

LEFF WAS RIGHT AFTER ALL: NEW EVIDENCE ON DEPENDENCY RATES AND SAVINGS RATES

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Abstract: *The purpose of this paper is to determine whether a negative relationship exists between dependency rates and savings rates as suggested by a number of empirical studies, including Leff (1969). We re-estimate the savings function as a function of, among other variables, dependency ratios and extend the analysis to the 1990s. Our major finding is that although this negative relationship is not confirmed in the 1980s, as was found by a number of empirical studies, the relationship is negative and significant for the Less Developed Countries in the 1990s. This confirms Leff's hypothesis.*

Keywords: *dependency ratios, savings, LDCs.*

Introduction

The importance of the relationship between population growth and savings is highlighted by their prominence in models of growth and development, particularly in the Solow (1956) model. For over 30 years, economists have debated whether or not high dependency ratios are an important factor for explaining the large disparity in aggregate savings rates between Developed Countries (DCs) and Less Developed Countries (LDCs). The major reason is that empirical studies have provided mixed evidence on this relationship.

Leff's (1969) study, the first major analysis of the effect of demographic factors on aggregate savings rates, used cross section data for 74 DCs and LDCs. He hypothesised that there is an inverse relationship between dependency ratios and savings rates. The logic behind this hypothesis was that children constitute a heavy charge for expenditure and since they contribute to consumption but not production, a high ratio of dependants to the working age population might be expected to impose a constraint on a society's potential for savings. His empirical results showed that demographic factors are important determinants of aggregate savings rates and that dependency ratios have a statistically distinct and quantitatively important influence on

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aggregate savings ratios. Moreover, high dependency ratios – and ultimately high birth rates – are among the important factors accounting for the great disparity in aggregate savings rates between developed and developing countries.

Since the early 1970s a number of studies have been carried out to test Leff's hypothesis. Gupta (1971) presents evidence showing that dependency rates have an insignificant effect on savings rates in the majority of LDCs. Furthermore, if we group DCs and LDCs together, high birth rates do explain differences in savings rates, but separately DCs tend to have high savings and low birth rates, whereas the reverse tends to be true for LDCs. Therefore, the relationship between dependency rates and aggregate savings appears to be a very tenuous one. Leff's (1971) response was to re-estimate his model for DCs and LDCs separately, concluding that the dependency variables were still significant for both samples.

Ram (1982) takes a closer look at dependency rates and aggregate savings using a larger and more recent data set than Leff. Using an improved savings function he estimates the function for 121 countries, for the period 1970-77 for different specifications and different sub-samples. His conclusion is contrary to the original findings of Leff (1969), in that he finds little evidence of significantly negative effects of high dependency rates on savings in the LDCs.

Other important empirical studies in this field include Kelley (1988) who concluded that the quantitative impact of dependency on savings was small and Schumaker and Clark (1992) whose results does not provide support for the hypothesis that increasing dependency rates lower the national savings rates.

Despite all the criticisms on Leff's original results, considerable credit has been paid to Leff's findings, although the users of his results have been cautious in their interpretation. A survey by Raymond and Zinser (1973) suggests that Leff's findings were at least partly valid. Singh (1975) argues strongly in favour of Leff's empirical results. Even Gupta (1975), who was critical of Leff's methodology and results, was subsequently persuaded to agree with Leff, when his results showed that the earlier studies have significantly underestimated the negative effects of dependency rates and exaggerated the negative effects of foreign capital inflows.

This paper re-examines the relationship between dependency ratios and savings rates for the same cross section of countries for the years 1980, 1985, 1990 and 1995. The addition of the two data points for the 1990's should shed more light on the relationship between saving rates and dependency rates. It is possible that the problems of adjustment in the 1980's disturbed this relationship, especially for the LDCs.

The model, data and empirical results

Assume that we can write the savings function as:

$$s = g_0 + g_1 y + g_2 g + g_3 DA + g_4 DB + g_5 F$$

All monetary values are in \$ US, s is the savings rate, y is per capita GDP, g is the growth rate of GDP, DA is the youth dependency rate (0-14 age group as a percentage of population), DB is the adult dependency rate (65 and older as a percentage of population), F is foreign capital inflow as a proportion of GDP and g 's are coefficients to be estimated. The

importance of the first four variables is highlighted by the life-cycle models and we expect a positive impact for g and y and a negative impact for the dependency variables. A strong case for including F in the savings regression has been put forward by, among others, Griffin and Enos (1970) and Papanek (1973). Most empirical studies show a negative impact of foreign capital inflow on domestic savings, the so-called displacement effect.

The data has been obtained from a number of sources, mainly the World Bank World Tables and World Development Report for various years, and population statistics are from various UN publications. The countries reported in this paper are those for which data on the four main variables could be found. The period that the sample covers includes the years 1980, 1985, 1990, and 1995 for developed and developing countries according to the classification used by Schumaker and Clark (1992). Complete information on the four main variables (DA , DB , g and y) was available for 101 countries, which includes 19 DCs and 82 LDCs. For the savings equations augmented by foreign capital inflows full information was available only on 71 less developed countries.

The savings function is first estimated using the full sample of countries. Estimated coefficients are reported in Table 1.

Table 1 – Estimated equations for the full sample

	1980	1985	1990	1995
Without F:				
DA	-0.028 (-0.280)	-0.288** (-2.463)	-0.374*** (-4.267)	-0.375*** (-4.795)
DB	-0.206 (-1.159)	-0.954* (-1.879)	-1.22*** (-3.094)	-1.242*** (-3.288)
g	0.427*** (2.978)	0.156 (0.942)	0.093 (0.650)	-0.037 (-0.578)
y	0.0014*** (2.821)	0.001* (1.803)	0.0005* (1.907)	0.0005** (2.378)
CONSTANT	10.212 (1.132)	41.903*** (3.564)	51.037*** (5.884)	49.827*** (6.464)
R^2	0.2197	0.1746	0.3052	0.3120
N	101	101	101	101

Note: t-statistics in parentheses. Coefficients marked with * are significant at 0.1 level and ** significant at 0.05 level and *** significant at 0.01 level and better.

We only interpret results concerning DA and DB . For the countries included in the sample the youth dependency ratio (DA) and the adult dependency ratio (DB) have the right sign for all four years but they are not significant for 1980. Their impact is highly significant, negative and larger in 1990 and 1995. This finding tends to strongly support Leff's hypothesis.

Table 2 presents the results for the estimated savings equation for the four years for LDCs and DCs separately. The LDC regression is first estimated without including F and then including F . Without F , both dependency ratios are negative and significant for the LDCs. Inclusion of F in the regression does not change the sign and significance of DA and DB but indicates that foreign capital inflow has a displacement effect on domestic savings. For developed countries as

a whole both ratios are significant, with the expected sign, in 1995 but not before that. Overall, it seems that the savings function is well behaved for 1995.

Table 2 – Estimated savings equations for DCS and LDCS

	1980		1985		1990		1995	
Developed Countries:	Coeff	t	Coeff	t	Coeff	t	Coeff	t
DA	-0.345	-1.071	0.115	0.495	-0.002	-0.006	-0.477**	-2.324
DB	-0.403	-0.849	-0.116	-0.322	-0.241	-0.595	-0.624**	-2.290
g	0.054	0.201	0.175	0.604	-0.103	-0.497	0.727***	4.370
y	-0.0001	0.201	-0.0003	0.614	0.0003	1.245	-0.0001	-0.871
CONSTANT	39.931**	2.160	19.178	1.407	24.096	1.476	47.256***	4.636
R ²	0.1657		0.1035		0.1564		0.2561	
N	19		19		19		19	
Less Developed Countries without F:								
DA	-0.054	-0.519	-0.264*	-1.953	-0.321***	-3.280	-0.328***	-3.547
DB	-0.07	-0.386	-0.93	-1.355	-1.617***	-3.280	-1.431***	-2.995
g	0.300*	1.978	0.192	1.061	0.023	0.147	-0.043	-0.627
y	0.0046***	5.182	0.0033**	2.964	0.003***	3.868	0.0014***	2.849
CONSTANT	9.669	1.047	37.427**	2.609	46.604***	4.619	46.118***	4.921
R ²	0.3661		0.1989		0.3649		0.2991	
N	82		82		82		82	
Less Developed Countries with F:								
DA	0.076	0.591	-0.244	-1.561	-0.343***	-3.367	-0.277***	-2.899
DB	-0.019	-0.104	-0.864	-0.981	-1.813***	-3.266	-1.365**	-2.392
g	0.203	1.209	0.138	0.695	-0.081	-0.487	-0.0064	-0.080
y	0.0087***	4.710	0.0058***	3.708	0.0052***	4.487	0.0019**	2.221
F	-0.09	-0.681	-0.059	-0.819	-0.0543*	-1.904	-0.51***	-3.123
CONSTANT	-2.585	-0.213	33.799*	1.989	48.155***	4.528	45.697***	4.739
R ²	0.3744		0.2126		0.4964		0.4676	
N	71		71		71		71	

Note: Coefficients marked * are significant at the 10% level and those marked with ** are significant at the 5% level and *** are significant at 1% or better.

Conclusions

The aim of this study was to take a close empirical look at the savings behaviour of a cross section of countries to establish whether or not dependency rates have an adverse effect on national savings rates. Our results indicate that the effects of the dependency ratios change significantly over time, which is in contrast to the results of Schumaker and Clark (1992). It seems that by 1995 both dependency ratios are significant in the savings function irrespective of country groupings (LDC, DC). Our results agree with those who found no relationship in the 1980's but suggests that Leff's hypothesis is alive and well in the 1990's for LDCs. Part of the blame for the breakdown may be due to the two oil price rises and the subsequent adjustments that most countries went through. Moreover, in the 1980s and 1990s a number of countries have undergone structural change that may have affected this relationship. One aspect of such a change is the privatisation of the pensions. However, if under 14s (child labour) or over 65s work our (and others') DA and DB are incorrectly specified. More country specific research is needed to shed light on these issues. It is also interesting to note that only in 1995 DCs exhibit negative and significant dependency ratios. This is in contradiction to both Gupta (1971) and Hammer (1986), who argued that the theory is better suited to DCs. In stark contrast to this, the results of this study appear to suggest that the theory is more suited to LDCs.

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