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This paper contains preliminary findings from research work still in progress and should not be quoted without prior approval of the author.

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# A NOTE ON SOCIAL SECURITY AND PRIVATE SAVINGS IN SINGAPORE

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## 1. Introduction

Empirical research using nationally-aggregated time-series data had achieved no consensus with respect to the effect of Social Security programs on private savings. For example, Feldstein (1974) argues that Social Security could reduce savings by providing a substitute for retirement income and concludes from both U.S. times-series evidence[1] and a multi-nation cross-section (Feldstein, 1978), that unfunded, pay-as-you-go public pension plans have reduced private savings substantially. In contrast, Barro (1974) argues that the impact of Social Security on savings may be offset by changes in voluntary, intergenerational transfers. His studies using U.S. time series (Barro, 1978) and a multi-nation cross-section, time-series panel of data (Barro and MacDonald, 1979) conclude that there is no convincing evidence of a savings-reducing effect.

The purpose of this note is to use similar methods to analyze the effects of the Singapore pension system (called the Central Provident Fund or CPF), which has a number of unique and empirically important features. First, it is fully funded, with investment held in government-registered securities. Second, it is not redistributive: each individual's benefits equal the accumulated value (with interest) of his or her contributions. Third, contributions are large and increasing and were, for example, 13% of the average (not self-employed) worker's pay in 1968, 30% in 1975 and 37% in 1979. In 1968, annual contributions and total fund value were 1.6% and 12% of GDP, respectively; by 1979 these figures had climbed to 6.6% and 14%, and in 1979 the percentages were 9% and 38%. Fourth, all CPF savings can be withdrawn at age 55 and are refunded to the beneficiaries if death occurs before that age. Finally, individuals may withdraw most of their CPF savings before retirement to purchase homes,[2] with a little more than half of current withdrawals on that basis.

Clearly time-series data from Singapore will not help us resolve the conflict between the Barro and Feldstein results for unfunded systems. Under the life-cycle hypothesis, extended or not by Barro-style intergenerational altruism, the fully-funded CPF should have no impact on private consumption. However, the results from Singapore are a kind of test of the validity of the life-cycle framework in this context. Moreover, it is of interest whether a funded public pension plan, as advocated by Feldstein (1977), might have effects on consumption and savings. For example, consumption could be reduced through a forced-savings effect or increased through the provision of a better savings instrument.[3]

Our basic estimating equation is taken from Barro and MacDonald and is:

$$(1) \qquad (C/Y)_t = \alpha_o + \alpha_1 (G/Y)_t + \alpha_2 (Y_{t-1}/Y_t) + \alpha_3 (1/Y_t) + \alpha_4 (SS/Y)_t + \alpha_5 A55+_t + \alpha_6 U_t + \epsilon_t$$

Total consumption $C_t$ is postulated to be a linear function of a constant, current and once-lagged Gross Domestic Product ($Y_t$ and $Y_{t-1}$, apparently to approximate permanent income), government spending $G_t$ (to allow for substitution between public and private expenditure), and Social Security benefits, $SS_t$. This relationship is then divided through by $Y_t$ and the final equation obtained by adding $U_t$, the unemployment rate (a cyclical variable), $A55+_t$, the percentage of people 55 and over) and a random disturbance $\epsilon_t$. This is identical to the Barro and MacDonald specification (8), except that they use 65 and over for their age variable, while 55 seems more appropriate here given that CPF benefits can be withdrawn at that age.[4]

The results based on the available data (1966-1979, annual) are reported in Table 1. The equation (1) coefficients are in the first column and all except $(SS/Y)_t$ have the theoretically-expected sign. The constant is the short-run marginal propensity to consume and the estimate of about .63 seems reasonable: in equation (8) of Barro and MacDonald the average was .70 for their 16 countries. The key $(SS/Y)_t$ coefficient would probably be expected to be zero or positive, given that $SS_t$ is a benefit measure. However, it is estimated to be negative, but not significantly different from zero at the 5 percent level, with a t-statistic of about .37.

It might be thought that the reason for this small t-value is that there are "too many" other variables in a regression with so few observations. Accordingly, variables (except $(SS/Y)_t$) with low t-statistics were successively removed--first $A55+_t$ then $Y_{t-1}/Y_t$ and finally $(G/Y)_t$ until the remaining coefficients (in the fourth column) all were significantly different from zero at the 5 percent level using a one-tail test. It can be seen that the magnitude of the SS/Y coefficient falls to about .03 with a t-ratio of about .05, indicating clearly there is no evidence of a Social Security effect on private consumption or savings. This result is qualitatively robust to many modifications, including using a CPF contributions variable both in conjunction with and as a replacement for CPF benefits in constructing $(SS/Y)_t$ and using the participation rate in the CPF instead of and in addition to $U_t$.[5] In addition, the results for equation (4) were virtually unchanged when it was re-estimated either using a weighted OLS based on the disturbance variance being proportional to the population or employing instrumental variables.[6]

## Summary and Conclusions

This note essentially extends the Social Security/Savings time-series evidence of Feldstein (1974) and Barro and MacDonald (1979) to the case of Singapore. The Singapore case is of special interest because the Singapore plan is fully funded and not redistributive. The key result is that there is no suggestion that fully-funded Social Security has altered private consumption of savings behavior in Singapore. This may be partly because individuals can withdraw most of their Social Security funds to purchase homes or because the lump-sum payment of retirement benefits at age 55 may be relatively easy to borrow against. Nonetheless, whatever drawbacks the time-series evidence on the Social Security/Savings issue may have, it is of interest that the results for Singapore conform so closely to those predicted by both the Feldstein and the Barro models.

# Footnotes

[1]Leimer and Lesnoy (1982) have found that the U.S. time-series results were in error.

[2]It is also permissible to withdraw CPF savings to buy up to $5,000 shares in the Singapore Bus Service, which pay dividends and include a discount fare pass.

[3]The plan is a relatively desirable savings instrument in that the CPF interest rate, which is broadly consistent with the market rate, is also tax-free.

[4]The other Barro and MacDonald specifications either exclude $1/Y_t$, which we always retain because of its apparent statistical explanatory power, or include a growth variable which only differs by nation and hence cannot be added here.

[5]As also noted by Barro and MacDonald, these changes in specification do change certain coefficients. However, in no instance was a Social Security coefficient even close to being statistically significant at the 5 percent level.

[6]Both $1/Y_t$ and $U_t$ were treated as endogenous with their lags employed as instruments, dropping one observation as unemployment data are not available before 1966.

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Table 1

Consumption Function Regression Results: Singapore 1966-1979

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| Constant | .6308 (.5344) | .6320 (.1705) | .6760 (.1464) | .6368 (.0367) |
| $(G/Y)_t$ | -.5274 (1.1688) | -.5279 (1.0717) | -.2561 (.9243) | -- |
| $Y_{t-1}/Y_t$ | .1291 (.2652) | .1293 (.2258) | -- | -- |
| $1/Y_t$ | 1420.7 (589.5) | 1420.4 (542.2) | 1241.5 (426.4) | 1172.1 (328.6) |
| $(SS/Y)_t$ | -.5354 (1.4332) | -.5332 (1.0510) | -.0809 (.6670) | -.0310 (.6118) |
| $U_t$ | -.0390 (.0329) | -.0391 (.0281) | -.0284 (.0203) | -.0247 (.1454) |
| A55+ | .0001 (.0548) | -- | -- | -- |
| $\bar{R}^2$ | .8967 | .9096 | .9163 | .9241 |
| D.W. | 2.2337 | 2.2334 | 2.2591 | 2.1791 |

Standard errors are in parentheses.

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