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**Real Wage Rigidities, Fiscal Policy,
and the Stability of EMU
in the Transition Phase**

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Real Wage Rigidities, Fiscal Policy, and the Stability of EMU in the Transition Phase

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Abstract

Real Wage Rigidities, Fiscal Policy, and the Stability of EMU in the Transition Phase. - EMU will start with eleven member countries as scheduled on January 1, 1999. The paper shows that the primacy of politics over economics in this decision could have serious consequences concerning the stability of EMU in the transition phase. Speculative attacks against currencies which are in economic distress due to asymmetric shocks can still happen. A speculative attack as such cannot force a country out of EMU. However, the country concerned might voluntarily decide to leave the system as the costs of staying inside EMU, e.g. due to further rising unemployment, become too large to bear.

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I. Introduction

After the endorsement of a large European Monetary Union (EMU) with 11 starting members by the European Commission, the European Monetary Institute, and last but not least the Bundesbank even the hard-core skeptics appear to be convinced: The Euro will start on time by January 1, 1999, and it will more or less smoothly sail onwards from there to finally substituting the respective national currencies by July 1, 2002. The rather surprising fulfillment of the Maastricht criteria by such a large number of countries serves as a strong argument for this rather optimistic point of view. It should be cautioned though that some countries only managed to fulfill the fiscal criteria by resorting to short term measures, by creative accounting, and of course by a generous interpretation of the criteria. This is of course not to deny that macroeconomic discipline has improved substantially throughout the European Union (EU) in recent years. The above institutions expressed nonetheless some reservations concerning the high level of outstanding government debt in Belgium and Italy; both have accumulated more than twice the reference value in the Maastricht Treaty of 60 percent of GDP. However, assuming that both countries continue their recently begun fiscal consolidation path, it is argued that the stability of the Euro is not undermined by this onerously high level of government debt.

This may or may not be true. Doubts are in any case appropriate whether the prescribed long transition phase of three and a half years until the national currencies are finally substituted by the Euro will really be as smooth as generally expected. The Maastricht criteria only demand nominal convergence. As is now evident, entry to EMU is not restricted to countries which exhibit a considerable degree of real convergence. Yet, the conditions for a well-functioning monetary union, which already date back to Mundell (1961), are set in real, not in nominal terms. As is well known, an optimum currency area (OCA) is characterized by one or more of the following features: Low incidence of asymmetric shocks, highly mobile workers, flexible real wages, and a system of fiscal federalism. As these adjustment mechanisms are not available to a great degree in Europe and as asymmetric shocks might nonetheless occur, tensions concerning the right course of monetary policy in EMU are bound to arise. If an asymmetric shock is large enough, EMU might even break apart as consensus on monetary policy cannot be reached and as economic costs of staying in EMU become too large for some countries to bear. Although there are no provisions in the Maastricht Treaty for countries

which wish to exit from EMU, it is hard to conceive of a sovereign country being forced to stay in EMU against its will.

However, it has recently been argued that the OCA-criteria are endogenous (De Grauwe, 1997; Fatás 1997; Frankel and Rose 1997). In particular, business cycle correlation might rise with stronger trade ties which could be triggered by the introduction of a common currency. Asymmetric shocks could therefore become less likely. Furthermore, EMU might contribute to increasing real wage flexibility, as the political viability of labor market reforms could rise with EMU. This might be the case because EMU removes the monetary cushion for absorbing adverse shocks so that the greater necessity of structural reforms of the labor market should become crystal clear to everybody. The stability of EMU is more of an issue in the short to medium run perspective than in the very long run according to this reasoning. A particularly revealing time period concerning the stability of EMU and the Euro is therefore going to be the transition phase. Economic structures will not have changed much yet during that time period, so that there will only be a minor improvement in the fulfillment of the OCA-criteria. Furthermore, national currencies continue to be in use during the transition phase. It is therefore still relatively easy for countries to withdraw from EMU. Although the national currencies are just Euros with another name starting from January 1, 1999, effectively being liabilities of the European Central Bank (ECB), there would be nothing to stop say a newly reconstituted Bundesbank from assuming circulating DM notes as its own liabilities. Hence, the transition phase will prove to be the litmus test for the stability of EMU as it leaves ample room for crisis-situations to occur.

In order to find out whether the Euro might sail into rough waters and in particular whether the prescribed transition phase will be stable or not, the paper is structured as follows. The ensuing section briefly discusses the probability of asymmetric shocks given a large EMU with eleven prospective member countries. The third section presents in considerable detail new empirical evidence on how negative shocks were absorbed in the past in Europe. Finally, the fourth section puts the stability of the scheduled transition phase in light of the results of the preceding sections under closer scrutiny.

II. Asymmetric Shocks in EMU

The probability of asymmetric shocks in EMU has been an issue in the literature for quite some time now.¹ The general consensus seems to be that the large EMU which is about to start with eleven members on January 1, 1999, is not an OCA in the sense that idiosyncratic shocks are highly unlikely. To the contrary, the selected participating countries are rather heterogeneous in their production structures so that sector specific shocks are bound to affect countries differently. This is not at all surprising considering that prospective EMU stretches from the Mediterranean to the arctic circle. Furthermore, the capacity to adjust to adverse shocks still differs considerably between countries. Hence, even symmetric shocks are all too likely to exert asymmetric effects on member countries. Using the states in the US or alternatively even the US and Canada as benchmarks as these are reasonably well functioning monetary unions, income correlation between member countries would only be similarly high if membership had been restricted to Germany, France, Austria, the Benelux countries, and maybe Denmark. Political economy considerations and, of course, the above mentioned recent developments show, though, that EMU will not be restricted to these core-countries.² Italy, Spain, Portugal, Finland, and Ireland will also participate in EMU in spite of their low income correlation with these core-countries.

This rather discouraging result has recently been challenged, though, on the grounds that founding a monetary union might by itself contribute to making EMU an OCA. Income correlation between member countries is not exogenous to EMU. As the recent literature on the endogeneity of the OCA-criteria has revealed, income correlation itself is increased by membership in EMU, so that the likelihood of asymmetric shocks can be expected to decline. Thus, EMU-membership could justify itself *ex post* in the long run although it might not have been justified on economic grounds *ex ante*. First, shocks induced by autonomous monetary policies and adjustable exchange rates can no longer occur in EMU. Second, EMU can be expected to promote direct investments and trade, in particular intraindustry trade, in Europe by eliminating exchange rate risks.³ Agglomeration effects, economies of scale, thick market

¹ See e.g. Bayoumi and Eichengreen (1993) and (1996), Bayoumi and Prasad (1996), Calmfors et al. (1997), von Hagen and Neumann (1994), Pissarides (1997), Krugman (1993), and Canzeroni, Vallées, and Viñals (1996).

² Due to the referendum result, Denmark will of course not participate from the beginning in EMU.

³ See Fatás (1997), Frankel and Rose (1997), and Wyplosz (1997). The lack of solid empirical evidence for positive effects of fixed exchange rate regimes on trade and direct investments should not be surprising and is not a suitable argument against such positive effects of EMU. Fixed exchange rate regimes merely change the

externalities, and positive external effects of R&D will therefore gain in importance. Hence, regional specialization in the production structure is enhanced similar to the developments in the US. It is sometimes argued that such a regional specialization increases the probability of nation-specific shocks. But this is only true in the unlikely case that regions and nations coincide. With large countries, lower transaction costs for cross-border business activities, and cross-border externalities it should rather be expected that countries consist of at least several such specialized regions and that regions stretch across borders. Idiosyncratic shocks should therefore become less likely the longer EMU lasts. This conjecture is backed up by recent empirical evidence showing that business-cycle correlations rise with closer trade links between nations, thus reducing the necessity of adjusting real exchange rates.

Yet, this is only a likely development in the very long run. Given the current diversity of prospective member countries, asymmetric shocks are still bound to occur from time to time in the near future. The transition phase, in which asymmetric shocks constitute the greatest threat to the stability of EMU, will therefore be particularly fragile because the benefits of EMU in terms of closer income correlation will not have materialized to any substantial degree yet. Furthermore, EMU does not render large politically induced asymmetric shocks such as German reunification impossible. One of the reasons for this assessment is of course that political unification lags far behind. Yet, adjustments in real exchange rates, which can be orchestrated at smallest cost by changing nominal exchange rates, are especially necessary in case of such large shocks. Overall, it is therefore essential to ask, how adverse shocks were absorbed by the prospective member countries in the past and whether these channels will still be available in EMU.

III. The Adjustment of EMU Countries to Adverse Shocks

There are in principle four channels through which countries can adjust to adverse shocks without rising unemployment: Labor mobility, real wage flexibility, monetary policy and fiscal policy. Since the often cited study of Blanchard and Katz (1992) it is well known that region-specific shocks in the US are to a great degree absorbed by the high mobility of the American labor force. Workers who have lost their job due to a negative shock move to more

nature of the exchange rate risk toward large and sudden jumps. Only a monetary union such as EMU eliminates

prospering regions thus reducing the unemployment rate in the respective state back to the national average. Comparing countries in Europe with states in the US, a similar capacity to absorb negative country-specific shocks would imply a very high mobility of the labor force between countries in Europe. However, neither does this high level of inter-country mobility already exist in Europe nor can it be expected to develop in the near future (Decressin and Fatás 1994). Deeply entrenched cultural and language barriers impede workers from moving easily between countries in Europe. Hence, Europe must rely on other mechanisms to absorb negative shocks without rising unemployment. As real wage flexibility is the only other channel which relies on market forces, this would be the most desirable alternative.

1. Real wage flexibility

Real wages are flexible if unemployment exerts a strong downward effect on equilibrium wages. If this is the case, the wage reaction to adverse shocks lays the foundation to a recovery and to a return to the pre-shock level of unemployment. Real wage flexibility has been an issue in Europe at least since the late 1980s when persistent unemployment became the number one topic of economic policy in Europe. The mainstream approach to estimating real wage flexibility still appears to be the one proposed by Layard, Nickell and Jackman (1991). Based on the well known framework of the labor market with a wage setting and a price setting schedule, they estimated structural wage and price equations across OECD countries. Their original results are reproduced in table 1 in column 1. As can be seen, the degree of real wage flexibility differs considerably between countries in Europe. Essentially, countries can be put into three groups. Italy, Sweden and Austria have highly flexible real wages according to these results. France, Belgium, the Netherlands, Ireland, and Finland exhibit a medium level of real wage flexibility, whereas Spain, Denmark, Germany, and the UK are beset by highly rigid real wages. The US, which shall serve as the benchmark country, would be a member of the middle group, while Japan would be in the top group. If accomodating demand policies are regarded as the alternative to real wage flexibility, the pressure to accomodate negative shocks with expansionary demand policies will therefore vary greatly between countries participating in EMU but will on average not be higher than in the US.

the risk of changes in the exchange rate (Mélitz 1997).

Table 1 - Different Measures for Real Wage Rigidity

	Layard, Nickell and Jackman ^a	SVAR ($\Delta(w-p), u$)	SVAR ($\Delta(w-p), \Delta u$)
	Real Wage Rigidity	Real Wage Rigidity	Real Wage Rigidity
Austria	0.11	2.518	0.997
Belgium	0.25	2.486	0.606
Denmark	0.58	1.708	0.626
Finland	0.29	1.253	0.116
France	0.23	2.055	1.433
Germany	0.63	1.730	0.812
Greece	-	1.902	1.399
Ireland	0.27	2.334	1.142
Italy	0.06	2.641	1.205
Netherlands	0.25	1.581	1.129
Portugal	-	1.302	0.959
Spain	0.52	2.414	1.294
Sweden	0.08	1.001	0.865
UK	0.77	1.594	0.981
USA	0.25	1.208	0.920
Japan	0.06	1.960	1.796

^a Layard, Nickell, and Jackman (1991: 406-407).

However, the Layard, Nickell, and Jackman approach to measuring real wage rigidities has been criticized on various grounds. Apart from identification problems the issue of integrated variables is not addressed at all. Thus, the question must be whether more advanced methods of estimating real wage rigidities exist, and whether they deliver different and maybe more plausible results.

Viñals and Jimeno (1996) have recently proposed to estimate real wage rigidities by resorting to the Blanchard-Quah⁴ method. The above labor market model is combined with a structural VAR approach. The model is composed of a labor demand equation and a real wage equation according to which real wages depend on current and lagged unemployment. The advantage of the Blanchard-Quah method lies in the fact that not only the effects on current unemployment are taken into account but rather the whole adjustment path to a wage-push shock. The measure for real wage rigidity is then a combination of the initial response of unemployment to a transitory wage-push shock and the mean lag reflecting the adjustment

⁴ See Blanchard and Quah (1989).

path to such a shock. Hence, in our SVAR framework the impulse response function of unemployment to wage-push shocks serves as a useful device to compute an index of real wage rigidities.⁵

The results of using this approach for the 1970 to 1995 period are found in columns two and three. While unit root tests for the real wage indicate integration of order 1 and thus secure the suitability of the Blanchard-Quah method, the results for the rate of unemployment are mixed. The fact that the SVAR results in Table 1 are comparable only within each column and not between them renders the interpretation to be difficult. Taking into account, however, that the unemployment rate is bounded from the lower by zero and from the upper by unity, it seems implausible that, in the long run, the mean and/or the variance of the series can grow beyond all limits, as it would be the case for an integrated process.⁶ In view of this ambiguity the exercise has been carried out for both cases. The first case, where real wages react more to the level of current unemployment than to the level of lagged unemployment and where unemployment is therefore treated as a non-integrated variable, is found in column two. The hysteresis case with real wages essentially only reacting to changes in unemployment is given in column three. In the first case, unemployment is viewed as stationary and a bivariate VAR consisting of the growth rate of real wages and the level of unemployment is estimated. In the second case, unemployment is assumed to be integrated of order one and therefore follows a random walk. Thus, a bivariate VAR composed of the growth rate of real wages and changes in unemployment is estimated. Taking a closer look at the results, it is interesting to note that in the standard case the US and Sweden now have as expected the greatest degree of real wage flexibility, whereas they are only outperformed by Germany and a group of smaller countries consisting of Belgium, Denmark and Finland in the hysteresis case. However, a number of European countries exhibit in any case a degree of real wage rigidity which is considerably higher than in the US. This suggests that with the present level of real wage rigidities, real wages can hardly be relied upon to absorb adverse shocks in Europe. The US labor market is therefore not only much better capable of absorbing negative shocks via labor mobility but also via real wage adjustments than almost any labor market in Europe.

⁵ A detailed description is provided in the appendix.

⁶ A random walk with drift, for example, exhibits both mean and variance that increase or decrease without limit as time increases. See Johnston and DiNardo (1997: 59).

Hence, if real wages do not become more flexible in EMU, tensions concerning the right course of monetary and fiscal policy are bound to arise in case of adverse shocks. However, as policymakers and the public at large realize that monetary policy in EMU is no longer available to accommodate idiosyncratic shocks, resistance to sweeping reforms of the labor market might decline, thus paving the way for reducing real wage rigidities in Europe (Viñals and Jimeno 1996). The further reaching such structural reforms would be, the less controversial would be the course of monetary and fiscal policy between EMU member countries. Hence, there is a second channel besides changes in the production structure through which EMU might become endogenously an OCA. Yet, whether EMU does indeed lead to major labor market reforms is far less clear than promoters of this view suggest. There are also at least two reasons why EMU might in fact lead to less labor market reforms and thus to even more rigid real wages (Calmfors 1997; Sibert and Sutherland 1997; Berthold and Fehn 1998). One motivation for reforming the labor market besides fighting unemployment is the ensuing reduction of equilibrium inflation. The higher equilibrium unemployment is, the higher is the credibility problem of monetary policy and the higher is therefore the equilibrium inflation rate. This result holds at least under the realistic assumption that a completely rule-bound monetary policy is not feasible in reality. Hence, the full benefit of labor market reforms in terms of lower equilibrium inflation can only be reaped under monetary autonomy, whereas national labor market reforms produce a positive externality in EMU as the inflation bias is also reduced for all other member countries. As is well known from standard welfare theory, the amount of activities producing positive externalities is below the social optimum.

This size of this effect rises with a growing level of nominal rigidities. Not only is the credibility problem of discretionary monetary policy aggravated, but a two-handed approach consisting both of supply and demand side policies to fight unemployment also becomes more attractive (Calmfors et al. 1997: 175; Gordon 1996). Both mechanisms work in favor of more labor market reforms outside EMU. Mainly political economy considerations support such a two-handed approach. Experience such as in the UK and in New Zealand shows that supply side policies take on their own a long time until major employment gains materialize.⁷ Any

⁷ This does of course not mean that labor-market reforms are only possible if there is an additional monetary stimulus. Countries such as the Netherlands and Denmark have made considerable progress in addressing labor-market problems without recourse to expansionary monetary policy. However, supply-side reforms become more politically viable if they are accompanied by an easing of monetary policy because the positive employment effects arise faster and inflation can nonetheless stay constant.

government relying exclusively on supply side policies therefore runs the risk of being voted out of office before the positive effects of the reforms undertaken are felt. Parallel demand side stimuli which speed up the process of employment gains are thus helpful for actually enforcing lasting labor market reforms. However, such a two-handed approach appears to be only possible if labor market policies as well demand policies are kept on the national level. As institutional frameworks of labor markets in Europe are and should be kept under national jurisdiction to foster institutional competition (Feldstein 1997), a centralized monetary policy therefore largely forestalls the opportunity for adopting such a two-handed approach.

Last but surely not least the time dimension must be kept in mind. EMU will be especially fragile during the transition phase. Yet, major labor market reforms are in any case highly unlikely to be realized quickly because unemployment currently seems to have stabilized at a high level in many EU-countries (Berthold and Fehn 1996). The experience in countries such as the UK, the Netherlands, and New Zealand shows that major labor-market reforms are most likely to be sparked acute crisis situations, i.e., when unemployment rises sharply due to negative shocks. However, tensions concerning the right course of macroeconomic policies could only be mitigated if labor market reforms preceded such an acute crisis situation. Due to the above arguments, this is highly unlikely, though. It is therefore safe to assume that the current rigidity of labor markets in Europe is a good description of the state of labor markets in Europe during the transition phase. This leads to the question to which degree prospective EMU member countries relied in the past on monetary and fiscal policies to accomodate negative shocks given this unfortunate state of the labor market. It should be kept in mind that the former policy instrument is in EMU no longer available to accomodate adverse asymmetric shocks, while the use of the latter policy instrument is restricted by the Pact for Stability and Growth.

2. Accomodative demand policies

The pressure to adopt accomodative demand policies in case of adverse shocks is particularly marked if not only labor mobility is low but if real wages are also highly rigid. As this is precisely the case in Europe, it must be expected that demand policies switch to a more expansionary course when faced with negative shocks. For analyzing this issue empirically, a traditional VAR approach is adopted. It is asked how monetary and fiscal policy in addition to

wages react to a shock in unemployment. Monetary policy is proxied by the short term interest rate while fiscal policy is proxied by the general government gross financial liabilities. The resulting impulse response functions for the different countries are presented in the first row for the large EU-countries which will participate in EMU. The results for Sweden and the UK are also presented as they might join before the transition phase is completed.⁸ To check whether demand policies not only react to rising unemployment rates but also to wage hikes, the impulse responses for each country to normalized wage shocks are in addition presented beneath. Although most of the time series appear to be integrated of order 1, the VARs were estimated in levels.⁹ This is in fact appropriate since the parameters that describe the system's dynamics are still estimated consistently (Hamilton 1994: 652). Differencing, on the other hand, produces no gain in asymptotic efficiency, even if it is appropriate (Fuller, 1976). In a VAR differencing throws away information, especially the long-run memory of the time series (Sims 1980; Doan 1992). The figures 1 to 7 show the impulse responses and the corresponding two-sigma error bounds which are represented by the dashed lines. They were obtained using Monte Carlo techniques (Kloek and van Dijk 1978; Doan 1992).

Considering first the German case, it can be seen that a shock in the unemployment rate clearly leads to a more expansionary monetary policy as there is a marked drop in short term interest rates. Hence, the Bundesbank used in the past its monetary autonomy as the guardian of the anchor currency in the EMS to at least partially accomodate rising unemployment rates in Germany. However, wage shocks are not accomodated by the Bundesbank. The diagram beneath shows that a rise in wages causes tendency of increased short term interest rates indicating that the Bundesbank dampens the inflationary impact of an aggressive wage policy, but the impulse response function is hardly significantly different from zero at any point in time. Concerning fiscal policy, there seems to be a tendency to a slight accomodation in both cases of a rising unemployment rate and wage shocks. However, the two-sigma-confidence bands quickly divert.

⁸ For each country a five year period is analyzed. Annual data had to be used for Spain, Sweden and the Netherlands, whereas semiannual data was available for the other countries. This is reflected on the time axis in the diagrams. Seasonal dummies were used for the countries where semiannual data was available, and for Germany a dummy was inserted after 1990:2 to account for the reunification. The lag length was obtained using Akaike and Schwartz information criteria. The ordering of the variables in the traditional VAR approach is $U \rightarrow W \rightarrow G \rightarrow R$. See the appendix for details on the data.

⁹ Details on unit root tests for the variables can be found in table A3 in the appendix.

The situation in France is somewhat different from Germany. Concerning a shock to unemployment there is no statistically significant amount of fiscal or monetary accommodation. There are differences with respect to wage shocks, too. While, initially, fiscal policy seems to counteract aggressive wage policy the more expansionary course in the following periods is not secured by statistical results. Monetary policy, on the other hand, seems to counteract aggressive wage policy in a strong fashion. Hence, wage setters in France can expect less than their German colleagues to be bailed out by fiscal and monetary policy. In the Italian case it can be seen that monetary policy accommodates rising unemployment via lower short term interest rates. There is, similar to both France and Germany, essentially no fiscal accommodation of rising unemployment. An isolated wage shock in Italy causes monetary policy to become more restrictive, but on the other hand, there is a lasting burst in fiscal expenditures. Somewhat surprisingly, aggressive wage policy in Italy therefore seems to be only accommodated by fiscal policy.

Spain is different from the above countries as there is no statistically significant monetary or fiscal accommodation of shocks in the unemployment rate. Considering wage shocks, Spain behaves similar to Italy as shocks in wages are largely accommodated via a more expansionary fiscal policy, whereas, at most, there could be identified only a very short term reaction in monetary policy. The Netherlands are the last country of prospective EMU starting member which is looked upon. Similar to Spain, there is again no sign of accommodation of shocks in the unemployment rate via fiscal policy. But there is some amount of monetary accommodation of shocks in the unemployment rate, at least in the short run. Concerning wage shocks, there is again no significant amount of fiscal accommodation of wage shocks in the Netherlands, and also monetary policy does hardly seem to react with the impulse response function being only on the verge of significance after about one year.

Sweden and the UK do not participate in EMU from the beginning but might join soon afterwards. Concerning the Swedish case, fiscal policy does not react to rising unemployment, but monetary policy clearly accommodates that type of shock. The impulse responses of monetary policy to wage shocks become almost significant after three years and indicate accommodating behavior. Again, fiscal policy reaction is not ascertainable on statistical grounds. Finally, isolated shocks in the unemployment rate are also accommodated by demand policies in the UK, monetary and even fiscal policy display a clear tendency to become more

expansionary. In contrast, wage shocks in the UK are only accommodated by fiscal policy, whereas monetary policy counteracts to dampen the inflationary impact.

In sum, given the somewhat mixed empirical results, the following can be tentatively concluded. There is no country where demand policies do not react at all to adverse shocks. To the contrary, a considerable degree of accommodation can be observed in many cases so that the negative employment effects of adverse shocks are mitigated. While seems to be the main instrument for reacting to shocks in unemployment and wages in the majority of countries, fiscal policy is not to be neglected at all. In Italy, Spain and the UK fiscal policy has been used heavily to accommodate wage push shocks in the past. Furthermore, considering the long data period from 1970 to 1995 used for the impulse response analysis, it can be argued that impulse responses would behave differently, if the sample would comprise only the eighties and nineties.¹⁰ In this period most governments have shied away from using monetary policy as a device for accommodating wage and unemployment shocks by recognizing the negative effects of high and volatile inflation rates. Hence, governments are likely to have turned more to fiscal policy for accommodating those shocks in the eighties and nineties. Wage setters in Europe, especially in the not so distant past, could therefore count on fiscal policy to dampen the negative employment effects of rising wages. If the Pact for Stability and Growth were not considered a change in regime, this result would not augur well for the chances of major labor market reforms in EMU. Wage setters could then still hope to be bailed out by fiscal policy so that EMU membership can't be expected to have a deep impact on their strong resistance against structural reforms of the labor market.

According to the Maastricht Treaty and according to the Pact for Stability and Growth, fiscal policy will in the future and contrary to the past be more closely circumscribed in its ability to accommodate adverse shocks. It is often argued that these restrictions for fiscal policy are necessary to avoid excessive levels of government debt from undermining monetary stability in EMU. Countries with a high level of government debt and/or unsustainable fiscal deficits could pressure the ECB and in particular board members from this very country to adopt a more lenient monetary policy. This would inevitably trigger higher inflation.¹¹ This reasoning is not watertight, though, since such fears could have been easily alleviated by constructing a

¹⁰ In our analysis the sample range could not be restricted to a period of, say, 1980 to 1995 due to the severe loss of degrees of freedom.

different institutional setup of the ECB, i.e. not allowing countries with a bad fiscal record to have members with voting rights on the board of the ECB (De Grauwe 1997).

However, the fiscal restrictions can alternatively be justified as restricting entrance to EMU to countries with a reasonable degree of real-wage flexibility, which the OCA-theory demands (Viñals and Jimeno 1996).¹² The pressure to adopt a discretionary accommodative fiscal policy in addition to automatic stabilizers is particularly high in countries where real wages are rigid. Rigid real wages are an important cause of high unemployment which in turn needs to be financed. Expansionary fiscal policy furthermore helps to keep unemployment at least in the short run at lower levels. Both channels lead to higher fiscal deficits and in the passage of time periods with severe unemployment problems to a higher level of government debt, both measured relative to GDP. Hence, when comparing countries there should be a positive relationship not only between fiscal deficits and the degree of real wage rigidity, but also between the level of government debt and the degree of real wage rigidity.

Figures 8 and 9, which concerning real wage rigidities are based on our preceding SVAR-analysis, show that these positive relationships can indeed be observed for the average fiscal deficit from 1970 to 1995, and for the level of government debt in 1997. A different deficit criterion, namely one based on long-run averages and not based solely on fiscal deficits in 1997, along with a stricter interpretation of both fiscal criteria could therefore have served to restrict membership in EMU to those countries which exhibit a relatively high degree of real wage flexibility, thus being better able to cope with idiosyncratic shocks via market forces. An important prerequisite for countries struggling with highly rigid real wages for achieving more flexible real wages is therefore a drastic, credible, and lasting change in the fiscal policy regime toward not accommodating rigid real wages. EMU together with the Pact for Stability and Growth could in principle cause such a change in regime. Yet, it is open to question how stable the new regime is in severe crisis situations.

¹¹ This is precisely the reason why not only EMI but also the Bundesbank expressed considerable reservations concerning the membership of Belgium and Italy in EMU.

¹² Hence, the degree of real-wage rigidity in EMU is regarded as endogenous and the fiscal criteria serve to reduce ex ante the total degree of real-wage rigidity in EMU. This is very different from the usual point made on the relationship between real-wage rigidity and fiscal policy in EMU. The degree of real-wage rigidity is generally taken as given and it is then argued that fiscal policy must be flexible ex post in EMU to act as a substitute for flexible real wages in absorbing adverse shocks.

IV. The Instability of the Transition Phase

It appears to be common wisdom that starting with the inauguration of the Euro on January 1, 1999, there will be no longer a currency risk between countries participating in EMU. It is specifically assumed that EMU will be a lasting institution, and that all starting members will stay in EMU so that EMU will only grow, but not shrink over time. In light of the preceding analysis these expectations are not at all uncontroversial. First, although monetary policy can no longer induce asymmetric shocks inside EMU, real asymmetric shocks are still bound to occur due to the heterogeneity of the member countries. Second, EMU was not restricted to countries with highly flexible real wages and real wages are furthermore not very likely to become much more flexible in the long run. Third, monetary policy is even less than in the past available as a policy instrument to adjust to idiosyncratic shocks. Thus, the pressure to accommodate such shocks via expansionary fiscal policies will be even greater than in the past. However, although the Pact for Stability and Growth does in general not include automatic fines for countries which have a fiscal deficit of more than 3 percent of GDP per year, taken at face value it nonetheless reduces the availability of the fiscal policy instrument on the national level.

It is an open question whether the Pact for Stability and Growth will effectively restrain fiscal deficits. It would certainly constitute a change in regime if countries which exceed the 3 percent threshold level for budget deficits relative to GDP actually had to pay heavy fines. However, considering the loopholes in the Pact it is still possible that fiscal misbehavior is not punished after all. Countries faced with growing unemployment would then just like in the past resort to expansionary fiscal policies in case of rising unemployment. Labor market reforms and more flexible real wages may thus not become more likely. However, even if national fiscal policy is indeed tied to the mast by the Pact, there is in the long run still another avenue open for the fiscal policy instrument to resurface. Rising unemployment in some countries together with the limitations imposed on fiscal policy by the Pact will strengthen calls for installing a system of fiscal federalism to accompany the Euro. Political economy considerations as well as experience with other monetary unions support the notion that such a development will take place in the medium to long run despite its negative effects on the incentives to exercise fiscal prudence and to implement structural reforms in the countries concerned. The current political resistance against such a development can be

expected to wither away in times of crisis (Calmfors et al. 1997: 146-151; Eichengreen and von Hagen 1995; Wyplosz 1997).

Member countries, interested in the stability of EMU, should however better be prepared to cope on their own with negative shocks during the transition phase. Conflicts between participants in EMU are bound to arise if the Pact for Stability and Growth is not actually enforced. More stability-oriented countries, which appear to be in the minority position right now, might then reconsider their membership in EMU as they fear to be negatively affected by excessive fiscal deficits of other member countries. Furthermore, an elaborate system of fiscal federalism, which in some form is likely to come about if EMU lasts, will take time to develop and will therefore not be available early on to cushion country-specific shocks. Hence, large asymmetric shocks, which might very well occur during the transition phase, will put the stability of EMU under severe strain. Both types of countries, the fiscally conservative ones as well as the more profligate countries, will then have to decide either to stay in EMU and to accept the associated costs or to drop out of EMU. However, in contrast to past currency crises, which sometimes had monetary roots, such a future crisis must always be related to real factors because monetary factors leading to speculation against certain countries do of course no longer exist inside EMU.

It is nonetheless generally argued that there is no longer a currency risk once the Euro is established as legal tender. Yet, this is only in a technical sense correct. In contrast to the old EMS, speculators cannot force countries out of EMU. To illustrate this, consider first the situation from January 1, 1999, to December 31, 2001. During this three year time period Euros only exist in non-cash form while the national currencies are still used in cash as well as in non-cash form. If a country, say Italy, is hit by a negative shock in the passage of these three years, traders might want to sell Lira and buy DM banknotes. As long as the Banca d'Italia commands over sufficient DM reserves, both the liability and the asset side of the Banco d'Italia's asset sheet simply contract by the amount of the Lira purchase. In addition, the EMU-wide monetary base shrinks. The ECB can easily avoid this monetary contraction by instructing the Bundesbank to issue additional DM. As the ECB has full authority to do that, there is an open-ended, unlimited international reserve support for the irrevocably fixed exchange rates between EMU member countries. This is the key difference to the situation before January 1, 1999, where in particular the Bundesbank could not be forced to give unlimited support to weak EMS currencies. However, the Banco d'Italia might not command

over sufficient DM reserves. This is still not a problem in EMU as it has the right to purchase any amount of DM from the Bundesbank paying either with Lira or Euro deposits.

Defending a currency against a speculative attack is from a technical point of view even more straightforward in the six months time period from January 1, 2002, to July 1, 2002. The Banco d'Italia is then allowed to issue Euro notes in exchange for Lira notes in case of a speculative attack against the Lira. Hence, the Banco d'Italia would simply exchange Euro notes for Lira notes thus keeping the Italian issued component of the EMU monetary base unchanged. In sum, speculative attacks can in both cases only make the Lira disappear from the market already before July 1, 2002, but they can never force Italy to devalue against say the DM. As the national currencies are from January 1, 1999, on only expressions of the Euro and part of the EMU-wide monetary base, currency demand shifts between EMU member countries are passively accommodated by the ECB and its national subsidiaries without any real or nominal consequences (Buiter and Sibert 1997; De Grauwe 1997).

However, this is only the technical side of the question whether there is still a currency risk in EMU. The economic side is quite different. In economics nothing is forever, and as history has shown there is in particular no such thing as irrevocably fixed exchange rates. This is not only true for fixed exchange rate systems but also for monetary unions. Historically, monetary unions have of course been dissolved like e.g. the post World War I Austro-Hungarian empire, Yugoslavia, and the post-Soviet CIS. Whether a country continues to stay in a monetary union or decides to leave depends decisively on a cost-benefit analysis. The legal argument that there is no provision in the Maastricht Treaty for countries which wish to leave EMU does not carry much weight. A sovereign country can hardly be forced to stay in EMU against its will. If a country wishes to withdraw unilaterally from EMU and to reintroduce its national currency, it will no doubt be allowed to do so. The lack of serious protests against the Swedish decision not to participate in EMU from the start underlines this point. Unlike Denmark and the UK, Sweden was not granted an escape clause concerning membership in EMU when entering EU. This is probably the principal reason why monetary unions which are not accompanied by political unification always remain somewhat unstable. Hence, there continues to be some risk that a country will pull out of EMU. This will be reflected in albeit small interest rate spreads between national currencies even after the Euro is introduced.

EMU will be more fragile during the relatively long transition phase of three and a half years than afterwards. There are essentially two reasons for this assessment. First, the endogenous adjustment mechanisms concerning asymmetric shocks and real wage flexibility will, if they come into effect at all, take time to materialize. Hence, there remains not only a certain risk of asymmetric shocks, but the economic costs of such idiosyncratic shocks especially in terms of unemployment are likely to be higher early on in the transition phase. As EMU countries in general already display excessive levels of unemployment, it is doubtful whether further substantial increases in joblessness are politically sustainable. Withdrawing from EMU and bearing the associated costs might in an acute crisis situation appear as the politically more attractive option. Second, a pullout will become a lot more costly after the transition phase is finished. It is cheaper to reintroduce a national currency as the only legal tender that is still in circulation than to reinvent a national currency from scratch. Countries might therefore regard the transition phase as a testing period during which abandoning the system is still possible at lower costs than afterwards (De Grauwe 1997).¹³

In sum, although countries cannot be forced out of EMU by speculative attacks, there is especially during the transition phase still a currency risk which will be reflected in risk premia and interest rate spreads between debt contracts denominated in national currencies which from a technical point of view should not exist in EMU. However, any new debt contract issued in the transition period and denominated in Euros will not carry such an exchange rate risk. Hence, debt contracts still denominated in certain national currencies might carry higher interest rates than those denominated in Euros. This increases of course the incentive to issue new debt contracts exclusively in Euros. Hence, doubts about the stability of EMU will make a number of national currencies vanish quickly from asset markets.

¹³ However, exiting EMU is in any case costly considering existing government debt will be redenominated in 1999.

V. Concluding Remarks

Barring unforeseeable events, EMU will start with eleven member countries as scheduled on January 1, 1999. This has primarily been a political decision as becomes clear upon careful reading of the relevant statement by the Bundesbank. Economic objections which are mainly based on concerns about fiscal policy in several countries and on the lack of labor market flexibility were shoved aside. The present paper analyzes whether this primacy of politics over economics could have serious consequences for the functioning of EMU. It is in particular demonstrated that real wages in Europe are by international comparison more rigid than suggested by some previous studies, and that monetary policy as well as fiscal policy played an important country-specific role in accomodating negative shocks in the past.

The stance of fiscal policy can be expected to be pivotal for the functioning of EMU. Considering Europe's history of accommodative fiscal policies and current demands for more expansionary fiscal policy even in Germany, it is not very likely that the restrictive course of fiscal policy prescribed explicitly and implicitly by the Pact for Stability and Growth is followed after all. It is for this scenario not even necessary to expressedly violate the Pact by excessive fiscal deficits on the national level. Member countries could rather shift additional fiscal responsibilities to the EU-level, e.g. for employment policies. This would invite national wage setters and policymakers to produce negative external effects as at least part of the burden to finance the unemployment produced by rigid labor markets is shouldered by other member countries. Hence, the badly needed labor market reforms would become even less likely and the establishment of a transfer union would be the likely consequence.

However, it cannot be excluded that the Pact for Stability and Growth is indeed adhered to. It will furthermore take considerable time until transfer payments between member countries reach a size which influences national wage setters and policymakers. This leads to the stability issue of EMU in the transition phase. It is argued in the paper that the starting date for the Euro does not necessarily initiate a process which will culminate in finally abandoning all national currencies concerned by July 1, 2002. A break-up of EMU can especially in the transition phase not be excluded as a possibility either. Speculative attacks against currencies which are in economic distress due to e.g. asymmetric shocks can still happen. Although the speculative attack as such cannot force a country out of EMU, the country concerned might voluntarily decide to leave the system as the costs of staying inside EMU become to large to

bear. It is particularly doubtful whether further rises in unemployment in EMU member countries are politically sustainable given the already excessively high levels of joblessness in Europe. Hence, there continues to be a currency risk even after the Euro will have been launched because exchange rate adjustments are inevitable once a country actually drops out of EMU. If private agents are aware of this albeit small risk, interest rates in EMU will at least during the transition phase and against general expectations not converge completely and certain national currencies will disappear quickly from asset markets. In sum, large asymmetric shocks during the transition phase might constitute a serious challenge to the viability of EMU.

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A. Appendix

1. Real Wage Rigidity

Following the approach by Layard, Nickell and Jackman (1991), a measure of real wage rigidity can be obtained from a system of price and wage equations. Assuming constant mark-up pricing, prices are given by:

$$p - w = m + z$$

where p is the price level, w is nominal wages, m is the mark-up, and z are shocks assumed to follow a I(1) process, so that innovations in z have permanent effects on real wages. Turning to the wage equation, wages are negatively related to unemployment, as in

$$w - p = -c(u - hu_{-1}) + z^w$$

where u is the unemployment rate, c and h are positive parameters, and z^w are shocks to the wage equation for $h < 1$. According to Viñals and Jimeno (1996) a measure of real wage rigidity can be defined as $RWR = (c(1-h))^{-1}$. The higher c is, the less rigid real wages are; the higher h is, the more rigid real wages are. Combining these two equations yields that unemployment is given by

$$u = \frac{m}{c} + hu_{-1} + \frac{z^w - z}{c}.$$

It is assumed that shocks to the price-setting equation are mostly of a technological nature with permanent effects on real wages, so that $z = e^s$. Shocks to the wage equation include both technological shocks and (stationary) wage push/labor supply shocks, so that $z^w = e^s + e^w$. Then solving recursively for u yields

$$u = \frac{m}{c} + hu_{-1} + \frac{e^w}{c} = \frac{m}{c(1-h)} + \sum_{j=0}^{\infty} \frac{h^j}{c} e_{-j}^w.$$

Thus, unemployment is stationary and its initial response to wage push/labor supply shocks is the greater the more rigid real wages are. The mean lag of the response to unemployment ($h/(1-h)$) is increasing in h .

If on the other hand $h=1$, unemployment follows a random walk with drift, and its short-run and long-run responses to wage-push/labor-supply shocks are decreasing in c . This simple model suggests that the degree of real wage rigidity is related to some characteristics in the impulse-response of unemployment to wage push/labor supply shocks. In both cases

considered ($h < 1$ and $h = 1$) real wages are $I(1)$, and wage push/labor supply shocks have no long run effects on the level of real wages. This property can be used for estimating an SVAR model following the Blanchard-Quah methodology, since it serves as the long-run restriction required to properly identify the impulse response functions. For $h < 1$, a bivariate VAR composed by the growth rate of real wages and the level of the unemployment rate is estimated, and the impulse response of unemployment to shocks which have no long run effects on real wages is recovered. From that the initial response and the mean lag of the response are obtained and used to compute c and h . For $h = 1$, the procedure is essentially the same, but instead of the level of the unemployment rate now first differences are used.

Table A1 - Unit Root Tests for the Real Wage

	(w-p)	$\Delta(w-p)$
Austria	-1.511	-3.267**
Belgium	-2.218	-3.131**
Denmark	-1.561	-3.416**
Finland	-2.268 (T)	-3.666***
France	-2.248	-4.376***
Germany	-2.565	-3.017**
Greece	-2.666*	-4.353***
Ireland	-2.472	-5.465***
Italy	-2.219	-5.246***
Netherlands	-2.084	-3.707**
Portugal	-2.566	-2.520** (N)
Spain	-2.768*	-4.011***
Sweden	-2.230	-3.847*** (N)
UK	-2.107 (T)	-3.884***
USA	-2.933 (T)	-7.749***
Japan	-3.023 (T)	-7.862***

*, ** and *** denote significance at the 10, 5 and 1 percent level, respectively.

To be able to apply the procedure it is crucial that the time series of the real wage contains a unit root. The results of the augmented Dickey-Fuller tests are presented in Table A1. All estimations contained a constant term unless otherwise indicated. A T in parentheses denotes a significant linear deterministic trend included in the estimation whereas an N in parentheses denotes that neither a trend nor a constant were significant in the regression. The lag length of the equations is obtained by successive reduction of the lag order until the last lag becomes significant. The critical values of the test depend on the actual specification and are taken from Hamilton (1994). At the five percent level the null hypothesis of an integrated real wage

can never be rejected. At the ten percent level only the real wage in Greece and Spain could be perceived as stationary. The tests for first differences indicate that at the five percent level all real wages are integrated of order 1. In conclusion the application of the Blanchard-Quah procedure is appropriate.

Table A2 - Unit Root Tests for the Rate of Unemployment

	u	Δu
Austria	-3.701** (T)	-4.082***
Belgium	-1.109	-3.654***
Denmark	-1.119	-4.919*** (N)
Finland	-2.028 (T)	-6.004***
France	-2.266	-3.560***
Germany	-3.726** (T)	-5.826***
Greece	-1.815	-2.36** (N)
Ireland	-0.697	-4.164***
Italy	-3.191* (T)	-6.814***
Netherlands	-2.613	-2.682** (N)
Portugal	-3.016 (T)	-3.956***
Spain	-1.134	-3.200**
Sweden	-3.179 (T)	-3.751***
UK	-3.727** (T)	-4.908***
USA	-3.451** (T)	-5.915***
Japan	-0.800	-5.802***

*, ** and *** denote significance at the 10, 5 and 1 percent level, respectively.

Table A2 shows the results of the integration test for the unemployment series. Based again on augmented Dickey-Fuller tests unemployment appears to follow a stationary process only for Germany, Italy, the UK and the US whereas all other countries exhibit unemployment rates that are integrated of order 1. Since the SVAR results in Table 1 are comparable only within each column and not between the columns, the interpretation becomes difficult. However, considering that the unemployment rate is bounded from the lower by 0 and bounded from the upper by 1, it can hardly be imagined that, in the long run, the mean and/or the variance of unemployment can grow beyond all limits as it would be the case for an integrated process. In view of this ambiguity it seems reasonable to consider both a stationary and an integrated unemployment rate for further analysis.

2. The Blanchard-Quah Methodology

The Blanchard-Quah methodology starts with the infinite moving average representation (VMA) of a vector of variables, X_t , with the corresponding number of shocks, ε_t (Enders 1995: 331-336; Bayoumi and Bordo 1998: 147-148)

$$X_t = \sum_{i=0}^{\infty} A_i \varepsilon_{t-i}$$

where the matrices A_i represent the impulse response functions of the shocks to the elements of X .

Considering our problem, X_t consists of the change in real wages and unemployment or the change in unemployment depending on whether unemployment is stationary or not. ε_t comprises wage push/labor supply shocks and technological shocks both being independent from each other following the approach of Viñals and Jimeno (1996). Then the model has the following form (here u is assumed to be stationary)

$$\begin{bmatrix} \Delta w_t \\ u_t \end{bmatrix} = \sum_{i=0}^{\infty} \begin{bmatrix} a_{11i} & a_{12i} \\ a_{21i} & a_{22i} \end{bmatrix} \begin{bmatrix} \varepsilon_{1t-i} \\ \varepsilon_{2t-i} \end{bmatrix} \quad (\text{A.1})$$

where a_{11i} denotes element a_{11} in Matrix A_i .

Our analysis implies that the technological shocks ε_{2t} have permanent effects on real wages whereas wage push/labor supply shocks ε_{1t} only have temporary effects. Since wages are denoted in first differences, the cumulative effect of wage push/labor-supply shocks on the change in real wages has to be zero. Thus, the long-run restriction is

$$\sum_{i=0}^{\infty} a_{11i} \varepsilon_{1t-i} = 0. \quad (\text{A.2})$$

The estimation of the model defined by eqs. (A.1) and (A.2) is straightforward. Consider a simple VAR model for X_t . Using B_i to denote the coefficients of the lagged endogenous variables, the model becomes

$$\begin{aligned} X_t &= B_1 X_{t-1} + B_2 X_{t-2} + \dots + B_n X_{t-n} + e_t \\ &= (I - B(L))^{-1} e_t \\ X_t &= \sum_{i=0}^{\infty} D_i e_{t-i} \end{aligned} \quad (\text{A.3})$$

with $D_0=I$ being the identity matrix. e_t represents the errors from the equations in the VAR. The problem is to derive the A coefficients from the model (A.3). The task is to transform the residuals of the estimated VAR model into the shocks ε_t . Using the fact that the VAR residuals are a linear combination of the pure shocks, $e_t = C\varepsilon_t$, four restrictions are required

to identify the four elements of the matrix C . Normalizing both variances of the pure shocks to 1 yields the first two restrictions. A third one is obtained by the assumption that both shocks are independent from each other, so that $\text{Cov}(\varepsilon_{1t}, \varepsilon_{2t})=0$. The final restriction is represented by eq. (A.2), i.e. the assumption that wage push/labor supply shocks have no long run effects on real wages. In terms of the VAR the restriction is

$$\sum_{i=0}^{\infty} \begin{bmatrix} d_{11i} & d_{12i} \\ d_{21i} & d_{22i} \end{bmatrix} \begin{bmatrix} c_{11} & c_{12} \\ c_{21} & c_{22} \end{bmatrix} = \begin{bmatrix} 0 & \cdot \\ \cdot & \cdot \end{bmatrix}$$

Using these restrictions, C is identified and so are the technology and wage push/labor supply shocks.

3. Data Sources

All the data were taken from the OECD Statistical Compendium. For sources and detailed definitions see OECD (1996, A73-A82)

The data for the VAR Analysis of unemployment and wage shocks range from 1970 to 1995 with the exception of France where data for the general government gross financial liabilities were limited to 1977-1995. The data are of semiannual frequency for Germany, France, Italy and the UK, whereas the data for Sweden, the Netherlands, and Spain have annual frequency. U is the unemployment rate measured by commonly used definitions. W refers to the nominal wage rate, G refers to the general government gross financial liabilities, whereas R corresponds to the short-term interest rates. Results of augmented Dickey-Fuller unit root tests are shown in table A3.

Table A3 - Unit Root Test for variables used in VAR analysis

	u	Δu	w	Δw	g	Δg	m	Δm
Germany	CI	CS	TI	TS	TI	CS	CI	NS
France	CI	CS	CI	TS	CI	CS	CI	NS
Italy	TI	NS	CS	TS	TI	CS	CI	CS
Spain	CI	TS	TI	CS	CI	TS	CI	NS
Netherlands	CI	TS	CI	CS	CI	CI	CS	NS
Sweden	CI	CS	CI	TS	TI	CI	NI	NS
United Kingdom	CI	NS	CI	TS	CI	CS	CI	NS

The first letter denotes whether no deterministic components (N), a constant (C) or a constant and a trend (T) were significant in the ADF equations. The second letter denotes whether the series is stationary (S) or integrated (I). All results are significant at the five percent level.

The data for the SVAR Analysis of real wage rigidities range from 1960 to 1995 with a few exceptions: Austria (1963-1995), Denmark (1966-1995), Spain (1964-1995), Greece (1962-1995), and the Netherlands (1970-1995). The data for France, Germany, Italy, and the UK are of semiannual frequency, whereas the data for the other countries have annual frequency. For Belgium, Greece, Ireland and Finland the wage rate in manufacturing had to be taken due to data limitations for the aggregate wage rate in these countries. To compute real wages the consumer price index was used.

Figure 1 - Impulse Responses to a shock in u and w for Germany

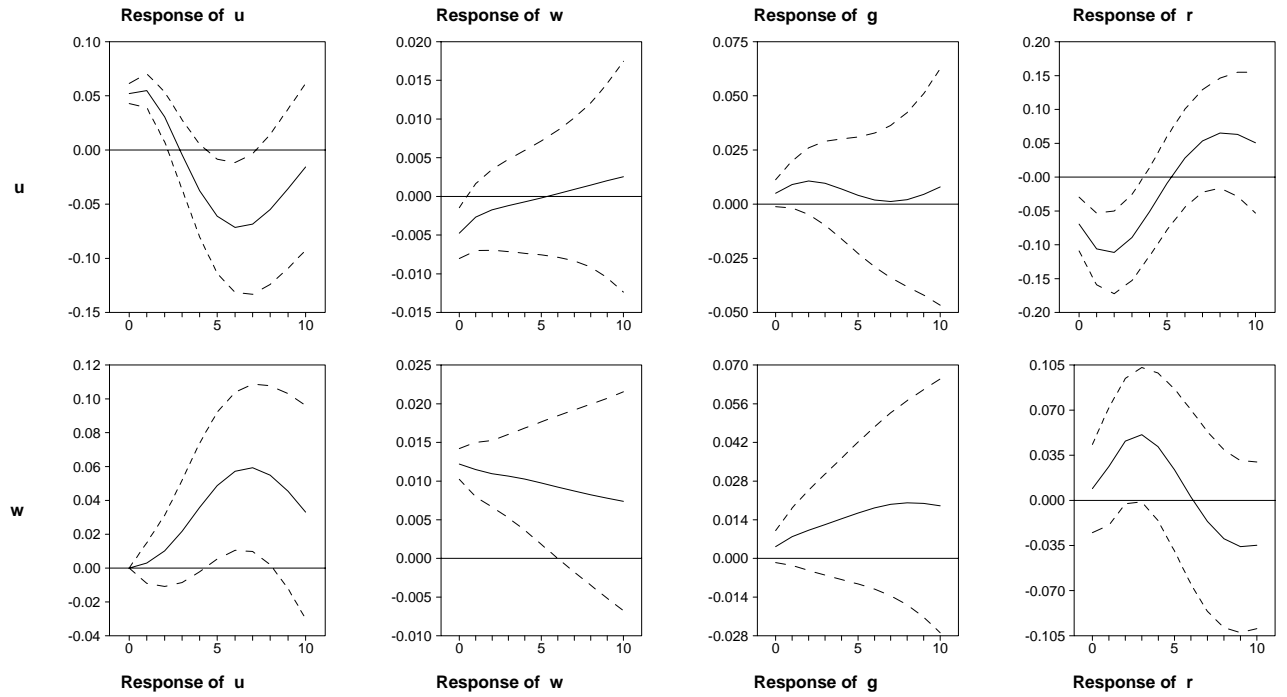


Figure 2 - Impulse Responses to a shock in u and w for France

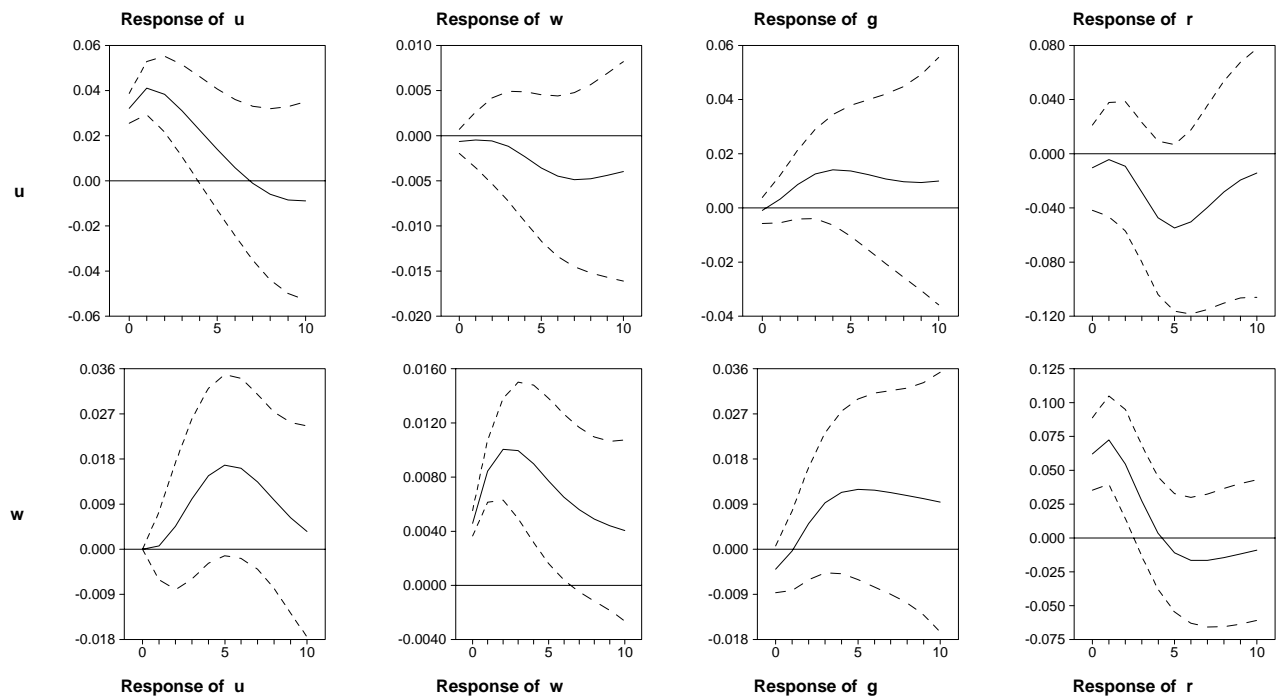


Figure 3 - Impulse Responses to a shock in u and w for Italy

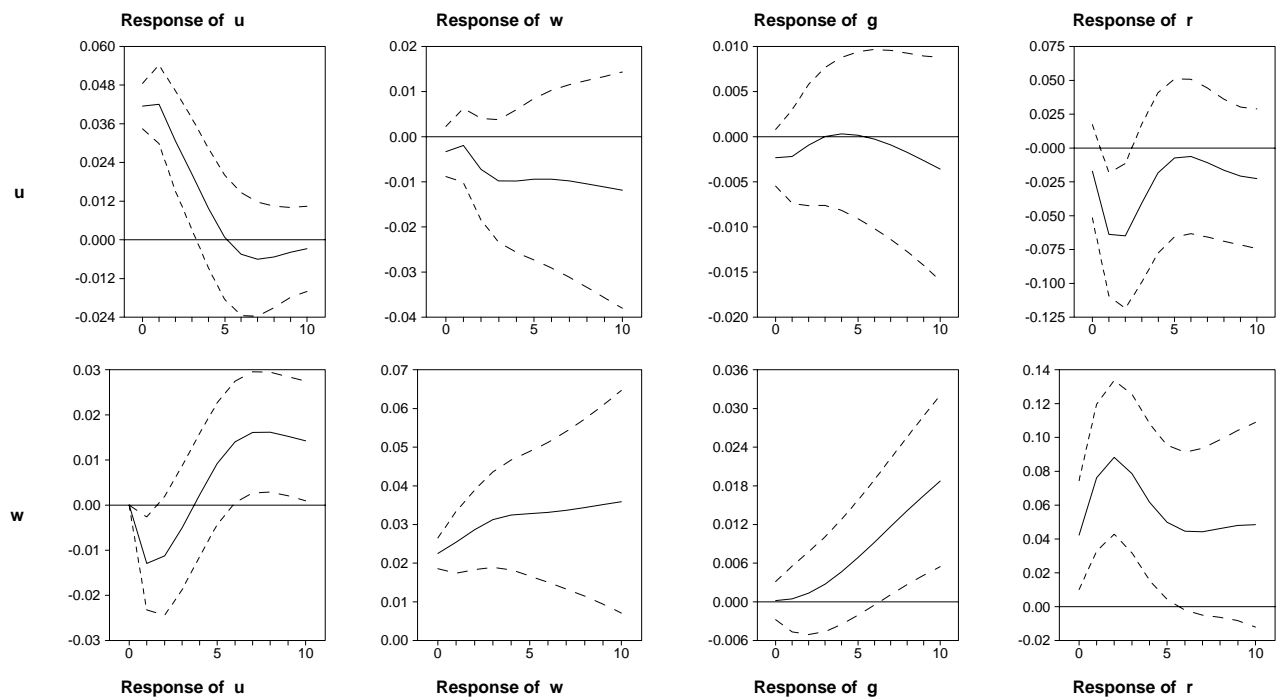


Figure 4 - Impulse Responses to a shock in u and w for Spain

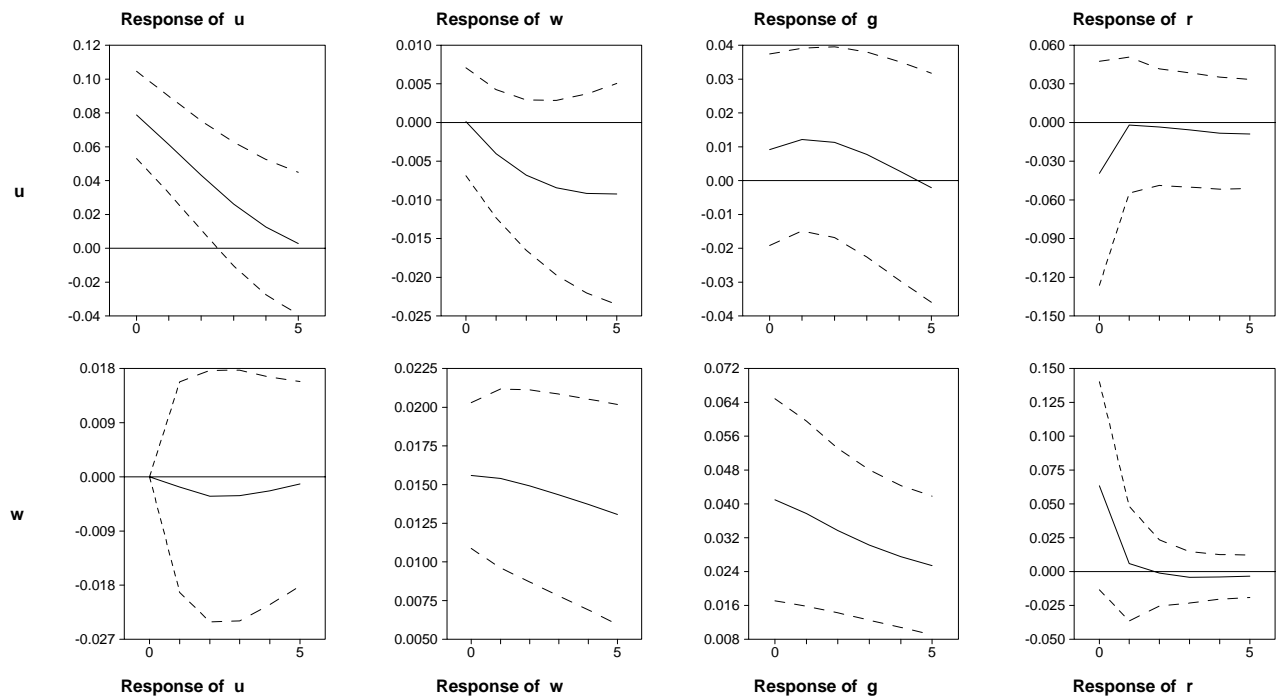


Figure 5 - Impulse Responses to a shock in u and w for the Netherlands

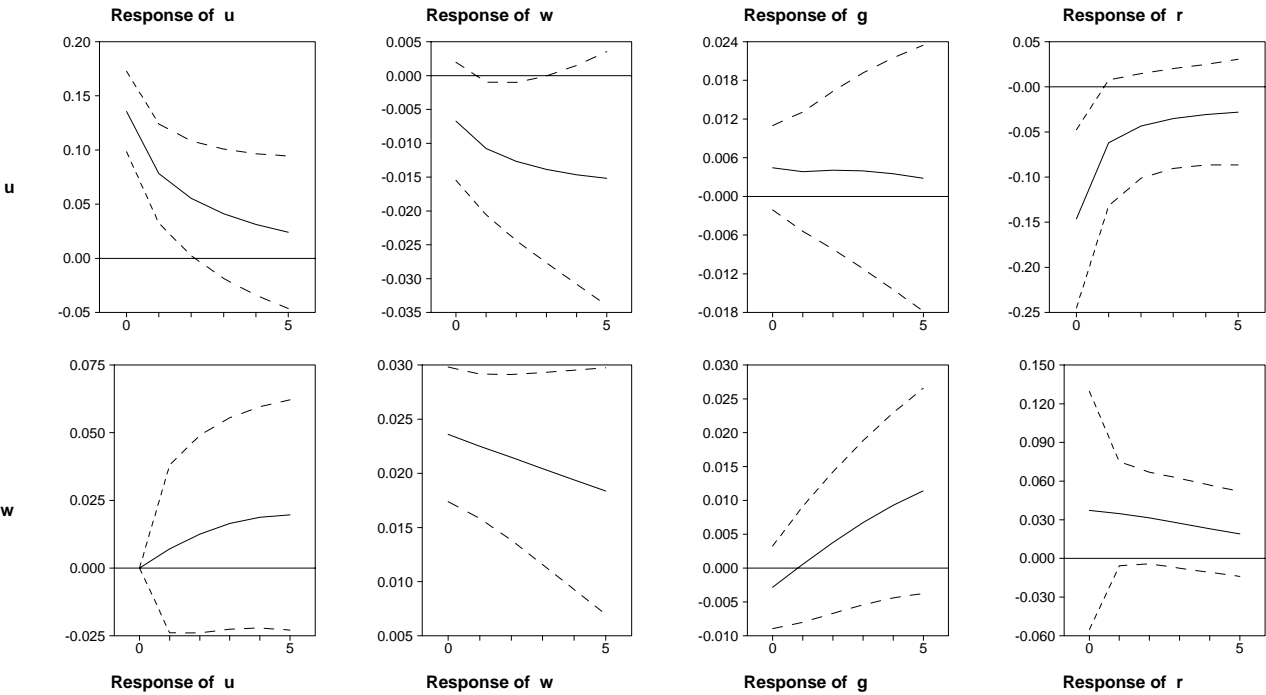


Figure 6 - Impulse Responses to a shock in u and w for Sweden

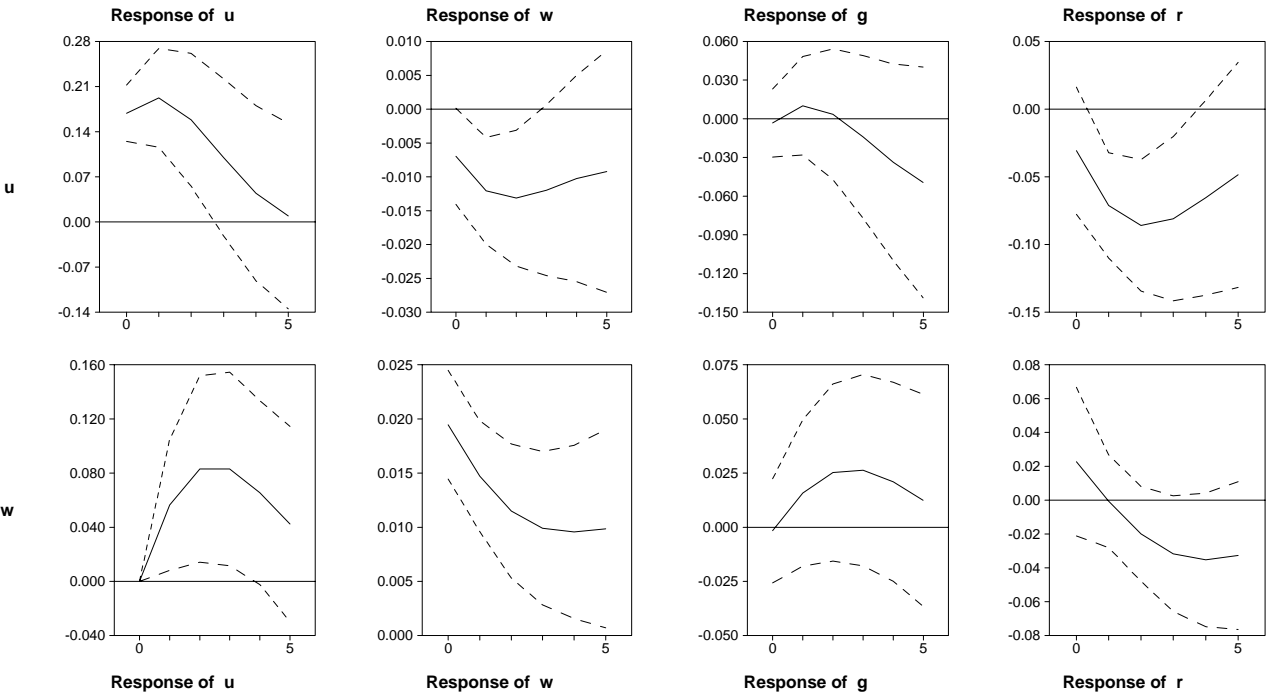


Figure 7 - Impulse Responses to a shock in u and w for the United Kingdom

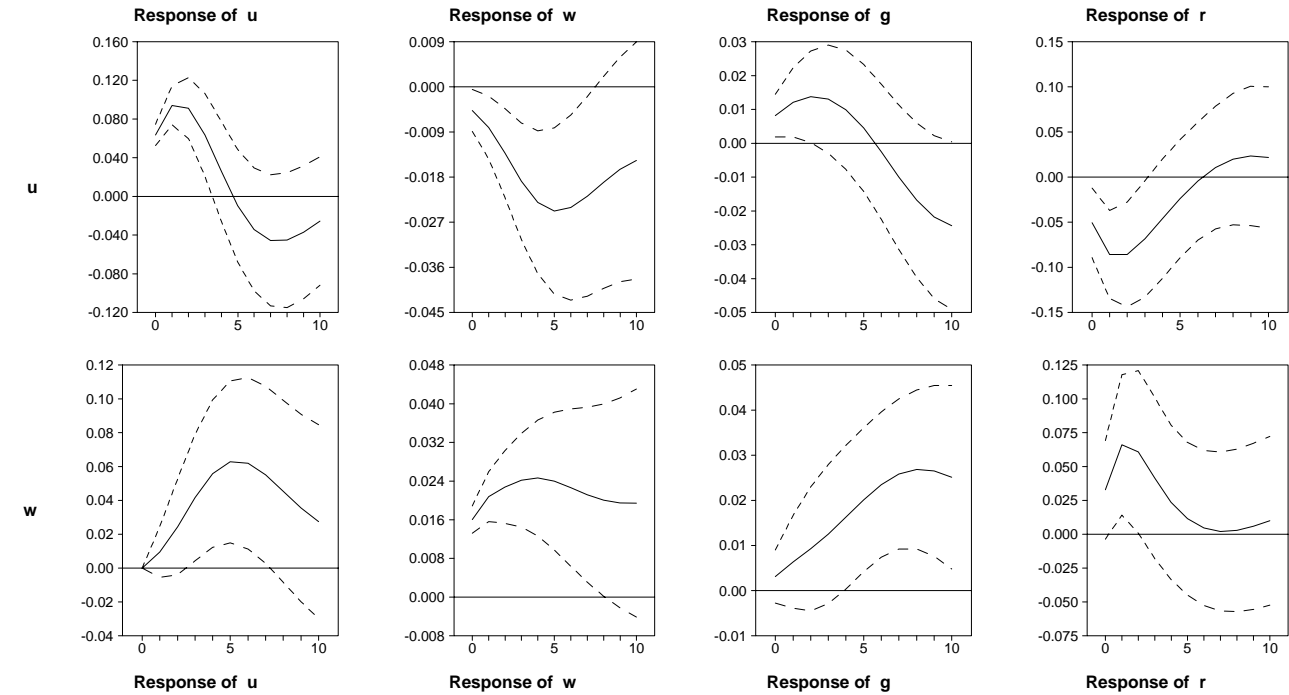
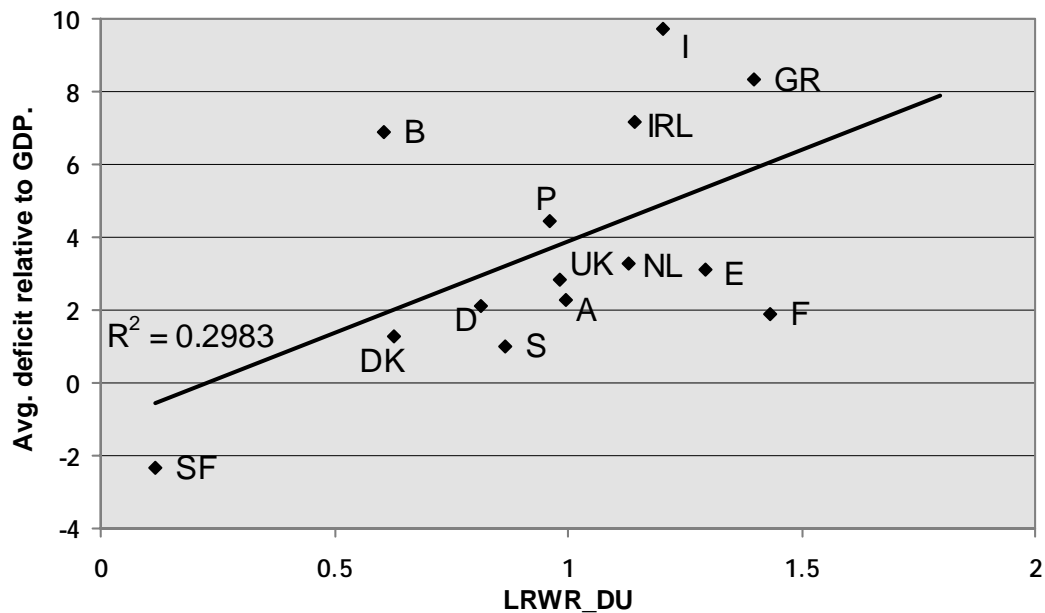
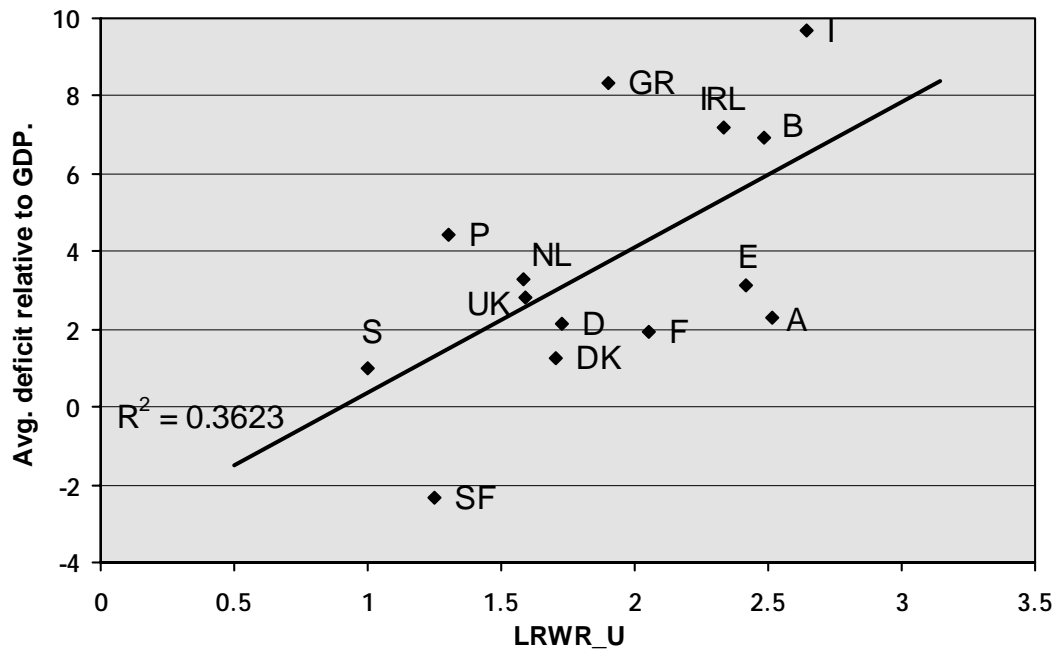


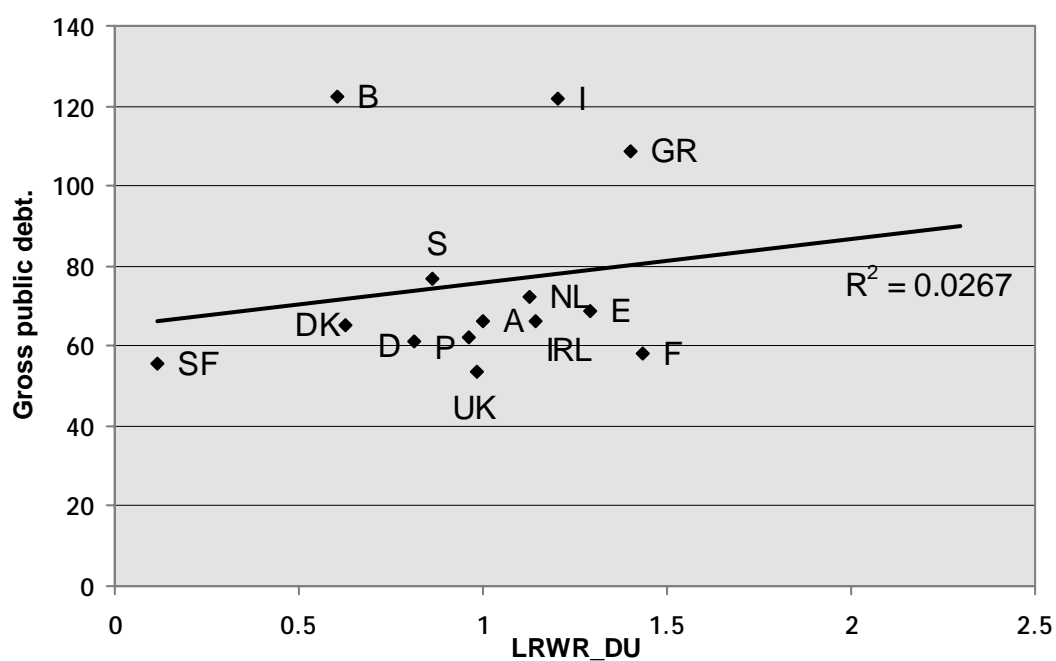
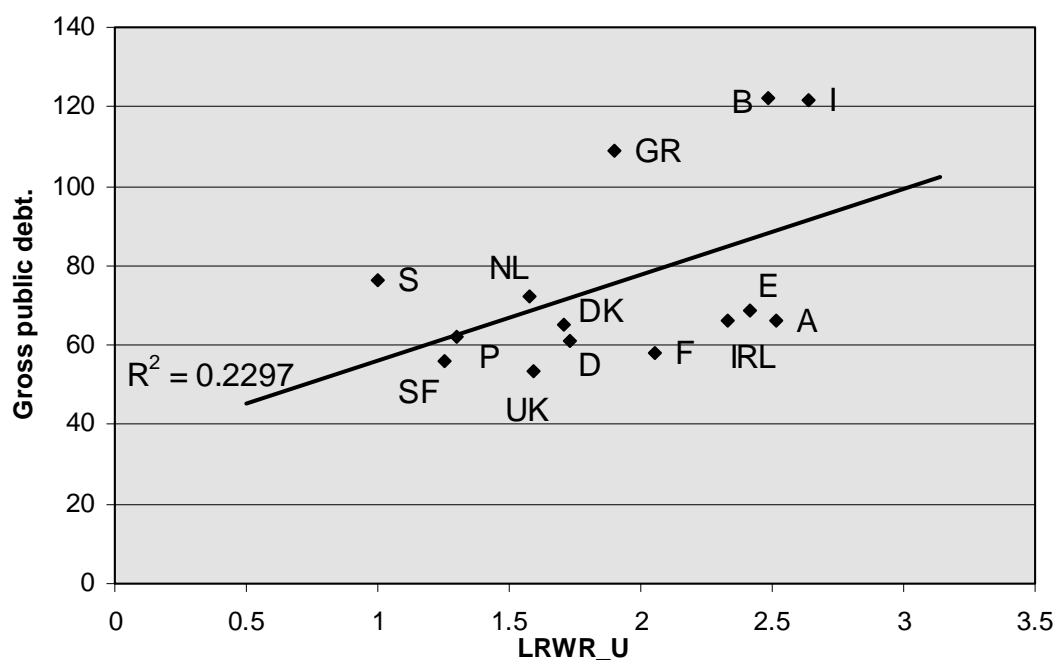
Figure 8 - Average Fiscal Deficit (1970-1995)^a and Real Wage Rigidity^b



^a Averages for Denmark, Greece, and Ireland refer to the periods 71-95, 74-95, and 77-95, respectively.

^b LRWR_U is our measure of real wage rigidity under the assumption of a stationary unemployment rate, while LRWR_DU refers to the non-stationary case (hysteresis).

Figure 9 - Gross Public Debt^a as of 1997 and Real Wage Rigidity



^a Gross public debt according to the Maastricht definition relative to GDP.

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