1984

A Note on Social Security and Private Savings in Singapore

Choon Cheong Loh
Michael R. Veall

Follow this and additional works at: https://ir.lib.uwo.ca/economicscsier_wp

Part of the Economics Commons

Citation of this paper:
A NOTE ON SOCIAL SECURITY AND
PRIVATE SAVINGS IN SINGAPORE

Choon Cheong Loh
and
Michael R. Veall

This paper contains preliminary findings from research work still in progress and should not be quoted without prior approval of the author.
A NOTE ON SOCIAL SECURITY AND PRIVATE SAVINGS IN SINGAPORE

Choon Cheong Loh
and
Michael R. Veall*

Department of Economics
University of Western Ontario
London Canada

July, 1984

*The authors would like to thank Debbie Fretz for research assistance. The latter author also acknowledges support from the Social Sciences and Humanities Research Council of Canada.
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. time-series evidence 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, 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.

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

\[
(C/Y)_t = \alpha_0 + \alpha_1 (G/Y)_t + \alpha_2 (Y_{t-1}/Y_t) + \alpha_3 (1/Y_t) + \alpha_4 (SS/Y)_t + \alpha_5 A_{55+} + \alpha_6 U_t + \epsilon_t
\]

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), \(A_{55+}\), 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.
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 \(U_t\). 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.
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.
REFERENCES


**Table 1**

Consumption Function Regression Results: Singapore 1966-1979

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>.6308</td>
<td>.6320</td>
<td>.6760</td>
<td>.6368</td>
</tr>
<tr>
<td></td>
<td>(.5344)</td>
<td>(.1705)</td>
<td>(.1464)</td>
<td>(.0367)</td>
</tr>
<tr>
<td>(G/Y)_t</td>
<td>-.5274</td>
<td>-.5279</td>
<td>-.2561</td>
<td>--</td>
</tr>
<tr>
<td></td>
<td>(1.1688)</td>
<td>(1.0717)</td>
<td>(.9243)</td>
<td>--</td>
</tr>
<tr>
<td>Y_{t-1}/Y_t</td>
<td>.1291</td>
<td>.1293</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td></td>
<td>(.2652)</td>
<td>(.2258)</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>1/Y_t</td>
<td>1420.7</td>
<td>1420.4</td>
<td>1241.5</td>
<td>1172.1</td>
</tr>
<tr>
<td></td>
<td>(589.5)</td>
<td>(542.2)</td>
<td>(426.4)</td>
<td>(328.6)</td>
</tr>
<tr>
<td>(SS/Y)_t</td>
<td>-.5354</td>
<td>-.5332</td>
<td>-.0809</td>
<td>-.0310</td>
</tr>
<tr>
<td></td>
<td>(1.4332)</td>
<td>(1.0510)</td>
<td>(.6670)</td>
<td>(.6118)</td>
</tr>
<tr>
<td>U_t</td>
<td>-.0390</td>
<td>-.0391</td>
<td>-.0284</td>
<td>-.0247</td>
</tr>
<tr>
<td></td>
<td>(.0329)</td>
<td>(.0281)</td>
<td>(.0203)</td>
<td>(.1454)</td>
</tr>
<tr>
<td>A55+</td>
<td>.0001</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td></td>
<td>(.0548)</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>R²</td>
<td>.8967</td>
<td>.9096</td>
<td>.9163</td>
<td>.9241</td>
</tr>
<tr>
<td>D.W.</td>
<td>2.2337</td>
<td>2.2334</td>
<td>2.2591</td>
<td>2.1791</td>
</tr>
</tbody>
</table>

Standard errors are in parentheses.
1981


8104C Laidler, David. On the Case for Gradualism.

8105C Wirick, Ronald G. Rational Expectations and Rational Stabilization Policy in an Open Economy


8107C Burgess, David F., Energy Prices, Capital Formation, and Potential GNP

8108C DSJ Jimenez, E. and Douglas H. Keare. Housing Consumption and Income in the Low Income Urban Setting: Estimates from Panel Data in El Salvador

8109C DSJ Whalley, John Labour Migration and the North-South Debate

8110C Manning, Richard and John McMillan Government Expenditure and Comparative Advantage

8111C Freid, Joel and Peter Howitt Why Inflation Reduces Real Interest Rates

1982

8201C Manning, Richard and James R. Markusen Dynamic Non-Substitution and Long Run Production Possibilities

8202C Feenstra, Robert and Ken Judd Tariffs, Technology Transfer, and Welfare

8203C Ronald W. Jones, and Douglas D. Purvis: International Differences in Response to Common External Shocks: The Role of Purchasing Power Parity

8204C James A Brander and Barbara J. Spencer: Industrial Strategy with Committed Firms

8205C Whalley, John, The North-South Debate and the Terms of Trade: An Applied General Equilibrium Approach

8206C Roger Betancourt, Christopher Clague, Arvind Panagariya CAPITAL UTILIZATION IN GENERAL EQUILIBRIUM

8207C Mansur, Ahsan H. On the Estimation of Import and Export Demand Elasticities and Elasticity Pessimism.

8208C Whalley, J. and Randy Wigle PRICE AND QUANTITY RIGIDITIES IN ADJUSTMENT TO TRADE POLICY CHANGES: ALTERNATIVE FORMULATIONS AND INITIAL CALCULATIONS

8209C DSU Jimenez, E. SQUATTING AND COMMUNITY ORGANIZATION IN DEVELOPING COUNTRIES: A CONCEPTUAL FRAMEWORK
1982

8210C Grossman, G.M. INTERNATIONAL COMPETITION AND THE UNIONIZED SECTOR

8211C Laidler, D. FRIEDMAN AND SCHWARTZ ON MONETARY TRENDS - A REVIEW ARTICLE

8212C Imam, M.H. and Whalley, J. INCIDENCE ANALYSIS OF A SECTOR SPECIFIC MINIMUM WAGE IN A TWO SECTOR HARRIS-TODARO MODEL.

8213C Markusen, J.R. and Melvin, J.R. THE GAINS FROM TRADE THEOREM WITH INCREASING RETURNS TO SCALE.

8214C INDUSTRIAL ORGANIZATION AND THE GENERAL EQUILIBRIUM COSTS OF PROTECTION IN SMALL OPEN ECONOMIES.

8215C Laidler, D. DID MACROECONOMICS NEED THE RATIONAL EXPECTATIONS REVOLUTION?

8216C Whalley, J. and Wigle, R. ARE DEVELOPED COUNTRY MULTILATERAL TARIFF REDuctions NECESSARILY BENEFICIAL FOR THE U.S.?

8217C Bade, R. and Parkin, M. IS STERLING M3 THE RIGHT AGGREGATE?

8218C Kosch, B. FIXED PRICE EQUILIBRIA IN OPEN ECONOMIES.

1983

8301C Kimbell, L.J. and Harrison, G.W. ON THE SOLUTION OF GENERAL EQUILIBRIUM MODELS.

8302C Melvin, J.R. A GENERAL EQUILIBRIUM ANALYSIS OF CANADIAN OIL POLICY.

8303C Markusen, J.R. and Svensson, L.E.O. TRADE IN GOODS AND FACTORS WITH INTERNATIONAL DIFFERENCES IN TECHNOLOGY.

8304C Mohammad, S. Whalley, J. RENT SEEKING IN INDIA: ITS COSTS AND POLICY SIGNIFICANCE.

8305C DSU Jimenez, E. TENURE SECURITY AND URBAN SQUATTING.

8306C Parkin, M. WHAT CAN MACROECONOMIC THEORY TELL US ABOUT THE WAY DEFICITS SHOULD BE MEASURED.

8307C Parkin, M. THE INFLATION DEBATE: AN ATTEMPT TO CLEAR THE AIR.

8308C Wooton, I. LABOUR MIGRATION IN A MODEL OF NORTH-SOUTH TRADE.

8309C Deardorff, A.V. THE DIRECTIONS OF DEVELOPING COUNTRIES TRADE: EXAMPLES FROM PURE THEORY.

8310C Manning, R. ADVANTAGEOUS REALLOCATIONS AND MULTIPLE EQUILIBRIA: RESULTS FOR THE THREE-AGENT TRANSFER PROBLEM.
1983

8311C DSU  Mohammad, S. and Whalley, J. CONTROLS AND THE INTERSECTORAL TERMS OF TRADE IN INDIA.


8313C  Jones, R.W., Neary, J.P. and Ruane, F.P. TWO-WAY CAPITAL FLOWS: CROSS-HAULING IN A MODEL OF FOREIGN INVESTMENT.

8314C DSU  Follain, J.R. Jr. and Jimenez, E. THE DEMAND FOR HOUSING CHARACTERISTICS IN DEVELOPING COUNTRIES.

8315C  Shoven, J.B. and Whalley, J. APPLIED GENERAL EQUILIBRIUM MODELS OF TAXATION AND INTERNATIONAL TRADE.

8316C  Boothe, Paul and Longworth David. SOME IRREGULAR REGULARITIES IN THE CANADIAN/U.S. EXCHANGE MARKET.

8317C  Hamilton, Bob and Whalley, John. BORDER TAX ADJUSTMENTS AND U.S. TRADE.

8318C  Neary, J. Peter, and Schweinberger, Albert G. FACTOR CONTENT FUNCTIONS AND THE THEORY OF INTERNATIONAL TRADE.

8319C  Veall, Michael R. THE EXPENDITURE TAX AND PROGRESSIVITY.

8320C  Melvin, James R. DOMESTIC EXCHANGE, TRANSPORTATION COSTS AND INTERNATIONAL TRADE.

8321C  Hamilton, Bob and Whalley, John. GEOGRAPHICALLY DISCRIMINATORY TRADE ARRANGEMENTS.

8322C  Bale, Harvey Jr. INVESTMENT FRICTIONS AND OPPORTUNITIES IN BILATERAL U.S.-CANADIAN TRADE RELATIONS.

8323C  Wonnacott, R.J. CANADA-U.S. ECONOMIC RELATIONS--A CANADIAN VIEW.

8324C  Stern, Robert M. U.S.-CANADIAN TRADE AND INVESTMENT FRICTIONS: THE U.S. VIEW.

8325C  Harrison, Glenn, H. and Kimbell, Larry, J. HOW ROBUST IS NUMERICAL GENERAL EQUILIBRIUM ANALYSIS?

8326C  Wonnacott, R.J. THE TASK FORCE PROPOSAL ON AUTO CONTENT: WOULD THIS SIMPLY EXTEND THE AUTO PACT, OR PUT IT AT SERIOUS RISK?

1983

8328C Boyer, Kenneth D. U.S.-CANADIAN TRANSPORTATION ISSUES.
8329C Bird, Richard M. and Brean, Donald J.S. CANADA-U.S. TAX RELATIONS: ISSUES AND PERSPECTIVES.
8330C Moroz, Andrew R. CANADA-UNITED STATES AUTOMOTIVE TRADE AND TRADE POLICY ISSUES.

1984

8401C Harrison, Glenn W. and Manning, Richard. BEST APPROXIMATE AGGREGATION OF INPUT-OUTPUT SYSTEMS.
8402C Parkin, Michael. CORE INFLATION: A REVIEW ESSAY.
8403C Blomqvist, Åke, and McMahon, Gary. SIMULATING COMMERCIAL POLICY IN A SMALL, OPEN DUAL ECONOMY WITH URBAN UNEMPLOYMENT: A GENERAL EQUILIBRIUM APPROACH.
8404C Wonnacott, Ronald. THE THEORY OF TRADE DISCRIMINATION: THE MIRROR IMAGE OF VENERIAN PREFERENCE THEORY?
8405C Whalley, John. IMPACTS OF A 50% TARIFF REDUCTION IN AN EIGHT-REGION GLOBAL TRADE MODEL.
8406C Harrison, Glenn W. A GENERAL EQUILIBRIUM ANALYSIS OF TARIFF REDUCTIONS.
8407C Horstmann, Ignatius and Markusen, James R. STRATEGIC INVESTMENTS AND THE DEVELOPMENT OF MULTINATIONALS.
8408C Gregory, Allan W. and McCurdy, Thomas H. TESTING THE UNBIASEDNESS HYPOTHESIS IN THE FORWARD FOREIGN EXCHANGE MARKET: A SPECIFICATION ANALYSIS.
8409C Jones, Ronald W. and Kierzkowski, Henryk. NEIGHBORHOOD PRODUCTION STRUCTURES WITH APPLICATIONS TO THE THEORY OF INTERNATIONAL TRADE.
8410C Weller, Paul and Yano, Makoto. THE ROLE OF FUTURES MARKETS IN INTERNATIONAL TRADE: A GENERAL EQUILIBRIUM APPROACH.
8411C Brecher, Richard A. and Bhagwati, Jagdish N. VOLUNTARY EXPORT RESTRICTIONS VERSUS IMPORT RESTRICTIONS: A WELFARE-THEORETIC COMPARISON.
1984

8412C Ethier, Wilfred J. ILLEGAL IMMIGRATION.
8413C Eaton, Jonathon and Gene M. Grossman. OPTIMAL TRADE AND INDUSTRIAL POLICY UNDER OLIGOPOLY.
8414C Wooton, Ian. PREFERENTIAL TRADING AGREEMENTS - A 3xn MODEL.
8416C Deardorff, Alan V. FIRless FIRwes: HOW PREFERENCES CAN INTERFERE WITH THE THEOREMS OF INTERNATIONAL TRADE.
8417C Greenwood, Jeremy. NONTRADED GOODS, THE TRADE BALANCE, AND THE BALANCE OF PAYMENTS.
8418C Blomqvist, Ake and Sharif Mohammad. CONTROLS, CORRUPTION, AND COMPETITIVE RENT-SEEKING IN LDCs.
8419C Grossman, Herschel I. POLICY, RATIONAL EXPECTATIONS, AND POSITIVE ECONOMIC ANALYSIS.
8420C Garber, Peter M. and Robert G. King. DEEP STRUCTURAL EXCAVATION? A CRITIQUE OF EULER EQUATION METHODS.
8421C Barro, Robert J. THE BEHAVIOR OF U.S. DEFICITS.
8422C Persson, Torsten and Lars E.O. Svensson. INTERNATIONAL BORROWING AND TIME-CONSISTENT FISCAL POLICY.
8423C Obstfeld, Maurice. CAPITAL CONTROLS, THE DUAL EXCHANGE RATE, AND DEVALUATION.
8424C Kuhn, Peter. UNION PRODUCTIVITY EFFECTS AND ECONOMIC EFFICIENCY.
8425C Hamilton, Bob and John Whalley. TAX TREATMENT OF HOUSING IN A DYNAMIC SEQUENCED GENERAL EQUILIBRIUM MODEL.
8426C Hamilton, Bob, Sharif Mohammad, and John Whalley. RENT SEEKING AND THE NORTH-SOUTH TERMS OF TRADE.
8427C Adams, Charles and Jeremy Greenwood. DUAL EXCHANGE RATE SYSTEMS AND CAPITAL CONTROLS: AN INVESTIGATION.
8428C Loh, Choon Cheong and Michael R. Veall. A NOTE ON SOCIAL SECURITY AND PRIVATE SAVINGS IN SINGAPORE.
8429C Whalley, John. REGRESSION OR PROGRESSION: THE TAXING QUESTION OF INCIDENTE ANALYSIS.