APPENDIX A. ROBUSTNESS TESTS

Tables A1 and A2 provide robustness tests for the employment and productivity regressions, respectively. The first two columns of table A1 remove Spain and then the Mediterranean countries from the sample. The post-1995 dummy falls from its estimate of approximately 0.9 in the main text, to roughly 0.7 However, the change is not statistically significant. In column 3 we add the US to the sample and find similar results as in the main text. The US has a negative post-1995 dummy of -0.38, and the coefficient on PMR becomes significant. Since we use population weights, the results in column 3 are largely driven by the US. Last, column 5 lags all of the explanatory variables by 1 year in order to avoid any possible simultaneity. The results do not change notably.

Table A2 presents robustness tests for the productivity regressions. Column 1 removes the Mediterranean countries from the sample. The coefficient on employment is now only significant at the 5 percent level, rather than the 1 percent level, because the standard error is larger. EPL also loses its significant coefficient. In column 2, we try dropping the output gap, since it could cause simultaneity bias in our results. The coefficient on employment rises to -0.46. This is likely due to the fact that the regression is now picking up some of the short-run correlation between employment and productivity.

In columns 3 and 4, we lag all of the explanatory variables by one year except for the output gap. Using only the tax wedge as an instrument, the coefficient on employment is no longer significant, as its standard error is relatively large. The 95 percent confidence interval extends from -0.75 to 0.25. Column 4 adds union density and high corporatism as dummies. This brings the standard error down and makes the coefficient significant at the 1 percent level. Column 5 shows that excluding the tax wedge from the regression does not affect the results.

Columns 6 and 7 add the US to the analysis. As before, since we use population weights, the US data dominates the sample. In column 6, the point estimate on employment is in line with other columns, but the standard error has risen to 0.31. In column 7, using a full set of instruments, employment is once again significant at the 1 percent level.

Looking across the columns, the positive coefficients on EPL and ARR are clearly very robust to a variety of specifications. The point estimate on the post-1995 dummy is usually negative, but it is never statistically significant at even the 10 percent level. In the US, on the other hand, the post-1995 dummy has a coefficient of 0.45, which is significant at the 1 percent level. So while it seems that there was no exogenous negative shock to European productivity growth, there was some sort of positive shock for the US.

APPENDIX B. DATA SOURCES BY ORDER OF APPEARANCE

Section 2.2
***Source*:** GGDC Total Economy Database, Jan. 2007. http://www.ggdc.net/index-dseries.html**:**

Output (1970-2006): Linear average of GK and EKS measures of GDP.
Data adjustments: Values for Germany ratio linked to W. Germany (GK only) in 1989. USA measures are from BEA NIPA Table 1.1.6 (last updated July 27, 2007). USA measures for Table 2 are from GGDC as defined above for the sake of uniformity when comparing levels.

Hours (1970-2006): Total annual hours worked.
Data adjustments: Values for Germany ratio linked to W. Germany in 1989. USA measures are the latest BLS numbers released August 7, 2007 provided by Phyllis Otto via email.

Population (1970-2006): Midyear population.
Data adjustments: Values for Germany ratio linked to W. Germany in 1989

Employment (1970-2006): Persons engaged.
Data adjustments: Values for Germany ratio linked to W. Germany in 1989

***Source*:** EU KLEMS Database, Mar. 2007. http://www.euklems.net**:**

Gross Output (1979-2004): Price indexes, 1995=100. Basic Files, tab "GO_P."
Data adjustments: Due to missing data, Greece GO_P values were set equal to tab "VA_P" (Value Added Price Index) values from 1979-1994. Also due to missing data, GO_P values for Luxembourg industries 21t22 and 34t35 were set equal to industry D from 1979-1994.

1997 Purchasing Power Parity (PPP) Index: National currency per 1997 German Euro.

Nominal Capital Compensation (1979-2004): Basic Files, tab "CAP."
Data adjustments: Negative CAP observations were replaced by multiplying VA by Total Economy CAP divided by Total Economy VA in that year.
Notes: Nominal amounts converted to German Euros by 1997 industry PPP's using the formula:
'CAP in 1997 German Euros = CAP in national currency / [((GO_P / 1997 GO_P) / (German GO_P / 1997 German GO_P)) * 1997 PPP].'

Real Growth in Capital (1980-2004): Basic Files, tab "CAP_QI."

Data adjustments: No CAP_QI data is available for Greece, Netherlands, and Portugal. These countries are therefore dropped from all calculations involving capital. No significant difference arises in non-capital measures from the exclusion of these three countries, and thus we continue to use the entire EU-15 when possible. No CAP_QI data is available before 1993 for Sweden. Therefore, Sweden was dropped from all calculations involving capital prior to 1993.
Notes: Real growth of aggregated and sub-aggregated industries and countries calculated using a weighted average of the components' real growth rates. The weighted average is calculated using the geometric mean across each year pair of the industry or country's nominal share of capital compensation.

Hours (1980-2004): Total hours worked by persons engaged. Basic Files, tab "H_EMP."

Nominal Value Added (1979-2004): Gross value added. Basic Files, tab "VA."
Notes: Nominal amounts converted to German Euros by 1997 industry PPP's using the formula:
'VA in 1997 German Euros = VA in national currency / [((GO_P / 1997 GO_P) / (German GO_P / 1997 German GO_P)) * 1997 PPP].'

Real Growth in Value Added (1980-2004): Basic Files, tab "VA_QI."
Notes: Real growth of aggregated and sub-aggregated industries and countries calculated using a weighted average of the components' real growth rates. The weighted average is calculated using the geometric mean across each year pair of the industry or country's nominal share of gross value added.

Capital's Share in Total Output (1980-2004): Geometric mean across each year pair of nominal capital divided by nominal value added.

Capital Deepening Growth (1980-2004): (Real capital growth minus growth in total hours worked multiplied by capital's share in total output.

Total Factor Productivity (TFP) Growth (1980-2004): Output per hour growth minus capital deepening growth.

Employment (1980-2004): Number of persons engaged. Basic Files, tab "EMP."

EU-KLEMS Notes:

Due to missing data: All values for Ireland industry 71t74 set equal to Ireland industry K before 1995, all nominal values for Ireland industries 60t63 and 64 set equal to 0.5*Ireland industry I before 1995, all index values for Ireland industries 60t63 and 64 set equal to Ireland industry I before 1995, and all index values for Germany industries 60t63 and 64 set equal to Germany industry I before 1991.

Aggregated total economy results may not match up perfectly to comparable estimates in the EU-KLEMS Database because we used their total economy PPP's to convert total economy numbers to a common currency, whereas EU-KLEMS only converted by industry and then added up the converted industry numbers to make a converted total economy total. We did it this way to keep total economy growth rates by country equal to the estimates given on the EU-KLEMS website. Converting by industry and then summing to make new total economy values distorts these growth rates.

Section 3.2.2
Source: OECD Population and Labor Force Statistics, Volume 2006 release 02. http://www.oecd.org:

Employment per Capita (1978-2003): Employment divided by population for men, women, and combined.

Source: Allard-Lindert Database, Jan. 2006. See website for their sources and data adjustments. http://www.econ.ucdavis.edu/faculty/fzlinder/OECD_1950-2001_annual1.xls**:**

Labor Tax Wedge (1978-2001): Total tax wedge including employer's social security contributions.

EPL (1978-2001): The Allard (2003) measure of the strictness of employee protection laws.

Source: GGDC Total Economy Database, Jan. 2007. http://www.ggdc.net/index-dseries.html**:**

Output Gap (1978-2003): Measure of the gap between actual and potential output as a percentage of potential output. Potential output created using a Hodrick-Prescott filter. For specific calculations, see our Stata do-file.

Source: Bassanini-Duval Dataset, obtained via email in April 2007. See Bassanini-Duval (2006) for their sources and data adjustments.

Labor Tax Wedge (1978-2003): Tax wedge between the labor cost to the employer and the corresponding net take-home pay of the employee for a single-earner couple with two children earning 100% of APW earnings. The tax wedge expresses the sum of personal income tax and all social security contributions as a percentage of total labor cost.

Data adjustments: Data ratio linked to Allard-Lindert's tax wedge measure for missing years.

EPL (1978-2003): OECD summary indicator of the stringency of employment protection legislation.
Data adjustments: Data ratio linked to Allard-Lindert's EPL measure prior to 1982.

ARR (1978-2003): Average unemployment benefit replacement rate across two income situations (100% and 67% of APW earnings), three family situations (single, with dependent spouse, with spouse in work) and three different unemployment durations (1st year, 2nd and 3rd years, and 4th and 5th years of unemployment).

PMR (1978-2003): OECD summary indicator of regulatory impediments to product market competition in seven non-manufacturing industries: gas, electricity, post, telecoms (mobile and fixed services), passenger air transport, railways (passenger and freight services) and road freight.

Union Density (1978-2003): Trade union density rate.
Data adjustments: Due to missing data, data for Finland, Germany, and Sweden years 1991 and 1992 obtained by linear interpolation. Data for Greece years 2002 and 2003 set equal to Greece 2001. Data for Spain years 1978, 1979, and 1980 set equal to Spain 1981.

Output Gap (1978-2003): OECD measure of the gap between actual and potential output as a percentage of potential output.
Data adjustments: Data ratio linked to output gap measure derived from the GGDC Total Economy Database for missing years.
Notes: Output gap measures are updated from Bassanini and Duval's paper. They used output gap measures from OECD Economic Outlook 76, December 2004. The OECD output gap measure was chosen in favor of the output gap measure derived from the GGDC using an H-P trend because the OECD measure has more plausible gaps and more stable growth rates of potential output.

Degree of Corporatism (1978-2003): Indicator of the degree of centralization/co-ordination of the wage bargaining processes, which takes a value of 1 for high degrees of centralization and coordination and zero otherwise.

Demographic Predictions

Predictions for future demographic trends were downloaded from the UN's "World Population Prospects" database at http://esa.un.org/unpp/index.asp?panel=2.

Additional Notes on the Productivity Regressions

The regressions all pass the standard specification tests. In particular, the Sargan test indicates that our instruments are valid, the Wu-Hausmann test rejects the null that employment growth is not endogenous, and the Cragg-Donald test for identification rejects the null that the model is underidentified at the .01 percent level.

The coefficients we find are nearly identical to those found by Bourles and Cette (2005), but are larger than those found by McGuckin and van Ark. Their sample is different from ours in its time period and selection of countries. Moreover, in at least some of their regressions, they do not control for the business cycle. Given the short run positive correlation between output, productivity and employment, we would expect the exclusion of the output gap to bias the estimated coefficient on employment upwards. In unreported experiments, we find that it does.

The other controls we include on the right hand side are slightly different from both Bourles and Cette (2005) and McGuckin and van Ark (2005). We try to be as careful as possible in avoiding simultaneity bias, which leads us to use fewer controls than Bourles and Cette.

Stata Commands

We used extensively the ivreg2 and xtivreg2 commands in stata:

Baum, C.F., Schaffer, M.E., Stillman, S., 2006. ivreg2: Stata module for extended instrumental variables/2SLS, GMM and AC/HAC, LIML and k-class regression. http://ideas.repec.org/c/boc/bocode/s425401.html

Schaffer, M.E., Stillman, S., 2007. xtivreg2: Stata module to perform extended IV/2SLS, GMM and AC/HAC, LIML and k-class regression for panel data models. http://ideas.repec.org/c/boc/bocode/s456501.html

Other Notes:

All trends were generated using Hodrick-Prescott filter with annual data smoothing parameter of 6.25. An extra year was added on to smooth the end of each trend. The value given to this year equaled the average growth rate of previous four years.

Growth rates were generated using the exponential growth rate formula.

Table A1

First-Stage Regressions of Employment on Policy Variables, 1980-2003

	1	2	3	4
Tax Wedge	-0.25 ***	-0.25 ***	-0.2 ***	-0.14 *
	(0.06)	(0.07)	(0.07)	(0.07)
Employment Protection Legislation	0.88	1.38	0.90	-1.03
	(0.75)	(0.86)	(0.30)	(0.79)
Product Market Regulation	0.24	0.34	-0.99 **	-0.84
	(0.49)	(0.51)	(0.48)	(0.56)
Unemployment Benefits (ARR)	-0.08 *	-0.01	-0.19 ***	-0.21 ***
	(0.05)	(0.06)	(0.05)	(0.05)
Union Density	-0.29 ***	-0.35 ***	-0.49 ***	-0.44 ***
	(0.10)	(0.11)	(0.10)	(0.10)
High Corpratism Dummy	-2.95 ***	-2.32 *	-2.18 **	-2.04 **
	(0.83)	(1.22)	(1.02)	(0.97)
Output Gap	0.46 ***	0.55 ***	0.54 ***	0.64 ***
	(0.04)	(0.04)	(0.03)	(0.05)
Post-1995 Dummy	0.66 ***	0.75 ***	0.93 ***	0.91 ***
	(0.14)	(0.14)	(0.16)	(0.16)
Post-'95 Dummy (U.S.)			-0.38 **	
			(0.17)	
R2	0.48	0.53	0.58	0.53
RMSE	1.02	0.99	0.96	1.15
N	296	251	344	306
Notes	Spain Excluded	Mediterranean Countries Excluded	U.S. included, with a separate post-'95 dummy	All explanatory variables except output gap lagged by one year

All regressions include population weights and fixed country dummies

Source: Authors' Calculations

Table A2

Second-Stage Regressions of Productivity on Employment and Policy Variables

	1	2	3	4		5	6
Employment Rate	-0.56 **	-0.46 **	-0.24	-0.43 ***	-0.64 ***	-0.39	-0.51 ***
	(0.26)	(0.22)	(0.23)	(0.13)	(0.16)	(0.31)	(0.15)
Tax Wedge					0.01		
					(0.04)		
Employment Protection Legislation	1.05	1.88 **	2.43 ***	2.72 ***	1.6 **	1.49 *	1.56 **
	(0.94)	(0.92)	(0.90)	(0.86)	(0.64)	(0.82)	(0.76)
Product Market Regulation	0.27	-0.56	0.93	0.65	0.59	0.47	0.4
	(0.50)	(0.63)	(0.68)	(0.63)	(0.44)	(0.50)	(0.44)
Unemployment Benefits (ARR)	0.25 ***	0.15 **	0.17 **	0.14 **	0.13 **	0.16 **	0.14 **
	(0.06)	(0.07)	(0.07)	(0.06)	(0.05)	(0.08)	(0.05)
Union Density	0.05	-0.16	0.14			0.08	
	(0.14)	(0.18)	(0.18)			(0.17)	
Output Gap	0.65 ***		0.28 ***	0.31 ***	0.67 ***	0.49 ***	0.56 ***
	(0.15)		(0.07)	(0.06)	(0.10)	(0.17)	(0.09)
High Corpratism Dummy	1.23	-0.57	1.37		-0.25	0.24	
	(1.37)	(1.30)	(1.31)		(0.21)	(1.24)	
Post-1995 Dummy	-0.06	0.20	-0.36	-0.13	-0.13	-0.41	-0.28
	(0.27)	(0.28)	(0.33)	(0.24)	(0.19)	(0.36)	(0.21)
Post-'95 Dummy (U.S.)						0.46 ***	0.44 ***
						(0.17)	(0.15)
R2	0.51	0.27	0.31	0.30	0.63	0.51	0.56
RMSE	0.97	1.3	1.28	1.28	0.95	0.93	0.88
N	251	329	305	305	320	344	344
Exogenous Instruments	Tax Wedge	Tax Wedge	Tax Wedge	Tax Wedge High Corp. Unions	High Corp. Unions	Tax Wedge	Tax Wedge High Corp. Unions
Notes	Mediterranean Countries Excluded	Output Gap Excluded	All explanatory variables except output gap lagged by one year	All explanatory variables except output gap lagged by one year	Tax wedge not used as an exogenous instrument	U.S. included, with a separate post-'95 dummy	U.S. included, with a separate post-'95 dummy

All regressions include population weights. In all cases, the Sargan statistic cannot reject the null of instrument validity at the 20% level

Source: Authors' Calculations