

# Studies on the Relationship between Social Security and Personal Saving

## A Tabular Survey

By Jan B. Kuné, Amsterdam

### I. Introduction

The past decade has witnessed an increased debate on the question whether the social security system<sup>1</sup> has a negative impact on private saving. Reduced private saving induces a capital shortfall and inhibits growth in productivity. Particularly since the publication of *Feldstein's* 1974 – study the effects of social security on private saving have been the subject of a still ongoing research controversy. In this study *Feldstein* claims that his empirical analysis of United States time series data for the period 1929 - 1971 suggests that the social security program has reduced private saving by 38 percent in 1971. In a climate of anxiety over a capital shortage this estimate raised serious questions about the economic consequences of the introduction and further growth of a social security program<sup>2</sup>.

This paper reviews the empirical content of the most important studies carried out for the United States, Canada and six European countries dealing with the impact of public social security on aggregate personal saving. Theoretical considerations are left aside.

### II. Empirical Studies

By including social security *Feldstein* has extended the life cycle/permanent income theory of *Ando* and *Modigliani* [1963], *Modigliani* and *Brumberg* [1954] and *Friedman* [1957] in an important way. *Feldstein* concludes

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<sup>1</sup> Social security generally includes old-age, survivors and disability programs.

<sup>2</sup> A review of the capital shortage literature is found in *Eisner* [1977]. See also *von Fürstenberg* and *Malkiel* [1977] and *Feldstein* [1977<sup>1</sup>]. *Pogue* and *Sgontz* [1977] argue that the U.S. social security system has provided an incentive for one generation to save for retirement by investing in the human capital of the next generation.

that the introduction and growth of a pay-as-you-go social security system would depress personal saving and hence national capital formation<sup>3</sup>. Individuals view anticipated social security benefits during retirement as a substitute for their own preretirement saving and thus are less motivated to save during their working years to provide for retirement consumption. This effect is called the saving replacement effect. On the other hand, however, saving is increased because of the “induced retirement effect” of the system: social security benefits encourage earlier retirement, thereby increasing saving. The effect of the social security program on personal saving is therefore theoretically ambiguous. *Barro* added to this a further source of ambiguity. He pointed out that the institution of a social security program might replace an existing system of intrafamily (intergenerational) transfers. To the extent that social security benefits result in offsetting adjustments in private transfers – reduced transfers from children to their aged parents or increased bequests from parents to their children – the effect on private saving would be diminished.

The authors included in this survey consider alternative definitions of saving (consumption) and use various functional forms of the saving (consumption) function for different time periods encompassing a rather wide range of explanatory variables. Among these variables are current and lagged disposable income, permanent income, transitory income, retained earnings, household wealth, the stock of household durables, human capital, other pension fund wealth, the unemployment rate, various interest rates, the labour force participation rate of the aged, government surplus, real money balances and others.

Variables assumed to represent the influence of the social security system are, (1) gross social security wealth (SSWG), i.e. the present value of expected future social security benefits that can be claimed by all those who are either in the labour force or already retired, (2) net social security wealth (SSWN), i.e. gross social security wealth minus the present value of social security contributions to be paid by those who are currently in the labour

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<sup>3</sup> In this survey only studies dealing with the impact of unfunded public social security programs on saving are considered. The influence of private pensions on saving is considered by *Cagan* [1965], *Katona* [1965], *Feldstein* [1978] and *Munnell* [1976, 1980]. *Cagan* and *Katona* found that people covered by private pensions did not reduce their saving but rather saved more than people not covered. *Cagan* explained his results in terms of a recognition effect: pension plans direct attention to retirement needs. *Katona* added to this a second explanation, the goal gradient hypothesis: people increase their saving efforts the closer the date of retirement. The studies of *Feldstein* and *Munnell* reveal that reduced private saving is offset by increased pension saving by a small amount.

force, (3) social security contributions (SSC) and (4) social security benefits (SSB). It will be clear that the variables SSWG and SSWN are just fictional quantities.

It should be kept in mind that the form and specification of the saving or consumption function used by an author is only one of many alternatives that could have been chosen. Carefully scrutinizing the work of different investigators reveals that estimation results are often very sensitive to changes in specification.

In order to reduce multicollinearity problems most authors use series in constant dollars and on a per capita basis or use the ratio's of relevant quantities to national income. All authors, except *Gultenkin* and *Logue* use yearly data, which makes it less meaningful to take into account the possibility of short-term disequilibria or, in other words, the possibility that actual saving differs from desired saving. All authors except the ones of the Ontario-study use a single-equation approach and ordinary least squares. The estimation results are therefore subject to possible simultaneous equation bias. The Ontario-study uses a simultaneous equations model that is comprised of two structural equations, the dependent variables being the saving of the households and the labour-force participation of the aged.

The table below summarizes the most important time-series studies carried out for the United States, Canada and six European countries<sup>4</sup>. Attention is only given to the sign and significance of the coefficient of the social security variable. Unfortunately it was not possible to calculate elasticities. From each author we choose those equations which are in our view most characteristic or on which the author himself places most interest.

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<sup>4</sup> Studies on the relationship between social security and private saving across countries have been carried out e.g. by *Feldstein* [1977<sup>II</sup>, 1980], *Barro* and *McDonald* [1979] and *Kopits* and *Gotur* [1980]. *Feldstein* concludes that his findings confirm the hypothesis of a negative influence of public social security on personal saving, whereas the results of *Barro* and *McDonald* and *Kopits* and *Gotur* do not support that hypothesis. The divergence of parameter estimates of *Feldstein* and *Barro* and *McDonald* is discussed by *Horioka* [1980]. Cross-section analyses of individual households at a point in time for the U.S. have been carried out e.g. by *Munnell* [1976], *Feldstein* [1976], *Feldstein* and *Pellechio* [1979] and *Kotlikoff* [1979<sup>I</sup>]. The findings of *Munnell*, *Feldstein* and *Feldstein* and *Pellechio* suggest that there is a negative impact of public social security on saving, whereas the evidence of *Kotlikoff* indicates inconclusiveness. A useful review of cross-section analyses for the United States is given by *Danzinger* et al. [1981]. The main conclusion of *Green* [1981] for the United Kingdom is that pension saving does not substitute with other types of saving. Against this *Schoeplein* [1970] found in Canada some evidence of substitutability between pensions and other retirement saving.



### 1. United States

*Feldstein* [1974] uses aggregate time-series data for the period 1929 - 1971. His estimates are based on a life-cycle model including gross and net social security wealth in turn<sup>5</sup>. The regression coefficient found on SSWG for the entire period has the right sign and is highly significant. However, this coefficient is not significant when the equation is estimated for the postwar period 1947 - 1971. More important, the result found for the entire period depends critically upon deleting the unemployment term from the equation. This however does not appear justified. *Kotlikoff* [1979<sup>II</sup>] notes that the effect of the implied decrease in saving on the rate of return on capital should be taken into account.

*Munnell* [1974] uses aggregate time-series data for the period 1900 - 1971. Her estimates are also based on the life-cycle model. Variables measuring the effect of social security are gross and net social security wealth and social security contributions. Furthermore a variable representing the induced retirement effect is included, which however appears never to be significant. The social security variables are not significant in explaining personal saving during the whole period; the variable SSWN is significant in one case for the postwar period 1949 - 1969. Although aggregate personal saving is not affected, social security seems to have an impact on the type of saving.

*Barro* [1978] uses aggregate time-series data for the period 1929 - 1974. His function is also inspired by the life-cycle model. A new variable used to measure the effect of social security is the benefit-coverage, which appears never to be significant. The unemployment variable is always significant, whereas the SSWG variable is not significant in all periods analyzed except when the unemployment term is deleted.

*Darby* [1979] uses time-series data for the period 1929 - 1974 and the functions he estimates are based on the permanent income hypothesis. The SSWG and SSWN variables seem to be significant in explaining personal saving during the whole period, but *Darby* himself is doubtful on this result because of specification errors. Regressions run for the postwar period 1947 - 1974 never show a positive or negative effect of social security on saving.

*Gultenkin* and *Logue* [1979] first use yearly time-series data for the postwar period. In one of two cases the SSC variable appears to be significant.

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<sup>5</sup> Though *Feldstein's* theoretical formulation clearly recognizes the induced retirement effect of social security, there is no variable explicitly designed to account for it in his specification.

The coefficient of SSWN is never significant. Next the authors estimate some saving equations based on a stock adjustment model using quarterly data for the period 1952: III-1974: II. The long-run effects of social security appear to be negative for the entire period and two chosen subperiods. Unfortunately standard errors of the long-term coefficients are not given.

*Leimer and Lesnoy* [1982] discovered an error in *Feldstein's* construction of the SSWG variable. The results of the authors based on the *Feldstein* replica variables do not provide statistically significant support for the hypothesis that social security decreased personal saving. *Leimer and Lesnoy* also developed various alternative SSWG variables. The coefficients are generally insignificant and (in the authors' view) of the wrong (positive) sign.

## 2. Canada

*Boyle and Murray* [1974] use annual time-series data for the period 1954 - 1975. Also their saving function is inspired by the life-cycle model. The SSWG variable appears not to be significant in any of the equations estimated. In a study of the Government of Ontario [1977] a saving function and a retirement function are estimated simultaneously for the period 1953 - 1975. The social security variable used here is real government public pension benefits per aged eligible individual. The findings are that there is no significant influence of this variable on personal saving.

## 3. England

*Hemming* [1978] extends *Feldstein's* study to England for the period 1949 - 1973. One of the explanatory variables is expected income, which is approximated by an infinite geometrically declining lag on past incomes. The coefficient of SSWG is found to be insignificant, whereas that of the SSWN variable is significant and has a positive sign.

## 4. Sweden

The model of *Markowski and Palmer* [1979] employs for the period 1952 - 1975 the framework of the permanent income hypothesis originally formulated by *Friedman*. Expected pension benefits are used as the social security variable. This variable becomes significant in the equation on which the authors themselves place most interest. It appears however that reduced

personal saving is more than offset by increased pension saving, since the Swedish pension scheme is partially funded.

#### 5. *Germany (FR)*

*Pfaff, Hurler and Dennerlein* [1979] consider the postwar periods 1958 (1964) - 1975. Social security benefits and contributions are used as variables reflecting the influence of the social security system. Their main finding is that the empirical evidence indicates that either no effect exists at all or else that it would tend to be negligible.

#### 6. *France*

*Kessler, Masson and Strauss-Kahn* [1980] extend the life-cycle model studies of *Feldstein* and *Munnell* to France for the period 1959 - 1977. With respect to the SSWG variable the findings are inconclusive. The variable SSC also does not seem to exert a significant influence.

#### 7. *Belgium*

*Pestieau and Perelman* [1980] perform the same calculations as the above mentioned authors for Belgium for the period 1962 - 1977. Their findings are that there is neither a negative nor a positive influence of social security on national saving.

#### 8. *Netherlands*

*Kuné* [1981] investigates the impact of social security on personal saving for the period 1952 - 1978. It appears that no unambiguous empirical support can be found for the hypothesis of a negative effect of social security on personal saving.

### III. Conclusions

In this paper the empirical results of the major studies that investigate the effect of social security on aggregate personal saving in the United States, Canada and six European countries are reviewed. The survey is summarized in tabular form.

**The Effect of Social Security on Personal Saving**

country	author(s)	period <sup>a)</sup>	social security variable	evidence <sup>b)</sup>
United States	Feldstein	1929 - 1971	SSWG	significant
		1947 - 1971	SSWG	not significant
	Munnell	1900 - 1971	SSC	not significant
		1929 - 1969	SSWG	not significant
		1929 - 1969	SSWN	not significant
		1946 - 1971	SSC	not significant
		1946 - 1969	SSWG	not significant
		1946 - 1969	SSWN	significant
		1929 - 1974	SSWG	not significant
		1947 - 1974	SSWG	not significant
	Barro	1929 - 1974	SSC	not significant
		1929 - 1974	SSWG	significant
	Darby	1929 - 1974	SSWN	significant
		1947 - 1974	SSC	not significant
		1947 - 1974	SSWG	not significant
		1947 - 1974	SSWN	not significant
		1947 - 1974	SSWN	not significant
		1947 - 1974	SSC	significant
		1952: III - 1974: II	SSWN	unknown
		and two subperiods	SSC	unknown
	Leimer and Lesnoy	1930 - 1974	SSWG	not significant
		1930 - 1974	SSWN	not significant
		1947 - 1974	SSWG	significant, positive sign, implausible size
		1947 - 1974	SSWN	implausible size
		1930 - 1974	SSWG variants	not significant, positive sign
		1947 - 1974	SSWG variants	positive sign
Canada	Boyle and Murray Gov. of Ontario	1954 - 1975	SSWG	not significant
		1953 - 1975	SSB	not significant
England	Hemming	1949 - 1973	SSWG	not significant
		1949 - 1973	SSWN	significant, positive sign
Sweden	Markowski and Palmer	1952 - 1975	SSB	significant
Germany (FR)	Pfaff et al.	1958 (1964) - 1975	SSC	significant, positive sign
		1958 (1964) - 1975	SSB	not significant
France	Kessler et al.	1959 - 1977	SSWG	not significant
		1959 - 1977	SSWG <sub>-1</sub>	significant
		1959 - 1977	SSC	not significant
Belgium	Pestieau and Perelman	1962 - 1977	SSWG	not significant
Netherlands	Kuné	1952 - 1978	SSC	not significant

a) Excluding the war years 1941 - 1946.

b) Unless otherwise noted there is (not) a significant evidence of a negative impact of social security on personal saving.



The overall conclusion from the studies surveyed must be a negative one: the evidence found does not provide empirical support for the hypothesis that social security depresses private saving. More important, the impression comes through that either a positive or a negative social security effect on saving can be produced depending on the details of specification and the length of the observational period. The studies which give support to the hypothesis of a negative impact of social security lose much of their validity after careful interpretation<sup>6</sup>.

There are many problems of economic conception, statistical theory and data characteristics that severely limit the reliability of the estimates of the effect of social security on saving. Furthermore, we are inclined to conclude that the motives for saving are much more complex than those postulated within the context of the life cycle model. The inconclusive results found by many authors may thus be consistent with the view that the life cycle model does not provide an adequate explanation of the individual's saving behavior.

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<sup>6</sup> This conclusion emerges also from theoretical considerations and from two other types of empirical evidence that are presently available: cross country studies and analyses of individual cross-sections.



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## **Zusammenfassung**

### **Untersuchungen über das Verhältnis zwischen Sozialversicherung und privater Ersparnis**

Dieser Beitrag gibt einen Überblick der wichtigsten Zeitreihenstudien des Verhältnisses zwischen Sozialversicherung und privater Ersparnis, die für die Vereinigten Staaten, Kanada und sechs europäische Länder ausgearbeitet wurden. Der tabellarische Überblick listet die Variable „Sozialversicherung“ und den Beweis der Wirksamkeit auf die private Ersparnisbildung auf.

## **Summary**

### **Studies on the Relationship between Social Security and Personal Saving**

This paper gives a survey of the most important time-series studies on the relationship between social security and personal saving carried out for the United States, Canada and six European countries. The tabular survey lists the social security variable and the evidence of the impact on personal saving.

## **Résumé**

### **Recherches sur les rapports entre l'assurance sociale et l'épargne privée**

Cet article donne un aperçu des plus importantes études dans l'ordre temporaire sur les rapports entre l'assurance sociale et l'épargne privée. Ces études furent poursuivies pour les Etats-Unis, le Canada et six pays européens. Le tableau reprend la variable « assurance sociale » et montre ses effets sur la formation de l'épargne privée.