Old age pensions and economic development
Analyzing the economic return of Pension in Mauritius

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Abstract

This paper attempts to assess the impact of social protection, with particular emphasis on old age pension on the economic growth of the island of Mauritius. The study makes use of rigorous time series econometric analysis over the period 1987 to 2018 to gauge if and the extent to which social protection and pension have been productive in the case of Mauritius. Results show that there is a positive and significant relationship between pension and economic growth in Mauritius. The coefficient of 0.123 is a measure of the efficiency of performance of pension concerning GDP creation. It is a measure of output elasticity of pension. A 1% increase in pension is likely to increase economic growth by 0.12%. In the short run, it is observed that there is an insignificant, although positive link, between pension and economic growth. This may indicate that the effects of pensions are felt on economic growth rather in the long run. The negative lagged value of the Error correction term indicates the existence of a long-term relationship and an adjustment of the effect to its long-run estimate. As far as the other determinants of Mauritian economic growth, it is found that it takes time for them to impact economic growth and thus remain essential long-term influencers.

1. Introduction

Worldwide, old age pensions are the largest social protection scheme and are increasingly common across low and middle-income countries. Old age pensions are usually viewed as a cost to the state and, despite their significant impacts on the well-being of older persons, it is rare for them to be understood as investments in economic growth. Yet, there is good evidence that an inclusive old age pension should be a core element of any country's economic growth strategies.

Pensions contribute to economic growth through a range of pathways at household, community and national levels. Within households, they are used to investing in children, tackling stunting and enabling them to attend and perform well in school, thereby helping them become a more effective and productive workforce. Pensioners and their families use the cash they receive to invest in income-generating activities while working-age household members are better able to gain employment, increasing the overall productivity of the labour force. They also enable households to recover their productivity more quickly following shocks. Across communities, the injection of cash into markets can stimulate local economies, with significant multiplier effects. Many entrepreneurs can benefit from the increased economic activity in local markets and there is good evidence of traders, in particular, doing well. Others, including unemployed young people, can sell their labour to pensioners. Governments can also use the payment of pensions to encourage financial service providers to increase their presence in more remote parts of the country.

At the national level, the increased consumption and demand generated by people spending their pensions can be a significant stimulus to national economies, bringing benefits to the business. Inclusive pensions can strengthen social cohesion, generating more peaceful and equitable societies and building an improved investment climate. Universal tax-financed pensions can also underpin contributory schemes, helping them grow their funds and offering resources for large investments in the economy. Furthermore, as the IMF argues, high levels of inequality can hinder growth and old age pensions have proven to be a key tool in reducing inequality.

Figure 1: Pathways through which tax-financed pensions can impact economic growth

Source : https://www.calpnetwork.org/wp-content/uploads/2020/03/1519919213.Social-pensions-and-their-contribution-to-economic-growth-1.pdf

Empirically, since the mid-1980s, several studies found that social protection and pensions have increased growth and these studies include the work of Cashin (1994), Castles and Dowrick(1990), Korpi (1985), McCallum and Blais (1987) and Perotti (1992, 1994). Alderman and Yemtsov (2012) also suggested that social protection in LICs and MICs can have positive impacts on aggregate growth. It is noteworthy that these results have been contradicted by Gwartneyet al. (1998), Hansson and Henrekson (1994). More recently a few studies depicted the positive link between social protection expenses and economic growth (see Khan and Bashar, 2015; Alper and Demiral, 2016; Ravallion et al., 2018).

This paper attempts to assess the impact of social protection, with particular emphasis on the old age pension, on the economic growth of the island of Mauritius. The study makes use of rigorous time series econometric analysis over the period 1987 to 2018 to gauge if and the extent to which social protection and pension have been productive in the case of Mauritius. Such an analysis is believed to interestingly shed some light on the question of whether expenses on social protection and pensions are worthwhile, from a macroeconomic point of view. The Mauritian government since independence all believe in the importance of old age pension and other social protection schemes both as a social measure and also as an economic investment. This can be witnessed by the continuously increasing support to this sector of the economy in terms of budget allocated (See appendix 1)

The rest of the paper is organized as follows: section 2 discusses the methodology used in modeling the social protection-growth nexus, section 3 discusses the results and section 4 concludes.

2. Methodology

The conceptual model adopted in this study draws from earlier empirical works on economic growth modeling in Africa (refer to Barro and Lee, 2010, Tilak 2003, Gmyiah-Brempong et al, 2006, and Seetanah,2009 among others) whereby an extended Solow growth model was used. The following functional form is thus specified

$$rdpg = f(invest, open, edu, pen, cps) \quad (1)$$

The dependent variable R*GDP*is a measure of countries' GDP (this proxy has been widely used in the literature to measure economic growth, see Mankiw, Romer and Weil (1992) and Barroand Lee (2010) among others). INVEST represents the countries' investment ratio and is measured by the ratio of Gross Domestic Fixed Capital Formation to GDP. It adds to the capital accumulation and the productive

capacity of the countries and drives increases in productivity and growth in addition to technical progress (Crowder and Himarios, 1997; Khan and Kumar, 1997; Nazmi and Ramirez, 1997; Yang, 2008). OPEN, measured as the total of export and an import divided by the GDP, is a measure of the openness level. The works of Grossman and Helpman (1991) and Aghion and Howitt (1992) offer theoretical support to the prediction that openness may affect long-run growth through various channels.

Education (EDU) is also included in the model specification, education being an ingredient of growth. Empirical backing exists from Adelakun (2011), Aka and Dumont (2008), Bils and Klenow (2000) and Wheller (1980) for the case of various countries and with Khadaroo and Seetanah (2008) for Mauritius in the long run. It is noteworthy that education is proxied in this research by the secondary enrolment ratio,

A strong consensus has emerged in the last decade that well-functioning financial intermediaries have a significant impact on economic growth,2 see King and Levine (1993), Jayaratne and Strahan (1996), Ross and Levine(1997), Chowdhury (1997), Demirguc¸-Kunt and Maksimovic (1998), Rajan and Zingales (1998), Levine and Zervos (1998), Neusser and Kugler(1998), Levine et al. (2000), Wachtel (2003). Credit to Private sector (CPS) measured by the value of credits by financial intermediaries to the private sector divided by GDP has been employed as a measure of financial development. Data for the above variables were obtained from the World Development Indicator (WDI)[1].

Of interest to us, PEN, is a measure of the amount of pension disbursed on yearly basis to those eligible. The theoretical and empirical link with economic growth has been already discussed hereabove. Pension is measured by the amount of money spent by the government on social protection spent by the government as a percentage of GDP of the country. The data was collected from the Accountant General's annual report (various issues).

The econometric specification of our model is illustrated below.

$$rgdp_t = \beta_0 + \beta_1 invest_t + \beta_2 open_t + \beta_3 edu_t + \beta_4 cps_t + \beta_5 pen_t + \varepsilon_t \qquad (2)$$

where t denotes time and small letters denote the natural logarithm of the variables implying a double log-linear specification for estimation and ease of subsequent interpretation.

The time series properties of the data have been tested and the Augmented Dickey-Fuller test (ADF) and Phillips Peron test both suggested that the data were integrated of order one, that is they were only stationary in their first difference (I(1)). In the presence of I(1) variables, a cointegration test is undertaken test for long-run relationships and the Johansen test (The trace test and the maximum eigenvalue test) while determining the number of co-integrating vectors in the system of cointegration confirmed the presence of cointegration in the relationship, with one cointegrating vector. Stock (1987) still argued that even when variables are non-stationary but stationary in the first difference; they may be co-integrated. Such a finding enables the use of an Error Correction Model which will also dwell into long and short-run impact analysis.

Endogeneity issues and the Vector Autoregressive Model (VAR)

There may also exist bi-causal and indirect effects while modeling the social protection-growth link. Levine, Loayza, and Beck (2000) argued that the possibility still exists as the explained variable may have something to do with explaining itself as well, especially when modeling economic growth (see Seetanah et al 2010). As such the possibility of reverse causation also theoretically exists as higher growth rates GDP may imply that a country is more able to allocate funds to social protection being economically better and with higher tax collection capacity. To account for the possibility of reverse causal links as well as dynamics (as economic growth is essentially a dynamic phenomenon and should be modeled as such), the study employs a Vector Autoregressive framework (VAR) and this takes into account the complex links between the various growth determinants and output level, with particular emphasis on social protection. VAR thus combines the traditional VAR approach in a time series, which treats all the variables in the system as endogenous (both in a dynamic and in a static sense), and interdependent while also allowing for unobserved country-specific heterogeneity.

[1]Data were available from the WDI (http://data.worldbank.org/indicator)

A typical first order VAR model is specified as follows

$$Z_{it} = \Gamma_0 + \Gamma_1 Z_{it-1} + \mu_i + \varepsilon_t$$

$$rdpg = f(invest, open, edu, pen, cps)$$

Where Z_t is a six-variable vector *(rgdpg, invest, open, edu, pen,cps)* and the variables are as defined previously. Γ_0 is the constant term (vector of time-invariant country-specific intercepts) and Γ_1 is the parameter/coefficient (matrices of the lagged coefficient) and ε is the error term (vector of idiosyncratic disturbances). In the presence of co-integration, the Vector Error Correction Model becomes the appropriate framework to analyze the pension-growth nexus and it allows the assessment of both long and short-run effects. The lag order of the VECM is selected based on the Schwarz Information Criterion. The estimates of the relevant coefficients are presented and discussed in the next section.

3. Estimation and analysis

Vector error correction modeling estimates: Long Run Estimates

Table 1 reports the results of the long-run estimates (1989-2018)

Variable	Coefficient	t-ratio
LNPEN	0.124	2.81 ***
LNEDU	0.654	2.44***
LNOPEN	0.435	5.35**
LNINVEST	0.705	2.93***
LNCPS	0.55	3.44**
c	1.47	1.454

Results from table 1 show that there is a positive and significant relationship between pension and economic growth in Mauritius. The coefficient of 0.123 is a measure of the efficiency of performance of pension concerning GDP creation. It is a measure of output elasticity of pension. A 1% increase in pension is likely to increase economic growth by 0.12%. Khan and Bashar (2015) found that social expenditures had a positive influence on economic growth in Australia and New Zealand. Using a sample of 18 OECD countries, Alper and Demiral (2016) concluded the positive link between social expenses and economic growth. For developing countries, Ravallion et al. (2018) depicted a positive relation between social protection and economic growth.

Such results are in line with the theoretical underpinnings of the social-protection- growth nexus. Indeed, pensions are crucially used to invest in children and education while pensioners and their families use the cash they receive to invest in income-generating activities and working-age household members are better able to gain employment, increasing the overall productivity of the labour force. As such, the injection of cash through pensions can stimulate local economies, with significant multiplier effects. At the national level, the increased consumption and demand generated by people spending their pensions has often been posited to be a significant stimulus to national economies, bringing benefits to the business. Old-age pensions have also been proven to be a key tool in reducing inequality.

It is noteworthy that the reported estimate is relatively lower than the other ingredients of growth, with investment being the most important ingredient in growth in the long run. The other determinants of growth are confirmed to be important elements as witnessed by their sign, size and significance of their coefficient.

Vector error correction modeling estimates: Short Run Estimates

Given that the variables under consideration were only stationary in the first difference and co-integrated, we formulated and estimated a VECM. By construction, the VECM specification forces the long-run behaviour of the endogenous variables to converge towards their co-integrated relationships, which includes short-run dynamics. The estimated error-correction equations pass the residual autocorrelation at the 5 percent significance level and are represented in Table 3. The variables in the system are all endogenous, given that the lagged error-correction term of the VECM is significant. To check for model specification, four diagnostic tests are imposed. First, the Lagrange Multiplier test for residual serial correlation finds no evidence of serial correlation even though the lag is extended to 8. The residuals are also multivariate normal. The null hypothesis of normality fails to be rejected for skewness,

kurtosis and Jarque-Bera tests. Besides that, the homoscedasticity of the residuals also fails to be rejected for both joint and individual tests. To note that the lagged error-correction term is significant, implying that growth is a dynamic phenomenon.

Table 2: VECM Estimates: Short Run estimates

Error Correction:	D(LNRGDP)	D(LNSOCP)	D(LNOPEN)	D(LNEDU)	D(LNCPS)
CointEq1	-0.081801	0.032367	0.028797	0.016173	-0.018784
	(0.00955)	(0.02333)	(0.01630)	(0.00304)	(0.02396)
	[-8.56555]	[1.38714]	[1.76689]	[5.32262]	[-0.78400]
D(LNRGDP(-1))	0.019922	-0.008287	-0.189560	-0.004485	0.134713
	(0.20822)	(0.50871)	(0.35533)	(0.06625)	(0.52237)
	[0.09568]	[-0.01629]	[-0.53348]	[-0.06770]	[0.25789]
D(LNPEN(-1))	0.047657	0.353027	-0.055668	-0.044906	0.063373
	(0.07107)	(0.17364)	(0.12128)	(0.02261)	(0.17829)
	[0.67056]	[2.03316]	[-0.45899]	[-1.98594]	[0.35544]
D(LNOPEN(-1))	0.152375	-0.138364	-0.166972	0.042335	0.038870
	(0.12103)	(0.29569)	(0.20653)	(0.03851)	(0.30362)
	[1.25904]	[-0.46795]	[-0.80845]	[1.09943]	[0.12802]
D(LNEDU(-1))	0.371091	2.349057	-0.482561	-0.306360	0.444120
	(0.38973)	(0.95218)	(0.66509)	(0.12400)	(0.97774)
	[0.95217]	[2.46702]	[-0.72556]	[-2.47067]	[0.45423]
D(LNCPS(-1))	0.077549	0.004677	-0.365985	-0.154248	0.147843
	(0.18112)	(0.44251)	(0.30909)	(0.05763)	(0.45438)
	[0.42816]	[0.01057]	[-1.18409]	[-2.67672]	[0.32537]
C	0.021680	0.054924	0.004289	0.030995	0.005308
	(0.01930)	(0.04714)	(0.03293)	(0.00614)	(0.04841)
	[1.12352]	[1.16504]	[0.13025]	[5.04857]	[0.10964]
R-squared	0.547370	0.392582	0.150680	0.668162	0.049846
Adj. R-squared	-0.475055	0.234125	-0.070882	0.581595	-0.198020
F-statistic	2.662559	2.477529	0.680082	7.718479	0.201100

In the short run, it is observed that there is an insignificant, although positive link, between pension and economic growth. This may indicate that the effects of pensions are felt on economic growth rather in the long run. The negative lagged value of the Error correction term indicates the existence of a long-term relationship and an adjustment of the effect to its long-run estimate. As far as the other determinants of Mauritian economic growth, it is found that it takes time for them to impact economic growth and thus remain essentially long-term influencers.

4. Conclusions

This paper attempts to assess the impact of social protection, with particular emphasis on old age pension on the economic growth of the island of Mauritius. The study makes use of rigorous time series econometric analysis over the period 1987 to 2018 to gauge if and the extent to which social protection and pension have been productive in the case of Mauritius

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With the aging population issue and the important debate of whether or not to maintain all social protection benefits (especially pensions), policymakers should also be taking into account the fact that these expenses have a positive influence on economic growth on balance. If the social protection expenses are well planned, these should normally be at the benefit of the countries, taking into account that the pensions budget may constitute pressure on the budget.

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Appendix 1

Table 1: Pensions paid & GDP per capita (PPP)1987-2018

Year	Amount paid (RsMn)					
	Basic Retirement Pension	Basic Widow's Pension	Basic Invalid Pension	Basic Orphan Pension	Total Social spending	GDP Per Capita (PPP_
1987-1988	*276.07*	-	-	-	*276.07*	*8776.615*
1990-1991	*541.36*	-	-	-	*541.36*	*10109.5*
1994-1995	*982.65*	-	-	-	*982.65*	*11886.15*
1999-2000	*2,208.45*	*451.16*	*484.93*	*10.22*	*3,154.76*	*13374.63*
2004-2005	*3,486.24*	*639.43*	*867.15*	*14.11*	*5,006.93*	*16961.68*
2010	*6,612.26*	*885.50*	*1,312.33*	*23.37*	*8,833.46*	*21436.28*
2015-2016	*14,096.08*	*1,454.15*	*2,322.00*	*35.52*	*17,907.75*	*23092.66*
2016-2017	*15,359.56*	*1,482.03*	*2,558.61*	*35.29*	*19,435.49*	*23777.04*
2017-2018	*16,809.63*	*1,525.78*	*2,706.17*	*34.81*	*21,076.39*	*24953.4*