economy reach that level.



Challenges to Take the Socially Optimal Savings Rate Path

The savings rate varies across countries, and the comparison between countries is especially challenging because multiple factors can influence the savings rate, namely policies, regulations, and economic-cultural behavior. Finding “the optimizing saving rate” for a specific country is near-impossible in itself, never mind a golden rule that could be applied to every country. Even if one were to find this optimizing path that would maximize the growth rate or the social utility, the implementation of policies to meet it would be equally difficult.

The relationship between savings and economic growth is a well-known one, and governments have a few ways to have an impact on the savings rates, but the evidence of the effectiveness of these government policies is mixed (Loayza et al, 2000). The most obvious financial instrument seems to be raising the interest rate to attract savings. This tends to be a long-term goal that needs to be changed by the business cycle as well. Tax incentives to save for

retirement or other pension reforms might be considered to increase private savings. Loayza et al. present evidence that long-term pension reform can indeed have positive effects on savings through mandatory saving requirements. It “can even have indirect effects on savings if it raises per capita income and growth by reducing labor market distortions and spurring capital market development” (Loayza et al, 2000).

There is strong evidence that the improvement of financial intermediaries can be a powerful way to create economic growth. (Beck et al, 2000) find that “legal and accounting reforms strengthening creditor rights, contract enforcement, and accounting practices can boost financial intermediary development and thereby accelerate economic growth.”

Nepal

With only 45% of total adults having bank accounts, financial access in Nepal is not satisfying compared to 70% of South Asian countries on average. There are 28 commercial banks, 36 development banks, 25 finance companies, and 64 microfinance companies in Nepal (Paudel et al, 2020). In terms of the securities market, the first Nepali IPO was not issued until 1937. As of now, the primary market is fully automated but the secondary market is just semiautomated (Shrestha, 2020). The limitations of access to finance restrict potential savers but even with the existing savings, the investments are not the most productive and efficient. The Nepali Stock Exchange is heavily concentrated in the financial sector. Around 68% of the listed companies are banks, insurance companies, and other financial companies. Hotels, Hydro Power, Manufacturing, and other industries make up the rest of the listing. Investments need to be directed towards more manufacturing and services to move to a point where the marginal product of capital is optimized.

The savings rate of Nepal is consistent with other developing countries and is on the right trajectory. The financial intermediaries are present and active but the capital is not at the optimal productivity. Government policies directing investments in the right direction and setting prudential regulations to prevent systemic risk in the credit market would help the Nepali capital market to mature and meet international standards. Opening up to Foreign Direct Investment (FDI) also allows any savings gap to be met and brings about accounting standards to meet the international requirements. Opening up to new financial instruments can also help redirect savings to the right sectors.

Tanzania

Similar to Nepal, Tanzania also has a low banking sector penetration, with less than 40% of the adult population having a bank account. Tanzania has 36 fully-fledged commercial banks, 6 community banks, 5 microfinance institutions, 3 financial leasing companies, 2 development banks, 1 mortgage refinancing company, and 1 housing financing company. DSE, the Tanzanian stock exchange became active around 1996 and 1998 and consists of 29 listings. The listings are more diverse than the Nepal Stock Exchange (Kapaya, 2020) and not concentrated on banking and financial services.

Nepal and Tanzania are probably in different stages of economic progress and capital accumulation. Being a unique case in its own right, a unique set of regulations to enhance savings, produce economic growth and advance its capital market would be appropriate. Being more interconnected with neighboring countries and their capital and security markets, Tanzania probably leads Nepal in terms of the maturity of its capital market.

Lucas Paradox and Dead Capital

In the model we looked at we were only looking at the domestic savings taken from the output of an isolated country but in the real world, investments can come from other countries as well. There are restrictions to the free flow of capital in most cases but money does cross borders. And “standard economic theory tells us that financial capital should, on the net, flow from richer to poorer countries” because poorer countries have a higher return to capital (Prasad et al, 2007). This idea ties back to the idea of marginal productivity of capital. Poorer countries are far from their production possibility frontier and have a higher room for growth and therefore higher rate of return on the capital. Therefore, investors from richer countries would be expected to seek higher returns in poorer countries compared to the lower return in their own country. The theory makes sense however, the data points to the contrary and this puzzle is called Lucas Paradox in economics. The empirical evidence shows that “capital has been flowing from poor to rich countries” (Prasad et al, 2007) and the problem is worsening. Prasad et al point to the growth premium together with financial and structural impediments limiting the ability of poor countries to absorb foreign capital. An open and sophisticated capital market again seems to be the answer to this problem.

In addition to the loss in gains from a mature financial system, poor countries face what the Peruvian economist Hernando De Soto calls “dead capital”. Soto talks about the economic potential of assets that can be derived from the enforcement of formal property rights and the trust in the legal system. He argues how formalizing property rights make assets fungible and billions of dollars worth of value that could not have been otherwise created. He estimates trillions of dollars being lost in poor countries. (Soto, 2000)

Conclusion

The dynamic of saving rate and economic growth is interesting and of great importance for policymakers as well. The Ramsey model, limited though it is, helps us understand how best to approach the problem of allocating income between saving and consumption. The idea of the marginal product of capital and its relationship with the level of development of an economy is consistent with the empirical evidence. However, as the Lucas Paradox points out, even with a higher return, developing countries cannot attract investment from richer countries. The trend of the flow has been the opposite where capital from poor countries is going to richer countries. From offsetting the lower rate of saving to the outflow of capital, the answer to the capital accumulation problem in developing countries seems to be to improve the capital and securities market. It's important to point out that just financial liberalization doesn't imply higher economic growth as this relationship hasn't been established (Loayza et al, 2000). Strengthening the existing financial system to make the investments more efficient, however, has the potential to create long-term growth.

As Soto points out, having a robust legal system and proper enforcement of property rights unlocks the huge potential that is not tapped especially in developing countries right now. Developing countries require institutional improvements along with improving the savings rate. There is a limitation to implementing the right regulations for taking the right savings path but with the right regulations, governments can encourage people to head in the right saving direction. Both Nepal and Tanzania seem to be heading in the right direction with their savings rate but COVID has impacted both their savings rate and the growth rate. As the global economy is taking a hit, the priority at the moment would be to create growth and not fall into recession.

However, the necessity for a good saving rate path and a strong financial sector remains important in the long run.

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