SOCIAL SECURITY AND ECONOMIC PERFORMANCE IN PORTUGAL*

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1. INTRODUCTION

The reform of the social security system is currently at the center of the policy debate in many countries (see, for example, World Bank (1995)). The need for reform is typically associated with the realization that the social security system is not financially sustainable. We say that the social security system is not sustainable if the current level of social security benefits cannot be financed given the current social security tax base and contribution rates. At the root of these solvency problems is the pay-as-you-go (PAYG) financing mechanism. Under a PAYG mechanism, currently employed workers pay for the benefits of the unemployed, elderly, or disabled. As a result, there is no direct relationship between contributions and benefits for each specific individual and the solvency of the systems may be seriously jeopardized by adverse demographic and economic conditions. Under such adverse conditions, the social security system may be unable to generate enough revenue into the future to finance their current commitments. This is also the situation with the Portuguese social security system(1).

While the lack of sustainability is widely recognized as an inherent problem of a PAYG system, the fact that the same PAYG system may cause considerable economic distortions is less appreciated in the policy debate. In fact, a PAYG social security system is likely to affect the labor and financial markets negatively (see, for example, Feldstein (1996), Gramlich (1996) and Kotlikoff (1997)). Since there is no direct relationship between social security contributions and social security benefits for each specific individual, social security contributions are perceived as taxes on labor income. To the extent that these taxes are borne by producers, they increase real labor costs and affect labor demand negatively. If, however, some of the burden of the labor taxes is borne by workers, then they will reduce disposable income and private savings. By affecting negatively both employment and funding for capital formation, a PAYG social security system is likely to affect output negatively as well.

The empirical evaluation of the magnitude of the negative effects of the social security system on economic performance is critical from a policy perspective. In fact, the presence of sizable negative effects would suggest that the social security system is inefficient even if it were sustainable. Accordingly, the social security would be in need of reform even if were sustainable. Furthermore, if inefficiency is a problem, the conventional recipes to deal with sustainability, increased contributions or decreased benefits, could cure the problem of sustainability but only at the cost of increased economic inefficiencies. As a corollary, in the presence of sizable inefficiencies the debate on social security reform would have to be re-focused from the issue of the sustainability of the system to the issue of its efficiency effects.

The objective of this paper is to provide an empirical evaluation of the size of the distortionary

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(1) See Banco de Portugal (1995), p. 104-106, for a short but comprehensive overview of the social security system in Portugal, Borges e Lucena (1988), Braz (1995), OECD (1996), and Silva (1997), on the issue of sustainability of the Portuguese system, and Gaspar, Lucena, and Pereira (1994), and Gouveia and Pereira (1997) on the issue of social security reform in Portugal.

effects of the social security system in Portugal. The analysis is based on a vector auto-regressive (VAR) approach and the associated impulse-response functions. This approach identifies explicitly the effects of changes in the evolution of social security spending on unit real labor costs, the unemployment rate, the savings rate and output. The dynamic multivariate approach follows from the argument that the analysis of the effects of the social security system requires the consideration of the dynamic feedback effects between changes in social security spending and changes in the remaining variables. Thus, social security spending is allowed to affect economic performance through time and economic performance itself is also allowed to affect the evolution of social security spending. In fact, it can clearly be argued that a country with higher standards of living can also afford a more generous social security system while a country with, for example, higher unemployment necessitates a more generous social security system. Ultimately, the effects of social security on the economic performance have to account for both the initial shocks to social security spending as well as the subsequent dynamic interactions among the different variables.

2. DATA: SOURCES AND DESCRIPTION

This paper considers the following variables: output (GDP), the private savings rate, i.e., private savings as a fraction of GDP (SAV), the unemployment rate, (UNR), the unit real costs of labor (UCL), and social security spending as a fraction of GDP (SSEC). All the variables are used in natural logarithm form, denoted by the letter L before their respective name (LGDP, for example).

For the international cross-section regressions in section 3, the data for all variables is obtained from the Statistical Annex of the European Economy (1995). Each variable is averaged over the period 1981 to 1990 for each of the fifteen European Union countries: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain, Sweden, and the UK.

The data for the time series regression covers the sample period of 1960 to 1991 and, therefore, contains 32 yearly observations. The data set is obtained from several sources. GDP is obtained as national spending in 1977 prices from the long-term national accounting series published in Cunha, Dias, and Santos (1992). Private saving in current prices is from the same source, as is the GDP price deflator used to convert nominal private savings into real savings in 1977 prices. The unemployment rate and the unit costs of labor are obtained from Statistical Annex to the European Economy (1995). Finally, social security spending in nominal terms was obtained from unpublished sources in the Banco de Portugal and converted into 1977 prices using the GDP price deflator.

The social security variable represents spending rather than revenues. While historically in Portugal the two series have been closely related, in recent years there has been a growing discrepancy between the two. The corresponding deficits have been covered from the general public account budget, i.e., either from general taxation or from public indebtedness, which are claims on future private sector income. Accordingly, social security spending, rather than revenues, best reflects the size of the social security system and more accurately measures the source of the burden induced by the social security system. The social security spending variable includes the general system covering private sector workers and the system for public sector employees. It does not include, however, special regimes that apply, for example, to the banking sector. Finally, the social security spending variable includes pensions for old age, invalidity, and survivors (about 77 per cent of total spending) and compensation for temporary loss of income due to sickness and unemployment as well as other welfare benefits (the remaining 23 per cent)[(2)].

(2) The use of aggregate spending is justified conceptually by the scope of the paper and for practical reasons by the need to keep the VAR estimates at a manageable level. It should be recognized, however, that the focus on aggregate spending obscures the fact that the different components of social security spending affect economic performance through different channels and with different intensities. Accordingly, it is likely that mere changes in the composition of social security spending, without changes in the overall spending, would affect economic performance. This point should in no way affect the answer to the general question in the paper. This is because all major components of social security spending show a positive trend and our prior is that all increases in social security spending are likely to be distortionary. Implicitly, our results presume that at the margin changes in the size of social security spending maintain the average composition of spending observed in the sample period.

Table 1

CROSS-SECTION REGRESSIONS

Dependent variable:	LPIB	LPOUP	LTXDES	LCTUP
Constant	2.503	0.974	0.085	2.589
	(0.324)	(0.194)	(0.259)	(0.180)
LSSEG	0.610	0.827	0.458	0.638
	(0261)	(0.156)	(0.208)	(0.145)
$\overline{R}^2$	0.22	0.63	0.19	0.53

Note: standard errors in parenthesis.

Table 2

TIME-SERIES REGRESSIONS

Dependent variable:	LGDP	LSAV	LUNR	LUCL
Constant	13.644	-0.146	3.843	6.613
	(0.276)	(0.834)	(0.363)	(0.176)
Trend	0.025	-0.004	-0.003	-0.030
	(0.004)	(0.013)	(0.021)	(0.003)
LSSEG	0.323	0.559	0.884	0.593
	(0.078)	(0.235)	(0.384)	(0.050)
$\overline{R^2}$	0.97	0.58	0.60	0.82

Note: standard errors in parenthesis.

3. SOME STYLIZED CROSS-SECTIONAL FACTS

The objective of this section is to provide some international stylized facts on the relationship between the size of the social security system and the evolution of the other variables under discussion. The purpose is to establish contemporaneous correlations not to make statements on causality.

Table 1 reports on the cross sectional regressions of LGDP, LSAV, LUNR, and LUCL on LSSEC. As is appropriate with cross-sectional regressions including such disparate countries, all variables are divided by the square root of the population of the respective country. This eliminates problems of heteroskedasticity on the assumption that the variance of the country-specific residual is proportional to the population of the country.

The international cross-section regressions show a strong positive correlation between national output and the savings rate and social security spending. This suggests that social security is a normal good good: richer and thriftier countries tend to have more of it. If one has the prior belief that social security may reduces savings and lowers GDP growth, then this results suggest that these effects are contemporaneously dominated by the "normal good" effect. In addition, both the unit costs of labor and unemployment are also strongly and positively correlated with the level of social security spending. This is consistent with the intuition that countries with higher unemployment may seek greater unemployment protection while at the same time greater unemployment protection may induce higher unemployment.

Table 2 reports on the regressions of LGDP, LSAV, LUNR, and LUCL on LSSEC with time series data for Portugal. The pattern of correlations that we have identified in the cross-sectional regressions for the EU is also found when we consider the same regressions with time series data for Portugal. In particular, there is a strong positive correlation between GDP and the unemployment rate and social security spending.

These results have very important policy implications and are very useful in putting the richer VAR results below into perspective. Portugal is currently going through a deliberate process of real convergence to EU standards. This means that GDP in purchasing power parity in Portugal is expected to increase substantially over the next decade or so. The positive correlation between GDP and the size of social security system suggests that there will be great pressures to increase the generosity of the Portuguese social security system. It also worth noticing, however, that in the cross-section regressions the observation for Portugal is below the regression line for both GDP and savings. This suggests that Portugal has a social security system that is more generous than what is implied, by EU standards, by its level of GDP *per capita* and savings performance. Thus, there may be less pressure to upgrade the social security system than what would be implied by an improvement in the Portuguese standards of living.

At the same time Portugal is currently experiencing levels of unemployment that are relatively

Table 3

TESTING THE NULL HYPOTHESIS OF A UNIT ROOT

Variable	Deterministic components	Optimal lag (BIC)	Test Statistic	Value 5%	Critical 1%
LGDP	Constant	0	-2.7167	-2.93	-3.58
LSAV	None	0	-0.6183	-1.95	-2.62
LUNR	None	0	0.0066	-1.95	-2.62
LUCL	None	2	-0.1598	-1.95	-2.62
LSSEG *	None	0	-2.9388	-1.95	-2.62

Note: * cannot reject the null hypothesis with Phillips-Perron's z-test.

Table 4

TESTING OF COINTEGRATION

Variable	Deterministic components	Optimal lag (BIC)	Test Statistic	Value 5%	Critical 1%
LGDP	Constant & Trend	0	-3.5169	-4.45	-5.07
LSAV	Constant & Trend	0	-3.6065	-4.45	-5.07
LUNR	Constant & Trend	0	-3.6419	-4.45	-5.07
LUCL*	Constant & Trend	1	-7.4658	-4.45	-5.07
LSSEG *	Constant & Trend	1	-5.4574	-4.45	-5.07

Note: * cannot reject the null hypothesis with Phillips-Perron's z-test.

Table 5

SPECIFICATION FOR THE VECTOR AUTOREGRESSIONS

Deterministic components	Lags	AIC	BIC
None	1	-25.051	-23.883
Constant	1	-25.206	-24.205
Constant & Trend	1	-25.433	-24.599
None	2	-26.49	-24.232
Constant	2	-26.684	-24.699
Constant & Trend	2	-26.721	-24.709

low by EU standards. There is a great concern that either institutional or economic changes may increase the unemployment rate. The positive correlation between the unemployment rate and the size of the social security suggests that there will be pressures to increase the generosity of the system, in particular the unemployment benefits. This is particularly important since in this case the observation for Portugal in the cross section unemployment regression is well above the regression line. This suggests that Portugal has currently a social security system that is less generous than what is implied, by EU standards, by its unemployment rate.

4. VAR ESTIMATION AND IMPULSE RESPONSE FUNCTION ANALYSIS

4.1 Preliminary data analysis and VAR estimation

To decide on the order of integration of the variables we test the null hypothesis of a unit root on LGDP, LSAV, LUNR, LUCL and LSSEC. The results of the Augmented Dickey-Fuller (ADF) t-test are reported in Table 3. The optimal lag structure was chosen using the Box Information Criterion (BIC). A deterministic component was considered if statistically significant. In all but one case, the value of the ADF t-test is greater than the 5 per cent critical value. Therefore, the null hypothesis of a unit root cannot be rejected. In the case of LSSEC, further experiments not reported in Table 3, suggest that the null hypothesis of a unit root cannot be rejected using the ADF t-test with any other specification of the deterministic component. Furthermore, the null of a unit root cannot be rejected, even at the 10 per cent level, with the Phillips-Perron's Z-test. We take this as evidence that stationarity in first differences is a good approximation for all the time series under consideration.

In order to investigate the existence of cointegration among the different variables, LGDP, LSAV, LUNR, LUCL, LSSEC, the ADF t-test was applied to the residuals from the regressions of each variable on the remaining variables. The results are shown in Table 4. Again, the optimal lag structure was chosen using the BIC and a deterministic component was considered if statistically significant. Five cases were considered, the endogenous variable in the regression being the residuals of the variable indicated. In three of the five cases the value of the t-statistic is larger than the 5 per cent critical value. This means that the null hypothesis of a unit root in the residuals cannot be rejected and the evidence is against the existence of co-integration among these variables. In the two cases where the ADF test allows us to reject the null hypothesis, further investigation suggests otherwise. In fact, the ADF Z-test suggests that the null could not be rejected in these cases, even at the 10 per cent level. All together, we conclude that the evidence is overwhelmingly against co-integration.

Following the standard procedure in the literature, and given the non-stationarity of the variables and the absence of co-integration, the VAR estimates are in first differences of log-levels, i.e., in growth rates, denoted by the letter D before their respective name (DLGDP, for example). The general specification of the VAR model is provided in Table 5. A second order specification with both constant and trend is suggested by the BIC. Likelihood ratio tests on both the second-order coefficients and the deterministic components confirm this choice. The VAR estimates are reported in Table 6. In all cases the R-squares as well as the Durbin-Watson statistics are within acceptable bounds. The matrix of contemporaneous correlations among the estimated residuals is given in Table 7. In general, the innovations tend to display relatively low contemporaneous correlations, i.e., under 0.50.

4.2 Impulse response function analysis: orthogonalization strategies

The analysis of the effects of changes in social security spending is based on the impulse response functions associated with the estimated VAR system. These functions are designed to identify the effects of an unanticipated one percentage point temporary increase in the growth in one variable in the system on the growth of the other variables in the system. We expect a temporary shock in the growth rate of one variable to have only a temporary effect on the growth of the other variables. It will have, however, a permanent effect on the levels of the other variables.

Table 6

ESTIMATES: THE VECTOR AUTO-REGRESSIVE MODEL

	DLGDP	DLSAV	DLUNR	DLSSEC	DLSSEG
Constant	0.049 (0.031)	-0.090 (0.141)	0.280 (0.167)	-0.052 -0.049	0.027 (0.080)
Trend	-0.001 (.001)	0.001 (0.004)	-0.005 (0.005)	0.002 (0.001)	0.000 (0.002)
DGDP-1	0.521 (0.240)	-0.873 (1.089)	-5.597 (1.289)	-0.068 (0.377)	0.106 (0.615)
DLSAV-1	0.055 (0.043)	0.031 (0.196)	-0.101 (0.232)	-0.092 (0.068)	0.025 (0.110)
DLUNR-1	0.032 (0.038)	0.202 (0.172)	-0.379 (0.204)	-0.005 (0.059)	-0.128 (0.097)
DLUCL-1	-0.108 (0.131)	0.165 (0.593)	2.287 (0.702)	0.446 (0.206)	0.828 (0.335)
DLSSEC-1	0.090 (0.076)	-0.272 (0.346)	-0.210 (0.409)	0.075 -0.119	-0.013 (-0.195)
DLGDP-2	-0.207 (0.268)	3.216 -1.214	1.992 -1.437	0.933 (0.421)	0.645 (0.685)
DLSAV-2	-0.084 (0.041)	-0.183 (0.186)	0.289 (0.220)	0.019 (0.064)	0.204 (0.105)
DLUNR-2	-0.033 (0.033)	0.365 (0.151)	0.477 (0.179)	0.060 (0.052)	-0.075 (0.085)
DLUCL-2	0.056 (0.142)	0.542 (-0.647)	0.815 (0.766)	-0.453 (0.224)	0.646 (0.365)
DLSSEC-2	-0.105 (0.072)	-0.416 (0.329	-0.223 (0.390)	0.104 (0.114)	-0.274 (0.186)
$\overline{R^2}$	.29	.12	.58	.42	.39
D-W	2.00	2.14	2.30	2.40	2.31

It is well known that the results of impulse response analysis depend on the ordering of the variables. Since the matrix of contemporaneous correlations among the estimated residuals is not diagonal, orthogonalization is necessary before we can conduct a meaningful analysis. Orthogonalization, however, is not unique. We confine our discussion of orthogonalization strategies to the use of triangular matrices under the Choleski decomposition method. In our case, there are five scenarios depending on whether social security spending growth is ranked first, second, third, fourth, or fifth. These five scenarios completely determine the range of results in the impulse response analysis.

Of the five possible scenarios, one seems to be the most plausible *a priori*. In this central scenario we focus on the case in which social security spending growth is ranked first. Here shocks to social security spending affect the other variables contemporaneously, but shocks from the other variables have no contemporaneous effect on social security spending growth. The choice of this case is based on the view that within a one-year

Table 7

ESTIMATES: MATRIX OF CONTEMPORANEOUS CORRELATIONS AMONG THE VAR RESIDUAL

	DLGDP	DLSAV	DLUNR	DLUCL	DLSSEC
s-error	0.0205	0.0931	0.1102	0.0323	0.0525
DLGDP	1.0000				
DLSAV	0.3422	1.0000			
DLUNR	-0.3165	-0.4624	1.0000		
DLUCL	-0.2482	-0.2637	0.0743	1.0000	
DLSSEC	-0.3424	-0.5554	0.0857	0.4838	1.0000

period, changes in social security spending can be determined independently by the government. Since our central scenario is based on orthogonalizations when social security spending is ranked first, for each variable there is a single estimated elasticity with respect to social security spending regardless of the order of the remaining variables.

4.3 On the estimated impulse response functions

Figures 1.1-1.5 show the impulse responses in our central scenario to a one-time increase in social security spending growth of one percentage point (1.00). Since our social security variable is social security spending as a fraction of the GDP, this means that at period one social security spending growth is one percentage point above GDP growth. As Figures 1.1-1.5 illustrate, all of the impulse response functions display a very smooth evolution. Though we carry out the simulations for twenty periods, in each case convergence is achieved after a period of five to ten years. In turn, Figure 2 gives the accumulated impulse responses to the shock in social security spending. The accumulated impulse response functions show the effects of the shock to social security spending on the levels of the other variables as opposed to the growth rates which are displayed in Figures 1.1-1.5.

It should be pointed out that, as Figure 2 shows, a one percentage point change in social security spending growth induces a total accumulated change in social security spending growth of just 0.8 percentage points. The fact that the accu-

Figure 1.1

IMPULSE RESPONSE FUNCTION OF DLGDP WITH RESPECT TO DLSSEG

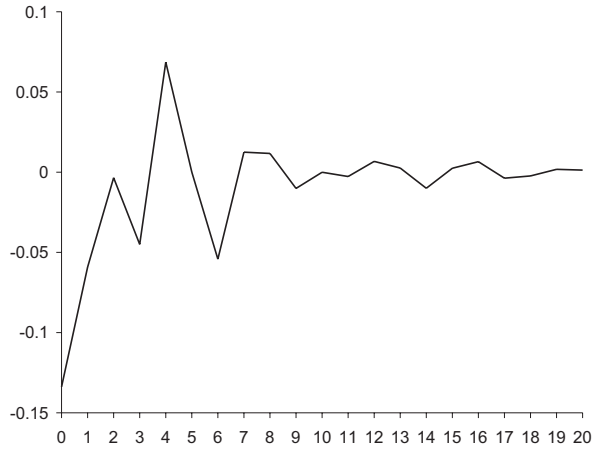


Figure 1.2

IMPULSE RESPONSE FUNCTION OF DLSAV WITH RESPECT TO DLSSEC

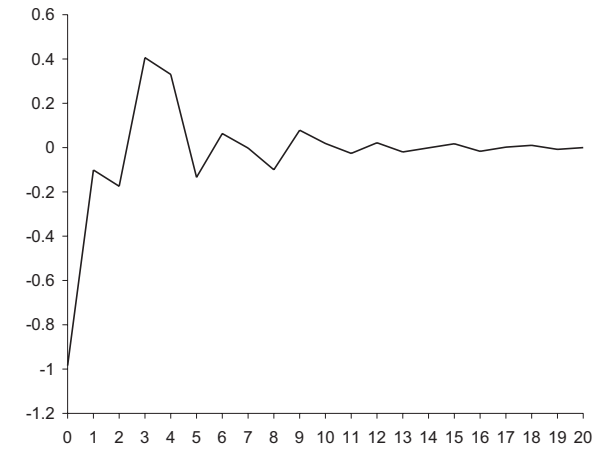


Figure 1.3
IMPULSE RESPONSE FUNCTION OF DLUNR WITH RESPECT TO DLSSEC

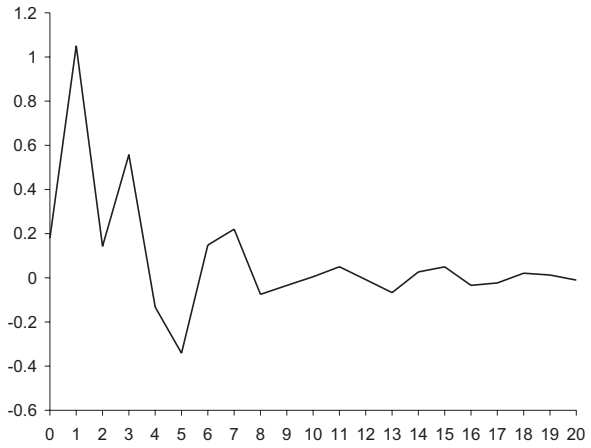


Figure 1.4
IMPULSE RESPONSE FUNCTION OF DLUCL WITH RESPECT TO DLSSEC

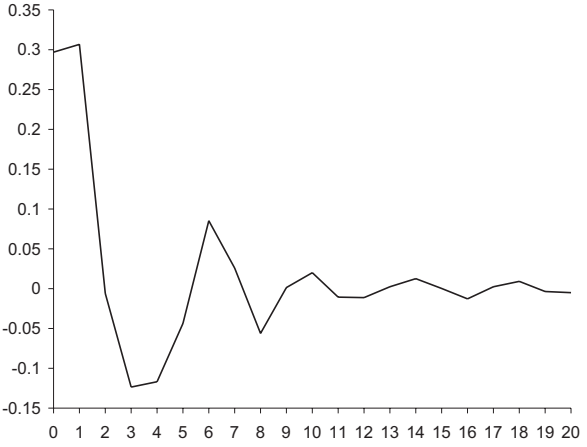


Figure 1.5
IMPULSE RESPONSE FUNCTION OF DLSSEC WITH RESPECT TO DLSSEC

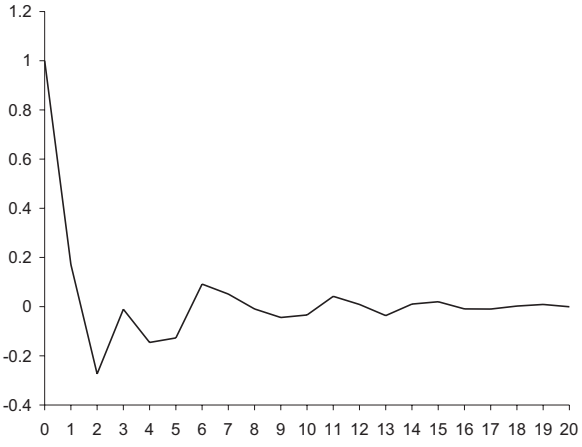
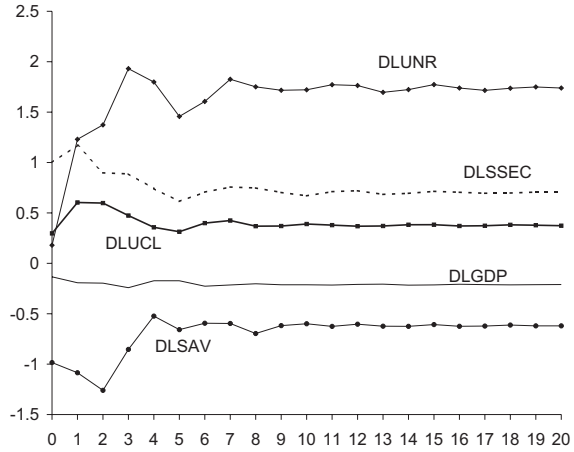


Figure 2
ACCUMULATED IMPULSE RESPONSES TO SHOCKS IN SOCIAL SECURITY SPENDING



mulated long-term effect differs from original shock means that social security is not, as often assumed in the literature, an exogenous variable. In fact, while changes in the evolution of social security spending affect the other variables, changes in the other variables also affect over time the evolution of social security spending(3).

4.4 Elasticities and marginal products

The results of the impulse response function analysis are summarized using long-term accumulated elasticities and marginal products. We focus on the long-term accumulated elasticities of output, savings rate, unemployment rate, and unit real labor costs, with respect to social security spending. The long term is defined as the time horizon over which the growth effects on the other variables of innovations in the growth rate of social security spending disappear. In our analysis this means a time horizon of ten years. The long-term elasticity is obtained by allowing all variables to respond over time to the initial shock to social security spending growth in the first step. It measures the long-term accumulative effects of so-

(3) The idea that the evolution of social security spending depends on the evolution of the remaining variables in previous periods should not be confused with the assumption that contemporaneously, social security spending is not affected by affected the other variables.

cial security spending on the growth of the other variables at the last step. Since social security growth itself changes over time, the elasticity figures are normalized to measure the total accumulated effect on the other variables of an accumulated one percentage point change in the evolution of social security spending.

In turn, the long-term accumulated marginal products are computed by multiplying the elasticity figures by the ratio of the private sector variable under consideration to the social security variable. This ratio is in the original levels of the variables. Since the variables are not co-integrated, there is no stable long-term relationship among them and they should be expected to drift apart over time. This means that the choice of when to measure this ratio is not irrelevant. Given the nature of our discussion we have chosen to consider the average ratio for the last five years of the sample. This allows us to interpret the marginal products as the long-term effects of policies implemented at the end of the sample, measured under the conditions observed by the end of the sample period.

It should be noted that the terms elasticity and marginal product are used in a way that greatly departs from the conventional definitions. Here, the effects on private sector variables resulting from changes in social security spending include all dynamic feedbacks among all the variables. Therefore, the elasticities and the marginal products are total elasticities and marginal products. They measure both the direct effects of changes in social security spending on output and the indirect effects of changes in social security spending on output through changes in the evolution of the other variables. This is the concept that is relevant from a policy standpoint.

5. SOCIAL SECURITY AND ECONOMIC PERFORMANCE

5.1 Economic effects of social security: social security, unemployment and savings

The impulse response function results reported in Table 8 suggest that an increase in social security spending leads to an increase in the unit costs of labor as well as in the unemployment rate. Indeed, the long-term accumulated elasticity of the unit labor costs with respect to changes in the evolution of social security spending is 0.582 while the elasticity of the unemployment rate is 2.463. These numbers mean that a one percentage point increase in social security spending, say from 13 per cent of the GDP to 14 per cent using current figures, would lead to an increase of 4.06 per cent in the unit real costs of labor. It would also lead to an increase in the unemployment rate of 0.758 percentage points, say from 7 per cent to 7.758 per cent, using again recent figures.

Table 8

LONG-TERM ACCUMULATED EFFECTS OF CHANGES IN SOCIAL SECURITY SPENDING

Variable	Elasticities	Marginal products
GDP	-0.298	-$3.32 per $l in social security
SAV	-0.850	-$1.40 per $1 in social security
UNR	2.463	0.758 percentage points per 1% in SSEC
UCL	0.528	4.06% per 1% in SSEC

Also, the long term accumulated elasticity of the savings rate with respect to changes in social security spending is -0.850. This means that a one percentage point increase in social security spending, say from 13 per cent of the GDP to 14 per cent, would reduce the savings rate in the long term by 1.4 percentage points, say from 21.9 per cent of the GDP to 20.5 per cent again using current figures. Since both variables are expressed in percentage of the GDP, this result also suggests that $1 in social security spending crowds out $1.40 in savings in the long term. To understand why the result is greater than $1 it may be noted that there are indirect negative effects on savings in terms of lost wages through increased long-term unemployment induced by increases in social security spending. This is above and beyond any direct crowding out effects among the employed population.

5.2 Economic effects of social security: social security and GDP

The analysis of the effects on output of changes in the evolution of social security spending are to a large extent implied by their effects on savings and unemployment. The crowding out of private savings by social security implies a lower availability of funds for investment purposes while the increase in unemployment reduces the working labor force. Accordingly, one would expect the effects on the GDP to be negative. In fact, as reported in Table 8, the long-term elasticity of GDP with respect to the changes in the evolution of social security spending is -0.298. This means that a $1 increase in the social security spending from its current level of 13 per cent of the GDP, would decrease GDP in the long term by an accumulated total of $3.3.

5.3 Variance decomposition: how much does social security explain?

The results of the forecast variance decomposition are reported in Table 9. These figures tell us how much of the variability of each variable is explained by shocks in the social security variable at all horizons. We find that the variability of social security spending is explained mostly by its own shocks. In addition, approximately one-fourth of the variability of both the savings rate and the unit costs of labor are consistently explained by shocks in social security spending. Finally, shocks explain approximately 10 per cent of the variability of output and the unemployment rate. The case of the unemployment rate is particularly interesting since it takes approximately 5 years for the effects of shocks in social security spending to have a noticeable effect on the unemployment rate.

5.4 On the robustness and plausibility of the results

Clearly, the results above are conditional on the assumption that the evolution of social security spending is not affected contemporaneously by the other variables. To establish the robustness of the results from this central case, we computed the values of the impulse response functions under all of the alternative orthogonalization strategies. Specifically, there are a total of five factorial (one hundred and twenty) possible orthogonalizations for our five-variable VAR system. The range of results across all possible orthogonalizations establishes that the qualitative nature of the results above is very robust. Although, the results presented above tend to be close to the upper bounds of the range of variation, in no case is the sign of the long-term effects reversed[4].

The quantitative results presented above are also very plausible by international standards. Clearly, many other countries have social security systems that are similar to the Portuguese in that they are based on a PAYG financing mechanism. In Pereira (1998) the basic methodology presented in the present paper is applied to European Union countries and to the United States. The results for Portugal are well within the range of variation the for the different countries in this study[5].

Table 9

VARIANCE DECOMPOSITION: PERCENTAGE OF THE CHANGES IN THE VARIABLES DUE TO CHANGES IN SOCIAL SECURITY

Variable	t=0	t=5	t=10	t=20
DLGDP	11.7	11.6	11.8	11.8
DLSAV	30.8	25.5	25.1	25.1
DLUNR	0.7	10.5	10.5	10.5
DLUCL	23.4	24.2	23.5	23.1
DLSSEC	100.0	50.8	47.1	46.5

(4) The elasticity of output with respect to changes in the evolution of social security spending, for example, ranges from -0.330 to -0.144.

(5) The results on the elasticity of output with respect to changes in the evolution of social security spending, for example, range from -0.670 in France to -0.012 in the United Kingdom (Denmark actually displays a positive, albeit small, elasticity).

6. SUMMARY AND CONCLUDING REMARKS

This paper analyzes the effects of the social security spending on the economic performance in Portugal. The empirical results are based on VAR estimates using output, the savings rate, the unemployment rate, the unit real costs of labor, as well as social security spending. This approach follows the conceptual argument that analysis of the effects of the social security system requires the consideration of dynamic feedback effects among the different variables. The main conclusion of this paper is that the social security system in Portugal is, under the current design, highly inefficient. The impulse-response function results indicate that an increase in the size of the social security system adversely affects the performance of the Portuguese economy in the long term: it increases both the unit real costs of labor and the unemployment rate while it decreases the private savings rate. Since it negatively affects both capital accumulation and employment the overall effect on GDP is also negative: a $1 increase in social security spending decreases GDP by $3.3.

The negative effects of social security have to be considered in the light of the cross-sectional evidence on the relation between the size of the social security system and GDP *per capita* and the unemployment rate. It has been shown that countries with higher GDP *per capita* and with higher unemployment rates tend to have more generous social security systems. The effort to increase GDP *per capita* in Portugal and the spectrum of increased unemployment in the near future should, by international standards, induce a temptation to increase the size of the social security system. Given the negative effects of social security on economic performance and the sustainability problems of the current system, such temptation should be consistently resisted.

The results in this paper are very important from the standpoint of social security reform. In fact, our results imply that even if the social security system in Portugal were sustainable from a financial perspective, and all the evidence suggests otherwise, it would still be economically inefficient. It would, therefore, be intrinsically undesirable in its current format. This is a far-reaching conclusion. It suggests that the usual prescriptions to deal with the problems of the social security system may eventually alleviate the problem of sustainability. They will not, however, alleviate the central problem of inefficiency and may even make the problem worse. Moreover, it suggests that the policy debate should be re-focused from the issue of sustainability to the issue of efficiency. Changes in the social security system in the direction of a fully funded system have to be the cornerstone of any meaningful social security reform.

Interestingly, if it true that our results relegate the issue of sustainability to a secondary role in terms of social security reform, they also imply that the sustainability problem in Portugal is substantially worse than previously understood. In fact, all the estimates of the implicit social security debt or the equilibrium contribution rates ignore the negative effects of increasing social security contributions on the performance of the economy and therefore its feed back to the sustainability problem. If increasing the size of the system increases unemployment and decreases savings and output, it also reduces the contribution base. Therefore, the increases in the tax burden necessary to generate the stream of additional contributions have been underestimated. As a corollary, the need of trimming down the social security system in Portugal is even greater than previously understood.

Given the sensitive nature of the topic under consideration it is important to conclude with some words of caution. The results in this paper represent, unquestionably, an indictment of the current social security system in Portugal. They make it more acute the need for a reform of the system. They also point the need to re-focus the debate of social security reform from sustainability to efficiency and, in particular, to the need to bring social security contributions and benefits into actuarial balance. In no way can it be inferred that the results in this paper suggest or imply that the social security system should be eliminated or even that it should be privatized. Furthermore, as it is well known, the transition from a PAYG system to a fully-funded system is a rather difficult and lengthy process. As desirable as it may conceptually be, the change from a PAYG to a fully-funded system can only be seriously endorsed after a careful consideration of the costs of transition vis-à-vis the future benefits of having a fully-funded system. This is, clearly, a matter in which the present paper does not have anything to say.

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