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DO EUROPEAN PENSION REFORMS IMPROVE THE ADEQUACY OF SAVING?

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Abstract

The decline in saving rates experienced by some European countries has raised concerns about the importance of a country's wealth accumulation, in particular in light of a more fair but less generous pension system. This paper carries out a macroeconomic analysis of the impact of pension reforms implemented in the nineties on private saving. The evidence shows no tendency for saving to change in the post-reform period, which is consistent with preliminary results on pension reforms in the eighties. We conclude that the adequacy of saving can not find a source of improvement in the pension reforms of the last decade.

I.   Introduction

From a macroeconomic point of view, an economy has necessarily to set aside some resources in order to finance investment and support growth, even though the relation between thrift and economic expansion may not always be straightforward. Moreover, when considering the challenges to social security systems put forward by the process of population ageing, the importance of saving becomes even clearer.

The decline in saving rates experienced by some OECD countries has raised concerns about the importance of a country's wealth accumulation. A research project promoted by the World Bank in the late Nineties (called "Saving Across the World"), revolved around the issue of saving and the policy-relevant questions related to it. Among its purposes there was also the identification of public policies with the greatest impact on saving (Loayza, Schmidt-Hebbel and Servén, 2000a).

As a matter of fact, the adequacy of saving is no less relevant from the individual point of view. Demographic forces – increased longevity and reduced fertility – are driving pension systems towards decreased generosity and at least partial restructuring as a way of safeguarding their sustainability. The need for additional private saving in the light of reduced pay-as-you-go (PAYG) benefits is going to become crucial. In this respect, an OECD study highlights the necessity for higher retirement saving, especially in countries – like Germany – where PAYG benefits are due to decrease (Börsch-Supan, 2005). Similarly, Khoman and Weale (2006) point out the remarkable gap between actual saving rates in the UK and those that would be observed if people were to make adequate provisions for their retirement.

Not surprisingly, the debate about the adequacy of household saving has developed mostly with reference to anglo-saxon countries, and in particular with respect to the United States where saving rates are remarkably low. Works dismissing systematic problems of under-saving (Kotlikoff, Spivak and Summers, 1982), are countered by other studies warning against the severe inadequacy of wealth accumulation to support retirement needs (Mitchell and Moore, 1997; Bernheim, 1993). In more recent and sophisticated pieces of research the problem of inadequate saving appears less worrisome. A broader definition of saving, for instance including housing equity and pension wealth, is one of the factors reducing the proportion of individuals who are not saving enough (Engen *et al.*, 1999; Uccello, 2001; Banks *et al.*, 2002; Scholz, Seshadri and Khitatrakun, 2004). In addition, recognizing that "how a saving benchmark is established has important implications for measuring the adequacy of saving" (Engen *et al.*, 1999, p. 142) is crucial.

Among the ways to increase thrift, monetary and fiscal policy have undoubtedly a prominent role. However, the steep increase in the national saving rate that charac-

terized the 1981 Chilean post-reform period[1] instilled the idea that pension reforms could play a major role in boosting saving.

The recent European pension reforms have been undertaken to ease the long-term financial problems of Social Security systems. In particular, the solvency of PAYG systems has become critical in the last decades – especially in the '90s – because of increasing longevity and declining fertility and productivity growth. For this reason several countries adopted (notional) defined contribution public systems, or started building new pre-funded private pillars, or undertook substantial parametric reforms in order to make their public systems more sustainable.

This paper assesses the effectiveness of pension reforms – occurred in Europe in the Nineties – in increasing saving. In particular, we focus on the patterns of private sector savings within countries that have adopted fundamental social security reforms. Our results suggest that no remarkable effect emerges. Just like a deeper investigation of the Chilean case revealed that the role of pension reform in stimulating private saving was indeed modest[2], our analysis argues that the European reforms did not have a sensible influence on the private saving rate.

The remainder of the paper is organized as follows. Section II presents the basic theoretical framework and Section III discusses the empirical literature on saving and public/private pensions. In Section IV we describe data and methodology, while in Section V we illustrate the results. Section VI concludes.

II. Theoretical background

As described in Engel and Gale (1997) and Schmidt-Hebbel (1998), under a theoretical perspective a pension reform has an ambiguous effect on both national and private saving. Thus, in this Section we briefly underline which are the causes of this ambiguity. For this purpose, a distinction between effects on public and private saving is adopted.

In what follows, we consider, as a *benchmark* case, a "radical" reform. The pre-reform era is characterized by a pay-as-you-go (PAYG) system in which benefits are earnings related and where a strong redistribution is carried out: hence a system not actuarially fair. The post-reform system is, instead, actuarially fair: in particular we consider a fully-funded (FF) system with contribution related benefits and no redistribution. Such a benchmark, although too radical with respect to actual reforms, allows us to better identify all the possible effects on saving. Any departure from the

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[1]In 1981 Chile replaced its pay-as-you-go retirement system with a fully funded system of individual retirement accounts managed by the private sector.

[2]The large effect on saving was more likely to derive from a number of factors, the pension reform being only one among them (Engen and Gale, 1997).

benchmark would simply imply weaker effects.

A.   *Public saving*

A pension reform creates what is usually termed as *transition deficit*: post-reform contributions are invested in the new FF system, but the government still has to honor its PAYG commitments ("implicit debt") by paying current and future pension benefits to those who remain affiliated with the old PAYG system. Thus, a critical question is: how can transition deficits be financed? (Holzmann, 1997). One option is to issue explicit government debt to replace the implicit one. In this case the cost of transition is paid by current and future generations. Another way is to raise taxes (or cut expenditures) by an amount equal to the transition deficit, so that the cost of transition hurts only current cohorts. More realistically a government adopts a combination of the two main financing options[3] which implies a lower public saving. Indeed, this is always the case if reform transition deficits are not entirely financed by a fiscal contraction.

B.   *Private saving*

Private saving is affected by a pension reform in a threefold way. In particular it responds to (i) the change in uncertainty induced by the new system, (ii) the change in public saving induced by the transition deficit, (iii) the new characteristics of the post-reform pension scheme.

If the pension reform raises the uncertainty perceived by individuals, then the precautionary part of the private saving increases (Carrol and Samwick, 1998). To simplify let's consider three main sources of uncertainty: political risk, investment risk and insurance risk. The first refers to the potential misuse of the pension system's funds to finance non-pension operations of the government (Bosworth and Burtless, 2004). A pension reform, as defined above, should reduce this risk since a FF system is usually managed by the private sector. The second one, instead, should increase after reform since contributions are invested in financial markets. Finally, insurance risk is associated with the extent of redistribution implied by the system covering against potential income shocks. Since, as stated above, the post-reform system is more actuarially fair, it should perform lesser redistribution and this risk should increase. Therefore, the effect of a pension reform on the overall uncertainty, and hence on precautionary saving, is ambiguous.

How individuals react to a lower public saving, if transition deficits are financed at least in part by issuing explicit government debt, depends on the Barro-Ricardo

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[3]A less significant financing option consists in liquidating government assets.

equivalence hypothesis (Barro, 1974). If this hypothesis holds, then there is a perfect crowding out of private saving by public saving. This means that private saving increases by exactly the same amount public saving has fallen, because individuals foresee the future debt re-payments. Empirical studies which focus on panel data (see Table 4 in Schmidt-Hebbel, 1998) reject a perfect crowding out but support a significant partial offset[4]. Therefore, private saving should increase, as a response to a lower public saving, but the overall effect on aggregate saving remains negative.

Finally, characteristics of the post-reform pension system can induce individuals to change their saving behaviour. If the explicit rate of return that characterizes the FF system (the financial market rate, r) is higher than the implicit one of the PAYG system (the economy rate of growth, $n + g$: Samuelson, 1958), then the individual social security wealth (SSW) increases. This implies, *ceteris paribus*, a negative effect on private saving. On the contrary, the development of a financial and capital market driven by the introduction of pension funds creates new investment opportunities, thus having a positive effects on private saving. Moreover, the reform itself makes individuals more aware about the importance of saving for retirement. Hence, this "recognition effect" can positively influence private saving. Again, the net effect of these components is not clear *a priori*[5].

From this analysis we can conclude that the effect of a pension reform on national and private saving is not univocal since it critically depends on many contrasting forces.

III.   Literature review

The empirical literature on pensions and aggregate saving has rarely focused on the effect of pension reforms. The two main strands of literature on the topic have concentrated on the effect on saving brought about by the introduction of either a PAYG system or pension funds.

A number of studies – among which Feldstein (1974, 1996), Edwards (1995) and Corsetti and Schmidt-Hebbel (1995) – indicates that the size of PAYG (measured as social security wealth, contributions or benefits) has a negative impact on private saving. However, they also show that an increase in public saving is only partially offset by the private one. Therefore, the overall result is a higher total national saving.

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[4]Private (or household) saving is regressed on public saving; the point estimates of offset coefficients are in the rage $[0.36, 0.66]$.

[5]Some empirical studies (see Table 5 in Schmidt-Hebbel, 1998) show that the net effect is negative for developed countries where financial and capital markets are already developed and information about retirement needs is high, while positive for developing countries for opposite reasons.

On the other hand, the impact of pre-funded pensions on saving is more ambiguous. Studies about Chile are particularly difficult to interpret: in Corsetti and Schmidt-Hebbel (1995) the relative size of private pension fund saving affects negatively the consumption ratio, corroborating the idea that the 1981 pension reform had a play in the subsequent strong increase in voluntary private saving. However, such effect is small and not statistically significant. On the contrary, as Schmidt-Hebbel (1998) suggests, the effect of the Chilean mandatory pension saving on voluntary private saving is negative. As for the UK, Granville and Mallik (2004) find that raising pension fund saving leads to a small but positive increase in total saving. This implies an imperfect substitution between pension funds and other forms of saving.

The evidence from cross-country studies is again mixed. Bailliu and Reisen (1997) study the effect of changes in funded pension wealth on national and private saving using a panel of 11 countries for the 1982-1993 period. The demographically adjusted stock of pension funds assets has a positive and statistically significant impact on aggregate savings (both national and private). Similarly, Bosworth and Burtless (2004) analyze the effect of net accumulation in life insurance and pension funds on private saving – for 11 countries in the period 1971-2000 – finding an impact on private savings not significantly different from zero.

The effect of specific pension reforms on national saving is considered by Samwick (2000). In his macroeconomics analysis, he argues that only Chilean saving shows a positive reaction to the reform, while none of the European reforms he considers – Switzerland (1985) and the United Kingdom (1986) – has a significant impact on national saving. For this reason he concludes that Chile's experience can not be generalized across other countries' pension reforms.

IV.   Data description and methodology

During the nineties many European countries undertook measures to reform their pension systems under the pressure of population ageing in order to improve their financial sustainability. Even though the reform process is far from being complete and some of the most important changes happened in recent years (as in Germany and France), we concentrate our study on those occurred in the nineties. As Table III shows, the last decade offers a fairly good number of reforms on which we can test the impact on national saving[6].

As far as the methodology is concerned, we follow a two stage procedure, as in

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[6]With respect to previous studies – namely Samwick, 2000 – the focus on the '90s allows us to extend the analysis to a larger group of reforms while still having enough data points in the post-reform period.

Table I. Summary Statistics – Saving Determinants

Variable	Mean	Median	Std. Dev.	25th Perc.	75th Perc.
Gross Private Saving Rate (% GDP)	21.41	20.57	4.50	18.29	24.28
Macroeconomic					
Log GDP per capita (PPP)	9.93	9.94	0.27	9.77	10.12
GDP per capita Growth Rate (%, PPP)	2.13	2.20	2.14	0.89	3.34
Private Credit to GDP (%)	83.91	78.77	37.38	61.29	101.30
Gross Public Saving Rate (% GDP)	1.16	0.99	4.25	-1.12	2.98
Foreign Saving Rate (% GDP)	0.35	0.45	3.67	-1.95	2.42
Long-term Real Interest Rate	3.42	3.85	3.32	2.09	5.53
Inflation Rate (CPI)	5.62	3.64	5.17	2.17	7.77
Demographic					
Total Population (millions)	45.34	16.94	60.80	8.33	56.94
Age Dependency Ratio (%)	52.60	51.17	9.50	48.08	55.75

Notes: 1. Source: Authors' calculations from the OECD and World Bank databases.
2. The panel dataset includes 17 OECD countries over a thirty-years period, 1975-2004.

Samwick (2000). In the first stage we estimate the following panel regression:

$$s = \alpha + \beta X + f + \epsilon \tag{1}$$

where s represents the Gross Private Saving Rate (% GDP), X the matrix of saving determinants, listed in Table I, f the country specific unobservable characteristic and ϵ the error term. We also control for common business cycle[7].

Table I presents summary statistics for saving determinants, while Table II shows panel regression results from the first stage, adopting both ordinary least squares and fixed-effects model.

Both of the income-related variables positively affect private saving. The first-stage fixed-effect estimation shows that the higher the log of GDP per capita, expressed in constant 2000 prices in PPP, the higher saving. In our specification, higher income growth appears to spur saving rates, as the life-cycle model suggests[8]. The domestic credit to private sector has a positive coefficient, capturing the effect of a more developed financial sector in promoting saving. On the contrary, a negative coefficient would indicate that the greater financial development induced liquidity

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[7]We disregard possible endogeneity problem (reverse causality between saving rate and GDP growth) because the few valid instruments explain little of the variation in the endogenous explanatory variables. Bound, Jaeger and Baker (1993) show that the use of such instruments can lead to large inconsistencies of the IV estimates even if only a weak relationship exists between the instruments and the error.

[8]If, instead, GDP growth captured future growth in income, then it would reduce saving.

Table II. First Stage – Panel Regression, 1975-2004

	OLS		Fixed Effect	
Gross Private Saving Rate (% GDP)	Coef.	p value	Coef.	p value
Log GDP per capita	-4.46231	0.000	8.02861	0.000
GDP per capita Growth Rate	0.19101	0.025	0.31674	0.000
Private Credit to GDP (%)	0.03392	0.000	0.00901	0.041
Gross Public Saving Rate (% GDP)	-0.63652	0.000	-0.69489	0.000
Foreign Saving Rate (% GDP)	-0.68723	0.000	-0.39894	0.000
Long-term Real Interest Rate	-0.13305	0.160	0.15890	0.002
Inflation Rate	0.05719	0.428	0.10613	0.003
Total Population (millions)	-0.02475	0.000	-0.02907	0.043
Age Dependency Ratio (%)	-0.10168	0.000	0.00050	0.973
Constant	74.03903	0.000	-54.23520	0.000
R-squared	0.5135		0.6888	
No. obs	510		510	
No. countries	17		17	

Notes: 1. Both specifications include year effects.

constraints to loosen. Domestic private saving also responds to saving from the public sector and the rest of the world. Both government saving and foreign savings, expressed as current account deficit, partially crowd out national ones as expected. The impact of long-term real interest rates is *a priori* ambiguous, depending on the net effect of income and substitution effects. In our case the coefficient is positive, implying a prevailing substitution effect. The inflation rate is used here as a proxy for macroeconomic uncertainty, with implications for precautionary saving: an increase in macro instability leads to increased saving via higher uncertainty upon future economic conditions.

Among the demographic variables, we consider total population and age dependency ratio, defined as dependants (under 14 or over 65) over the working-age population. Since the propensity to save is expected to be higher for working households, the age dependency ratio should be negatively correlated with saving rates. However, in our data the effect is not significantly different from zero.

In the second stage[9] we study the behavior of saving residuals from the fixed effect regression over time for the countries that have implemented a reform in the

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[9] The choice of two separate stages can be justified by the fact that pension reforms are country specific and have a potential impact only on the country where it is implemented. Hence, we prefer to run a saving residual regression for each country to rule out cross-country effects. This approach still leads to consistent estimates as long as saving determinants and pension reforms are uncorrelated.

Table III. Second Stage – Saving Residuals Analysis

Country	Reform	Trend	p value	Slope Change	p value	Level Change	p value
Austria	1998	0.08463	0.001	0.18481	0.174	-0.24207	0.662
Belgium	1997	0.13079	0.050	-0.32519	0.286	0.39358	0.788
Finland	1996	-0.09083	0.015	0.14585	0.270	-0.60748	0.324
France	1996	0.10178	0.026	0.00519	0.974	-0.05075	0.955
Germany	1999	-0.23683	0.002	0.18294	0.323	-0.64601	0.285
Italy	1996	-0.04258	0.062	0.04055	0.621	-0.48222	0.295
Portugal	1994	-0.24491	0.011	0.07145	0.750	-0.12122	0.937
Spain	1997	0.11662	0.000	0.20638	0.124	-0.48518	0.448
Sweden	1999	-0.02939	0.488	0.24097	0.487	0.30617	0.796
UK	1997	0.05527	0.159	-0.18674	0.307	-0.98103	0.269

Notes: 1. In terms of coefficient of Equation (2), the Trend is represented by β, the Slope Change by δ,
the Level Change by $\beta + \gamma + \delta \cdot$ (reform year).

nineties. A significant change in the saving residuals after the reform is consistent with a significant effect of the pension reform on private saving. Hence, we estimate for each country the following regression:

$$e = \alpha + \beta y + \gamma R + \delta R y + \upsilon \qquad (2)$$

where e represents the Saving Rate Residual from the first stage estimation, y the vector of sample years, R the matrix of reform dummy variables, Ry the matrix of interactions between sample year and reform dummies, υ the error term.

V.   The impact of European reforms on private saving

In order to see whether a pension reform had a significant effect on private saving we need to test if the reform brought about a structural shock in the trend of saving residuals. In particular, we test significance of the *level change* of saving residuals in the reform year and the *slope change* of the post-reform trend.

First, we run the residual regression for each country that implemented a relevant pension reform in the nineties. Second, we plot for all those countries the time series of saving residuals and predicted values from Equation (2). Figures 1 and 2 collect graphs where the dashed line represents saving residuals and the solid line the predicted values. The vertical line denotes the year of the pension reform. Third, Table III reports the significance of pre-reform *trend*, the *slope change* and the *level change* induced by the reform. The fifth column shows that most of the countries experienced a positive slope change but none of them is significantly different from zero. The same holds for the negative slope changes. Concerning the level changes

(seventh column), although most countries show a negative change, all of them are not significantly different from zero. The same analysis has been carried out using national saving instead of private but the results still hold. Therefore, we can conclude that European pension reforms in the nineties had no impact on private saving: none of the countries that implemented a pension reforms experienced a significant change in the trend of saving residuals after the reform. Even in countries like Italy and Sweden, where the introduction of Notional Defined Contribution (NDC) systems represents a more substantial reform, the impact on private saving is negligible.

On the whole, recent pension reforms are necessary to modernize and make pension systems more sustainable. At the same time, such reforms risk making future private saving inadequate and call for urgent measures to incentive private wealth accumulation. However, as we have shown, pension reforms are not an effective instrument for this purpose.

VI.   Concluding remarks

Stimulating aggregate saving is an important target for governments, both for growth financing and as a response to a more fair but less generous pension system introduced by reforms in the nineties. These reforms were particularly needed in OECD countries, where low mortality and high longevity put the pay-as-you-go pension systems' sustainability under pressure. However, neither theory nor previous literature indicate a clear relation between pensions reforms and saving. Theoretical considerations show that private savings are ambiguously affected by a reform going in the direction of greater actuarial fairness. The combined impact of direct effects (precautionary motives, investment and political risks, etc...) and indirect ones – through individuals' reaction to lower public saving – can vary from case to case.

The ambiguity at the theoretical level are confirmed by the mixed results from the literature. Most empirical aggregate-level studies look at either the magnitude of pay-as-you-go system or at the size of pension funds' assets. On the contrary, we take a different perspective by looking at a the impact of specific reforms (as it has been done before only by Samwick, 2000).

By exploiting a dataset of seventeen OECD countries and thirty years covering both pre- and post-reform periods, we test the impact of major European pension reforms on private saving. We interpret the absence of significant changes in saving residuals (saving depurated by its determinants) after the reform as a failure of pension reforms to contribute to the adequacy of private saving.

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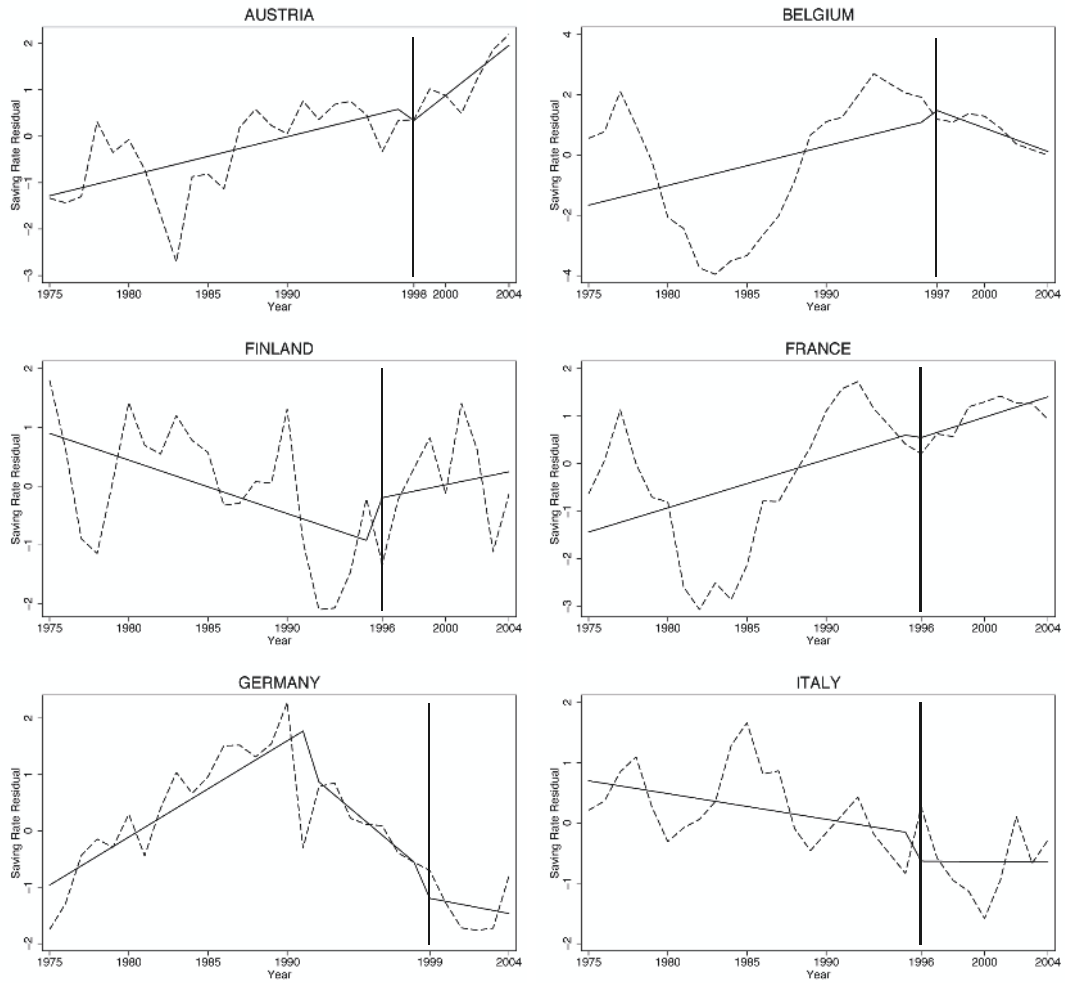
Figure 1. **Time series of saving residuals and trends**
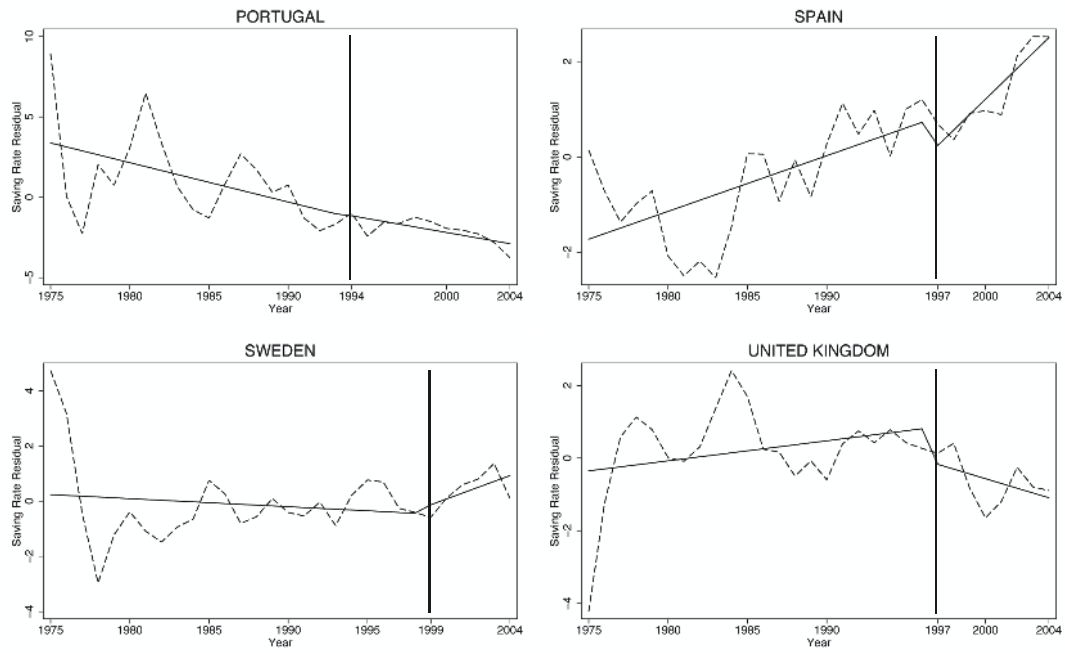
Figure 2. **Time series of saving residuals and trends (cont.)**

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