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The Causes of High Unemployment: Labour Market Sclerosis versus Macroeconomic Policy

by Thomas I. Palley, Chief Economist, U.S.-China Economic & Security Review Commission, Washington, DC.

Introduction: Debating the Causes of High Unemployment

The economies of Western Europe remain afflicted by high and intractable rates of unemployment. European Union unemployment averaged 9.6 percent between 1993 and 2000, while the unemployment rate in the eleven country euro zone area was even higher (averaging over 10 percent during the same time). In stark contrast, the U.S. unemployment rate was much lower through the last decade, averaging barely 5 percent from 1993 through 2000, and touching a thirty-year low of 3.9 percent in September 2000. This divergence in performance has sparked a great debate. One side claims that Europe=s unemployment is the result of rigid and sclerotic labour markets that have rendered it incapable of adjusting to technological advance and change in the international economy. Unemployment benefits are too generous

and their duration too long, unions are too strong, and employee protections are such that firms are discouraged from hiring workers. This contrasts with the U.S. economy which is marked by flexible dynamic labour markets that have adjusted to these developments and used them to create new jobs. We will refer to this as the Alabour market flexibility@ hypothesis, represented forcefully by the OECD Jobs Study (OECD 1994) and its subsequent policy applications.

The other side claims that Europe's unemployment problem is significantly attributable to bad macroeconomic policy (Baker and Schmitt, 1998: Palley, 1998, 1999; Solow, 1994), which has resulted from mistaken adherence to the theory of the natural rate of unemployment.[1] We=ll call this the Amacroeconomic policy@ hypothesis. This has prompted policy makers to adopt austere macroeconomic policies aimed at reducing inflation, regardless of the unemployment cost or the underlying cause of inflation. Currency market concerns have also played an adverse role. In the 1980s and 1990s the persistent threat of currency speculation induced European governments to raise rates to defend their currencies and guard against imported inflation. Subsequently, arrangements leading up to the introduction of the Euro aggravated the problem as countries were forced to satisfy strict fiscal convergence criteria that called for policies of austerity irrespective of economic conditions. The net result

has been a persistent contractionary bias to policy, and policy has also exhibited insensitivity to the state of the business cycle. Contrastingly, U.S. macroeconomic policy has been relatively flexible and counter-cyclical (Palley, 1999). Both the U.S. budget deficit and Federal Reserve monetary policy have exhibited clear counter-cyclical fluctuation, and in the recession of 1990-91 the Fed lowered short term nominal rates such that the real rate (after inflation) equaled zero.

Moreover, this sharp difference in macroeconomic policy persists through to the present. Thus, in 2001, faced with an economic slowdown, the U.S. Federal Reserve slashed its interest rate xx times during the year, lowering rates from 6.5% in January to just x.x% by the end of the year. Side-by-side, fiscal policy shifted into expansionary mode with a significant tax cut, albeit one tilted toward the affluent. These policy shifts were undertaken despite the fact that the unemployment rate was still below 4.5% and the inflation rate had actually increased above 3%; they were very important in limiting the depth and duration of the slowdown, and sparking an earlier recovery in growth. In stark contrast, the European Central Bank begrudgingly lowered rates much more slowly, by just xx points during 2001, despite the fact that Europe=s unemployment remains significantly higher and growth has been slowing.

These two accounts of unemployment have enormously different

policy implications. If the labour market flexibility hypothesis is correct, Europe needs to adopt the U.S. model and introduce policies of labour market flexibility that render wages downwardly flexible, reduce employee protections, and reduce unemployment benefits and other social protections. If the macroeconomic policy hypothesis is correct, Europe should adopt expansionary macroeconomic policies predicated on lower real interest rates. It also needs to adopt policy rules that ensure monetary and fiscal policy move in counter-cyclical fashion.

The outcome of this controversy is not only germane to the countries of the OECD. It is also relevant for the developing economies which are marked by a parallel debate. Thus, the AWashington Consensus@ - which represents the developing world=s analogue of the AEuro-sclerosis hypothesis@ - maintains that employment and output growth in the developing world depends upon the adoption of policies of labour market flexibility. Supporters of this consensus therefore counsel developing countries to resist calls for international labour standards since such standards would promote worker rights of freedom of association and collective bargaining. Instead, they propose structural measures to make developing world labour markets more reliant on market forces and competition.

These observations reveal the critical nature of the debate

over the causes of unemployment. How it is resolved promises to have deep lasting impacts on policy in both developed and developing countries. This chapter provides some new statistical evidence on the relative contributions of macroeconomic factors and labour market institutions to unemployment in the OECD. The principal empirical innovation of the paper is that it integrates macroeconomic time series variables that capture the stance of macroeconomic policy, with microeconomic labour market institution variables, in a comprehensive statistical examination of the causes of international differences in unemployment rates. This means that the effects of both labour market institutions and macroeconomic policy are taken into account in statistical examinations of the causes of higher unemployment. The principal findings are that macroeconomic policy variables consistently and robustly matter for the evolution of national unemployment rates, and that macroeconomic policy affects unemployment rates in the manner expected. High real interest rates and slow growth raise unemployment, as does a slowdown in export growth. With regard to the microeconomic labour market variables, the evidence is more problematic. Unemployment benefit duration and union density are both consistently insignificant in explaining unemployment rates. The level of wage bargaining coordination and the extent of union coverage matter consistently, but they need not raise unemployment if they are appropriately paired with other

policies. Finally, the significance of other microeconomic variables (employment protection, unemployment insurance wage replacement rate, tax burden) is unstable and not robust to changes in the specification of the statistical models. These findings lead to the conclusion that high unemployment in western Europe is principally the result of self-inflicted dysfunctional macroeconomic policy. European policy makers adopted a course of disinflation, high real interest rates, and slower growth that raised unemployment. Moreover, they all adopted this course at the same time, thereby generating a wave of trade based cross-country spill-overs that generated a continent wide macroeconomic funk and further raised unemployment.

Finally, an additional important finding is that real interest rates have tended to be systematically higher in countries with high union density, despite the lack of any evidence that high union density raises inflation. This suggests that central banks have systematically adopted tighter monetary policy in countries with high union density.

Evidence on the Causes of Different Unemployment Rates in the OECD

As noted above, the principal contribution of the current study is to fully incorporate both microeconomic labour market institution variables and macroeconomic variables, thereby allowing for a proper assessment of the relative contributions of

labour market institutions and macroeconomic policy to higher unemployment. This section describes the data, the empirical model, and the empirical findings.

Data

Data for the labour market institutional variables were supplied by Stephen Nickell, and are described fully in his widely cited study on the impact of labour market rigidities on unemployment (Nickell,1997). Data for the macroeconomic variables were drawn from the annex tables in the 1999 OECD *Economic Outlook*, from the World Bank statistical CD-rom, and the IMF *International Financial Statistics* CD-rom.[2] Further details regarding the data are provided in the data appendix.

The statistical analysis covers the twelve-year period from 1983 to 1994. The macroeconomic variables are measured with annual time series data, so that there is one observation per year for each variable for each country. Contrastingly, the labour market institution variables correspond to longer-lasting fixed effects. Therefore, for each type of labour market institution six-year average measures were constructed for each country covering the periods 1983-1988 and 1989-1994. Thus, for each institutional variable in each country there are two observations: one for the earlier period (1983-1988), and the other for the latter (1989-1994). Data for the following OECD countries was used in the regressions: Austria, Belgium, Denmark,

Finland, France, Germany, Holland, Ireland, Italy, Norway, Portugal, Spain, Sweden, Switzerland, U.K., Australia, New Zealand, Japan, U.S., and Canada.

Table 1 summarizes the average macroeconomic data for these twenty countries for the two periods; Table 2 does the same for the microeconomic labour market indicators. The macroeconomic data reported include the average standardized unemployment rate (percent), average real GDP growth (percent per year), average inflation rate (percent), average short term nominal interest rate (percent), and average short term real interest rate (percent, defined as the difference between the short term nominal interest rate and inflation rate). The labour market institution data reported include the wage replacement rate of the unemployment insurance system (percent), the duration of unemployment benefits (years), an index of employment protections (on a scale of 1 - 20), union density (percent), the overall tax rate (as a percentage of average labour income), an index of spending on active labour market programs, an index of union wage coverage (on a scale of 1 - 3), and an index of coordination in wage bargaining (on a scale of 2 - 6). Nickell (1997) fully describes the rationale for and construction of these measures.

There are a number of interesting features of the data. First, with regard to unemployment rates the U.S. is in the bottom half of the distribution, but many countries experienced

even lower unemployment rates over the entire period (1983-1994). In other words, the U.S. was not the only economy to experience low rates of unemployment during this period, contrary to the implicit assumption of adherents of the Alabour market flexibility hypothesis@ who argue that U.S.-style labour market structures are a necessary condition for attaining low unemployment. Second, inflation rates were much higher in Europe in the first half of the sample, but they fell significantly in the second half. Third, average short-term real interest rates have been very much lower in the U.S. than in the other OECD countries. These two features, disinflation and higher real interest rates in Europe, are indicative of the more difficult macroeconomic conditions that have confronted European economies.

With regard to the labour market institution data, the U.S. clearly has the most Alaissez faire@ markets as indicated by its low wage replacement rate, low benefit duration, low level of employment protections, low union density, low tax rate, low spending on active labour market programs, low union wage coverage, and low level of coordination of wage bargaining. Many of these features carry over to the other AAnglo-Saxon@ countries (the U.K., Canada, Australia, and New Zealand) - particularly their relatively low employment protection, tax rates, labour market spending, union wage coverage, and coordination of wage bargaining. However, despite having deregulated labour markets,

these countries tended to have unemployment rates that clustered in the top of the distribution during the period covered by this analysis.

An empirical model

Differences in unemployment rates across the OECD are analyzed with an empirical model which incorporates both macroeconomic and institutional variables.[3] Table 3 summarizes the various factors which are incorporated into the statistical regressions. The dependent variable is the set of annual unemployment rates for the twenty countries, over the 1983-1994 period.

The explanatory variables can be broken down into three sets. The microeconomic labour market variables consist of the employment protection index, the unemployment insurance replacement rate, the duration of unemployment benefits, union density, union bargaining coverage, the tax rate on labour income, the extent of wage bargaining coordination, and the extent of active labour market programming. The effects of macroeconomic policy and conditions are captured by the change in the inflation rate (with reduced inflation corresponding to tighter monetary policy), the level of real interest rates (with high real rates corresponding to tight policy), and the rate of real GDP growth. Two variables which measure the importance of foreign trade flows in the economies of Europe and Canada are

also included in the set of macroeconomic variables. These variables capture the cross-country Keynesian multiplier effects that operate through international trade. Within the European economy, it is critical to account for these cross-country spill-over effects owing to the high degree of economic integration among countries. Just as an explanation of unemployment in Texas would need to take into account developments in the U.S. economy, a similar logic applies in Europe where countries are highly integrated with each other. This same approach also applies to Canada, which is highly dependent on foreign trade linkages with the U.S. economy. These cross-country effects are noticeably absent from other studies examining the causes of higher E uropean unemployment (Blanchard and Wolfers, 1999; Nickell, 1997). Lastly, country-specific dummy variables for Ireland and Spain capture unique fixed effects that are specific to these two countries, both of which experienced much higher unemployment rates over the sample period, reflecting their position as quasi-developing economies on the periphery of the European Union.[4]

The empirical model also includes two lags of the unemployment rate itself as an explanatory variable, reflecting the fact that adjustment in labour markets tends to be gradual as it takes time for workers to reallocate and for firms to create new jobs. As a result, all economies exhibit considerable persistence to unemployment shocks. The construction of all

variables is described fully in the data appendix.

Empirical findings

Table 4 reports several regression estimates of the empirical model, using a two-stage least squares process, for the sample period 1983-1994.[5] Column 2 reports a benchmark regression equation which contains just the lagged dependent variable itself (two lags of the country unemployment rates). In this model there are assumed to be absolutely no differences between countries, and both micro institutions and macro policy and performance factors are absent. Despite this, the model has considerable explanatory power as measured by the adjusted R^2 which indicates the goodness of fit of the model with the data. This highlights the fact that persistence in unemployment rates is a feature common to all economies, and it should therefore be incorporated in all models of unemployment.

Column 3 expands the benchmark equation to include labour market institution variables. The coefficients of the unemployment benefit replacement rate and the overall tax rate are both statistically significant at the 5% level, and both variables are seen to raise unemployment. The extent of wage bargaining coordination is significant at the 1% level, but it is seen to result in lower unemployment. Employment protections and union coverage are both significant, but only at the 10% level, and both raise unemployment. Lastly, unemployment benefit

duration, union density, and active labour market programs are all insignificant at the 10% level.

Column 4 reports on the same regression after expanding the model to include country specific effects for Ireland and Spain. Both of these country specific effects are statistically significant and positive at the 1% level, and their inclusion dramatically changes the significance of other explanatory variables. Now, both the employment protection index and replacement rate become statistically insignificant at the 10% level, but union density and spending on active labour market programs now both become statistically significant at the 1% level. This is indicative of coefficient instability among the microeconomic labour market institution variables.

Column 5 reports on a regression which begins the task of incorporating macroeconomic variables by including the change in inflation, the lagged real interest rate, and the current and lagged rates of real output growth. Inclusion of these variables dramatically improves the quality of the regression estimate as indicated by a jump in the adjusted R^2 statistic and a decline in the standard error of the regression equation. The change in inflation, the lagged real interest rate, and the real GDP growth rate are all statistically significant at the 1% level, while the lagged GDP growth rate is statistically significant at the 10% level. All are signed in a manner consistent with conventional

understandings of the impact of macroeconomic policy on unemployment: disinflation raises unemployment, as do higher real interest rates,[6] while faster growth reduces unemployment.

As regards the labour market institution variables, inclusion of the macroeconomic variables causes major changes. First, the union density coefficient becomes insignificant - an outcome which is examined in greater detail below. Second, the statistical significance and magnitude of the tax coefficient falls considerably. Third, the employment protection and benefit replacement rate variables now become significant at the 1% level, further indicating a pattern of coefficient instability surrounding the institutional variables. This, too, is further discussed below.

Column 6 further augments the model by including the international trade exposure variables for Europe and Canada. The former is significant at the 1% level, while the latter is only significant at the 14% level. Both are negatively signed, suggesting that unemployment rates in these regions decline when stronger economic growth in their trading partners spills over into a stimulus for exports. The large magnitude and clear statistical significance of the European trade penetration coefficient indicates the particular importance of interdependence amongst European economies.[7] The signs of the other macro variables all remain unchanged, and all coefficients

are statistically significant at the 1% level. The coefficients of these macroeconomic variables are robust and stable with regard to changed model specification, lending confidence to their importance for explaining unemployment. The coefficients on the microeconomic labour market variables, however, remain unstable and inconsistently significant. Unemployment benefit duration, union density, the aggregate tax rate, and the scale of active labour market programming are all statistically insignificant in this extended regression. The benefit replacement rate, union coverage, and bargaining coordination are statistically significant at the 1% level (the latter still with a negative sign, indicating that increased coordination reduces unemployment), while the index of employment protection is significant at the 6% level.

Column 7 reports the findings for the full model that includes all labour market institution variables, all macroeconomic variables, and the Ireland and Spain country fixed effect variables. The coefficients of all the macroeconomic variables remain same signed, and all except the Canadian openness variable are statistically significant at the 1% level. The Ireland and Spain country fixed effects are also both positive and statistically significant at the 1% level. However, most of the labour market institution variables now become statistically insignificant. This holds for the employment

protection index, the wage replacement rate, benefit duration, and union density. The fully specified model therefore suggests that none of these variables matter for explaining unemployment. Spending on active labour market programs is statistically significant at the 1% level, and it contributes to lower unemployment. The overall tax rate is also significant (at only the 10% level), with higher taxes contributing to higher unemployment.

This fully specified model helps illustrate a number of features of comparative labour market performance in the OECD countries. First, both union wage coverage and the extent of coordination in wage bargaining are significant at the 1% level - and both variables are statistically significant in most of the less complete regressions, as well. These variables have opposite signs, with the former being positive and the latter is negative. Recall that the union coverage index variable takes values ranging from 1 to 3, while the bargaining coordination variable takes values ranging from 2 to 6. The two collective bargaining variables are strongly positively correlated, with a simple correlation coefficient of 0.49. The two variables therefore co-move strongly and systematically, and should best be thought of as describing a Asystem of industrial relations.@ Coordination in wage bargaining lowers unemployment, while union wage coverage raises it. As long as these two features are

appropriately paired, there need be no negative combined impact on unemployment.[8] Problems only emerge when there is extensive union wage coverage that is unaccompanied by wage bargaining coordination. This finding is consistent with the work of Calmfors and Drifill (1988).[9]

Second, the inclusion of the country dummy variables for Ireland and Spain causes the employment protection and wage replacement rate variables to become statistically insignificant. Inspection of the data in Tables 1 and 2 indicates that Spain had extremely high unemployment rates, and it also had an extremely high level of employment protection and a very high replacement rate. The statistical significance of these two institutional variables therefore appears to be entirely dependent on the Spanish experience; this apparent relationship, in other words, depends on a single outlier data point. When only the Spain dummy variable is included, both unemployment benefit coefficients become insignificant. This finding holds for both the full model (compare Columns 6 and 7), and for the restricted model which only includes the labour market institution variables (compare Columns 3 and 4). The policy implication is that existing employment protections and wage replacement rates have not been a contributory factor to European unemployment, except perhaps in Spain.

Finally, Columns 8 and 9 report estimates of the restricted

model including only the macroeconomic variables. These regressions are presented to give additional evidence of the central importance of macroeconomic factors for explaining unemployment. The coefficients of the macroeconomic variables continue to be highly statistically significant, remaining same signed with little change in magnitude. At the same time, the restricted regressions with just macroeconomic variables perform very well in terms of adjusted R^2 and standard error of the regression, being only marginally inferior to the full model including the labour market institutional variables.

Further interpretation of the results

In summary, the regressions reported in Table 4 provide clear evidence of the importance of macroeconomic factors in explaining cross-national differences in unemployment. This conclusion is robust to empirical specification. Based on the statistical model reported in Column 7 (the most completely specified model), permanently lowering the inflation rate by 1 percent point increases unemployment by 0.4 percentage points. An increase in real interest rates of 1 percentage point increases unemployment by 0.3 percentage points. Lowering the rate of real output growth by 1 percent point increases unemployment by 2.1 percentage points.[10] For a European country that exports 20% of its GDP, a 1 percentage point increase in the growth rate of other European economies results in a 0.35 point

decrease in that country=s unemployment rate.

The implications of these macroeconomic policy variables can be alternatively understood as follows. The fully specified regression indicates that a one hundred basis point increase in the real interest rate increases the unemployment rate by 0.4 percentage points. During the second period of our data sample (1989 - 1994), the U.S. real interest rate averaged just 1.8%. In Canada during the same period, the real interest rate averaged 4.7%, which (according to this regression) raised the Canadian unemployment rate relative to the U.S. by 1.2 points. In Germany, meanwhile, the real interest rate averaged 4.03%, raising the German unemployment rate relative to the U.S. by 0.9 percentage points. In France, it averaged 6.12%, raising the French unemployment rate relative to the U.S. by 1.7 percentage points. Finally, in the Scandinavian countries (Denmark, Finland, Norway, and Sweden), the real interest rate averaged 5.87%, raising the Scandinavian unemployment rate relative to the U.S. by 1.6 percentage points.

With regard to the labour market institution variables, the regressions provide no evidence that lowering employment protections, replacement rates, or benefit durations will reduce unemployment. Nor will lowering union density. Cutting taxes, however, would seem to imply lower unemployment, but only modestly. A 10 percentage point reduction in tax burdens (which

in most countries would require reducing taxes by about one fifth) lowers the unemployment rate by only 0.8 points. Increasing spending on active labour market policies generates a much bigger Abang for buck@. Increasing active labour market spending per unemployed worker by an amount equal to 10% of potential output per worker lowers the unemployment rate by 1.2 percentage points. Spending on job training and placement programs for the unemployed would therefore seem to be a more cost effective fiscal approach to the problem of unemployment.

Finally, if properly paired, the coordination of wage bargaining in conditions of widespread union wage coverage can actually lower unemployment. If both of these institutions were maximally implemented (UNIONCOV = 3, COORD = 6), then the unemployment rate would be reduced by 0.6 percentage points. Of course if there is widespread union wage coverage without coordinated wage bargaining, then unemployment rates will tend to rise.

Quantifying the causes of changed unemployment rates

The previous section reported several estimates of structural equations determining the causes of unemployment. This section adjusts the focus of analysis, and uses these estimates to identify the causes of changes in country unemployment rates between 1983 and 1994. For this purpose, the preferred equation is the one reported in Column 7 of Table 4 -

the one which includes the full set of labour market, macroeconomic, and country-specific dummy variables. According to this equation, the contribution of microeconomic institutional factors to unemployment in any time period can be calculated by summing, across all the microeconomic variables, the product of each microeconomic variable=s value with its estimated coefficient.[11] The change in unemployment rates between two time periods attributable to changes in labour market institutional factors can then be computed as the change in that composite value between the two periods.

Table 5 reports an analysis that decomposes the actual change in country unemployment rates between 1983 and 1994 into those parts attributable to micro and macro factors. Columns 2 and 3 detail the country unemployment rates ruling in 1983 and 1994 respectively, while Column 4 reports the change in country unemployment rates during that period. Column 5 then reports that portion of the change in unemployment that can be attributed, given our regression results, to changed microeconomic institutional settings. Finally, Column 6 details the change in unemployment rates which is attributable, as a residual, to macroeconomic factors.[12]

Table 5 contains a number of interesting and important findings. First, the effect of the microeconomic variables on unemployment is negative in thirteen out of twenty countries,

indicating that most countries have pursued structural policies designed to make labour markets more flexible. Second, the impact of macroeconomic factors on unemployment is positive in fifteen out of twenty countries, indicating that over the period 1983 - 94 most countries experienced negative macroeconomic outcomes that raised unemployment rates. Third, in Europe=s three biggest economies (France, Germany, Italy) these negative macro shocks were quantitatively large. In all three of these economies the direction of microeconomic change was such that unemployment should have fallen, but instead unemployment rose owing to the large scale of macroeconomic shocks. Fourth, the U.S. unemployment rate fell by 3.5 percentage points (the biggest decline of any country included in the table), but this decline was entirely due to favorable macroeconomic conditions. American labour market structures had no influence on the change in unemployment during this time. Fifth, Finland, Sweden, and Spain all suffered large increases in unemployment rates, and in all three instances the increase was almost entirely due to extremely unfavorable macroeconomic forces. Sixth, Belgium, Denmark, and Holland experienced reductions in unemployment rates, and favorable macroeconomic developments explain more than fifty percent of the decline in each case.

In sum, almost all of the decline in U.S. unemployment is attributable to positive macro forces, while almost all of the

increase in Europe is attributable to negative macro forces. In those few instances in Europe where unemployment rates fell, macro forces were again primarily responsible. The policy implication is clear. Rather than engaging in a wholesale re-making of labour market institutions and arrangements, European governments should correct the dysfunctions that have driven macro economic policy over the last two decades. That these dysfunctions remain in place is clearly evident given the starkly different policy responses of the Federal Reserve and the European Central Bank to the economic slowdown of 2001.

The political economy of monetary policy: Have central bankers waged war on unions?

Both Nickell (1997) and Scarpetta (1995) report that union density has a statistically significant positive impact on unemployment rates. This contrasts sharply with the findings reported in the current study, and it is worth enquiring as to the source of this difference.

One clue to this difference comes from a comparison of the regressions reported in Columns 4 and 5 of Table 4, in which the inclusion of macroeconomic variables appears to undo the negative unemployment impact of union density. In the regressions reported by Nickell (1997) the only macroeconomic variable included was the change in inflation rates. This suggests that the effect may be related to the inclusion of real interest rates

in the present regressions.

To test this hypothesis, union density was regressed against the average measure of country real interest rates reported in Table 1. Two pooled least-squares regressions were performed, one of which utilized a dummy variable to differentiate the two time periods, and one of which did not.[13] In both regressions, the union density is found to have a positive and statistically significant influence (at the 5% level) on real interest rates. According to these regressions, a 10 percentage point absolute increase in the union density rate results in roughly a 0.3 percentage point increase in the real interest rate.

To test for robustness, this union interest rate hypothesis was also tested in a simple pooled time series regression, in which the annual real interest rate in each country was regressed on the lagged real interest rate and on the average union density for each country in the period 1983 - 94.[14] Once again, the union density coefficient is positive and statistically significant at the 5% level. In this case, the net effect of a 10 point increase in union density is to raise real interest rates by 0.35 percentage points, almost exactly matching the results from the earlier regression.

Prima facie, this statistical link between real interest rates and union density suggests that central bankers may have been more aggressive in raising interest rates in economies where

union density is high. However, it is possible that union density causes inflation and central banks were really aiming to reduce inflation. To test this hypothesis, average country inflation rates (as also reported in Table 1) were regressed on country union density, for all twenty countries in the two time periods. Once again, one regression included a dummy variable to distinguish between the two time periods, and one did not.[15] Both regressions indicate no statistical relation between inflation and union density. This conclusion was further tested by a simple auto-regressive pooled time series model of country inflation rates (exactly similar to the time series regression of interest rates on union density above).[16] In this case, too, union density is found to have no explanatory power regarding inflation. In summary, these results suggest that while union density does not cause inflation, it does seem to be positively associated with higher interest rates. This challenges the standard argument that real interest rates are higher in countries with higher union density, because unions cause inflation. Instead, it appears that central banks systematically raised interest rates in countries with high union density. This is fully consistent with the political-economy argument that monetary policy is an instrument of class conflict, and that monetary authorities have largely been captured by interests antagonistic to unions (Palley, 1997).

Toward fair and full employment for all

The conventional wisdom is that the cause of high European unemployment lies in labour markets that are rigid and inflexible. These rigidities include excessive employment protection, too generous replacement rates, too long benefit durations, and high rates of unionization. The empirical results reported in this paper challenge this received wisdom.

These results are based on empirical investigations of unemployment that consider both microeconomic labour market institution variables and macroeconomic variables. The evidence is clear that macroeconomic factors matter for unemployment, and these factors are robust to changes in the empirical specification of the empirical model. However, when it comes to microeconomic factors, the evidence is much more problematic. The level of wage bargaining coordination and the extent of union coverage matter consistently, but they need not raise unemployment if they are appropriately paired. The level of unemployment benefit duration and the level of union density are both consistently insignificant. The significance of other microeconomic variables (employment protection, replacement rate, tax burden) is unstable and not robust to changes in specification. Moreover, none of these variables is significant in a fully specified model that takes account of country specific fixed effects related to Ireland and Spain.

This leads to the conclusion that high unemployment in western Europe is the result of self-inflicted macroeconomic policy. European policy makers adopted a course of disinflation, high real interest rates, and slower growth that raised unemployment. Moreover, since all adopted this course at the same time, they generated a wave of trade-based cross-country multipliers, that further raised unemployment and contributed to a continent wide macroeconomic funk.

The policy implications are clear. Lowering European unemployment will require a period of sustained expansionary macroeconomic policy, and this policy needs to be pursued by all countries. Implementing more flexible labour market institutions will not lower unemployment, as these institutions are not the cause of unemployment. Indeed, if this process of labour market deregulation involves simply reducing the extent of wage bargaining coordination, it could actually raise unemployment. These policy conclusions can be summarized in a two-dimensional macroeconomic - microeconomic policy framework (Palley, 1998), which is illustrated in Figure 1.[17] In this framework, unemployment is caused by macroeconomic factors. Microeconomic labour market institutions protect workers by giving them voice and bargaining power, which in turn impacts on distributional outcomes. Weakening these institutions therefore worsens income distribution, but has little impact on unemployment. In the U.S.

macroeconomic policy has been expansionary, but labour market institutions protecting workers have eroded; the result has been low unemployment and increased income inequality. In Europe macroeconomic policy has been contractionary, but labour market institutions protecting workers remain largely intact; the result has been high unemployment but relatively unchanged income inequality. Restoring the economic prosperity of the post-World War II era will require expansionary macroeconomic policy combined with labour market institutions that protect workers= voice and bargaining power. Unfortunately, however, the laissez-faire Washington consensus that currently dominates policy-making recommends exactly the opposite combination.

Data appendix

This appendix details the sources and construction of the data that were used in the regressions reported in Tables 4 and 5, and in the body of the text.

All data for the labour market institution variables were provided to the author by Nickell, and are as described in Nickell (1997).

The macroeconomic data were taken from the *OECD Economic Outlook* (1999), the World Bank CD-rom, and the *IMF International Financial Statistics* CD-rom. The series on real GDP growth was taken from the World Bank series of that name on the CD-rom. Updates for 1998 were taken from the World Bank=s homepage. These

series match the real GDP growth figures reported in the June 1999 OECD Economic Outlook, Annex table 1. Short-term interest rates are from the IMF CD, series 60B, money market rates. For Ireland, series 60C, Treasury Bills, was used due to the unavailability of the money market series. Missing values for New Zealand 1978-82 and Australia 1996-98 were filled in using 60C values. The measures of inflation are the percent change in consumer prices drawn from the OECD database=s purchasing power parity figures for private consumption, updated to match the OECD=s published 1999 figures. The change in inflation is then computed as the first difference of the annual inflation rates. The real short-term interest rate was computed as the difference between the short term nominal interest rate and the CPI inflation rate.

Standardized unemployment rates were drawn from the Statwise database where available, and completed manually from the *OECD Economic Outlook* (1999) Annex table 22, with which these figures are in accordance. To extend the series to include values back to 1977, the June 1999 *OECD Economic Outlook* numbers were supplemented by values from the June 1994 *OECD Economic Outlook*. However, these two series are not always identical owing to adjustments made by the OECD. To achieve compatibility, the 1994 figures were adjusted hard copy from the OECD. The series were adjusted for compatibility according to the following:

1979 Adjusted std.unemp = 1979 std.unemp per OECD June 1994 * (1980 std.unemp per OECD June 1999/ 1980 std.unemp per OECD June 1994).

Thus, earlier measures of the standardized unemployment rate were converted to the new basis by multiplying the old series by an adjustment factor. This adjustment factor was computed as the ratio of the first year of the new series to the old measure of standard unemployment in that year. The first year of the series in Annex table 22 is 1980. A similar scaling method was used to create standard unemployment rate values for countries for which they were unavailable. In these instances, values for the commonly used definition of unemployment rates (Annex table 21) were adjusted according to :

Adj. Std.unemp(t) = common unemp(t) * [std.unemp(t+1) / Common unemp(t+1)]

where the adjustment factor was calculated for the earliest year for which the standard unemployment series was available. The countries to which this approach was applied are: Denmark, Austria, Portugal, Ireland; New Zealand had a scalar of 1.

The cross-country Keynesian multiplier openness variable is designed to capture the impact of growth in the rest of the European economy on each European country. Canada is especially exposed to growth in the U.S., and a similar variable was therefore also constructed for the Canadian economy. The

European country openness variable is defined as:

$$EUROPEN_{j,t} = sx_{j,t}\left[\sum_{\substack{i=1 \\ i \neq j}}^{n} [EMP_{i,t} / TOTEMP_{-j,t}]\, GY_{i,t} \right]$$

where sx_j = export share of GDP for country j, EMPi = employment in country i (i = j), TOTEMPi = total employment in all European countries excluding country j, and GYi = growth of real output in country i (i = j). The logic of this openness variable is as follows. The sx_j component measures the export openness of a country, while the rest of the term measures real growth outside the country. This real growth component is the employment weighted average of country growth rates. For all non-European countries EUROPEN takes on a value of zero. The Canadian openness variable follows a similar logic, and is defined as:

$$CANUS_t = sx_{CAN,t}\, GY_{US,t}$$

where $sx_{CAN,t}$ = Canadian export share of GDP, and $GY_{US,t}$ = U.S. real GDP growth rate. For all countries other than Canada it is zero.

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Table 1: Country Macroeconomic Data

Country	Average Standardized Unemployment Rate (%)		Average Real GDP Growth Rate (% per yr.)		Average CPI Inflation Rate (% per r.)		Average Short-Term Interest Rate (%)		Average Short-Term Real Interest Rate (%)	
	1983-89	1989-94	1983-89	1989-94	1983-88	1989-94	1983-88	1989-94	1983-88	1989-94
Australia	8.40	9.05	4.43	2.65	7.60	3.78	12.62	9.79	5.02	6.01
Austria	2.86	3.43	2.09	2.76	2.87	3.30	5.36	7.78	2.49	4.48
Belgium	10.30	7.83	2.00	1.77	3.83	2.88	7.21	8.00	3.38	5.12
Canada	9.98	9.81	4.26	1.35	4.45	3.17	9.32	7.87	4.87	4.70
Denmark	6.41	8.51	2.71	1.49	5.02	2.53	10.47	10.48	5.45	7.95
Finland	5.68	9.90	3.41	-0.26	5.47	3.87	12.76	11.00	7.29	7.13
France	9.71	10.35	2.19	1.69	5.25	2.75	9.57	8.87	4.32	6.12
Germany	6.70	5.90	2.35	2.92	1.53	3.57	4.73	7.60	3.20	4.03
Ireland	15.98	14.70	2.77	5.44	5.60	2.90	11.42	9.13	5.82	6.23
Italy	8.88	9.76	2.73	1.29	8.30	5.43	14.52	11.67	6.22	6.24
Japan	2.68	2.35	3.98	2.61	1.27	2.05	5.15	4.90	3.88	2.85
Netherlands	8.51	6.36	2.47	2.84	1.40	2.57	5.47	7.63	4.07	5.06
New Zealand	4.48	8.85	1.81	1.98	10.70	3.08	17.31	9.38	6.61	6.30
Norway	2.78	5.58	3.35	2.91	7.17	3.02	13.22	10.06	6.05	7.04
Portugal	7.63	5.06	3.12	2.58	17.42	9.67	16.70	13.78	-0.72	4.11
Spain	20.13	19.21	3.22	2.08	8.52	5.77	13.75	12.58	5.23	6.81
Sweden	2.76	5.06	2.56	0.38	6.47	6.07	10.97	11.94	4.50	5.87
Switzerland	0.81	2.31	2.07	1.20	2.22	3.78	3.58	6.47	1.36	2.69
UK	10.75	8.90	3.95	1.07	4.68	5.17	10.32	9.94	5.64	4.77
USA	7.16	6.36	3.68	2.06	3.45	3.83	8.08	5.63	4.63	1.80

Table 2: Country Labour Market Institutional Data

Country	Unemployment Insurance Benefit Rate (% of wages) 1983-89	1989-94	Unemployment Insurance Benefit Duration (years) 1983-89	1989-94	Employment Protection Index (scale 1-20) 1983-88	1989-94	Average Union Density (% non-agric. workers) 1983-88	1989-94
Australia	39	36	4	4	4	4	44.7	40.4
Austria	60	50	4	2	16	16	51.2	46.2
Belgium	60	60	4	4	17	17	53.6	51.2
Canada	60	59	5	1	3	3	35.9	35.8
Denmark	90	90	2.5	2.5	5	5	73.7	71.4
Finland	75	63	4	2	10	10	70.9	72.0
France	57	57	3.75	3	14	14	13.8	9.8
Germany	63	63	4	4	15	15	34.3	32.9
Ireland	50	37	4	4	12	12	53.4	49.7
Italy	20	20	0.5	0.5	20	20	44.1	38.8
Japan	60	60	0.5	0.5	8	8	28.3	25.4
Netherlands	70	70	4	2	9	9	30.4	25.5
New Zealand	38	30	4	4	2	2	50.4	44.8
Norway	65	65	1.5	1.5	11	11	56.5	56.0
Portugal	60	65	0.5	0.8	18	18	46.3	31.8
Spain	80	70	3.5	3.5	19	19	18.0	11.0
Sweden	80	80	1.2	1.2	13	13	81.1	82.5
Switzerland	70	70	1	1	6	6	28.6	26.6
UK	36	38	4	4	7	7	44.8	39.1
USA	50	50	0.5	0.5	1	1	19.0	15.6

Table 2: Country Labour Market Institutional Data *(Continued)*

Country	Overall Labour Income Tax Rate (%)		Active Labour Market Spending (% potential GDP per unemployed worker)		Collective Bargaining Wage Coverage (scale 1-3)		Collective Bargaining Coordination (scale 2-6)	
	1983-89	1989-94	1983-89	1989-94	1983-88	1989-94	1983-88	1989-94
Australia	30.8	28.7	4.1	3.2	3	3	3	3
Austria	54.5	53.7	8.7	8.3	3	3	6	6
Belgium	47.6	49.8	10	14.6	3	3	4	4
Canada	37.8	42.7	6.3	5.9	2	2	2	2
Denmark	48.8	46.3	10.6	10.3	3	3	6	6
Finland	59.6	69.5	18.4	16.4	3	3	6	5
France	62.8	63.8	7.2	8.8	3	3	4	4
Germany	52.6	53	12.9	25.7	3	3	5	5
Ireland	59.3	56.5	4	6.9	3	3	4	4
Italy	33.6	34.3	9.2	9.1	3	3	2	2
Japan	57.2	62.9	10.1	10.3	3	3	3	4
Netherlands	33.1	36.3	5.4	4.3	2	2	4	4
New Zealand	35.3	34.8	15.4	6.8	2	2	3	3
Norway	49.9	48.6	9.5	14.7	3	3	6	6
Portugal	33.5	37.6	5.9	18.8	3	3	4	4
Spain	50.1	54.2	3.2	4.7	3	3	3	3
Sweden	68.9	70.7	59.5	59.3	3	3	6	6
Switzerland	40	38.6	23	8.2	2	2	4	4
UK	44.6	40.8	7.8	6.4	3	2	2	2
USA	42.6	43.8	3.9	3	1	1	2	2

Table 3
List of Variables Included in the Empirical Model

Symbol	Definition
Dependent Variable	
$UNEMP_{j,t}$	Standardized unemployment rate in country j in year t
Lagged Dependent Variable	
$UNEMP_{j,t-1,\ t-2}$	Standardized unemployment rate in country j (lagged one and two periods)
Microeconomic Labour Market Explanatory Variables	
$EMPPROT_{j,t}$	Index of employment protection (1 - 20) in country j
$REPRATE_{j,t}$	Unemployment insurance wage replacement rate (%) in country j
$BENDUR_{j,t}$	Benefit duration (years) in country j
$UNIONDEN_{j,t}$	Union density (%) in country j
$UNIONCOV_{j,t}$	Extent that union wage coverage extends to non-union workers (1 = less than 25%, 2 = 25 - 70%, 3 = greater than 70%) in country j
$COORD_{j,t}$	Extent of coordination (index = 2 - 6) of wage bargaining amongst unions and employers in country j
$TAXRATE_{j,t}$	Total tax rate (sum of average payroll, income, and consumption tax rates) in country j
$ALMPROG_{j,t}$	Measure of active labour market policy (spending per unemployed worker as a percent of the potential output per worker) in country j
Macroeconomic Explanatory Variables	
$DINFLATE_{j,t}$	Change in the CPI inflation rate (%) in country j in year t
$REALINT_{j,t-1}$	Real interest rate (%) in country j in year t-1 (lagged one period)
$GDPGROW_{j,t}$	Rate of real GDP growth (%) in country j in year t
$GDPGROW_{j,t-1}$	Rate of real GDP growth (%) in country j in year t-1 (lagged one period)
$EUROPEN_{j,t}$	Measure of exposure of individual European countries to intra-European trade in year t (0 for non-European countries)
$CANUS_{j,t}$	Measure of exposure of the Canadian economy to trade with the U.S. in year t (0 for all countries except Canada)
Country-Specific Dummy Variables	
IREDUM	Dummy variable capturing effects specific to unemployment in Ireland
SPADUM	Dummy variable capturing effects specific to unemployment in Spain

Table 4
Time Series Unemployment Rate Regressions
Pooled Annual Data, 20 OECD Countries, 1983-1994

1	2	3	4	5	6	7	8	9
CONSTANT	0.359***	-0.378	-0.049	0.695**	0.383	0.434	1.190***	0.795***
	(2.91)	(-0.95)	(-0.13)	(2.21)	(1.13)	(1.30)	(8.17)	(5.84)
UNEMP(-1)	1.522***	1.475***	1.392***	1.273***	1.237***	1.142***	1.204***	1.287***
	(28.49)	(27.99)	(27.11)	(23.26)	(22.01)	(20.76)	(21.82)	(22.72)
UNEMP(-2)	-	-	-	-	-	-	-	-
	0.564***	0.617***	0.644***	0.348***	0.313***	0.296***	0.271***	0.293***
	(-10.29)	(-11.17)	(-12.39)	(-5.96)	(-5.30)	(-5.27)	(-4.88)	(-4.97)
EMPPROT		0.034*	0.005	0.023***	0.029*	0.007		
		(1.84)	(0.27)	(1.55)	(1.96)	(0.49)		
REPRATE		0.013**	0.005	0.007***	0.013***	0.007		
		(2.40)	(0.94)	(1.78)	(2.69)	(0.20)		
BENDUR		0.029	0.026	-4.610-5	0.016	0.007		
		(0.58)	(0.55)	(-0.01)	(0.42)	(1.47)		
UNIONDEN		0.008	0.016***	-0.002	0.003	0.007		
		(1.37)	(2.84)	(-0.51)	(0.56)	(1.47)		
UNIONCOV		0.385*	0.556***	0.381**	0.415***	0.540***		
		(1.86)	(2.81)	(2.46)	(2.69)	(3.64)		
COORD		-	-	-	-	-		
		0.463***	0.520***	0.243***	0.298***	0.286***		
		(-4.11)	(-4.85)	(-2.76)	(-3.24)	(-3.28)		
TARATE		0.020**	0.035***	-0.005*	-0.003	0.012*		
		(2.57)	(4.42)	(-0.83)	(-0.40)	(-1.93)		
ALMPROG		-0.014	-	-0.002	-0.006	-		
			0.029***			0.019***		
		(-1.56)	(-3.23)	(-0.230)	(-0.81)	(-2.73)		
DINFLATE				-	-	-	-	-
				0.084***	0.077***	0.064***	0.080***	0.086***
				(-3.54)	(-3.27)	(-2.86)	(-3.51)	(-3.58)
REALINT(-1)				0.070***	0.061***	0.046***	0.046***	0.040**
						139		
				(3.85)	(3.39)	(2.70)	(2.97)	(2.41)
GDPGROW				-	-	-	-	-
				0.263***	0.245***	0.225***	0.257***	0.274***
				(-10.23)	(-9.30)	(-9.01)	(-10.65)	(-10.78)
GDPGROW(-1)				-0.055*	-	-	-0.079**	-0.040
					0.067***	0.103***		
				(-1.68)	(-2.08)	(-3.31)	(-2.48)	(-1.21)
EUROPEN					-	-	-0.167**	-0.135**

					0.227***	0.269***		
					(-2.62)	(-2.97)	(-2.51)	(-2.00)
CANUS					-0.318	-0.031	-0.057	-0.288
					(-1.49)	(-0.15)	(-0.29)	(-1.44)
IREDUM			1.028***			1.332***	1.196***	
			(3.07)			(4.84)	(4.87)	
SPADUM			2.440***			1.536***	1.229***	
			(5.74)			(4.49)	(4.56)	
Adj. R^2	0.956	0.959	0.964	0.977	0.978	0.981	0.979	0.976
S.E.	0.930	0.896	0.840	0.664	0.655	0.615	0.641	0.682
N	240	240	240	239	239	239	239	239

t-statistics in parentheses.

**** = significant at the 1% level. ** = significant at the 5% level. * = significant at the 10% level.*

Table 5

Decomposition of the Causes of Changing Unemployment Rates

1983 to 1994

1	2	3	4	5	6
	Unemployment Rate, 1983 (%)	**Unemployment Rate, 1994 (%)**	**Change in Unemployment Rate, 1983-94 (% points)**	**Change Ascribed to Change in Micro Variables (% points)**	**Change Ascribed to Change in Macro Variables (% points)**
Austria	3.8	3.8	0.0	-0.79	0.79
Belgium	11.1	10.0	-1.1	-0.51	-0.59
Denmark	10.3	8.2	-2.1	-0.26	-1.84
Finland	6.1	16.8	10.7	2.29	13.17
France	8.1	12.3	4.2	-0.34	4.54
Germany	6.9	8.4	1.5	-1.61	3.11
Holland	9.7	7.1	-2.6	-0.89	-1.71
Ireland	14.0	14.3	0.3	-0.69	0.99
Italy	7.7	11.4	3.7	-1.68	5.38
Norway	3.5	5.5	2.0	-0.77	2.77
Portugal	7.8	7.0	-0.8	-1.69	0.89
Spain	17.5	24.1	6.6	-0.64	7.24
Sweden	3.7	9.4	5.7	0.23	5.47
Switzerland	0.9	3.8	2.9	1.63	1.27
U.K.	11.1	9.6	-1.5	-3.80	2.3
Australia	10.0	9.7	-0.3	-0.38	0.80
New Zealand	5.8	8.1	2.3	0.40	1.90
Canada	11.9	10.4	-1.5	0.20	-1.70
U.S.	9.6	6.1	-3.5	0.05	-3.45
Japan	2.7	2.9	0.2	0.25	0.05

Figure 1

The Policy Menu

		LABOUR MARKET POLICY	
		Regulated	**Flexible**
MACRO-ECONOMIC POLICY	**Expansionary**	**A. Progressive Consensus**	**B. U.S.**
	Contractionary	**C. Europe**	**D. Laissez-Faire Consensus**

Notes

1. Malcolm Sawyer=s chapter in this volume examines the weak theoretical underpinnings of natural rate theory in more detail.

2. The OECD continually changes its reported measure of standardized unemployment, and as a result the measures used here do not match earlier measures used by Nickell (1997). The current measures are drawn from the OECD=s *Economic Outlook*, December 1999.

3. The model can be described formally with the following equation, where the variable symbols are defined in Table 3:

$$UNEMP_{j,t} = a_0 + a_1 UNEMP_{j,t-1} + a_2 UNEMP_{j,t-2} + a_3 EMPPROT_{j,t} + a_4 REPRATE_{j,t} + a_5 BENDUR_{j,t} + a_6 UNIONDEN_{j,t} + a_7 UNIONCOV_{j,t} + a_8 COORD_{j,t} + a_9 TAXRATE_{j,t} + a_{10} ALMPROG_{j,t} + a_{11} DINFLATE_{j,t} + a_{12} REALINT_{j,t-1} + a_{13} GDPGROW_{j,t} + a_{14} GDPGROW_{j,t-1} + a_{15} EUROPEN_{j,t} + a_{16} CANUS_{j,t} + a_{17} IREDUM + a_{18} SPADUM + u_{j,t}$$

4. Over the sample period 1983-1994, Spain had average standardized unemployment of 19.2%, while Ireland had average standardized unemployment of 15.3%. The country with the next highest unemployment after these two was Belgium, with an average standardized unemployment rate of 11.3%.

5. A two-stage least squares methodology was required because the active labour market programming variable is defined as the percentage of GDP

spent on labour market policies, normalized on the unemployment rate (which is itself the dependent variable). The instrument used for this two-stage process was spending as a percent of GDP normalized on the average unemployment rate in 1977-1979 (see Nickell, 1997, p.64).

6. The statistical significance of the real interest rate is at odds with results reported by Scarpetta (1995), which in turn have influenced much OECD policy analysis. This difference likely stems from differences in the measure of real interest rates. Scarpetta used a measure of world real interest rates based on a GDP-weighted average of domestic long term rates. The current estimate uses the short run country interest rate, which is the appropriate rate for purposes of assessing the impact of country macroeconomic policies on country unemployment rates.

7. Though negatively signed, the Canadian openness variable is only weakly significant. This may be because the impact of U.S. growth on the Canadian economy is fully captured in the domestic GDP growth variable.

8. Indeed, given the coefficients in Column 4 of Table 4, a properly constructed system of coordinated wage bargaining and extensive union coverage will actually lower unemployment. The coefficient of COORD is -0.298, while that of UNIONCOV is 0.415. However, the average value of the COORD index is twice that of UNIONCOV, and hence the positive

impact of coordination in reducing unemployment is found to outweigh the negative impact of bargaining coverage.

9. Ireland suffers especially from having high coverage and low coordination (UNIONCOV = 3, COORD = 2). The U.K., Canada, and New Zealand also suffer, albeit less so (UNIONCOV = 2, COORD = 2).

10. This latter finding implies an Okun coefficient equal to one-half. This is fully in accordance with existing estimates of the Okun coefficient (Palley, 1993), lending additional support to the results presented.

11. More formally, the collective importance of the microeconomic variables can be calculated as:

$$MICRO_{j,t} = [0.007EMPPROT_{j,t} + 0.007REPRATE_{j,t} + 0.007BENDUR_{j,t} + 0.007UNIONDEN_{j,t} + 0.541UNIONCOV_{j,t} - 0.286COORD_{j,t} + 0.012TAXRATE_{j,t} - 0.019ALMPROG]/0.154$$

The change in unemployment due to changes in the microeconomic variables is then determined

12. This macroeconomic component is computed as:[146]

$$DMACRO = DUNEMP - DMICRO$$

13. The regression results are as follows (the second equation includes a time dummy to capture changes in financial market conditions across

the periods 1983 - 88 and 1989 - 94):

$REALINT_j$ = 3.505 + 0.032 $UNIONDEN_j$ $Adj.R^2$ = 0.096 N = 40

(5.33) (2.27)

$REALINT_j$ = 2.943 + 0.035 $UNIONDEN_j$ + 0.923 TIMEDUMMY $Adj.R^2$ = 0.145 N=40

(4.12) (2.49) (1.77)

Figures in parentheses are t-statistics.

14. The resulting regression was:

$REALINT_{j,t}$ = 1.822 + 0.483$REALINT_{j,t-1}$ + 0.018 $UNIONDEN_j$ $Adj.R^2$ = 0.333 N = 238

(4.82) (10.11) (2.36)

Figures in parenthesis are t-statistics.

15. The two regression results are as follows (the second equation includes a dummy variable to control for differences between the two time periods):

$INFLATION_j$ = 3.845 + 0.023 $UNIONDEN_j$ $Adj.R^2$ = -0.005 N = 40

(3.25) (0.89)

$INFLATION_j$ = 4.839 + 0.019 $UNIONDEN_j$ - 1.633TIMEDUMMY $Adj.R^2$ = 0.045 N = 40

(3.76) (0.74) (-1.74)

Figures in parenthesis are t-statistics.

16. The resulting regression (with t-statistics in parenthesis) was:

$INFLATION_{j,t} = 0.514 + 0.776\ INFLATION_{j,t-1} + 0.001\ UNIONDEN_{j}$ Adj.R^2 = -0.005 N = 240

(1.59) (26.69)

(0.14)

17. Stanford (2000) uses a similar framework to compare Canadian economic policy with that of other countries.