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On The Long-Term Macroeconomic Effects of Social Security Spending: Evidence For 12 Eu Countries (*[1])

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Abstract

We estimate the long-term impact of social security and social protection spending in a set of twelve EU countries. We estimate country-specific VARs relating GDP, unemployment, savings, and social spending. We find that social spending has a negative effect in most countries while the effects on savings are either not significant or positive but small. In turn, the negative effects on output are significant and in some cases large. Unemployment is the dominant channel through which social spending affects output. Our results imply that any increase in generosity would, under the current situation, bring detrimental macroeconomic effects. In addition, a less distortionary tax mix should be used to finance redistributive spending and the insurance component of the systems should be changed in the direction of a capitalization regime based on defined contributions. Obviously, this transition would take time and would not be costless but neither is maintaining the status quo.

Keywords: Social security spending, unemployment, saving, output, fiscal multipliers, VAR, EU.

JEL Classification: C32, C51, C52, H55.

1. Introduction

It is widely accepted that social security and protection systems based on pay-as-you-go (PAYG, hereafter) financing regimes and based at least partially on payroll taxes are particularly vulnerable to long-run solvency problems. It is also understood that these systems are likely to generate macroeconomic distortions in the labor market and in the accumulation of capital and ultimately likely to be a hindrance to growth. The central objective of this paper is to assess the magnitude of these inefficiencies in a set of twelve European Union countries comprising the bulk of the EU-15 and covering the major social protection systems in the EU.

Estimating the effects of social security spending on long-term economic performance is a very timely endeavour. Indeed, in the aftermath of the current crisis, and facing delicate economic and budgetary conditions, many EU countries are now contemplating substantial structural reforms. In many cases, the consolidation of the public budget had significant effects on the social security programs and made the issue of social security reform difficult to avoid as a possible impetus for further budgetary consolidation and economic growth. On the flip side, the current crisis seems to have greatly eroded the social protection mechanisms in the EU beyond what was to be expected for cyclical reasons [see Bontout and Lokajickova (2013)].

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As such it is not surprizing that there is an ongoing call for adjustments to increase the level of social protection and that there has been a significant number of social policy reforms – pension reforms, health care reforms, and social inclusion reforms, taking place in the last couple of year in the EU [see European Union (2013) as well as OECD (2011, 2013)]. In fact, it is well understood that social security spending tends to increase right after economic crises [see, for example, Prasad and Gerecke (2010)]. In fact, the quest for reform of the social security and social protection systems in the EU is not new as significant efforts have been going on over the last two decades. The background for reforms has typically been sharply increasing social security expenditures and concerns about the long-term sustainability of the social security systems in general and the pension component in particular. The incipient manifestation of adverse demographic trends, the general maturing of the systems in the form of greater non-contributory coverage, increase in the magnitude of the dimension of benefits, early retirement schemes, as well as the increase in generosity of the unfunded social benefits, all have contributed to these concerns. In most cases, however, the reforms have been parametric, that is, they have attempted to reduce future pensions or other social entitlements while at the same time keeping the PAYG nature of the system intact. In some cases, countries have undertaken more far-reaching structural reforms with the spread of multi-pillar pension systems, the introduction of individual saving schemes, and a narrowing of the public PAYG system.

Although the reforms over the last two decades have attempted to reduce the financial vulnerabilities of the social protection systems, their main focus has not been the elimination of the inefficiencies of the social security and social protection systems. In fact, it is not clear whether or not they have eliminated, or to what extent they have reduced, such inefficiencies. This issue is of paramount importance since the existence of significant distortions would require the implementation of further reforms even in the absence of sustainability issues and future reforms even those guided by sustainability considerations would need to be mindful of the possible distortionary effects that current financing mechanisms generate.

The starting point of this paper is the concern that social security and protection systems based traditionally on a PAYG financing regime and defined benefits are likely to have a negative impact on long-term economic performance. In fact, social security spending has been traditionally financed through payroll contributions the remaining financing coming from general taxes revenues. In some cases, the payroll contributions are used to finance both pension payments and social protection while in some cases both pensions and social protection spending are mostly financed by general tax revenue funds. In most cases, the PAYG system goes hand in hand with a defined benefit mechanism for computation of the pensions.

The fact that social security and social protection spending is financed through payroll taxes and general tax revenues under a defined benefit mechanism, implies that there has been no direct relationship between payroll contributions and pension benefits, for example, and therefore contributions are perceived essentially as taxes on labor income. To the extent that the burden of these taxes is borne by producers they may increase the costs of labor and adversely affect the unemployment rate and, to the extent that these taxes are borne by workers, they may reduce disposable income and overall private savings and ultimately capital formation [See, for example, Brauninger (2005), Evans (2001), Engen and Gale (1997), Feldstein (1996), and Gramlich (1996)]. The general point [see, for example, Disney (2006)] is that the further away the pension systems are from a more actuarially-based or a more fully capitalized system, the more distortionary they will tend to be. In addition, the more labor taxation is used to finance the social protection systems the more distortionary these systems will tend to be.

The objective of this paper is to determine the magnitude of the economic distortions induced by the social security and social protection systems in the labor and capital markets and ultimately on long-term output performance. We follow a multivariate time-series approach by estimating separate vector autoregressive models for each country, relating GDP, unemployment rates, saving rates, and social security spending. This dynamic multivariate approach follows the conceptual argument that the analysis of the social security effects requires considering the dynamic feedback effects between changes in social security spending and changes in the rest of the economy. In this context, all variables are treated as endogenous and social security spending affects economic performance over time but it is also affected by the countries' economic performance over time. Accordingly, our approach fully accommodates the possibility of reverse causality [bi-directional causality has been identified for example in Lee and Chang (2006)].

In turn, identification of innovations in social security spending follows a strategy common in the monetary economics literature by estimating the residuals of policy functions relating changes in social security spending to lagged information on the other economic variables [see, for example, Christiano, Eichenbaum, and Evans (1996, 1998), and Rudebusch (1998)]

This work is also related to the literature on fiscal multipliers, i.e., on the macroeconomic effects of taxes and government purchases [see, for example, Baunsgaard et al. (2014) and Ramey (2011), for recent surveys of this literature]. It is in fact very much in the spirit of the approach pioneered by Blanchard and Perotti (2002), which is based on a VAR approach and uses the Choleski decomposition to identify government spending shocks. We focus, however, on a specific type of public spending – social security spending and the channels through which it affects the economy, as opposed to aggregate spending or military spending as it is traditional in this literature. The paper is organized as follows. Section 2 describes the data, some methodological issues, and provides preliminary statistical information. In section 3, we present the estimates of the effects of innovations in social security spending in each of the twelve countries and how they relate to the evidence in the literature. We also discuss the extent to which the differences in the results across countries may be explained by differences in the nature of their social security and protections systems. Finally, section 4 presents a summary, some concluding remarks and discusses the policy implications of our results.

2. Data and Preliminary Analysis

In this section we present the data, preliminary statistical analysis - unit root and cointegration tests, as well as VAR model specification tests. Then, we discuss the identification of innovations in social security spending. While for the sake of brevity many of the most basic test results are only briefly discussed, details are readily available from the authors upon request.

2.1 Data sources and description

We consider annual data for a set of twelve EU countries comprising about 75% of the population and about 88% of the GDP of the EU-28. Indeed, they form the core of the EU before the admission of new entrants in the last decade and account for just under 95% of the population and GDP of the EU-15. These countries represent the four major social protection models in the EU: the Nordic system – Denmark, Finland, and Netherlands, the Anglo-Saxon system – Ireland and United Kingdom, the Continental model – Austria, Belgium, France, and Germany, and the Mediterranean system – Italy, Portugal and Spain [see, for example, Sapir (2006)].

We consider four variables: GDP, the unemployment rate, the private sector gross saving rate (as a % of the GDP), and social security spending (as a % of the GDP). All monetary variables are measured in billions of constant 2000 euros and the data for all variables were obtained from the macro-economic database of the European Commission's Directorate General for Economic and Financial Affairs – AMECO. The period under analysis starts in the 1970s, depending on data availability, and ends in 2007. The lack of data for social security spending for the earlier part of the sample period dictated the exclusion of the remaining EU-15 countries - Greece, Luxemburg, and Sweden. In turn, we exclude information after 2007 to avoid contaminating our results on the effects of social security programs with the significant impacts on the labor and financial markets and ultimately on GDP generated by the international economic and financial crisis that followed.

Social security spending covers the full spectrum of activities of the social security and protection systems. It comprises retirement pensions for both private sector and public sector employees, their dependents and their survivors, disability pensions, as well as a myriad of unfunded social benefits and social assistance programs, such as sickness and maternity, unemployment, family allowances, social inclusion and poverty reduction. Our choice of social security spending as the relevant social security variable is meant to reflect the true dimension of the social protection system and therefore the true dimension of its burden on the economy. In fact, a strong empirical relationship between social spending and distortionary taxation has been established in the literature [see, for example, Benos (2009) and Romer and Romer (2013)]. Table 1 presents the main features of the social security spending for the different countries in our sample. For the sample period, Austria, France, Germany, Italy display the largest shares of social security spending closely followed by Belgium, Denmark, Finland, and Netherlands. In all of these countries social security spending exceeds 15% of the GDP. They are followed by Spain, and the UK with 12.7%.

Ireland and Portugal have the smallest systems with social security spending at 10.9% and 10.3% of the GDP over the period. These two countries, however, have very different patterns over the sample period with the importance of social security expenditures sharply increasing in the case of Portugal and sharply declining in the case of Ireland. In fact, in terms of the magnitude of social security spending as a fraction of the GDP, the data shows an increasing trend in Germany, Italy, and Portugal. In the last ten or fifteen years, Denmark, Finland, Spain and the United Kingdom show, albeit to different degrees, a decreasing trend. Only Ireland and Netherlands show a consistently decreasing trend throughout the period. The remaining countries show relatively stable paths throughout the last couple of decades.

Today, all countries in our sample have a first-tier unfunded mandatory PAYG public pension system which aims to prevent poverty in old age and is redistributive in nature. In some countries, this first tier is complemented by statutory funded schemes, consisting on a purely funded scheme where accounts are managed mainly by private institutions as in Austria, Denmark and Italy. In all countries, there a second tier of occupational pensions with an "insurance" role. Like the first tier, it is mandatory or quasi mandatory in all countries with the exception of Ireland. It can be either publicly or privately provided as in Austria, Denmark, Finland, France, and the UK, or only public provided as in Belgium, Germany, Italy, Portugal and Spain, or only privately provided as in Ireland, and the Netherlands. When privately provided it is a fully funded scheme. Finally, all countries have third-tier voluntary scheme, either occupational or personal, but with large differences in coverage. Coverage is highest in Belgium, Denmark, Germany, Ireland, the Netherlands, and the United Kingdom.

A good part of the changes observed through the sample period were due to a flurry of pension reforms in many of these countries. Indeed, Austria, Finland, France, Germany, Italy, Portugal, and United Kingdom all had major parametric or systemic reforms between 1990 and 2007. Belgium, Denmark, Ireland, Netherlands, and Spain had substantially smaller reforms. No major changes occurred in the balance between private and public provision of the pension systems, or in the nature of the financing mechanisms – PAYG versus capitalization. Yet, there were important systemic changes in Italy in 1995 with the introduction of notional defined contribution accounts, in Ireland in 2001 and 2002 with the introduction of pre-funding of pensions and individual accounts and in Germany in 2001 also with the introduction of individual accounts. In addition, in Finland, France, Germany, and Portugal, there were important changes in terms of adjustments to changes in life expectancies. In most cases, parametric changes occurred in eligibility age, computation of benefits, etc., which tended overall to decrease the replacement rates for public pensions. In the case of Austria the parametric changes were particularly comprehensive. [For details on social security reforms throughout the world and, in particular, in the twelve countries under consideration, see OECD (2005, 2007, and 2009)].

Given all of these changes, any attempt to explain the evolution of social security spending and its effects on economic performance cannot ignore the existence and timing of these social security reforms. Table 1, includes for each country a reference to the years when some of the most meaningful social security reforms occurred. The possible existence of structural breaks in these years is fully incorporated throughout our analysis – unit root, cointegration, and VAR specification tests, as well as the VAR estimation procedures themselves. We follow the standard procedure in the literature [see, for example, Maddala and Kim (1998)], and consider the possible significance of dummy variables for the relevant periods in every step of the analysis. Naturally, in several instances the breaks considered were not statistically relevant. This is to be expected since even major reforms often take many years to filter through the system.

2.2 Unit roots and cointegration analysis

We start by using the ADF test to determine the order of integration of the variables. The optimal lag structure is chosen using the Bayesian Information Criterion (BIC, hereafter), and deterministic components, as well as structural break dummies, are included when statistically significant. For the variables in log-levels, all *t*-statistics are lower in absolute value than the 5% critical values, except in one case, where it is higher than the 5% critical value but below the 1% critical value. We therefore cannot reject the null hypothesis of a unit root in these variables. In turn, for the first differences of the log-levels, i.e. in growth rates, almost all *t*-statistics are greater in absolute value than the 1% critical values or, at lest the 5% critical values and, therefore, we can reject the null hypothesis of a unit root in these variables. These test results provide evidence that stationarity in growth rates is a good approximation for all variables.

We next test for cointegration using the Engle-Granger procedure, which has proven less vulnerable than the Johansen procedure to the small sample bias toward finding co-integration when it does not exist [see, for example, Gonzalo and Lee (1998) and Gonzalo and Pitarakis (1999)]. Following the standard approach, we performed four tests using the residuals for the variables under analysis as the endogenous variables. We apply the ADF *t*-test to the residuals from the regressions of each variable on the remaining variables. Again, the optimal lag structure is chosen using the BIC, and deterministic components as well as structural break dummies are included when they are statistically significant. The *t*-statistics are lower, in absolute value, than the 1% critical values in most of the cases and in all cases lower than the 10% critical value. Accordingly, we cannot reject the null hypothesis of no cointegration.

2.3 VAR specification and estimation

We have now determined that all the variables are stationary in growth rates and that they are not cointegrated. Accordingly, we follow the standard procedure in the literature and proceed to estimate the VAR model in growth rates.

The model specification is determined using the BIC. The VAR specification has two jointly determined dimensions – the specification of the deterministic components and the determination of the existence of structural breaks in appropriate years for each country. We find that the BIC leads to the selection of a first order VAR specification with a constant and a trend for all countries. Furthermore, for each and every country some, but not necessarily all, of the structural breaks considered were significant according the BIC rule and were duly included.

2.4 Identification of the effects of shocks in social security spending

We use the accumulated impulse-response functions associated with the estimated VAR models to obtain the economic effects of innovations in social security spending. Our methodology allows for the consideration of both the contemporaneous correlations and the dynamic feedbacks among the different variables. This means that social security spending is an endogenous variable in our analysis and that the feedbacks from the economy onto the social spending decisions are fully accounted for. In addition, both contemporaneous correlations and dynamic feedbacks are critical in the identification of innovations in social security spending and in the measurement of the effects of such innovations on the private sector variables.

The key methodological issue in determining the effects of social security spending is identifying shocks to social security spending that are truly exogenous, i.e., that are not contemporaneously correlated with innovations in the remaining variables. In dealing with this issue, we draw from the standard approach in the monetary policy literature [see, for example, Christiano, Eichenbaum, and Evans (1996, 1998), and Rudebusch (1998)] and consider a policy function, which relates the rate of growth of social security spending to the relevant information set. The residuals from this policy function reflect the unexpected component of the growth of social security spending and are uncorrelated with innovations in the other variables.

In our estimates we assume that the relevant information set includes past but not current observations of the growth rates of the other variables. This is equivalent, in the context of the Choleski decomposition, to assuming that shocks in social security spending lead shocks in the other variables. As such, shocks in social security while affecting contemporaneously economic performance are not affected contemporaneously by it. This identification strategy seems to be rather reasonable conceptually, since social security reforms have been driven by long-term political considerations as opposed to short-term macroeconomic conditions.

The policy functions estimates are reported in Table 2. We observe that for several countries there are important feedback effects from the other variables to social security spending, which implies that social security spending is an endogenous variable. More specifically, social security spending is responsive to previous changes in some of the macroeconomic variables in Austria, Belgium, Denmark, Finland, Germany, Italy and Portugal. For the remaining countries the empirical evidence suggests that the evolution of social security spending is exogenous relative to the other variables in consideration. These results closely match the evidence in Herce et al (2001) on causality between changes in the welfare state and GDP growth for an earlier period in the EU. It is also in line with evidence in Romer and Romer (2013) for the USA where social security spending is shown not to respond to short-term macroeconomic developments.

Furthermore, reforms have a significant impact on the policy rule in the cases of Austria, Denmark, Finland, Germany, Netherlands, Portugal and Spain. Accordingly, for nine of the twelve countries – the exceptions being France, Ireland, and UK – the policy rule reflects feedbacks from either the other economic variables or social security reforms or both.

3. Social Security Spending and Economic Performance

In this section we start by detailing the indicators used to measure the effects of innovations in social security spending and then proceed to present and analyze such effects. The central empirical results are reported in Table 3.

3.1 Measuring the effects of social security spending

In measuring the effects of changes in social security spending we consider the effects on the other variables of a one-time innovation in the growth rate of social security spending. The impulse-response functions and the corresponding error bands associated with the VAR estimates and the policy function described above are presented in Figure 1.

The error bands surrounding the point estimates for the accumulated impulse responses convey uncertainty around estimation and are computed via bootstrapping. We consider 80% intervals although bands that correspond to a 68% posterior probability or one standard error are standard in the literature [see, for example, Sims and Zha (1999)]. In fact, evidence exists that nominal statistical coverage distances may underrepresent the true statistical coverage in a variety of situations [see, for example, Kilian (1998)]. Employing the 80% intervals widens the range of values that characterize the likelihood shape and only serves to statistically strengthen our results when even with wider margins they remain on the same side of the spectrum, negative or positive.

We estimate the long-term accumulated elasticities of the different variables with respect to social security spending as the long-term accumulated changes in the different variables, for a one percent long-term accumulated change in social security spending**.** This is a conventional definition only in that it measures relative percentage changes. Unlike the conventional definition, however, this is a total accumulated and normalized elasticity. It is a total elasticity in that it accounts for all the dynamic feedbacks among the different variables. It is an accumulated elasticity in that it measures the long-term effects as the impulse response functions converge. It is a normalized elasticity in that it measures the effects of a one percentage point change in social security spending in the long term and not a one percentage point initial shock, which through the feedback mechanisms translates into a different accumulated long term shock.

In turn, the long-term accumulated marginal products give us the percentage point change in each variable for a one percentage point change in social security spending as a percentage of the GDP. The marginal products are obtained by multiplying the estimated accumulated long-term elasticities by the average ratio for the last ten years of the sample of the corresponding variable to social security spending as a percentage of the GDP. This allows us to interpret the marginal products as the long-term effects of social security spending under the most recent economic conditions while at the same time avoiding business cycle effects.

3.2 The effects of social security spending on unemployment, savings and GDP

Our estimation results suggest that social security spending increases the unemployment rate in all countries. In the cases of Ireland, Italy, and United Kingdom, however, the effects are not statistically significant in that zero is included in the standard deviation bands for the accumulated impulse response functions. We estimate that an increase in the ratio of social security spending to GDP by one percentage point leads to a percentage point increase of the unemployment rate by 2.6 in Belgium, 1.7 in Portugal, 1.6 in Finland, 1.4 in France, 1.2 in the Netherlands, and 1.1 in Germany. For the remaining countries, Austria, Denmark, and Spain, the effects on unemployment rate are all positive and statistically significant, but of a smaller magnitude.

Our empirical results also suggest that social security spending has positive effects on the savings rate for most countries. In many cases, however, and including the cases in which negative results are observed, the estimates are not statistically significant. Indeed, we cannot identify effects that are statistically different from zero for Belgium, France, Germany, Ireland, Italy, Netherlands, Portugal, and Spain. For the remaining countries we estimate a positive and statistically significant effect.

An increase of one percentage point in the ratio of social security spending to GDP leads to percentage point increases in the saving rate of 1.2 in Austria, 1.6 in Denmark, 0.7 in Finland, and 0.8 in the UK. It is significant the fact that we observe for Austria and Denmark, effects on the savings rate as a percentage of the GDP that exceed the increase of social security spending also as a percentage of the GDP.

Finally, the estimated effects of social security spending on GDP are negative in all countries. In the case of Ireland, the estimate is not statistically different from zero. One euro increase in social security spending reduces output, over the long-term, by 2.7 euros in Belgium, 2.2 euros in Finland, 2.5 in France, 2.8 in Germany, 2.5 in the Netherlands, 2.9 euros in Portugal, and 2.4 euros in the UK. These are the countries with the largest negative effects. For the remaining countries the effects of social security spending on GDP are negative but smaller. One euro increase in social security spending reduces output, over the long-term, by 1.5 euros in Austria, 1.8 in Denmark, 1.4 in Italy and 1.3 in Spain.

It is important to note that the adverse effects of social security spending in the labor markets, as reflected in increased unemployment rates, seem to be dominant. Indeed, Belgium, Finland, France, Germany, Netherlands, and Portugal countries with large effects on the unemployment rates also show large negative effects of GDP. In turn, countries with small but significant effects on the labor markets also have GDP effects that are small – Austria, Denmark, and Spain. In turn, for Ireland both effects are statistically insignificant.

The effects of social security spending in the financial markets, as measured by the effects on the savings rate, are more subdued – for eight of the twelve countries the effects are not statistically different from zero. For the remaining countries, for Austria and Denmark, the large positive effects on savings combine with small adverse unemployment effects to yield small negative GDP effects while for Finland, the small positive effects on savings do not seem to be enough to counteract the large negative effects on unemployment. In turn, for the United Kingdom, the positive small effects on savings are not enough to prevent a sizable negative effect on GDP.

Finally, in some countries we observe the interesting pattern that neither the labor market nor the financial market effects are significantly different from zero and the GDP effects are either also insignificant – as in Ireland, or negative but small – as in Italy.

3.3 On the nature of the results versus the nature of the social security systems

It could be informative to match our results with the general taxonomy of social protection systems in the EU and in particular with the general perception that the Nordic and Anglo-Saxon systems are reasonably efficient and that the Continental and the Mediterranean systems, aside from unsustainable, are reasonably inefficient. Our results in terms of the effects on unemployment both Anglo-Saxon countries shows insignificant detrimental effects while two of the three Mediterranean countries and all Continental countries show either moderate or substantial negative effects. The same is true, however, about the three countries in the Nordic system. As to the effects on savings, our results are even closer to the stereotypical view. Two of the three Nordic countries and one of the two Anglo-Saxon countries show significant positive effects on savings while all Mediterranean and all but one Continental show insignificant effects. Finally, in terms of the effects on output, the patterns are less clear in that all countries except for Ireland show negative effects.

From a different perspective, from the patterns of results presented above, it is clear that the labor market effects as measured by our estimated unemployment effects are the dominant channel for effects of social security spending in the economy. In fact, the dominance of the unemployment effect is clear in that the output effects very closely mirror the unemployment effects for most countries. With this in mind we can actually divide the countries in three groups depending on the magnitude of the effects of social security spending on employment. The discussion matches the general idea that depending on its design social security can be perceived as somewhere between a tax-and-transfer program or close to a pure form of retirement saving [see, for example, Disney (2006)].

A first group includes Belgium, Finland, France, Germany, Netherlands, and Portugal. For these countries social security spending has large negative effects on unemployment but insignificant effects on savings, the combination resulting in large negative effects on output. These countries all share some interesting characteristics.

The social security systems are very large and the pension component is public, effectively based on PAYG system, with relatively high ear-marked payroll taxes, and relatively low public pension replacement rates. The private systems are small and have limited coverage, although Finland and Netherlands do have large mandatory private components. The combination of high payroll taxes and low public pension replacement rates certainly in an environment of high social protection, certainly contributes in these countries to the unlinking of contributions and benefits and the large negative effects in the labor markets and by extension output.

The second group includes Austria, Denmark, and Spain. For these countries the negative effects of social security on unemployment are moderate while the effects on savings are either positive – Austria and Denmark – or zero – Spain. Overall, the effects on output are also moderate, mirroring the effects on unemployment. These countries have large social security systems with either very large public pension coverage rates as in Austria or very low public pension coverage rates but a large private system, as in Denmark. In both countries the large public systems are financed to a large extent by general tax revenues as opposed to payroll taxes. Accordingly, for these two countries, the negative effects on unemployment are moderate and they have positive effects on savings. Spain has a smaller public social security system with very high pension payroll taxes, in particular the component with direct incidence on employers, but also relatively high public pension coverage rates and a small private component. This translates into an insignificant effect on savings and a moderate negative effect on unemployment and output.

The third group includes Ireland, Italy, and United Kingdom. For these countries, the negative effects on unemployment are insignificant and the effects on savings either positive – United Kingdom – or zero – Ireland and Italy. The effects on output are mixed: insignificant for Ireland, negative but moderate for Italy, and negative and large for the United Kingdom. This means that while for the first two groups there is a close, almost perfect, match between the effects on unemployment and output, the link seems to be less clear for the third group. Ireland and the United Kingdom have very small public social security systems financed mostly by general tax revenues as opposed to payroll taxes. In fact they do not have payroll taxes specifically ear-marked for public pensions. The public pension replacement rates are very low but the private component of the pension system is very significant. In the case of Ireland this translates into a public social security system that is pretty innocuous in terms of its economic impact. For the United Kingdom, the particularly large private component for the second tier of the public pension system is consistent with a positive effect on savings. Finally, Italy has a large public system with large contribution rates, with incidence mostly on employers, but also relatively large public pension replacement rates in a system that has adopted for the last two decades a close to fully funded accounting. At the same time the size of the purely private pension system seems to be declining. The effects of the public social security system on unemployment and on savings are naturally not significant. The effects on output are moderately negative. The negative effects on output observed for Italy and the United Kingdom could possibly be explained by the large distortions of the tax systems used to finance the public component, something not considered in this study.

3.4 International comparisons

International comparisons are not easy due to the wide disparity in the literature of time periods, regions, methodologies, and even the specifics of the issues under consideration. Still, such comparisons, at least at a qualitative level, are not impossible. Overall, we find that the results presented in this paper are well within the boundaries of the evidence in the international empirical literature.

In terms of the effects of social security spending on unemployment, our results are in line with the negative effects on unemployment and labor market conditions in general which are often found in the literature. Mortensen and Pissarides (1999) and Mariman and Zilibotti (1999), for example, explain the higher unemployment rates observed in Europe relatively to the United States based on the idea that the unemployed in a country with extensive social security protection spend more time searching for a job which fully matches their skills than unemployed in countries with little social protection. The resulting negative effects on unit labor costs and on unemployment follow naturally. Other empirical studies, reporting similar negative effects on unemployment or other aspects of the labor market conditions, include, for example, Jousten et al. (2010) for Belgium, Riphahn (1997) for Germany, Butter (1993) and Borstlap (1996) for Holland, Bjorklund and Holmlund (1989) for Sweden, Papps (2010) for Turkey, and Bosworth and Burtless (2004a) and Mastrobuoni (2009) for the United States.

In terms of the effects on savings, the relatively small effects we identify are consistent with the evidence in Conesa and Carriga (2008) where the labor market effects of social security reform are shown to be much more substantial in eliminating distortions in the labor market than in savings behaviour.

In terms of the findings in the international literature, our results fall somewhere in between a broad spectrum of evidence. On one hand, for example, Samwick (2000) for a cross-section of 94 countries and Disney (2006) for a panel of OECD countries with tax-and-transfer systems show that movement from the PAYG system to a provident fund or fully funded system would have positive effects on household saving rates while Ehrlich and Kim (2007) and Baldacci et al. (2010) find evidence for negative effects on private household savings in the OECD. On the other hand, Lee and Chang (2006) find positive effects of social spending on savings for a panel of 25 OECD countries, while Cigno et al (2000), Obben and Waayer (2009), for example, find positive effects for Germany, New Zealand, respectively

Finally, our negative effects of social security spending on GDP are also consistent with the international literature. For example, Afonso and Alegre (2011) estimate a negative impact of social protection expenditures on growth in a panel of 15 EU countries while Alam et al. (2010) find similar effects for a panel of 10 Asian countries. In turn, using a panel of 57 countries, Ehrlich and Kim (2007) find evidence for negative effects on GDP growth for PAYG systems in particular in the OECD. Finally, Benos (2009) using a panel of 14 EU countries finds that the effects of changes in social protection spending on GDP tend to be very small while Romer and Romer (2013) find no significant effects on output for the USA.

4. Concluding Remarks

In this paper we estimate the long-term economic impact of changes in social security and social protection spending on the economic performance in a set of twelve European Union countries. We estimate country-specific vector autoregressive models relating GDP, unemployment rates, saving rates, and social security spending. This dynamic multivariate approach considers the dynamic feedback effects between changes in social security spending and changes in the other economic variables, allowing for reserve causality.

Our results can be summarized as follows. First, the negative effects of social security spending on unemployment are relevant in most countries. They are particularly high in Belgium, Finland, France, Germany, Netherlands, and Portugal, countries with relatively high contribution rates and low public coverage rates. The effects of social security on savings are not relevant for most countries and when they are they tend to be small. They are only significant in Austria, Denmark, Finland, and UK, countries with private mandatory occupational schemes or voluntary schemes with large coverage, based mostly on defined contributions. Overall, the negative effects on output are sometimes large and also relevant for most countries. The only country where the detrimental effects on output seem to be absent is Ireland, a country which relies mostly on private and voluntary pension schemes.

Second, it is clear that the labor market effects as measured by our estimated unemployment effects are the dominant channel for effects of social security spending in the economy. In fact, the countries could be divided into three main groups. A first group includes Belgium, Finland, France, Germany, Netherlands, and Portugal. For these countries social security spending has large negative effects on unemployment but insignificant effects on savings, the combination resulting in large negative effects on output. The second group includes Austria, Denmark, and Spain. For these countries the negative effects of social security on unemployment are moderate while the effects on savings are either positive – Austria and Denmark – or zero – Spain. Overall, the effects on output are also moderate, mirroring the effects on unemployment. The third group includes Ireland, Italy, and United Kingdom. For these countries, the negative effects on unemployment are insignificant and the effects on savings either positive – United Kingdom – or zero – Ireland and Italy. The effects on output are mixed: insignificant for Ireland, negative but moderate for Italy, and negative and large for the United Kingdom.

From a policy perspective, our results suggest that conventional parametric reform strategies focusing merely on increasing contributions or reducing benefits seem not to have helped in a meaningful way with the inefficiency problems induced by the systems as substantial detrimental effects are still present in most countries. This is true even in those countries where extensive reforms have occurred although in this case we need to be cautions as the results of these reforms often take a long time to filter through the system and the economy as a whole.

This has important implications for further reforms of the social security and social protection systems. First, any increases in the generosity of the current systems would, under the current funding framework, bring detrimental long-terms macroeconomic effects.

This should not in itself be understood as an indictment of such goals and policies. To the extent that important social equity and social protection issues need to be addressed there is room for reforms to extend the systems. Our results suggest, however, that great attention needs to be paid to the way these programs are financed. The systematic use of payroll taxes in most countries to finance spending areas that are redistributive in nature needs to be reconsidered in favor of a more systematic use of general tax revenues and a less distortionary tax mix.

Second, it would seem that the time has come to consider comprehensive structural reforms of the insurance component of the pension systems. These reforms would be designed to shift much of the pension burden from the state, to the employer, and the individual. A central piece of such reform would be to progressively change the PAYG financing regime based on definite benefit mechanisms into a capitalization regime based on defined contributions. Under this new financing regime, inefficiency effects on savings and employment would also be alleviated and economic growth would be encouraged [see, for example, Bosworth and Burtless (2004a, 2004b), Coronado (2002), Meyermans (2004), and Conesa and Garriga (2008)]. Obviously, this transition would take time and would not be costless but neither is maintaining the status quo. This is much more so in light of current high unemployment rates and difficult economic and budgetary conditions in so many of the EU countries under consideration. In fact, the current state of affairs may be the ideal environment from a political economy perspective to allow for such far-reaching reforms. A more efficient social security and protection system may serve as a catalyst for growth and fiscal consolidation.

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Table 1: Social security expenditures: stylized facts

	Sample	Social security spending as a percentage of GDP				Dates of social security main reforms
		Sample	Until 90	91-00	01-07	
Austria	1976:2007	17.86	17.07	18.63	18.46	1992, 2003
Belgium	1970:2007	15.80	15.70	16.07	15.72	1987, 2001
Denmark	1971:2007	15.82	14.56	18.10	16.17	1990, 2001
Finland	1975:2007	15.57	12.36	20.29	16.17	1989, 1999
France	1978:2007	17.05	16.32	17.66	17.52	1993, 1999, 2003
Germany	1970:2007	16.54	15.23	17.65	18.88	1990, 2001
Ireland	1980:2007	10.90	12.00	11.01	9.00	1990, 2002
Italy	1980:2007	16.80	14.40	16.43	21.11	1995, 2004
Netherlands	1970:2007	15.49	17.23	14.89	11.11	1998, 2004
Portugal	1979:2007	10.31	8.76	10.95	14.03	1985, 1994, 2003
Spain	1980:2007	12.68	12.27	13.83	11.67	1990, 1997, 2001
UK	1970:2007	12.68	11.70	14.50	13.00	1986, 1995, 2004

Table 2: Policy functions for social security spending
(Dependent variable: ratio of social security spending to GDP)

Countries (time dummies)	Constant	Trend	Dummies	GDP(-1)	Unemployment rate (-1)	Savings/GDP (-1)	Social security Spending/GDP (-1)
Austria (1992, 2003)	0.0322*** (2.40)	-0.0029*** (-2.73)	0.0319*** (2.04) 0.0476** (1.99)	0.1913 (0.66)	-0.0175 (-0.64)	-0.1969*** (-2.98)	0.1795*** (3.18)
Belgium (1987, 2001)	0.0004 (0.02)	-0.0012 (-1.22)	0.0004 (0.03) 0.0229 (0.99)	1.0479*** (2.55)	-0.0331 (-0.56)	-0.1208 (-0.86)	0.4871* (1.72)
Denmark (1990, 2001)	0.1419*** (3.39)	-0.0062*** (-2.79)	0.0513 (1.55) 0.0856* (1.73)	-1.5676** (-2.33)	-0.0553 (1.43)	-0.3034*** (2.79)	0.1689 (0.69)
Finland (1989, 1999)	0.1523*** (2.94)	-0.0069** (-2.50)	0.0658* (1.79) 0.1062* (1.77)	-2.7306** (-2.47)	-0.3105*** (-3.36)	-0.1649** (-2.09)	0.4666 (1.43)
France (1993, 1999, 2003)	0.0386 (1.59)	-0.0021 (-1.16)	0.0103 (0.54) 0.0148 (0.62) 0.0268 (0.79)	-0.3878 (-0.86)	-0.0269 (-0.28)	-0.0969 (-1.05)	0.0906 (1.18)
Germany (1990, 2001)	0.0394* (2.02)	-0.0035* (-2.54)	0.0626** (2.55) 0.0674* (1.99)	0.1908 (0.72)	-0.0777*** (-4.49)	0.2215 (1.71)	0.3025** (2.16)
Ireland (1990, 2002)	0.0231 (0.23)	-0.0087 (-0.74)	0.0124 (0.13) 0.1331 (0.63)	1.5848 (1.39)	0.3060 (0.99)	0.0174 (0.07)	0.0028 (0.05)
Italy (1995, 2004)	0.0490* (1.87)	-0.0016 (-0.55)	0.0043 (0.13) 0.0214 (0.40)	-0.3514 (-0.44)	-0.4374** (-2.29)	-0.1457 (-0.40)	0.0539 (0.23)
Netherlands (1998, 2004)	0.0485 (1.55)	-0.0032** (-2.36)	0.0393* (1.76) 0.0474 (1.49)	-0.0946 (-0.18)	0.0005 (0.01)	0.0742 (0.76)	0.2982 (1.34)
Portugal (1985, 1994, 2003)	0.0388* (2.99)	-0.0009 (-0.88)	-0.0104 (-0.84) 0.0124 (1.03) 0.0290** (2.43)	-0.3661 (-1.26)	-0.1562** (-3.49)	0.0336 (0.48)	-0.3455* (-1.72)
Spain (1990, 1997, 2001)	0.0661 (1.28)	-0.0144** (-2.18)	0.1094* (1.88) 0.1620* (1.73) 0.2868** (2.20)	0.7969 (0.58)	-0.1824 (-0.89)	0.1455 (0.64)	0.0913 (0.46)
UK (1986, 1995, 2004)	-0.0276 (-0.62)	0.0020 (0.64)	-0.0039 (-0.09) -0.0465 (-0.74) -0.0505 (-0.60)	0.2718 (1.31)	0.0939 (0.76)	0.2615 (1.30)	0.2424 (1.22)

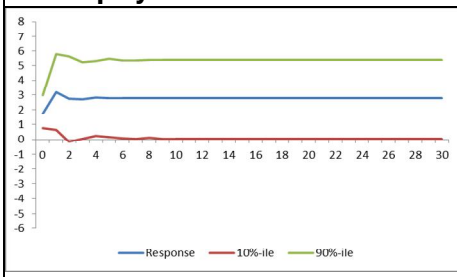
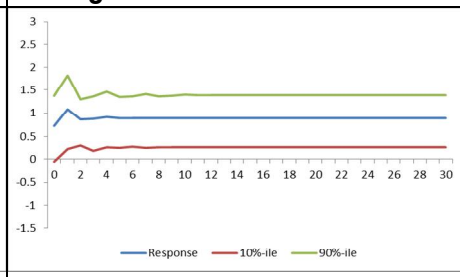
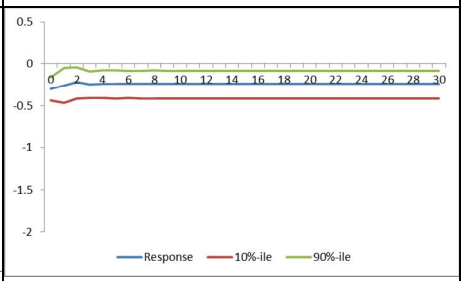
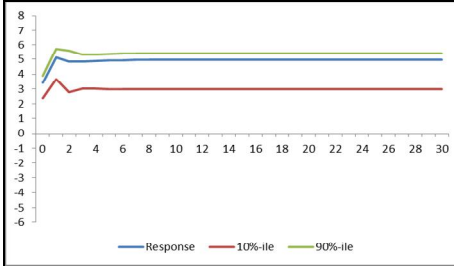
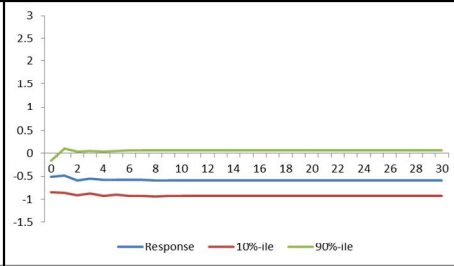
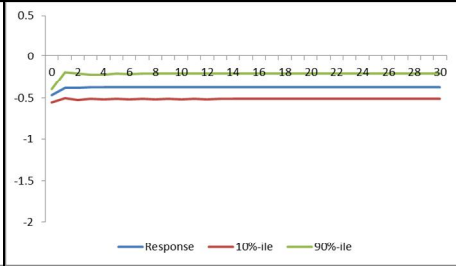
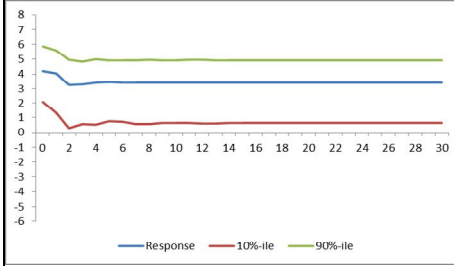
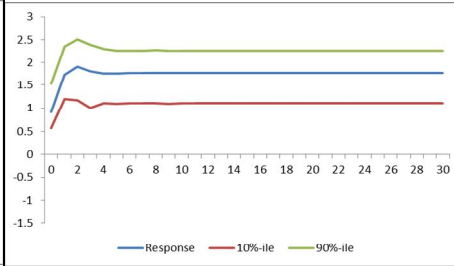
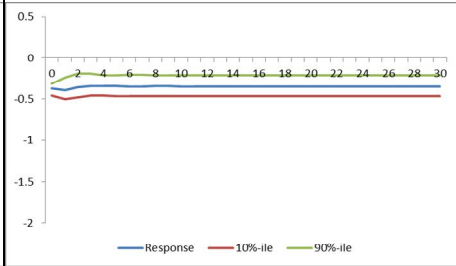
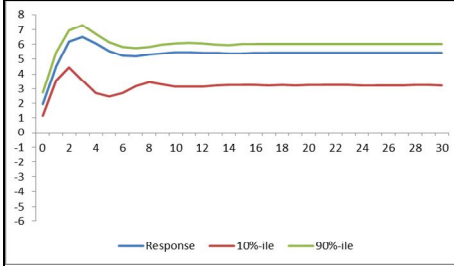
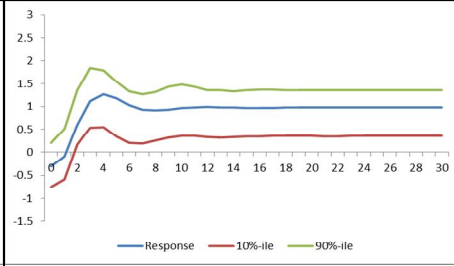
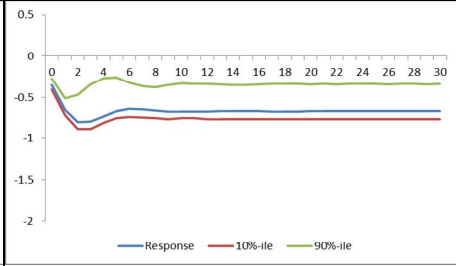
Note: t-statistics in parenthesis; * Significant at 10%.; ** Significant at 5%; *** Significant at 1%.

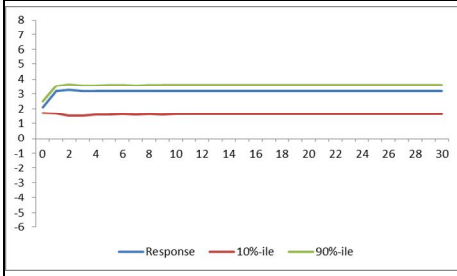
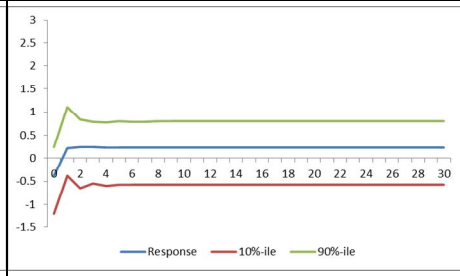
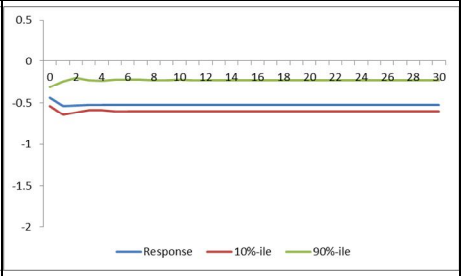
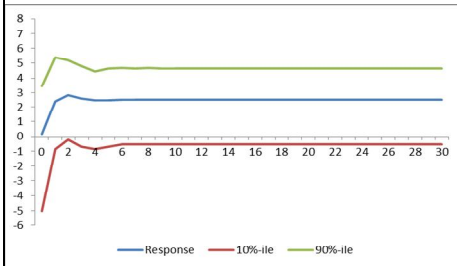
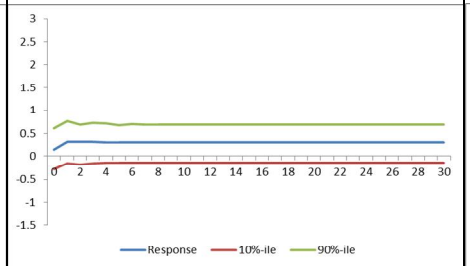
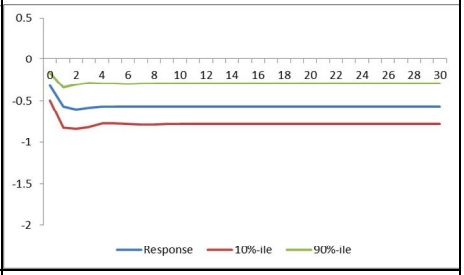
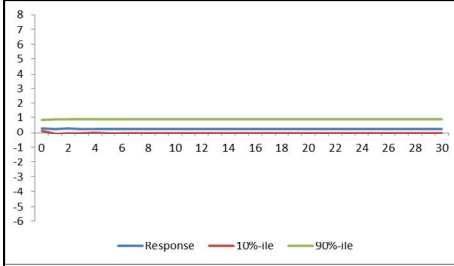
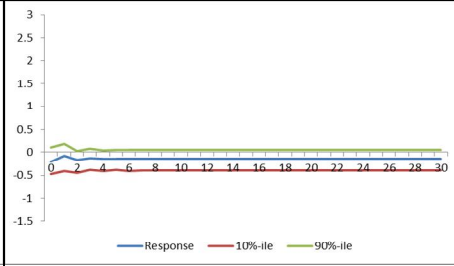
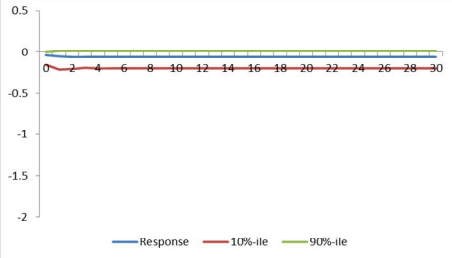
Table 3: Long term effects of changes in social security spending

	Unemployment rate		Saving rate		GDP	
	Elasticities	Marginal products	Elasticities	Marginal products	Elasticities	Marginal products
Austria	3.1241	0.7307	1.0048	1.1741	-0.2711	-1.4675
Belgium	5.1064	2.5896	-0.6034	-0.8878	-0.4258	-2.7191
Denmark	2.5600	0.7299	1.3617	1.6243	-0.3006	-1.8407
Finland	2.9372	1.6010	0.5267	0.6638	-0.3627	-2.1992
France	2.6464	1.3940	0.1908	0.2084	-0.4354	-2.4864
Germany	2.2718	1.0727	0.2677	0.2984	-0.5185	-2.7643
Ireland	0.2654	0.1439	-0.1419	-0.2856	-0.0571	-0.6439
Italy	0.0913	0.0420	0.2396	0.2838	-0.2736	-1.4131
Netherlands	3.9744	1.2198	0.2116	0.4468	-0.2856	-2.5144
Portugal	3.8341	1.7033	-0.2132	-0.2751	-0.3785	-2.8962
Spain	1.1890	0.9552	0.0211	0.0325	-0.1642	-1.3380
UK	0.2021	0.0814	0.7106	0.8252	-0.3127	-2.3974

Note: The results that are statistically different from zero as determined by the standard deviation bands of the accumulated impulse response functions are presented in boldface.

Figure 1: Accumulated impulse-response functions with respect to social security spending

Austria		
Unemployment rate	**Saving rate**	**GDP**
		
Belgium		
Unemployment rate	**Saving rate**	**GDP**
		
Denmark		
Unemployment rate	**Saving rate**	**GDP**
		
Finland		
Unemployment rate	**Saving rate**	**GDP**
		

France		
Unemployment rate	**Saving rate**	**GDP**
		
Germany		
Unemployment rate	**Saving rate**	**GDP**
		
Ireland		
Unemployment rate	**Saving rate**	**GDP**
		
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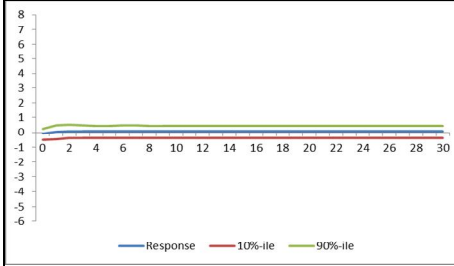
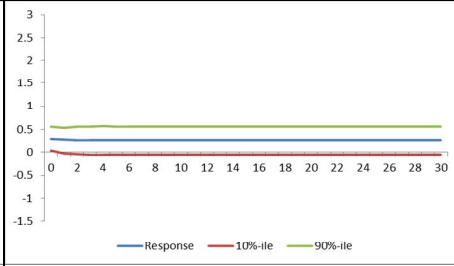
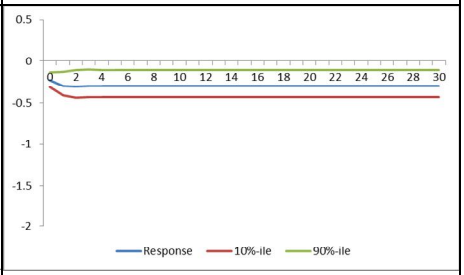
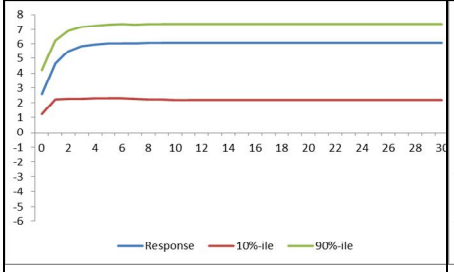
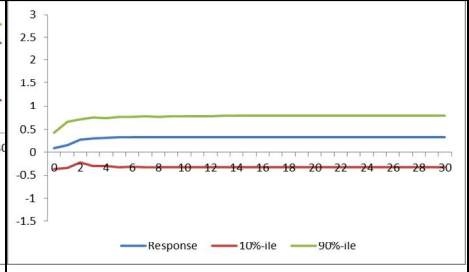
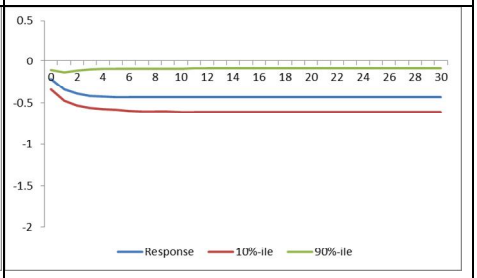
Unemployment rate	**Saving rate**	**GDP**
		

Netherlands		
Unemployment rate	**Saving rate**	**GDP**
		
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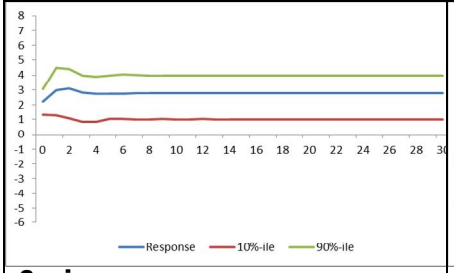
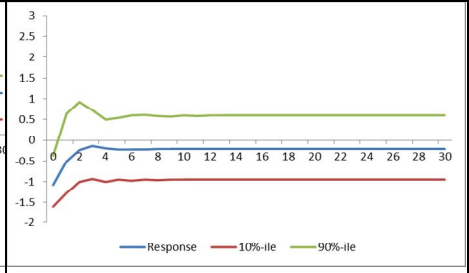
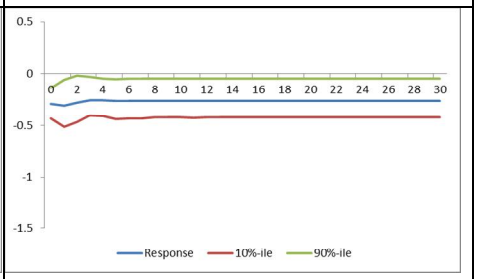
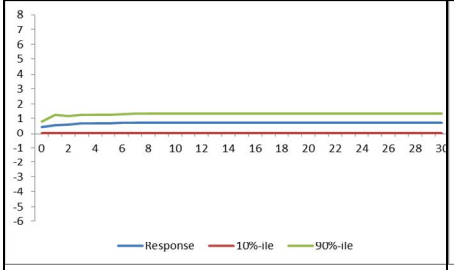
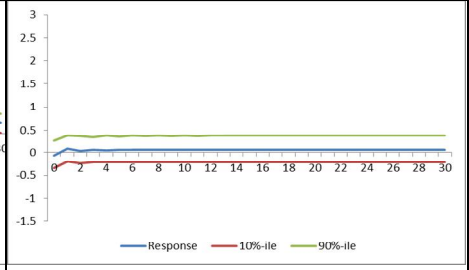
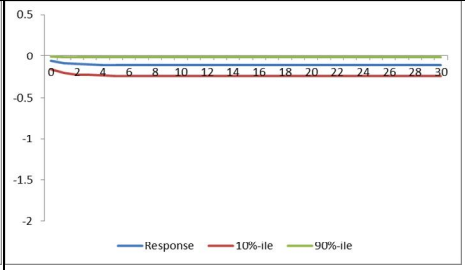
Unemployment rate	**Saving rate**	**GDP**
		
Spain		
Unemployment rate	**Saving rate**	**GDP**
		
United Kingdom		
Unemployment rate	**Saving rate**	**GDP**