The Impact of Taxes on Employment and Economic Growth in Industrialized Countries

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Abstract

Looking at economic trends in industrialized countries during the time frame 1965 to 1995, there has been an upward trend in unemployment, which appears to be related to the slowdown of economic growth. However, the relation between unemployment and a slowing growth pattern stems from an external variable: a rapid increase in the cost of labor. There are many factors behind the rise of labor costs, but the most significant reason is from higher taxes being placed on labor. Increasing labor taxes have two primary effects on employment and growth. First, the demand for labor is decreased as the cost rises, therefore creating unemployment. Second, because the cost of labor rises, firms will begin replacing labor with capital until the marginal product of capital falls, diminishing the incentive for investment and growth. The empirical evidence found in this paper proves this theory is accurate as a 10 percentage point increase in the tax rate on labor increase the unemployment rate by 5.3 percentage points and decreases growth by 2.1 percentage points.

I. Introduction

A major problem industrialized nations are facing is increasing unemployment rates and slow or stagnant growth. Many industrialized nations are experiencing an increase in unemployment; however, some of the most significant cases lie within the European Union. According to Bentolila et al. (2000), from 1965 to 1995, the unemployment rate in the EU rose by more the 7 percent, while rising only 1.3 percent in the US.

Data collected for continental Europe shows the effective tax rate on labor rose from 28% in 1965 to 42% in 1995, while during the same period the average unemployment rate increased 2.1% to 10.5%, the growth rate of per-capita GDP fell from 4.2% to 1% per year and investment decreased from 27.5% to 24.5% [Bentolila et al. (2000)]. Evidence suggests that unemployment and growth have a negative relation to each other, but given the long time period of data, these two trends cannot simply be the result of business cycle fluctuations. Bentolila et al. (2000) argue that the correlation between rising unemployment and a decreasing rate of growth is driven by an external factor: a sharp increase in labor costs through taxes on labor.

The theory behind the argument is that an increase in labor taxes will increase the real price of labor, decreasing the demand for labor and increasing the unemployment rate. In response, firms will replace labor with capital, and the long-run shift from labor to capital will eventually decrease the marginal product of capital low enough to reduce investment and growth.

This paper will examine data on taxes, growth, and employment in several industrial countries over a span of 30 years, and will attempt to obtain direct empirical evidence supporting the negative effects of taxes on employment and growth.

II. Literature Review

The effect of taxes on growth and employment is not limited to the national level, but can be examined at state or even regional levels as well. Mofidi and Stone (1990) examine the effect of non-federal taxes and the impact it has on local growth. The purpose of the work carried out by Mofidi and Stone (1990) was to examine the very micro level analysis of the effect of taxes, in hopes of removing national trends and business cycles. The empirical tests in Mofidi and Stone (1990) examine data on taxes and expenditures, private investment, employment in manufacturing, and personal income from all fifty states over a period from 1962 to 1982. The results show that the coefficients for taxes are significantly negative at the 5% level for both manufacturing employment and private net investment. However, the test also shows that government expenditures used for education, health, and investment in infrastructure have a significantly positive effect on employment and economic growth. The conclusion is that taxes can increase unemployment and decrease growth, as Bentolila et al. (2000) suggest; however, government expenditures used for public service or infrastructure have a positive effect on employment and growth.

III. Empirical Model

Looking at a panel of industrialized countries, the main goal will be to test the following propositions:

a) Countries with higher labor taxes lead to higher unemployment and;

b) A higher cost of labor decreases the amount of investment by lowering the capital – labor ratio, and therefore slowing growth.

To test these propositions, two primary models will be estimated. Taking data from 14 industrial nations over the period 1965-1995, each variable will be averaged over five year periods to remove the effect of cyclical fluctuations. This data can be found in Table 1.

Therefore, the panel will consist of 14 countries with 6 observations for each variable per country with a summary of the variables found in Table 2.

To test the first proposition, unemployment will be used as the dependent variable, and regressed on the effective tax rate on labor using a fixed effects model. The equation will be as follows, with i representing individual countries and t representing a period in time:

$$\text{EQ 1: } u_{it} = \beta_0 + \beta_1 TL_{it} + \alpha_i + V_{it}$$

To test the second proposition, the growth rate will be used as the dependent variable, and regressed on unemployment using a fixed effects model. The equation will be as follows, with i representing individual countries and t representing a period in time:

$$\text{EQ 2: } g_{it} = \beta_0 + \beta_1 U_{it} + \alpha_i + V_{it}$$

Both models will be based on a level-level model, with effects measured in percentage point changes. The reason the models will be estimated using a fixed effects model is to eliminate any fixed effects caused by differences in policies between countries.

IV. Findings

The results for EQ 1 can be found in Table 3. Looking at the coefficient, the data suggests that a 10 percentage point increase in the labor tax will increase the unemployment rate by 5.3 percentage points. This data is very significant with a t-value of 10.36, showing that increasing taxes will have a negative impact on employment within an industrialized nation. Also, approximately 74% of the variation in unemployment can be explained by using the above equation. This data is vary comparable to that found in Bentolila et al. (2000), which can be found in Table 5. The regression results from both Table 3 and from Bentolila et al. (2000) found in Table 5 seems to support the theory that taxes do have a positive impact on unemployment. The differences between the two models however; is that the results in Table 3

are based on a fixed effects model, which eliminates the differences between countries, while the model in Bentolila et al. (2000), uses a standard OLS regression, separating the results by region. The results found by Bentolila et al. (2000) show a strong positive correlation between labor taxes and unemployment in the Anglo and Euro regions, but the results are not significant for the Nordic region. This result could be due to problem of not enough observations or not enough variables included in the model.

The results from EQ 2 can be found in Table 4. Looking at the coefficient, the data suggests that a 10 percentage point increase in the unemployment rate will decrease growth by 2.1 percentage points. This data is also very significant having a t-value of -5.04, supporting the proposition that taxes on labor will ultimately have a negative effect on growth. Approximately 38% of the variation in growth can be explained using the second equation. These results are also similar to the results found by Bentolila et al. (2000) in Table 6. The results found by Bentolila et al. (2000) suggest that a 10 percentage point increase in the unemployment rate will decrease growth by .9 percentage points, which is also significant at the 1 percent level.

V. Sensitivity Tests

To test the models for how accurate they are, sensitivity tests were performed. The first test was to implement lags in the independent variables to test for time-series problems. The time-series test for EQ 1: $u_{it} = \beta_0 + \beta_1 TL_{it} + \alpha_i + V_{it,}$ uses a time lag in variable for labor taxes found in table 7. When this lag is introduced, the coefficient decreases from .53 to .13. However, this model is still significant at the 5 percent level, suggesting that there is a positive correlation between taxes on labor and unemployment.

The results for EQ 2: $g_{it} = \beta_0 + \beta_1 U_{it} + \alpha_i + V_{it,}$ found in Table 8 have two problems. The first is that the coefficient is positive, which is the opposite of what is expected, and second

the variable is insignificant having a p-value above the ten percent level. To attempt to correct for these problems, a second sensitivity test is implemented, found in Table 9, where a 2SLS regression is used having labor taxes as the instrumental variable for unemployment. The purpose of running an Instrumental Variable regression is to counter for errors with omitted variables and errors-in-variables problem. The results of this regression give much better results, as the coefficient is again negative and the variable is significant at the five percent level.

VI. Conclusion

The purpose of this research was to attempt to test the theory that an increase in taxes on labor will increase the unemployment rate within an industrialized nation, and that an increase in labor taxes will ultimately decrease long-run growth within the economy. This paper tests this theory using two fixed effects regressions.

The results of the regressions in Tables 3 and 4 as well as the results found in Bentolila et al. (2000), Tables 5 and 6, support the theory that taxes are positively correlated with unemployment and negatively correlated with growth. However, while it is apparent that taxes do have a positive impact on unemployment, the fact that the results vary by country and even regions suggests that there are important factors not included in the models. This is also true for the effect of taxes on growth, as sensitivity testing does not hold as well for this regression.

To improve the models, a better analysis of determining what variables have been omitted should be included to give a better test of significance. Also, problems with incomplete data that occurred with the tax rates should be corrected to give more accurate results. Even with these possible errors, it is apparent with the empirical data found that the theory that taxes are positively correlated with unemployment and negatively correlated with growth holds.

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Tables

Table 1
Variable Rates by Country

Country/Variable Rate	1965-70	1971-75	1976-80	1981-85	1986-91	1991-95
Australia						
tax on labor	11.7	14.1	16.5	17.9	18.6	20.1
Unemployment	1.5	2.6	5.8	8.0	7.3	9.9
growth rate	3.1	1.4	2.1	1.9	1.3	2.1
Belgium						
tax on labor	30.5	36.4	41.7	45.3	48.0	47.3
Unemployment	2.2	2.8	7.2	12.4	10.5	11.6
growth rate	4.1	3.2	3.2	0.6	3.2	1.2
Canada						
tax on labor	17.1	22.0	22.6	25.0	28.7	31.9
Unemployment	4.3	6.0	7.7	10.5	8.4	10.6
growth rate	2.5	3.2	2.5	1.7	1.5	0.8
Finland						
tax on labor	20.7	28.1	30.9	31.1	34.0	36.0
Unemployment	2.4	2.2	5.6	5.2	4.3	13.4
growth rate	4.8	3.5	2.3	1.9	2.8	-1.7
France						
tax on labor	33.9	33.0	37.9	42.4	45.5	48.5
Unemployment	2.2	3.1	5.6	9.0	10.1	11.1
growth rate	4.4	2.6	2.8	1.3	2.8	0.6
Germany						
tax on labor	30.5	35.1	38.3	38.9	41.0	42.0
Unemployment	0.9	1.8	3.6	6.7	5.9	7.4
growth rate	3.2	1.8	3.4	0.9	3.0	1.5
Italy						
tax on labor	26.1	28.7	32.0	37.0	41.1	45.4
Unemployment	5.6	5.9	7.3	9.3	11.8	10.9
growth rate	5.1	2.2	4.0	1.4	2.9	1.0
Japan						
tax on labor	16.4	18.1	20.6	24.4	27.2	27.7
Unemployment	1.2	1.4	2.1	2.5	2.5	2.6
growth rate	9.8	3.0	3.3	2.3	4.5	1.1
Netherlands						
tax on labor	36.1	42.7	47.1	50.1	51.6	52.6
Unemployment	1.1	2.8	5.6	11.1	9.1	6.8
growth rate	4.0	1.7	1.9	0.2	2.7	1.3
Norway						
tax on labor	31.0	38.9	38.7	38.4	39.6	39.0
Unemployment	0.9	1.6	1.7	2.8	3.5	5.6
growth rate	3.4	4.2	3.7	2.7	1.4	3.4
Spain						
tax on labor	15.4	20.2	26.4	32.8	35.6	33.0
Unemployment	1.6	3.1	7.4	17.9	18.9	21.0
growth rate	5.4	4.4	0.7	0.8	4.2	1.1
Sweden						
tax on labor	34.3	38.9	47.2	48.1	51.5	50.1
Unemployment	1.7	2.3	2.1	3.4	2.1	7.5
growth rate	3.0	2.1	0.8	1.4	2.2	-0.1
UK						
tax on labor	22.6	24.7	26.7	27.1	25.9	24.4
Unemployment	1.8	2.7	5.1	10.8	8.9	9.3
growth rate	2.0	2.1	1.6	1.9	3.3	1.4
USA						
tax on labor	20.1	23.0	26.1	28.3	28.8	27.4
Unemployment	4.0	6.1	6.8	8.3	5.9	6.6
growth rate	2.8	1.8	2.7	2.5	2.1	1.6

*Numbers are in percentages

Table 2
List of Variables with sources and summary statistics.

Variable	Source	Mean	Std. Dev.	Min	Max
Growth Rate % Real GDP per capita	Heston et al. (2006)	2.44	1.51	-1.73	9.80
Unemployment Rate %	OECD Labour Statistics	6.09	4.21	0.91	20.96
Effective Tax on Labor	Bentolila et al. (2000)	32.53	10.30	11.70	52.60
Unemployment Rate [n-1]	Calculated in STATA	6.08	4.23	.906	20.96
Effective Tax on Labor [n-1]	Calculated in STATA	32.59	10.35	11.7	52.6

Notes: Summary above is based on data collected for 14 countries from years 1965-1995, and averaged to 5 year intervals. Total of 84 observations.

Table 3
Unemployment and Labor Taxes (1965-1995, five year averages)

Dep. Variable Estimation Specification	u FE	Coefficient	Standard Error	t-value	p-value	R-Squared
Labor Tax		0.527	0.051	10.36	<.001	0.742

Table 4
Growth % Real GDP per capita and Unemployment (1965-1995, five year averages)

Dep. Variable Estimation Specification	g FE	Coefficient	Standard Error	t-value	p-value	R-Squared
Unemployment		-0.21	0.042	-5.04	<.001	0.381

Table 5
Unemployment and Labor Taxes, Bentolila et al. (2000) (Base Paper Findings)

Dep. Variable Estimation Specification	u ols	Coefficient	Standard Error	t-value	Significance
Labor Tax					
Anglo		0.25	0.11	2.34	1% Level
Euro		0.54	0.06	8.71	1% Level
Nordic		0.11	0.16	0.68	>10% Level

Table Data from Bentolila et al. (2000)

Table 6
Growth % Real GDP per capita and Unemployment, Bentolila et al. (2000) (Base Paper Findings)

Dep. Variable Estimation Specification	g ols	Coefficient	Standard Error	t-value	Significance
Unemployment		-0.098	0.039	-2.513	1% Level

Table Data from Bentolila et al. (2000)

Table 7
Unemployment and Lagged Labor Taxes (1965-1995, five year averages)

Dep. Variable Estimation Specification	u FE	Coefficient	Standard Error	t-value	p-value	R-Squared
Labor Tax[n-1]		0.1289	0.055	2.36	.021	0.395

Table 8
Growth % Real GDP per capita and Lagged Unemployment (1965-1995, five year averages)

Dep. Variable Estimation Specification	g FE	Coefficient	Standard Error	t-value	p-value	R-Squared
Unemployment[n-1]		.07	0.043	1.64	.105	0.191

Table 9
Growth % Real GDP per capita and Labor Tax as an Instrumental Variable for Unemployment

Dep. Variable Estimation Specification	*g 2SLS*	Coefficient	Standard Error	t-value	p-value
IV Labor Taxes, Unemployment		-.47	0.200	-2.36	.021