
JAMES CARRITTE* and JOHN B. WILLIAMSON*

ABSTRACT

This paper addresses the debate as to the impact of public pension spending (the single largest component of welfare state spending) on economic growth rates. We examine the effect of pension spending on economic growth from two perspectives, aggregate pension expenditure and pension expenditure per recipient, in a study based on pooled time-series cross-section social indicator models for 18 affluent industrial democracies for the period between 1960 and 1988. We find that for the period between 1960 and 1973 the level of pension spending does not have a substantial impact on economic growth. For the period between 1974 and 1988 we find some evidence of a negative impact; an impact that is statistically significant, but modest in magnitude. Two control variables (percent of the labor force working in the agricultural sector and years of democracy) generally worked as predicted.

During the past two decades a number of studies have attempted to assess cross-nationally the impact of government spending on economic growth (Castles and Dowrick, 1988; Körpi, 1985; Marlow, 1986; McCallum and Blais, 1987; Saunders, 1985; Weede, 1986a, 1986b, 1991). Most of these studies have assessed the impact of government consumption spending or, more commonly, total social welfare spending. Few studies, however, have attempted to specifically assess the impact of the largest component of social welfare spending, public pension expenditures, on rates of economic growth.

Determining the impact of pension spending on economic growth has potentially important social policy implications. An important factor in the future of the welfare state may well be whether its programs hinder or facilitate economic development. The coincidence of declining economic growth and rapidly rising social spending in the industrial democracies during the past two decades has led many to implicate this spending as a cause of economic difficulties. If expenditures on social programs are widely believed to be detrimental to economic growth, support for those programs may wane. As the

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largest component of social welfare spending, public pension programs may be an especially important factor in determining the direction of whatever effects government spending has on economic growth.

This paper investigates the relationship between public pension expenditures and economic growth in the affluent democracies for the years 1960-1988. We measure the effects on economic growth of both aggregate pension expenditures and average per recipient benefit levels. Previous studies have shown that the size of a nation’s population is a major factor in the size of its social welfare and public pension budget (Holzman, 1988; Pampel and Williamson, 1985, 1988; Williamson and Pampel, 1993). Nations with larger elderly populations will have larger public pension budgets even if their per recipient benefit levels are lower than those of other nations. To distinguish the effects of the total size of public pension programs from their generosity, attention must be paid to the per recipient benefit levels as well as aggregate spending levels.

Theoretical and empirical analyses of the economic impacts of public pension programs focus largely, but not exclusively, on savings rates, labor supply, and income redistribution. Though there are likely economic growth consequences for income redistribution brought about by public pensions there is little published work in that area. Instead, attention to the redistributitional impact of pension schemes primarily concerns the net effect of transfers on income levels of the aged and the intergenerational transfer of wealth.1 In contrast to the work on redistribution, much of the work on the savings and labor supply impacts of public pension programs is directly related to economic growth, at least implicitly. Savings rates, as they translate into capital investment, and labor supply are primary components of economic growth. The economic growth concern of public pensions programs is how those programs alter savings and work incentive structures for both beneficiaries and taxpayers.

Mainstream neo-classical theory is ambivalent about the impact of public pension expenditures on economic growth, primarily because microeconomic responses to the receipt of those benefits are varied (Aaron, 1982; Danziger, Haveman, and Plotnick, 1981). Some of the actual responses consumers and workers have to the prospect of guaranteed public pension benefits might be growth promoting, while others might be growth retarding. As a way of highlighting the difficulties encountered in trying to anticipate the economic impact of public pensions, Aaron presents three theoretical models of the savings and labor supply behavior of individuals. The central issue distinguishing these three models is their assumption of the time horizon on which individuals base their behaviour. In Aaron’s life-cycle model individuals and families are assumed to base their savings and work decisions on anticipated income levels, wealth, and interest rates with no anticipation of leaving bequests. In contrast, Aaron’s multigenerational model features many of the same assumptions as the life-cycle model but allows bequests and anticipation of bequests to affect decisions about savings and working. Included in the multigenerational model is the possibility of “negative bequests” wherein assets
are transferred from more affluent children to less well situated parents. Aaron’s third model, the short-horizons model, drops the strict assumption of rational lifetime accounting in the first two models. Instead, individuals may ignore the future in deciding how much to save or work or employ a time horizon of short dimension when making those plans.

Aaron concludes his summary analysis of the competing models with the observation that virtually any preconception about the economic consequences of public pensions can be theoretically supported (Aaron, 1981: 28). For example, it might seem fairly obvious that prospective pension beneficiaries would reduce retirement savings in anticipation of guaranteed benefits, but the actual response of individuals may be more complex. Beneficiaries may actually maintain constant savings rates to allow an earlier retirement, augment government benefits they will receive, or compensate their children for the additional taxes they pay toward national transfer programs.\(^2\) Anticipating the total effects of pension spending on labor supply is similarly complex. While labor force participation rates for elderly workers, especially males who have had long periods of full-time employment, are likely to decrease as a consequence of pension benefits and the regulation that accompanies their receipt, for younger workers the impact of pensions schemes on labor supply is less certain. Higher taxes to cover pension benefits to the elderly may discourage younger workers from entering the job market. Or, in contrast, the realization that opportunities to work will be constrained by government regulation during the years one is a pension beneficiary may lead some to increase their work/earnings efforts during their younger years.\(^3\)

As Aaron (1981: 28) points out, empirical efforts to distinguish the economic effects of pension expenditures have not resolved the theoretical uncertainties. Various studies have found both positive and negative consequences of pension spending for savings rates and labor supply.\(^4\) Our intention here is not to evaluate the validity of models of the relationship between pension spending and any particular economic variables, but rather, to measure the cumulative impact of pension spending on total economic growth. In effect, we test the more sweeping generalizations about public pension spending offered by conservative critics and liberal supporters. In anticipating negative effects of large public budgets on economic growth, conservative theorists generally emphasize the inefficiencies in government’s delivery of services along with the deleterious effects of taxes and public spending on investment and labor (Wagner, 1989). Liberal supporters of public redistribution programs base their support primarily on moral grounds, but some, particularly social-democratic analysts, also claim that redistribution efforts facilitate economic growth by lowering social division and conflict that might otherwise compromise free-market models (Korpi, 1985).\(^5\) We limit our analysis to the impact of direct public pension expenditure benefits though we acknowledged private pension benefits, both mandated and voluntary, may also have important economic consequences (Esping-Andersen, 1990: 84; Rein and Rainwater, 1986). We would have preferred to include some consideration of private benefits in this study, but we
were unaware of any data series of cross-national private pension benefits for all the countries of interest here.

Model and Methodology

Sample

We estimate the effects of pension spending on economic growth for a group of eighteen affluent democracies: Australia, Austria, Belgium, Canada, Denmark, Finland, France, (West) Germany, Ireland, Italy, Japan, the Netherlands, New Zealand, Norway, Sweden, Switzerland, United Kingdom, and the United States. Because of their common political-economic systems, viz., democratic capitalism, as well as their advanced level of economic development, we treat these nations as a somewhat distinct group whose experiences may not necessarily translate to other nations. There is a controversy among analysts of the government spending economic growth relationship over whether or not Japan should properly be included in this group of nations (Korpi, 1985; Marlow, 1986; Saunders, 1986). The essential argument against the inclusion of Japan is that it tends to dominate analytical results such that government spending has a strong inverse relationship to economic growth when Japan is included in the analysis while the relationship is weak or insignificant when Japan is excluded. Because our model poorly captures the Japanese economic growth experience for 1960-1973 and the presence of Japan’s observations for those years dramatically skews our results and introduces violations of regression assumptions, we choose to eliminate those observations while keeping data for 1974-1988.

As others have acknowledged, there are no generally accepted comprehensive models of the economic growth process (Landau, 1985). Consequently, we follow what we believe to be the best applied model of the government spending/economic growth relationship, Castles and Dowrick (1988). Our dependent variable is gross domestic product per capita (GDPPC) growth rate 1960-1988 averaged over four periods which approximate beginning and endpoints of four major international business cycles 1960-1967, 1968-1973, 1974-1979, 1980-1988 (OECD, 1991 and various years). The independent variables are similarly averaged. The customarily designated endpoint for the international business cycle occurring during the 1980s is 1988. However, as we have consistent pension expenditure data only through 1985, our pension spending variables for the 1980-1988 period are averaged over the years 1980-1985. By averaging over the business cycles we effectively eliminate short-term fluctuations such as recessions and subsequent recoveries from the analysis. Our dataset is then a pooled time-series of cross-sections.

Our main independent variables are (1) PENSION, which is the ratio of a nation’s spending on public pensions to its GDP (OECD, 1988), and (2) PENAGED, which is the ratio of PENSION to the proportion of the total population age 65 and over (World Bank, 1983). This second measure is a proxy for pension generosity or average pension benefit relative to the nation’s
standard of living (Williamson and Pampel, 1993). Through appropriate algebraic manipulations it can be shown that the PENAGED variable is equivalent to the ratio of pension spending per person age 65 and over to the GDP per capita (Pampel, Williamson, Stryker, 1990): (PENSION/GDP) / (AGED/POPULATION) = (PENSION/AGED) / (GDP/POPULATION).8

In addition to pension expenditures our models include two control variables. Our first control variable is intended to account for opportunities for catch-up or opportunities of backwardness. A widely appreciated proposition in development economics is that less technologically advanced nations have inherently greater economic growth potential as they absorb the technologies of more advanced nations (Abramovitz, 1986; Rostow, 1992: 465-477). One way to measure the level of a nation's economic advancement is through its share of employment devoted to agriculture. More technologically advanced nations are likely to have shifted workers from the less productive agricultural sector to more productive manufacturing and service sectors. We use the share of a nation's civilian employment devoted to agriculture, AGRICULT, as a control variable to account for opportunities for catch-up (OECD, 1990 and various years).9

A second control variable we employ is used to account for interest group induced institutional rigidities that may develop in democratic-capitalist economies. Olson (1982) proposed that the growth of narrow-based interest groups contributes to the economic decline in democratic nations characterized by long histories within stable borders and an absence of major social disruptions. As democratic nations age, they experience the growth of increasingly larger numbers of interest groups who work to pursue their own purposes or agendas at the expense of the larger society. Olson argued that these interest groups created a kind of "institutional sclerosis" with serious economic consequences by working to limit competition, thwarting technological innovation, and manipulating government. Olson's theory has received broad support in cross-national analysis of the affluent democracies (McCallum and Blais, 1987; Weede, 1986a, 1986b, 1991). We use data from Hewitt (1977) to construct a proxy for the interest group penetration of society. Our measure, YR Sofdem, calculates the years a nation has been democratic within unchanged borders and without major social upheavals.10 Nations such as Switzerland and the United States receive high scores on this measure while nations such as Germany and Japan have relatively low scores. Our models are set out as follows:

\[
GDPPC = a_0 + a_1 AGRICULT + a_2 YR Sofdem + a_4 PENSION \quad (1)
\]

and

\[
GDPPC = a_0 + a_1 AGRICULT + a_2 YR Sofdem + a_4 PENAGED \quad (2)
\]

Model Estimation

We estimate our models using ordinary least squares while augmenting the regression with period and country dummy variables to improve model fit.
Selection of time and period dummy variables follows an analysis of variance to
determine whether there are significant time or cross-sectional effects in the
composition of regression error, as well as to correct for heteroskedasticity.\footnote{11}

Models that pool time-series and cross-sections assume parameter estimates
that are stable over both time periods and cross-sections. To determine the
legitimacy of pooling all our time periods into one analysis, we follow Doan
(1990: 612) and use a variant of the Chow (1960) test of structural stability. We
constructed our test by creating a dummy variable for the 1960-1973 period
and multiplying each of the independent variables in our analysis by that
dummy variable. We then ran two regressions: one with the interaction terms
included with the main effects independent variables, and one with the interac-
tion terms excluded. An F-test is used to test whether these interaction terms
significantly increase explained variance. Our results indicate assumptions of
structural stability over the full period 1960-1988 are not warranted. Thus, we
estimated separate results for 1960-1973 and 1974-1988.\footnote{12}

Pension spending and economic growth may simultaneously influence one
another, thus introducing bias and inconsistency into our coefficient estimates.
To test for endogeneity of pension spending in this analysis we followed a
procedure suggested by Castles and Dowrick (1988). Our test was constructed
by first regressing pension spending on the value of that variable at the
beginning of each period as well as variables anticipated to affect levels of
pension expenditures: the aged as a share of population, the strength of left
parties in government, and years of democratic government.\footnote{13} The residuals
from that regression were then included in a regression of economic growth and
our main independent variables. If the coefficient on the residuals variable
proved significant we assumed a simultaneous relationship between our pen-
sion variable and economic growth.\footnote{14} Our results indicate simultaneity may be
a problem for our pension per capita variable and economic growth for the
1974-1988 periods. The residuals from our analysis were significant at approx-
imately the .10 level but that was sufficient to alarm us. To avoid the simul-
taneity problem we used the value of PENAGED from the first year of each
period as our independent variable. Our selection is based on the fact that
economic growth during the latter years of the period could not have caused
pension levels during the first year.\footnote{15}

We apply a number of diagnostic tests to regression results in order to
ensure adequate model specification and robust regression coefficients. We can
distinguish those tests as being of two main types. The first focuses on violations
of regressions such as heteroskedasticity, and the second assesses the sensitivity
of coefficient estimates to the presence of particular observations in the
analysis.

To test for heteroskedasticity we follow Beggs (1988) and search for specific
sources of non-constant variance in the residuals. Our tests involve regressing
residuals against predicted values, lagged squared residuals, time period values,
and independent variables from the main regression to examine whether any
heteroskedasticity is functionally related to values of the dependent variable,
specific cases, time periods, or particular independent variables. We report and
correct heteroskedasticity as appropriate.

Serial correlation is a potentially serious problem with pooled time-series of
cross-sections datasets. In our analyses, however, that threat is much reduced.
Because we have run separate analyses for the 1960-1973 and 1974-1988
period we have only two time points for each cross-section. Consequently, our
model design is more cross-sectionally dominant than time-serially. We find no
evidence of serial correlation.16

Regression results can be disproportionately influenced by observations
with extreme values on one or more variables. To ensure that our results are
not unduly influenced by a single country or observation, we use three diagnost-
tic tests for determining influential cases: partial regression plots, hat matrix
values, and vector change rankings. Partial regression plots allow for a graphi-
cal presentation of influential cases. Hat matrix analysis employs the indepen-
dent variable values to provide a quantitative measure of a particular observa-
tion’s leverage in determination of variable coefficients.17 To calculate our
vector change rankings we use the KALMAN facility in RATS and follow a
program suggested in Doan (1990: 13-3). The program calculates the sum of
squared changes in coefficient values that occurs when a particular observation
is deleted from an analysis. The summed values are then ranked to indicate
dominant observations in determination of the coefficient vector for the inde-
pendent variables.

Results

We find no statistical evidence of a strong relationship between pension
spending and economic growth either for our measure of aggregate spending or
per recipient benefit levels. However, for the 1974-1988 period we do find a
moderate inverse relationship between our aggregate pension spending vari-
able and economic growth, although the relationship is not robust. Table 1
presents results for the analysis of the relationship between aggregate pension
We have added a time period dummy variable, YR6873, to the analysis for
1968-1973 to correct for a strong time period effect evidenced in an analysis of
variance. The variable FINLAND-6873 in regression 1 and NORWAY-7479
in regression 2 are dummy variables for the Finland 1968-1973 and Norway
1974-1979 observations. They have been added to correct marginally signifi-
cant heteroskedasticity problems in those regressions. In regression 1 our
pension variable, PENSION, contributes nothing to the explained variation as
measured by the Adjusted R-Square. In regression 2 it contributes 6%, and that
contribution is significant at the .05 level.18 The coefficient of .026 for AGRI-
CULT, the share of the workforce engaged in agriculture (range: 3.20 to
33.80), in regression 1 of Table 1 indicates that additional percentages of the
workforce engaged in agriculture are anticipated to increase the yearly eco-
nomic growth rate by .026%. A difference of 10% between two nations would
yield a predicted increase in growth rates for the nation with a larger share of its workforce in agriculture of .26% per year. The coefficient of -.015 for the years of democracy variable (range: 25.5 to 98.5), YRSOFDEM, indicates that each additional year of democratic experience lowers growth estimates by .015%. The .006 coefficient for pension expenditures, PENSION (range: 2.85 to 11.70), indicates that each percentage increase in pension expenditures yields a positive return to growth of .006%. However, the coefficient for PENSION is not even close to being significant. The coefficient for YR 6873 indicates that average estimated 1968-1973 growth rates were .61% higher than those for 1960-1967. Finland's coefficient for 1968-1973 reflects the fact that its economic growth rate during that period was nearly 2% more than the regression 1 would otherwise estimate.

The R-square and adjusted R-square for regression 1 inadequately reflect the fact that our model poorly captures the economic growth experience of these nations for the years 1960-1973. Nearly half of the explained variance is attributable to the presence of the time and period dummy variables. Regression diagnostics for regression 1 suggested two nations, Austria and Ireland, may have disproportionately influenced our results. However, deletion of the observations for those countries produced only minor changes in the estimated coefficients and R-square.19

The results presented by regression 2 in Table 1 suggests our model better captures the growth experience of 1974-1988 than it does 1960-1973. The major coefficient change from regression 1 to regression 2 occurs for PENSION. In regression 2 each additional 1% increase in public pension spending as a share of GDP results in a decrease in estimated economic growth of .10%

Table 1

<table>
<thead>
<tr>
<th>Dependent Var.: Per Capita Gross Domestic Product Growth Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression Number</td>
</tr>
<tr>
<td>R-Square</td>
</tr>
<tr>
<td>Adjusted R-Square</td>
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<tr>
<td>N</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Constant</td>
</tr>
<tr>
<td>AGRICULT</td>
</tr>
<tr>
<td>YRSOFDEM</td>
</tr>
<tr>
<td>PENSION</td>
</tr>
<tr>
<td>YR 6873</td>
</tr>
<tr>
<td>FINLAND-6873</td>
</tr>
<tr>
<td>NORWAY-7479</td>
</tr>
</tbody>
</table>

*** Significant at .01
** Significant at .05
annually. The change in the importance of pension spending as a determinant of economic growth is reflected by its level of significance. PENSION is now significant at the .05 level and contributes 6% to the explanation of economic growth. The other important coefficient change from regression 1 to regression 2 occurs for AGRICULT whose value substantially increases. It would be incorrect, however, to understand that change as indicative of a major change in the explanatory power of that variable because the range of AGRICULT decreased for the years 1974-1988 compared to 1960-1973 and the average dependent variable value decreased sharply as well. The coefficient for Norway for 1974-1979 indicates that Norway’s economic growth during the 1974-1979 period was much higher than the model otherwise estimates. Apparently, abundant domestic energy reserves proved as much a boon to Norway’s economy as they did to the economies of other energy exporters during the 1970’s.

A number of observations, including Ireland 1968-1973 and 1974-1988, New Zealand 1974-1979, and Switzerland 1980-1988 were identified as dominant contributors to the derivation of coefficient estimates. Individual deletion of these observations did not substantially change the results of our analysis, but deletion did generally result in PENSION’s loss of .05 significance.

Table 2 presents results for the analysis using our per recipient program generosity variable for both the 1960-1973 and 1974-1988 periods. Model results are quite similar to those in Table 1 except that the estimated coefficient for PENAGED is not as strong for the 1974-1988 period as is the coefficient for our total pension expenditures variable, PENSION, for the same period in Table 1. The coefficient of -1.41 in regression 2 means that for each one unit

**Table 2**

*Dependent Var.: Per Capita Gross Domestic Product Growth Rate*

<table>
<thead>
<tr>
<th>Regression Number</th>
<th>1</th>
<th>2</th>
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</thead>
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<tr>
<td>R-Square</td>
<td>.59</td>
<td>.48</td>
</tr>
<tr>
<td>Adjusted R-Square</td>
<td>.51</td>
<td>.42</td>
</tr>
<tr>
<td>N</td>
<td>32</td>
<td>36</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th></th>
<th>coeff.</th>
<th>t-stat</th>
<th>coeff.</th>
<th>t-stat</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>3.35</td>
<td>5.29***</td>
<td>3.44</td>
<td>4.55***</td>
</tr>
<tr>
<td>AGRICULT</td>
<td>.33E-01</td>
<td>2.13**</td>
<td>.43E-01</td>
<td>1.45</td>
</tr>
<tr>
<td>YRSOFDEM</td>
<td>-.13E-1</td>
<td>-2.54**</td>
<td>-.18</td>
<td>-3.52***</td>
</tr>
<tr>
<td>PENAGED</td>
<td>-.39E-1</td>
<td>-.05</td>
<td>-1.41</td>
<td>-1.78</td>
</tr>
<tr>
<td>YR 6873</td>
<td>.57</td>
<td>2.40**</td>
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<td></td>
</tr>
<tr>
<td>FINLAND-6873</td>
<td>1.81</td>
<td>2.83***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NORWAY-7479</td>
<td>2.03</td>
<td></td>
<td>2.65**</td>
<td></td>
</tr>
</tbody>
</table>

*** Significant at .01
** Significant at .05
increase in PENAGED our model estimates a 1.41% decrease in average annual economic growth for the years 1974-1988. However, because the range for PENAGED is only .358 to .970 for 1974-1988, the contribution of that variable to economic growth is less than might appear at first glance. For instance, taking our highest value of PENAGED (.970) and multiplying that by our coefficient (1.41) results in a maximum estimated reduction in annual economic growth of 1.37%. The explanatory weakness of PENAGED is reflected in the fact that it contributes barely 4% to the explained variance of economic growth. Further, the coefficient for PENAGED is not significant at the .05 level. Regression diagnostics identified the observation for the Netherlands 1980-1988 as one possibly having a disproportionate influence on our variable coefficients. When that observation was deleted from the analysis the coefficient for PENAGED decreased to 1.22 and its significance level was further weakened. Deletion of other observations did not have similarly strong effects.

To determine whether our linearly specified model failed to capture a more curvilinear relationship between pension spending and economic growth we also ran regressions testing for a quadratic relationship between those variables. The quadratic models were no more successful explaining economic growth than were the linear models.

Discussion

An important issue shaping the future of the welfare state is how well its redistributive goals can be reconciled with aspirations for economic growth. If the programs of the welfare state are viewed as compromising general economic welfare, public support for those programs may wane. We have attempted here to measure the impact of the largest component of social welfare spending, public pension expenditures, on economic growth. Because determining the impact of pension expenditures on particular economic variables such as savings rates or labor force participation rates is difficult, our analysis of economic growth rates is intended to capture the net economic performance effects of public pension spending.

Our analysis offers little support for those who would argue that generous public pension schemes facilitate economic growth and may have important policy implications. The failure to find a positive link between public pension spending and economic growth undermines much of the argument for the generosity of those programs. And the emergence of a negative, albeit weak, relationship between pension spending and economic growth during the 1970's and 1980's may indicate that spending on social programs is beginning to have the kinds of growth retarding effects conservative analysts have been claiming for some time. Of course, social democrats might argue that even if social spending is somewhat growth retarding, the social harmony that accompanies such spending is worth the cost. However, if the long run consequences of such
spending are negative, proponents of generous social programs may have a
difficult time maintaining the high levels of public support for them.

For conservative theorists these results offer some support for their reserv-
ations about the economic growth consequences of large public budgets, par-
icularly the results for the 1974-1988 period. The negative relationship between
pension expenditures and economic growth during those years suggests that as
pension programs have matured they may have become an impediment to
economic performance.

Our control variables worked much as predicted. Confirming results from
previous studies, the years of democracy variable was a strong, consistent, and
robust predictor of economic growth rates in all the regressions estimated here.
Ceteris paribus, the longer a nation has been stable and democratic, the slower
will be its rate of economic growth. The agricultural employment variable,
while not as strong a predictor of economic growth as the other control
variables, did perform consistently.

NOTES

1 See, for example, Danziger, Haveman, and Plotnick (1981).
2 Feldstein's (1974) time series study of social security benefits and savings rates and the
substantial literature on the impact of social security benefits and investment and economic
growth that his study generated illustrate Aaron's point. Despite the broad literature, the
central issues remain unresolved (Danziger, Haveman, and Plotnick, 1981).
3 See Danziger, Haveman, and Plotnick (1981) for an excellent review of the literature on the
economic affects of income transfers including the relationship between public pensions and
private sayings, and public pensions and work commitments.
4 Also, see Danziger, Haveman, and Plotnick (1981) for a review of studies examining the
effects of pension spending on economic growth.
5 Korpi casts the debate about the cumulative impact of social welfare spending on economic
growth as between a liberal market hypothesis and a reformist hypothesis. His reformist
hypothesis draws heavily from Myrdal's (1970) contention that welfare state spending can be
a foundation for accelerated and sustained growth.
6 Iceland and Luxemburg also fit our political-economic and development criteria, but we
excluded them because of their small populations, less than one million. See McCallum and
Blais (1987) for a similar approach.
7 Had we not averaged our dependent variable over those business cycles, effective modelling
would have required determining and specifying dummy variables for the recessionary and
recovery periods for each nation, a formidable and uncertain task.
8 While we believe PENAGED is a good proxy for pension generosity it does have some
limitations. It lacks some precision because we do not have a measure of the actual number of
recipients for most countries. Also, this measure does not take into consideration variation
between nations with respect to age of eligibility, variation in marital status criteria, or
difference in the ways in which work histories affect pension benefits. (See OECD (1988) for
an overview of eligibility requirements and entitlement benefits of public pension programs in
OECD countries.)
9 We also tried using a variable based on relative levels of per capita real gross domestic
product (Summers and Heston, 1984) as a control in place of AGRICULT. However, the
alternative variable was not as successful a control variable as was AGRICULT.
10 See Bernholz (1986) for a similar variable.
11 We use the PSTAT command in Doan (1990) for our analysis of time and cross-sectional
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effects. RATS can be used to calculate such effects because it takes explicit consideration of the structure of pooled time-series of cross-sections datasets.

12 Our structural stability test results reflect an important government policy concern about the shift in economic growth patterns after the first oil shock. Economic growth rates declined sharply after 1974 and have not returned to the pre-1974 levels. A number of factors have been posited as responsible for the decline including growing labor strength (Bernabe, 1982: 174; OECD, 1987: 21-24) and political and institutional changes (Lane and Ersson, 1986: 21; Weede, 1986a: 205-206).

13 We base our measure of left party strength on the relative number of cabinet seats held by left party members. Our classification of left parties is from Castles (1982) and McHale (1983). Annual data for control of cabinet seats is from Europa Yearbook, The Stateman's Yearbook, and Keesing's Archives.

14 As an example of this technique consider the regression:

PENSION = BPENSION + AGED + LEFT + YRSOFDEM where PENSION is our variable from above, BPENSION is the value of that variable for the first year of each of our time periods (1960, 1968, 1974, and 1980), AGED is the percentage of persons in the population aged 65 and over, LEFT is the average share of federal cabinet seats held by left parties over the past eight years, and YRSOFDEM is years of democratic government as above. The residuals from this regression are then entered in our standard growth regression such that:

GDPPC = AGRICULT + YRSOFDEM + POPGROWTH + PENSION + RESIDUALS

Because these residuals are the unexplained component of PENSION and are uncorrelated with the variables in their generating regression, any relationship between them and GDP growth in the subsequent regression is considered to reflect the influence of GDP growth on PENSION.

15 See Beggs (1988) and Castles and Dowrick (1990).

16 The Durbin-Watson statistic output by RATS does not take account of the pooled structure of the data. We calculated our DW from a formula in Findley and Rubenfeld (1981).

17 See Fox (1991) for a discussion of partial regression plots, the hat matrix, and other diagnostic regression methods.

18 Adjusted R-square is a modification of R-square to compensate for the number of variables entered in the regression. (Unadjusted) R-square is biased toward higher values as additional variables are entered into the equation even if those variables have little explanatory power.

19 Pension spending data was unavailable for Belgium for the 1960-1967 period.

20 The range of AGRICULT was down to 2.63%-17% of civilian employees by 1980-1988 from 3.2%-32.33% during 1960-1973.

21 In most instances, the deletion of observations resulted in PENSION's significance level falling to .06 or .07.

22 PENAGED values were unavailable for Belgium for both 1960 and 1968.

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