Long-run growth, the minimum wage and other labor market institutions

Preliminary notes

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Abstract

This paper uses the recently created World Bank Development Research Group dataset to investigate the effects of labor market institutions on economic growth. Whereas usually estimates of growth regressions are based on cross-sectional variation the World Bank dataset is sufficient rich to apply panel data estimation techniques so that the estimated effects of labor market institutions are based on calendar time variation. We find a nonlinear relationship between minimum wage and growth. At low minimum wages an increase in the minimum wage stimulates economic growth. At higher minimum wages we find no effect on growth. We do not find a relationship between economic growth and labor market institutions related to union bargaining and social security. We find that the share of government employment has a negative effect on economic growth. but this effect is estimated on a limited number of observations.

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1 Introduction

How do labor market institutions and arrangements affect long term growth? Due to the absence of unified cross country data on labor market institutions the existing voluminous empirical literature on the determinants of growth has been largely silent on this issue. A recently created World Bank Development Research Group pooled cross section time series dataset (Rama and Artecona (2000)) opens new avenues of empirical investigation on this question. This paper makes a first step in this direction by introducing various institutional labor market variables into otherwise standard growth regressions of the Barro (1991, 1997) type.

In particular, the new data set makes it possible to empirically aboard questions like: How do socially minded labor market institutions like minimum wages, mandated benefits and job security and other structural features of labor markets as characterized by the extent of unionization and the share of the labor force employed in the public sector affect long term growth? There are two views regarding this question. One is that the more rigid are labor markets (higher minimum wages, higher mandated benefits, a higher degree of unionization and the larger the share of employment in the government sector) the lower the rate of growth (TO ADD REFERENCES). The other is that labor market institutions have large distributional effects but modest effects on efficiency and growth (Freeman (2000)).

The new labor market data set possesses both a cross sectional, as well as a time dimension, making it possible to base estimates on cross sectional, as well as on some limited degree of over time variation. More specifically the data set contains a maximum of seven, five year periods, for each country and anywhere between 70 and 120 countries depending on the precise combination of variables used. The seven 5 year-periods in the data set refer to 1960-64, 1965-69, 1970-74, 1975-79, 1980-84, 1985-89, and to 1990-94. But, since for many variables the number of observations per country is substantially smaller than seven our regressions are based on a smaller number of observations. This number is usually anywhere between one hundred and three hundred. Although limited, the added time dimension makes it possible to estimate the effects of various variables after controlling for country and for period specific effects on growth. One advantage of introducing fixed effects is that the danger of bias due to omitted country and period specific effects is thereby reduced.

The paper proceeds as follows. First, two benchmark panel growth regressions that exclude labor market variables are estimated. Alternative measures of labor market institutions are then added one by one to the benchmark regression and their significance is evaluated. Both linear as well as non linear effects are usually tried. The main results of the paper can be briefly summarized as follows. Except for the minimum wage which has a non linear impact on growth the effects of all other labor market institutional and structural variables on growth is, for the most part, insignificant. In particular the evidence suggests that, contrary to conventional wisdom, the minimum wage has a positive impact on growth at low levels of this variable and has no effect on growth at higher values of the minimum wage. This finding raises a number of deeper questions about the mechanism that may underlie the positive relation at low levels of the minimum wage.[1] Those questions lead to additional empirical tests which are presented in section 3 of the paper.

The paper is organized as follows. Section 2 presents benchmark growth regressions that include fixed country and time effects. Section 3 investigates the effect of the minimum wage on growth, discusses possible mechanisms for the non linearity of this effect and presents more direct tests of those mechanisms. Section 4 investigates the effects of the remaining labor market variables on growth. Those variables are the extent of unionization, the share of the labor force employed in the public sector, and the relative size of social security contributions. This is followed by concluding remarks.

2 A benchmark growth equation

We experimented with two basic benchmarks. The first includes, in addition to country and time fixed effect, (the log of) initial GDP at the beginning of each five years period ($ln(Y)$), initial investment at the beginning of each five years period (I) and the share of government in GDP (Cg). The second benchmark also includes the fraction of the population over 25 with at

[1] The finding for low levels of the minimum wage is consistent with the findings of Card and Krueger (1995) for the US. They find that following an increase in the minimum wage employment increased contrary to conventional economic wisdom.

least secondary education also at the beginning of each five years period ($Lsh25$).[2] As Temple (1999) stresses empirical work on growth has often been controversial. Cross-country regressions, the offspring of growth theory and econometrics, "are not greatly loved by either parent". An important reason for this lack of parental love is the fact that most of the literature is based on relating cross-sectional variation in growth rates to cross-sectional variation in other variables. We use the following general specifications:

$$g_{i,t} = \alpha_i + \alpha_t + \beta_1 \ln(Y_{i,t}) + \beta_2 I_{i,t} + \beta_3 Cg_{i,t} (+\beta_4 Lsh25) + \varepsilon_{i,t} \tag{1}$$

where g is the average growth rate over a five-year period, t indicates the period and i the country. Furthermore, the α_i and α_t are country-specific and time period-specific fixed effects and the β's represent parameters to estimate. Within each basic benchmark we experimented with five alternative specifications: 1. No fixed effects of any kind with estimation by ordinary least squares (OLS), 2. OLS on means, 3. Inclusion of random country effects, 4. Inclusion of fixed country fixed effects, 5. Inclusion of both country and time fixed effects.

The parameter estimates for the two basic sets of benchmark regressions are summarized in tables 1 and 2. Table 1 below shows the different estimation results for our benchmark regressions in case we do not include an educational variable. The main conclusion from this table is that all coefficients are affected by the estimation procedure used. In the case of OLS the coefficients of initial GDP per capita, initial investment rate and government consumption are all significantly different from zero. The initial GDP has a negative effect on growth, an effect that is often referred to as conditional convergence. The initial investment rate has a positive effect on economic growth while government consumption has a negative effect. From the OLS on means regressions we find that the effect of initial GDP does not differ significantly from zero. When we introduce random country effects the coefficient of initial GDP doubles, while the other coefficients are hardly affected. When we introduce fixed country effects the coefficient of initial GDP is about 8 times as large as in the OLS-estimation. The coefficients of

[2] The use of two basic benchmarks is due to the fact that there is some question about the reliability of the data that allows for over time variation in the fraction of individuals with secondary or high education (details appear in de la Fuente and Doménech (2000).

the investment rate and of government consumption are substantially reduced. Finally, when, in addition to the country fixed effects, we also introduce time period fixed effects the parameter estimates are hardly affected.

Table 1-[a)]

	OLS	Between effects[b)]	Random effects[c)]	Fixed effects[c)]	Fixed effects[d)]
$ln(Y)$	-0.592 (3.4)	-0.346 (1.4)	-1.29 (6.1)	-5.12 (7.8)	-5.84 (4.7)
I	0.073 (4.0)	0.074 (2.8)	0.065 (3.3)	0.041 (1.3)	0.039 (1.2)
Cg	-0.113 (5.1)	-0.069 (2.5)	-0.152 (7.9)	-0.101 (2.4)	-0.140 (2.4)
N	918				
countries	147				

[a)] absolute t-values in parentheses based on heteroskedastic-consistent standard errors; all coefficients should be multiplied by 0.01.

[b)] OLS on means

[c)] For countries

[d)] For countries and time periods

Table 2-[a)]

	OLS	Between effects[b)]	Random effects[c)]	Fixed effects[c)]	Fixed effects[d)]
$ln(Y)$	-0.806 (2.8)	-0.843 (2.3)	-127 (5.6)	-3.81 (5.6)	-3.58 (4.6)
I	0.088 (4.3)	0.110 (3.3)	0.080 (3.7)	0.046 (1.3)	0.037 (1.1)
Cg	-0.114 (5.3)	-0.074 (2.5)	-0.141 (6.9)	-0.093 (2.6)	-0.086 (2.3)
$Lsh25$	0.0069 (0.9)	0.019 (1.1)	0.0061 (0.5)	0.0013 (0.1)	0.041 (1.7)
N	689				
countries	106				

[a)] absolute t-values in parentheses based on heteroskedastic-consistent standard errors; all coefficients should be multiplied by 0.01.

[b)] OLS on means

[c)] For countries

[d)] For countries and time periods

Table 2 gives the parameter estimates when we include the share of individuals with a secondary or higher education in the population of age 25 and older. The results are similar to those of table 1. The coefficient of the educational variable is not significantly different from zero in the first three columns of the table. But when both country and time period fixed effects are introduced the coefficient of the educational variable becomes significantly different from zero (at 10%).

In the absence of controls for country and for time specific effects there is a danger that the coefficients of the variables we are focussing on will be biased. The last estimation procedure is, therefore, our preferred one. The country fixed effects account for time invariant country specific differences, which are related to country specific differences in economic efficiency, that are not necessarily captured by existing panel regressors. The time period fixed effects account for general country invariant changes in economic growth over time. In our preferred specification the initial investment rate does not affect growth significantly. Apparently, the initial investment rate is correlated with unobserved time invariant differences between countries.[3]

Section 3 adds the minimum wage to the benchmark regressions from the last columns of tables 1 and 2 and section 4 adds the remaining labor market institutional variables (LMIV) one at a time to each of the two benchmark equations. Both sections examine the sign and the significance of the impact of the appropriate LMIV on growth. The presentation of each of those experiments is preceded by a brief discussion of the result to be expected in each case according to conventional economic wisdom.

3 The effect of the minimum wage on growth

Conventional economic wisdom is that the higher the minimum wage, the lower are the level of employment and the efficiency of the economic system. Although, as a theoretical matter, a permanently lower level of employment need not be associated with lower growth the presumption of conventional economic wisdom is that it is.[4] Since the potential distortionary effects of the

[3] Our use of panel data and of country fixed effects excludes the use of variables that do not have time variation as regressors, such as financial depth, democracy and the rule of law index.

[4] For example in an Ak model of endogenous growth in which there are constant returns to scale to total capital a permanently lower level of employment may decrease the rate of growth (to be checked and elaborated).

minimum wage are higher the higher the minimum wage in comparison to free markets wages we use the ratio between the minimum wage and average labor cost per worker in manufacturing as a proxy for the detrimental economic effects of the minimum wage. This variable, labelled mw, is added, in table 3, to the two benchmark equations from tables 1 in table 2.

Table 3-[a)]

	(1)	(2)	(3)	(4)	(5)	(6)
$ln(Y)$	-5.35 (1.9)	-9.36 (3.5)	-2.93 (2.2)	-3.78 (2.8)	-5.53 (2.1)	-3.10 (2.4)
I	-0.059 (0.7)	-0.012 (0.1)	0.019 (0.3)	0.034 (0.5)	-0.056 (0.7)	0.020 (0.3)
Cg	0.046 (0.2)	0.106 (0.5)	-0.012 (0.1)	0.037 (0.2)	0.019 (0.1)	-0.033 (0.2)
$Lsh25$	-	-0.023 (0.6)	-	-0.016 (0.4)	-	-
Mw	2.07 (0.9)	0.140 (0.1)	-	-	12.39 (2.0)	-
Mw^2	-	-	-	-	-9.80 (2.1)	-
Mwe	-	-	2.29 (1.1)	1.32 (0.6)	-	12.10 (2.2)
Mwe^2	-	-	-	-	-	-9.43 (2.2)
$\overline{R}^2$	0.399	0.394	0.434	0.393	0.413	0.443
N	206	179	259	232	206	259
countries	69	60	69	60	69	69

[a)] absolute t-values in parentheses based on heteroskedastic-consistent standard errors; all coefficients should be multiplied by 0.01. All estimates are with fixed effects for time periods and countries.

In many cases information on the minimum wage is available only for a subset of the seven periods in the sample. In most cases the periods for which data on the minimum wage is available are the latest ones. It seems reasonable to presume that a country in which the data indicates that there is no minimum wage for **all** the periods for which there are observations on this variable did not have a minimum wage in all other periods as well. In order to utilize more of the observations on other variables we also created an expanded version of Mw that expands the range of values of this variables by relying on the above presumption. This variable, labelled, Mwe, is added to the two benchmark equations in the third and fourth columns of table 3.

The basic result from the addition of the two minimum wage variables to the two benchmarks is that the effect of the minimum wage on growth is positive but usually not significant. The last two columns of table 3 experiment with a quadratic version of the minimum wage variables. In each case both Mw and Mwe as well as second powers of those variables are entered as regressors. In both cases the coefficients of the linear terms are positive and significant and those of the quadratic terms, negative and significant suggesting the presence of non linearities in the effect of the minimum wage on growth.

3.1 Spline regressions for the effect of the minimum wage

The significance of the quadratic specification raises the possibility that the size and sign of the effect of the minimum wage on growth differs between high and between low levels of this variable. To test for this possibility we reestimated the two benchmark regressions with spline regressions. Those regressions allow the, linear, slopes of Mw and of Mwe to differ depending on whether the minimum wage variable is below or above a certain threshold. We specified the spline part of the regressions for Mw (and in the same way for Mwe) as follows:

$$f(Mw_{i,t}) = \gamma_1 d_{i,t}\ (Mw_{i,t} - \delta) + \gamma_1 \delta + \gamma_2 (1 - d_{i,t})(Mw_{i,t} - \delta) \tag{2}$$

where δ is the threshold value of the minimum wage, d is a dummy with value 1 if the minimum wage is below the threshold value, γ_1 is the minimum wage effect below the threshold and γ_2 is the minimum wage effect above the threshold.

We experimented with alternative threshold values δ and finally chose those that maximize the value of the adjusted R-squares. The resulting "best" spline regressions for Mw and Mwe are summarized in the first two columns of table 4.

In both cases the threshold is at 0.20. The main finding is that the minimum wage has a positive and significant effect on growth below the threshold and no effect above the threshold. A Chow test of the null hypothesis that the minimum wage has no effect above the threshold does not reject this hypothesis at conventional levels of significance. Columns three and four of table 4 report a reestimation of the first two columns subject to the restriction that the

coefficient γ_2 is equal to zero.

Table 4-[a)]

	(1)− Mw	(2)− Mwe	(3)− Mw	(4)− Mwe
$ln(Y)$	-5.17 (2.1)	-2.90 (2.3)	-5.11 (2.2)	-2.90 (2.3)
I	-0.090 (1.2)	0.004 (0.1)	-0.092 (1.3)	0.004 (0.1)
Cg	0.063 (0.3)	-0.002 (0.1)	0.062 (0.3)	-0.002 (0.0)
γ_1	37.95 (2.4)	33.07 (2.5)	37.47 (2.4)	32.96 (2.5)
γ_2	-0.84 (0.7)	-0.10 (0.1)	0 (-)	0 (-)
$\overline{R}^2$	0.435	0.452	0.439	0.455
N	206	259	206	259
countries	69			

[a)] absolute t-values in parentheses based on heteroskedastic-consistent standard errors; all coefficients should be multiplied by 0.01. All estimates are with fixed effects for time periods and countries.

In table 5 we show for the specification with the Mwe-variable the effect of subsequently removing variables with insignificant coefficients. In the regression with$Lsh25$ as explanatory variable the Mwe-variable has a coefficient that is positive and different from zero at a 10% level of significance. The coefficients of the initial investment rate, government consumption and the educational variable are not significantly different from zero. When we drop $Lsh25$ the coefficient of the minimum wage become significantly different from zero at a 1% level.[5] This remains the case if we also remove the initial investment rate and government consumption from the estimated equation. The last column of table 5 shows that only the coefficients of initial GDP and the minimum wage spline are significantly different from zero. As indicated before, the threshold is at a value of the minimum wage of 0.20.[6]

Table 5-[a)]

[5] Note that column (2) of table 5 is the identical to column (4) of table 4.

[6] Recall that our minimum wage variable is defined as the minimum wage as a fraction of the labor costs per worker in manufacturing. Therefore the minimum wage as a fraction of the average wage will be higher than 0.20.

	(1)	(2)	(3)	(4)
$ln(Y)$	-3.52 (2.6)	-2.90 (2.3)	-2.89 (2.3)	-2.85 (2.2)
I	0.016 (0.2)	0.004 (0.1)	0.004 (0.1)	-
Cg	0.032 (0.2)	-0.002 (0.0)	-	-
$Lsh25$	-0.025 (0.7)	-	-	-
Mwe (γ_1)	26.11 (1.9)	32.96 (2.5)	32.96 (2.5)	33.11 (2.6)
$\overline{R}^2$	0.408	0.455	0.458	0.461
N	232	259		
countries	60	69		

[a)] absolute t-values in parentheses based on heteroskedastic-consistent standard errors; all coefficients should be multiplied by 0.01. All estimates are with fixed effects for time periods and countries. The threshold of the spline is 0.20, γ_2 is imposed to be equal to zero.

3.2 Possible mechanisms for the positive effect of the minimum wage on growth at low levels of the minimum wage and some related tests

There are at least two economic mechanisms that could account for the positive effect of the minimum wage on growth at sufficiently low levels of this variable. The first operates via the effect of the minimum wage on employment and is related to monopsony power on the part of employers as suggested by Card and Krueger (1995). The second operates via the effect of the minimum wage on investment in human capital by credit constrained low income individuals (Perotti (1993,1996)). We refer to the first mechanism as the "monopsony hypothesis" and to the second one as the "credit rationing - human capital" hypothesis. In what follows we elaborate on those two hypotheses.

3.2.1 A direct test of the monopsony hypothesis

The type of workers that are most likely to be affected by minimum wage legislation are normally those with no human capital at the low end of the distribution of wages. The monopsony hypothesis relies on the view that, in the presence of local monopsony power with respect to such workers, employers face increasing supply curves of labor.[7] Hence, in the absence of minimum wage legislation, it pays them to set the wage rate, and therefore the level of employment, below their competitive levels. When moderate minimum wage legislation is introduced employers face, within some range, an effective infinitely elastic supply curve of labor, which induces them to employ more labor. As a consequence an increase in the minimum wage at low levels of this variable raise the level of employment. At least along the transition path the increase in employment raises the rate of growth of the economy. It may even raise it permanently in the presence of externalities in the productivity of total capital (human and physical). Such externalities transform micro based production functions with decreasing returns to scale into a constant, or even increasing, returns to scale production function at the aggregate level (perhaps illustrate by means of an Ak or other model of endogenous growth).

A direct implication of the monopsony hypothesis is that, for sufficiently low levels of the minimum wage, the level of employment should be positively related to the minimum wage. We test this hypothesis by regressing the employment ratio (the level of employment divided by the labor force - *empr*) using a spline on the minimum wage (see equation (2)) and controlling for country and for time fixed effects (check whether those are the only controls). The spline is used to in order to detect whether there is evidence of a difference between the effects of the minimum wage on the employment ratio at high and at low levels of the minimum wage. The 0.17 threshold is, again, determined by goodness of fit. The parameter estimates for the spline function are shown in the first column of table 6. The impact of the minimum wage at low levels of this variable is significantly positive and its impact at high levels positive but insignificant. The second column of table 6 shows the estimation results if the parameter γ_2 is imposed to be equal to zero. We cannot reject the null-hypothesis that indeed above the threshold the minimum wage has no effect. This evidence provides some support for the view

[7] Frequently this monopsony power is due to the fact that the number of employers within a given area is small and for social, family or other reasons workers prefer not to relocate.

that the minimum wage has a positive effect on employment at sufficiently low levels of the minimum wage and that at higher levels this effect vanishes.

Table 6-[a)]

	(1)	(2)
γ_1	62.89 (2.1)	67.29 (2.3)
γ_2	10.86 (1.4)	0 (-)
$\overline{R}^2$	0.824	0.822
N	198	
countries	61	

[a)] absolute t-values in parentheses based on heteroskedastic-consistent standard errors; all coefficients should be multiplied by 0.01. All estimates are with fixed effects for time periods and countries. The threshold of the spline is 0.17.

3.2.2 A direct test of the credit rationing - human capital hypothesis

The credit rationing - human capital hypothesis conjectures that individuals at the low end of the distribution of wages are credit constrained. As a consequence they cannot invest in human capital as much as they would have invested in it in the absence of those constraints. By increasing the income of credit constrained individuals minimum wage legislation raises the total level of investment in human capital, and through it, the rate of growth. An immediate implication of this hypothesis is that, at sufficiently low levels of the minimum wage, there should be a positive association between the fraction of educated individuals and the level of the minimum wage.

We test for this implication by regressing the fraction of individuals over 15 with no education ($Lu15$), the fraction of individuals over 15 with primary education ($Lp15$) and the fraction of individuals over 25 with secondary or higher education ($Lsh25$) on Mwe. Two sets of regressions are run, both with the level of GNP per capita as a control. In the first set we control only for time fixed effects and in the second set also for country fixed effects. The results are summarized in table 7. They indicate that the level of GNP per capita has a negative and significant impact on the fraction of individuals with no education at all. The minimum wage

also has a negative and significant impact on the fraction of individuals with no education at all, but only in the absence of country specific effects (elaborate). For $Lp15$ we find no significant coefficients at all, while for $Lsh25$ we find positive effects for the initial GDP and the minimum wage, but both effect disappear after including country fixed effects.

Table 7-[a)]

	(1)	(2)	(3)	(4)	(5)	(6)
	Lu15		Lp15		Lsh25	
$ln(Y)$	-21.35 (18.6)	-6.69 (3.0)	0.85 (0.6)	5.11 (1.1)	20.3 (18.8)	-0.18 (0.1)
Mwe	-9.19 (2.7)	5.00 (0.9)	3.10 (0.7)	-7.65 (0.6)	7.28 (1.9)	6.20 (0.9)
country f.e.	no	yes	no	yes	no	yes
$\overline{R}^2$	0.644	0.947	0.001	0.698	0.631	0.912
N	236					
countries	60					

[a)] absolute t-values in parentheses based on heteroskedastic-consistent standard errors. All estimates include time period fixed effects.

The results in table 5 also provide some indirect support for the credit rationing - human capital hypothesis. In particular, the fact that the minimum wage has a positive and significant impact on growth in the absence of the educational variable, whereas it is insignificant in its presence suggest that at least part of the effect of mwe on growth operates by changing the stock of human capital. In conclusion there appears to be some support for the credit rationing - human capital hypothesis but it is not overwhelming.[8]

4 The effect of other labor market variables on growth

This section tests for possible effects of several other labor market institutional variables on long term growth. This is done by adding a measure of the share of employment in the public

[8] As indicated before there is some question about the reliability of the education data, which could explain our poor results.

sector, a measure of trade union density, and a measure of the burden of social security taxes to the basic benchmark regressions from section 2. Theoretical considerations suggest that the size of government may have non linear effects on growth. When government is very small infrastructure and other public goods may be insufficient for vigorous growth whereas, when government is too large, growth may be stifled by an oversized government. This suggests that the relation between growth and the share of employment in the public sector may be non linear (Barro (ReStud)).

Table 8-[a)]

	(1)	(2)	(3)	(4)	(5)	(6)
$ln(Y)$	-11.42 (2.5)	-7.82 (1.5)	-6.99 (4.4)	-7.57 (5.1)	-14.3 (4.6)	-14.9 (5.3)
I	-0.21 (0.9)	-0.21 (0.9)	0.094 (1.5)	0.102 (1.7)	0.051 (0.4)	0.125 (1.1)
Cg	0.36 (0.8)	0.24 (0.7)	-0.11 (.12)	-0.09 (1.3)	-0.18 (0.9)	-0.13 (0.7)
$Lsh25$	-0.002 (0.0)	-	0.015 (0.5)	-	-0.036 (0.4)	-
GT	-79.8 (1.7)	-86.3 (2.3)	-	-	-	-
TU	-	-	-0.004 (0.1)	-0.014 (0.5)	-	-
BF	-	-	-	-	-0.005 (0.1)	0.018 (0.3)
$\overline{R}^2$	0.588	0.596	0.546	0.521	0.597	0.598
N	127	141	319	364	174	200
countries	92	101	86	101	83	99

[a)] absolute t-values in parentheses based on heteroskedastic-consistent standard errors; all coefficients should be multiplied by 0.01. All estimates are with fixed effects for time periods and countries.

This section adds each of the following three variables, one at a time, to the two basic benchmark regressions: The share of employment in the public sector (Gt), union density (the fraction of the labor force that is unionized: Tu), and social security contributions as a percent of salaries (Bf). The results, for linear specifications of those variables are summarized in table 8. Except for minor exceptions the general conclusion is that none of those variables has a significant effect on growth The minor exception is the Gt-variable. As shown in column (2)

of table 8 the coefficient related to this variable is significantly negative. However this results is based on a limited number of observations (and degrees of freedom). None of quadratic specifications of the regressors has a significant effect (not shown).

5 Concluding remarks

The main findings of the investigations done so far is that, except for the minimum wage, none of the labor market institutional variables has a significant impact on growth.[9]

The minimum wage does have a significant impact on growth within some range, but in a direction opposite to that of conventional economic wisdom. In particular, for values of the minimum wage as a percentage of the wage rate in manufacturing below some threshold, the minimum wage exerts a **positive** effect on growth. There is no evidence of any association between growth and the minimum wage above the threshold. There are two possible, not mutually exclusive, explanations for the first finding. One, due to Card and Krueger (1995) is that the minimum wage, by offsetting the monopsony power of some employers, raises employment and growth. The other, due to Perotti (1993) and others is that, low income individuals are prevented from investing in human capital because of credit constraints. An increase in the minimum wage, at low levels of this variable, raises investment in human capital and growth. Preliminary direct tests of those two channels provide some support for both of those hypotheses.

[9] The negative effect of government employment on growth is based on a limited number of observations.

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7 Appendix: Details about the dataset

Our dataset is based on a combination of existing datasets. From Heston and Summers (1991) we use:

1. g = annual growth of real GDP per capita averaged over a period of 5 years

2. $ln(Y)$ = natural logarithm of real GDP per capita (in constant dollars using Chain index - 1985 international prices in PWT5) in the first year of the period

3. I = investment share of GDP in the first year of the period (percentage based on 1985 international prices)

4. Cg = fiscal policy, share of government consumption in GDP averaged over a period of 5 years (current international prices)

From Barro and Lee (2000) we use:

5. $Lsh25$ = share of the population aged 25 years and older with secondary or higher education, first year of the period

6. $Lu15$ = share of the population aged 15 years and older with no education, first year of the period

7. $Lp15$ = share of the population aged 15 years and older with primary education, first year of the period

From Rama and Artecona (2000) we use:

8. Mw = minimum wage in current US dollars per year as a fraction of the labor cost per worker in manufacturing in current US dollars per year

9. Mwe = Mw, except for the countries where there are only zero's available. Then we assume that for every period for this country the minimum wage is zero

10. Tu = total trade union membership, in percent of the labor force

11. Bf = social security contributions in percent of salaries

12. Gt = employment in the general government, in thousands of persons as a fraction of the total labor force in thousands of persons.