DEPARTMENT OF ECONOMICS

MINIMUM WAGE EFFECTS ON WAGES, EMPLOYMENT AND PRICES: IMPLICATIONS FOR POVERTY ALLEVIATION IN BRAZIL

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Minimum Wage Effects on Wages, Employment and Prices: Implications for Poverty Alleviation in Brazil

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Abstract

This paper presents new evidence on the effects of the minimum wage using Brazilian monthly household and firm panel data between 1982 and 2000. By examining the effects on wages, employment and prices together we are able to provide an explanation for the small employment effects prevalent in the literature. Our principal finding is that increasing the minimum wage raises wages and prices with small adverse employment effects. This suggests a general wage-price inflationary spiral, where persistent inflation offsets some of the wage gains. The main policy implication deriving from these results is that the potential of the minimum wage to help the poor is bigger under low inflation. Under high inflation, the resulting wage-price spiral makes the minimum wage increase – as well as its antipoverty policy potential – short lived. In this case, the wage effects are volatile and the permanent scars are lower employment and higher inflation in Brazil.

Keywords: minimum wages, employment, labor costs, cost shock, Brazil.

JEL code: J38.

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1 Introduction

The minimum wage helps the poor if it increases wages and does not destroy jobs or cause inflation. It is well established in the literature that minimum wage increases compress the wage distribution (Brown, 1999). As a result, the policy debate hinges on whether employers respond to the associated higher labor costs by reducing profits, reducing employment, or raising prices. Firstly, the empirical evidence on the profit effects is very limited, but standard theory suggests that low wage firms operate in competitive markets with zero profits (Card and Krueger, 1995). Therefore, changes in profits are hard to detect. Secondly, evidence of negative employment effects, predicted by the standard theoretical model, conflicts with evidence of non-negative effects in the literature. Although there is yet no consensus, small employment effects have been frequently reported (Freeman, 1996; Brown, 1999; Dickens et al, 1999). Thirdly, with employment and profits not significantly affected, higher prices are the obvious alternative response to minimum wage increases. This is consistent with the standard theory prediction that an industry wide cost shock is passed on to prices. Nonetheless, there is very little empirical evidence on price effects in the literature (Brown, 1999; Lemos, 2004a).

The main contribution of this paper is to present new evidence on all three of these minimum wage effects together. By examining wages, employment and price effects together, we are able to provide an explanation for the small employment effects prevalent in the literature. This has potentially important policy implications, and yet empirical analysis has been unable to shed sufficient light at it. The price effect evidence we provided is, in turn, another contribution of this paper to a very under researched area.

A further contribution of this paper is to provide evidence on what Brown (1999, p. 2157), in his recent comprehensive survey, reckons is "the largest and most important gap in the minimum wage literature". We estimate anticipated and lagged wages, employment and price responses to minimum wage increases. This is another aspect of minimum wage effects that has important policy implications, as we demonstrate in this paper.

The data used is monthly Brazilian household and firm panel data from 1982 to 2000. As the non-US literature is relatively scarce, an additional contribution of this paper is to extend the current understanding on the effects of the minimum wage in developing countries. The limited available empirical evidence for Brazil suggests that the minimum wage compresses the wage distribution and has a small adverse employment effect (Fajnzylber, 2001; Carneiro, 2002; Neumark, Cunningham and Siga, 2005).

Our principal finding is that increasing the minimum wage raises wages and prices with small adverse employment effects in Brazil. This suggests a general wage-price inflationary spiral, where persistent inflation offsets some of the wage gains. Minimum wage indexation and reinforced inflationary expectations were a phenomenon first noticed by Gramlich (1976) and Cox and Oaxaca (1981), and more recently discussed by Card and Krueger (1995) and Freeman (1996). If this is the context, it is perhaps not so surprising that adverse employment effects are small. The main policy implication deriving from these results is that the potential of the minimum wage to help the poor is bigger under low inflation. Under high inflation, the resulting wage-price spiral makes the minimum wage increase – as well as its antipoverty policy potential – short lived. In this case, the wage effects are volatile and the permanent scars are lower employment and higher inflation.

Another important finding is that the poorest only benefit from higher wages in the month of the minimum wage increase. However, they start suffering from higher unemployment and inflation one month before. Furthermore, they are faced with higher inflation for the following three months, by which time some of their wages gains are offset. Under this scenario, a better antipoverty policy is perhaps to lower inflation. A stable growing economy will aid the poor perhaps more than quickly eroded minimum wage increases. Other options include structural reforms and direct cash transfers (Harrison, Rutherford, Tarr and Gurgel, 2004; Jayaraman and Lanjouw, 2004; Bourguignon, Ferreira and Leite, 2003). The remainder of this paper is organized as follows. Section 2 describes the institutional background of the minimum wage in Brazil. Section 3 describes the data. Section 4 discusses the empirical equations and identification issues. Section 5 presents the results and Section 6 concludes.

2 Minimum Wage Institutional Background

The minimum wage was introduced as a social policy in Brazil under the 1940's populist government. After a steep decline during the 1940s, the real minimum wage was adjusted and reached its peak during the boom of the 1950s. It then decreased as a result of the subsequent recession. With the installation of the dictatorship in the mid 1960s, the real minimum wage was systematically devalued because the government associated the then high inflation with wage adjustments. Even after the end of the military regime in the mid 1980s, the minimum wage continued to be used as an anti-inflationary policy throughout the 1980s and most of the 1990s. During this time, minimum wage increases were subject to the rules of five different stabilization plans. The increases were large and frequent, but

were quickly eroded by the subsequent inflation. Since the mid 1990s, under reasonably stable inflation, the minimum wage has again been used as a social policy. Since 1984, the minimum wage in Brazil has been the same for all individuals. There have been no differentiated minimum wage rates for different regions, specific demographic groups or labor market categories. Coverage is full, although accommodation and food costs can be deducted from the wage.

3 Data

The data we use is the PME (Monthly Employment Survey), the PIM (Monthly Industrial Survey), the Consumers Price index, and the minimum wage. All data is available from the IBGE (Instituto Brasileiro de Geografia e Estatistica).

The PME is a rotating household panel, similar to the US Current Population Survey, which has been collected since 1982. The IBGE interviews on average 30.000 households per month in the six main Brazilian metropolitan regions (Salvador, Recife, Belo Horizonte, Rio de Janeiro, Sao Paulo and Porto Alegre). Households are interviewed for four consecutive months, not interviewed for eight months, and then interviewed again for four additional months, before being dropped from the sample. In the PME the panels are refreshed every two years, rather than every year, as is the case in the CPS. The PIM is a rotating firm panel, similar to the US Production Index, which has been collected since 1968. The IBGE interviews on average 6.000 firms per month in most of the Brazilian metropolitan regions including the six regions above. Firms are assigned a random number when they are first selected for the sample. They are then interviewed monthly for a maximum of four years, but they may be dropped from the sample before then, depending on the initial random number assigned. The sample is refreshed once a year.

We aggregate the PME and PIM across regions and months; the average number of observations per region-month cell is respectively 13,000 and 600. The cross-region variation in the data is considerable and we exploit this in order to identify the minimum wage effect in the econometric models below. In Table 1 we show statistics for the poorest region (Recife) and the richest region (Sao Paulo) in the sample. Wages, prices and employment are lower in Recife, where the fraction of workers earning the minimum wage is larger. In Figure 1 we show that the patterns of the log nominal minimum wage and average log wages in differences are remarkably synchronized in the aggregate over time, with a correlation of 0.77. In Figure 2 we show that the correlation between the log nominal minimum wage and

the employment rate in differences is much weaker, 0.09. Finally, in Figure 3 we show that the patterns of the log nominal minimum wage and log prices in differences are also fairly synchronized, with a correlation of 0.55.

4 Empirical Equation Specifications

4.1 Wage Effects

A standard empirical wage equation in the literature (Brown, 1999; Dickens, Machin and Manning, 1999) is delivered by a labor market equilibrium reduced form equation:

$$\Delta \ln W_{rt} = \alpha^w + \sum_{l=-k}^{L} \beta_l^w \Delta \ln MW_{t-l} + \gamma^w \pi_{rt-1} + \delta^w \Delta u_{rt-1} + \lambda^w X_{rt} + f_r^w + f_t^w + \epsilon_{rt}^w \quad (1)$$

where W_{rt} is nominal average wages in region r and month t, $r = 1, ..., 6$, and $t = 1, ..., 214$; MW_t is nominal minimum wage; π_{rt-1} is past inflation; u_{rt-1} is the past unemployment rate; f_r^w and f_t^w are region and time fixed effects; X_{rt} are labor supply shifters; and ϵ_{rt}^w is the error term. The supply shifters we include are the proportion of the total population who are younger than 10 years old, between 10 and 24 years of age, women, illiterates, retirees, students, in urban areas, with completed basic (8 years) education and high school (11 years) education; the average years of schooling in the total population; the proportion of the working population holding two jobs, in the informal, public, construction and metallurgy sectors. We include lags and leads of the minimum wage (indexed by $l = -k, ..., L$) to allow the effect of the minimum wage on average wages to be complete. The number of lags and leads is an empirical matter and is discussed in Section 5. A GLS correction is performed in all models in the paper to correct for heteroskedasticity arising from aggregation and to account for the relative importance of each region. Also, standard errors are corrected for serial correlation across and within regions.[1]

We re-estimate Equation (1) taking W_{rt} to mean, in turn, the 10^{th}, 20^{th}, 30^{th}, 40^{th}, 50^{th}, 60^{th}, 70^{th}, 80^{th} and 90^{th} deciles of the wage distribution. This gives an overall picture of the effect of the minimum wage in the entire wage distribution (Dickens, Machin and Manning, 1999). Because the nominal minimum wage does not vary across regions, we cannot use

[1] The GLS estimates were robust to GMM estimation using lags of the minimum wage variable as well as a number of political variables as instruments (Lemos, 2004d). This suggests that any endogeneity bias arising from the simultaneous determination of "fraction at" and employment is not too severe.

it as our shock variable. Instead, we use the "fraction of workers at" the minimum wage (plus or minus 0.02%)[2]. "Fraction at" replaces the nominal minimum wage in Equations (1), (2) and (3), as is now standard in the literature (Dolado, Kramarz, Machin, Manning and Margolis, 1996; Card and Krueger, 1995; Brown, 1999; Lemos, 2004b).

4.2 Employment Effects

The counterpart empirical employment equation (Brown, 1999; Dickens, Machin and Manning, 1999) is:

$$\Delta \ln N_{rt} = \alpha^n + \sum_{l=-k}^{L} \beta_l^n \Delta \ln MW_{t-l} + \gamma^n \pi_{rt-1} + \lambda^n X_{rt} + f_r^n + f_t^n + \epsilon_{rt}^n \qquad (2)$$

where N_{rt} is taken in turn to mean total average hours worked in the labor force (includes zeros for those unemployed) T, average hours for those working (hours per worker) H, and the employment rate E. As Equation (2) is separately estimated using each of these dependent variables, the estimates in the T equation equal the sum of the estimates in the H and E equations, i.e. $\beta_T^n = \beta_H^n + \beta_E^n$. This makes it possible to decompose the total effect of a minimum wage increase on employment into a hours effect and a jobs effect.

4.3 Price Effects

A standard empirical price equation – largely used in the literature on the price response to industry wide shocks (Poterba, 1996; Goldberg and Knetter, 1997) – is the inverse of the profit maximizing condition under imperfect competition. This equation expresses prices as a markup over costs:

$$\Delta \ln P_{rt} = \alpha^p + \sum_{l=-k}^{L} \beta_l^p \Delta \ln MW_{t-1} + \xi^p \Delta \ln E_{rt} + \delta^p \Delta \ln A_{rt} + f_r^p + f_t^p + \epsilon_{rt}^p \qquad (3)$$

where P_{rt} is prices; E_{it} is the cost of industrial power consumption, and A_{it} is productivity. We define productivity as the total industrial output divided by total number of workers

[2] The bounds account for measurement error introduced by rounding approximations. All estimates in the paper were robust to defining "fraction affected" with and without bounds (the correlation between the two is 0.91).

directly employed in production in the metallurgic industry.[3] The cost of industrial power consumption is a proxy for costs of inputs other than labor.

5 Results

In Table 2 we show generalized least squares β estimates. Row 1 shows evidence of anticipated effects of the minimum wage on average wages, but no evidence of lagged effects. The coefficient of the first lead of the shock variable, one month before the increase, is positive and significant. The contemporaneous coefficient is also positive and robust. The coefficients of further leads and lags are not statistically different from zero. This suggests that on average, wages adjustment in response to minimum wage increases happens in the month of the increase and in the month before, and that no lagged adjustment follows the increase. However, the estimate of the minimum wage effect on average wages is a summary measure of wage effects throughout the wage distribution. A closer look at the estimates of the minimum wage effect on each decile of the wage distribution reveals a more intricate picture. For example, while there is evidence of lagged, but not anticipated effects at the very bottom of the distribution; conversely, there is evidence of anticipated but not lagged effects at the top half of the distribution. This suggests that the higher paid workers have greater bargaining power and revise their labor contracts in anticipation of the minimum wage increase.

Row 2 shows that the contemporaneous coefficient is positive and robust at the 10^{th} decile of the distribution. It is three times larger than the coefficient for the average wages (row 1). This suggests that the wages of the poorest increase three times more than average wages do. However, the coefficient of the second lag of the shock variable, two months after the increase, is negative and significant. It is half the size of the contemporaneous coefficient. This suggests that after two months, the poorest lose half of the wage gains they had in the month of the increase. Neumark, Schweitzer and Wascher (2004) also find evidence of strongly negative lagged minimum wage effects for the US. They argue that employers take advantage of inflation in the following periods to partly undo the wage gains resulting from minimum wage increases. Row 3 shows a similar picture for the 20^{th} decile.

The results for the 30^{th} decile in row 4 show that the contemporaneous coefficient is positive and significant. It is about as large as the coefficient for the average wages (row 1).

[3] Data for all industries was not available, and thus the productivity in the metallurgic industry is taken as a proxy to overall productivity.

The coefficient of the first lead is positive and significant and the coefficient of the second lag is negative and significant. As both are roughly of the same magnitude, whatever those at the 30^{th} decile gain one month before the increase, they loose two months after the increase. In the remainder of the distribution, anticipated gains are roughly about the same magnitude as the effect on average wages (row 1). Further leads and lags are not statistically different from zero. This suggests that most labor contracts – especially those of higher paid workers – are revised in anticipation of the minimum wage increase.

Concurrently, there is a decrease in total hours worked in the labor force. Row 11 shows a negative and significant effect on total hours worked one month before the increase. Further leads and lags are not statistically different from zero. Row 13 shows that the coefficient of the first lead of the employment rate is not statistically different from zero. This suggests that while revising labor contracts in anticipation of the minimum wage increase, employers and employees negotiate not only wage increases, but also the number of hours worked. It also suggests that employers do not fire employees at this stage. Instead they first increase prices to offset some of the higher labor costs, as shown by the significant and positive coefficient of prices in row 14. However, in the month of the increase and in the subsequent month, not only do employers continue to increase prices, but they also start adjusting employment through firing employees. The coefficient of the employment rate is negative and significant in the month of the increase and the following month, while the coefficient of prices is significant and positive for four consecutive months. The price coefficient is about three quarters of the average wage coefficient (row 1) in the month before and in the month of the increase. The prices coefficient remains positive and significant in the two following months, even though wage effects become negative and often insignificant. This suggests more stickiness in price than in wages following a minimum wage increase. These results are consistent with those of Aaronson (2001), who included lags and leads of the minimum wage in his price equation specifications. He found that in the US most of the price response occurs in the two months period immediately after a minimum wage increase.

The last column of Table 2 shows long run effects. The wage effects are not statistically different from zero, suggesting no wage gains associated with the minimum wage increase in the long run. The long run total hours worked effect is significant, although month-by-month this effect is mostly insignificantly different from zero. The price effect is positive and significant, consistent with month-by-month persistent increases. This suggests that firms' responses to higher labor costs resulting from minimum wage increases is a mix of

lower employment and higher prices.

In summary, the anticipated wage gains are roughly about the same magnitude throughout the wage distribution (except for the very poor) one month before the increase. The price effects are about half the size and there is no evidence of disemployment effects in that month (although there is some evidence of reduction in hours worked). This suggests a general wage-price spiral, where nominal variables are affected but not real ones. In the month of the increase, the poorest benefit relatively more than other workers, as there is no spillover effects above the 30^{th} percentile. However, the inflation effects are now larger and persistent, and some small disemployment effects start to take place. One month after the increase, inflation persists and some of the wage gains are undone for the poor, with some further small disemployment effects. Finally, two months after the increase inflation starts to ease, employment effects disappear and those at the bottom half of the distribution have wage losses. In the long run, the wage effects are volatile and the permanent scars are lower employment and higher inflation.

We calibrate the estimates above to ensure comparability with those in the literature (Brown, 1999; Card and Krueger, 1995). Following Card and Krueger (1995), the "fraction at" estimates are multiplied by 0.6, which is the approximate elasticity of the "fraction at" with respect to the nominal minimum wage (Lemos, 2004c). A 10% increase in the minimum wage decreases employment by 0.2% and increases prices by 0.8% in the long run. These results are in line with previous evidence for Brazil, where wage effects are large and employment effects are small (Fajnzylber, 2001; Carneiro, 2002; Neumark, Cunningham and Siga, 2005). Our results compare with respectively 1% (mainly in the food industry) employment decrease and 0.2% to 0.4% economy wide price increases for the US (Brown, 1999; Sellekaerts, 1981; MacCurdy and McIntyre, 2001). Thus, a smaller employment effect in Brazil is consistent with a larger price effect. However, these are economy wide estimates that might have diluted more negative employment effects in low wage industries.

6 Conclusions

This paper fills a gap in the literature by providing an overall picture on the effects of the minimum wage on wages, employment and prices using monthly Brazilian monthly household and firm panel between 1982 and 2000. The evidence we provide indicates that increasing the minimum wage raises wages throughout the wage distribution in the month before the increase, although it only raises the wages of the poorest in the month of the

increase. However, persistent inflation effects offset some of the wage gains in the following months. This suggests a general wage-price spiral, where nominal variables are affected but not real ones. It is then perhaps not so surprising that adverse employment effects are small. Small employment effects – frequently reported in the recent literature – are sensible when relatively large price effects are uncovered. In the long run, the wage effects are volatile and the permanent scars are lower employment and higher inflation.

A 10% increase in the minimum wage decreases employment by 0.2% and increases prices by 0.8% after five months of adjustment, when wage gains have already vanished. These results compare with respectively 1% (mainly in the food industry) employment decrease and 0.2% to 0.4% economy wide price increases for the US. One potential criticism here is that aggregate estimates might have diluted more negative employment effects in low wage industries. Estimates for such industries are not available for Brazil. Thus, a fruitful avenue for future research is to estimate wages, employment and price effects for industries overpopulated by minimum wage workers in Brazil and other developing countries.

The main policy implication deriving from these results is that the potential of the minimum wage to help the poor is bigger under low inflation. Under high inflation, the resulting wage-price spiral makes the minimum wage increase – as well as its antipoverty policy potential – short lived. In this case, the wage effects are volatile and the permanent scars are lower employment and higher inflation in Brazil. The poorest only benefit from higher wages in the month of the minimum wage increase. However, they start suffering from higher unemployment and inflation one month before the increase. Furthermore, they are faced with higher inflation for the following three months, by which time some of their wages gains are offset. Under this scenario, a better antipoverty policy is perhaps to lower inflation. A stable growing economy will aid the poor perhaps more than quickly eroded minimum wage increases.

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Table 1 - DESCRIPTIVE STATISTICS ACROSS REGIONS AND SECTOI

Variables	**Recife** (poor region)	**Sao Paulo** (rich region)
Average hours worked in the labor force	18.56	34.26
Hours worked per worker	38.61	41.31
Employment rate	44.9%	46.3%
"Fraction (of workers) at" the minimum wage	15.1%	4.0%
Log price index	-9.01	-9.13
Log real minimum wage	4.95	5.09
Log 25th percentile real earnings distribution	5.12	5.70
Log 50th percentile real earnings distribution	5.61	6.18
Log 75th percentile real earnings distribution	6.23	6.76
Log average real earnings distribution	5.72	6.26
Log standard deviation real earnings distribution	0.87	0.85
Log price of industrial power consumption	7.93	9.30
Log of average productivity in the metallurgic industry	0.14	0.21
Percentage of Population which is:		
Aged 0 to 14 years old	0.18	0.15
Aged 15 to 24 years old	0.27	0.25
Aged 25 to 64 years old	0.47	0.53
Aged over 65 years old	0.07	0.07
Women	0.45	0.43
Students	0.31	0.22
Enrolled in schooling	0.38	0.31
Iiterates	0.86	0.95
Elementary education (8 years of schooling)	0.43	0.38
Secondary education (11 years of schooling)	0.14	0.14
Graduates	0.08	0.11
Retired	0.13	0.11
Urban	0.93	0.97
Percentage of Workers in the:		
Metallurgic industry	0.07	0.19
Building construction	0.03	0.04
Commerce	0.09	0.09
Services	0.26	0.29
Public sector	0.07	0.05
Informal sector	0.23	0.36
Sample size	1507171	3292027

Table 2 - EFFECT OF THE MINIMUM WAGE ON WAGES, EMPLOYMENT AND PRICES

	2 months before		1 mont before		mont of the increase		one month after		2 months after		total	
Dependent Variable	**coefficient**	standard error	**coefficient**	standard error	**coefficient**	standard error	**coefficient**	standard error	**coefficient**	standard error	**coefficient**	standard error
average wage	**0.02**	0.17	**0.39**	0.18	**0.51**	0.19	**-0.07**	0.18	**-0.24**	0.17	**0.59**	0.60
10th wage distribution decile	**-0.42**	0.25	**0.09**	0.25	**1.60**	0.26	**-0.02**	0.25	**-0.82**	0.25	**0.43**	0.74
20th wage distribution decile	**-0.38**	0.27	**0.33**	0.27	**1.28**	0.27	**-0.59**	0.27	**-0.84**	0.27	**-0.20**	0.80
30th wage distribution decile	**-0.23**	0.22	**0.47**	0.23	**0.49**	0.23	**-0.38**	0.23	**-0.51**	0.23	**-0.16**	0.69
40th wage distribution decile	**-0.06**	0.19	**0.40**	0.19	**0.26**	0.20	**-0.13**	0.20	**-0.48**	0.19	**-0.02**	0.61
50th wage distribution decile	**-0.04**	0.17	**0.31**	0.18	**0.20**	0.18	**-0.12**	0.18	**-0.30**	0.17	**0.04**	0.56
60th wage distribution decile	**0.15**	0.17	**0.34**	0.18	**-0.03**	0.18	**-0.02**	0.18	**-0.30**	0.17	**0.14**	0.55
70th wage distribution decile	**0.11**	0.16	**0.39**	0.18	**0.16**	0.18	**-0.14**	0.18	**-0.11**	0.17	**0.42**	0.57
80th wage distribution decile	**0.12**	0.17	**0.42**	0.18	**-0.10**	0.18	**-0.02**	0.18	**-0.21**	0.17	**0.21**	0.56
90th wage distribution decile	**0.28**	0.17	**0.40**	0.18	**-0.02**	0.19	**-0.04**	0.19	**-0.21**	0.18	**0.42**	0.59
total hours worked	**-0.04**	0.05	**-0.10**	0.05	**-0.03**	0.05	**-0.02**	0.05	**-0.07**	0.05	**-0.26**	0.13
hours worked per worker	**-0.04**	0.05	**-0.09**	0.05	**-0.01**	0.05	**0.00**	0.05	**-0.08**	0.05	**-0.22**	0.13
employment rate	**0.00**	0.01	**-0.01**	0.01	**-0.02**	0.01	**-0.02**	0.01	**0.01**	0.01	**-0.05**	0.03
prices	**0.10**	0.09	**0.28**	0.12	**0.38**	0.13	**0.32**	0.12	**0.17**	0.09	**1.26**	0.45

(a) The dependent variable is, in turn, the log of various deciles of the wage distribution, (average) total hours worked for the labour force, hours worked per worker, the employment rate, and logs of prices. The hours worked per worker estimate plus the employment rate estimate add to the total hours worked estimate.

(b) These are the GLS estimates of the shock variable "fraction at" in Equations (1) to (3). The weights are the square root of the inverse of the sample size. Standard errors are White-corrected and serial correlation corrected across and within regions.

(c) Labour supply shifters are included as controls in the wages and employment equations, namely, the proportion of the total population younger than 10 years old, between 10 and 24 years of age, women, illiterates, retirees, students, in urban areas, with completed basic and high school education; the average years of schooling in the total population; the proportion of the working population corresponding to workers holding two jobs, workers in the informal, public, construction and metallurgy sectors. A measure of productivity and a measure of other inputs' prices is included in the price equation.

(d) To reflect a 10% increase in the minimum wage, the estimates and standard errors need to be multiplied by 0.6, which is the approximate elasticity of the minimum wage with respect to “fraction at”.

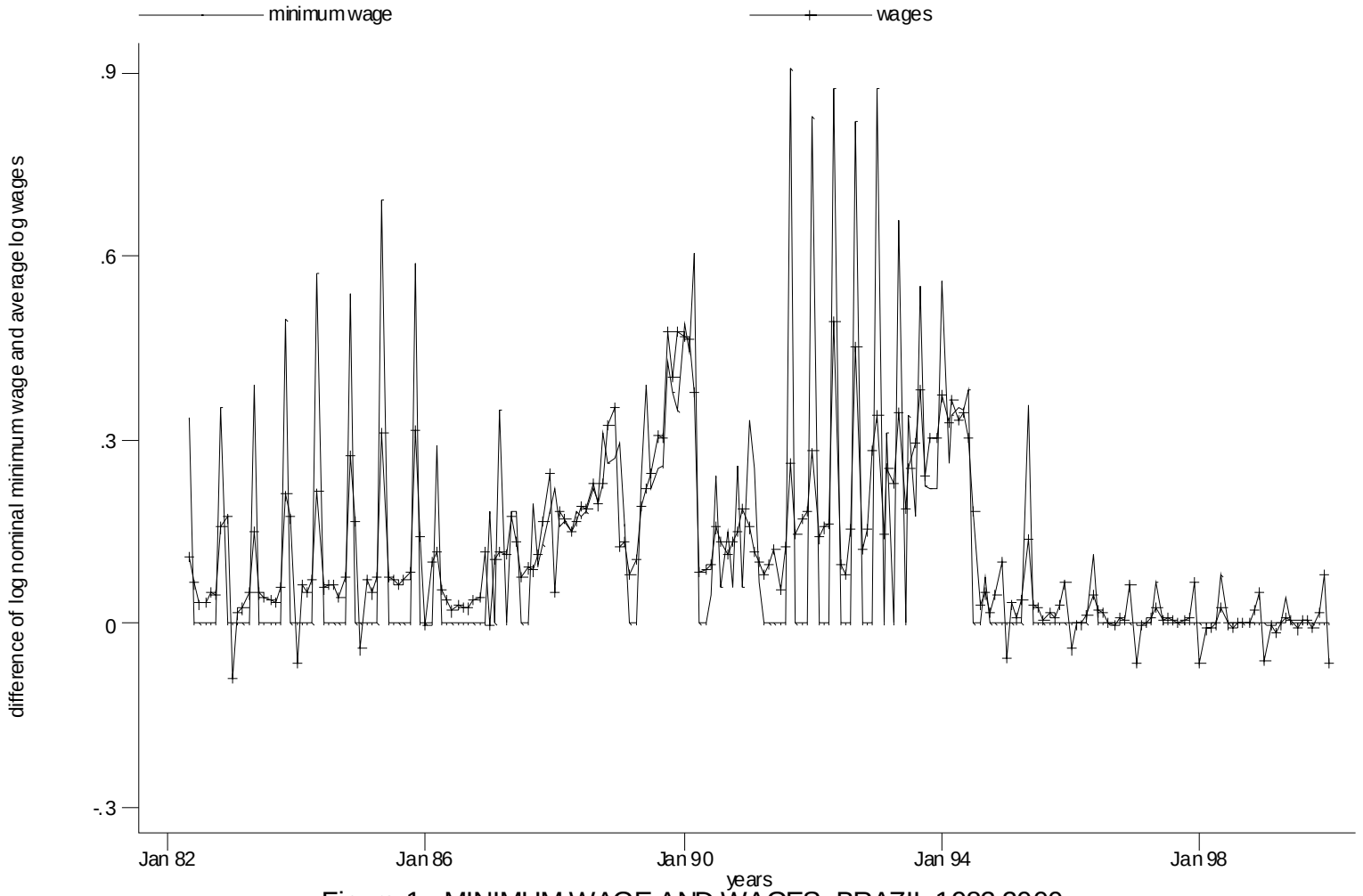

Figure 1 - MINIMUM WAGE AND WAGES, BRAZIL 1982-2000

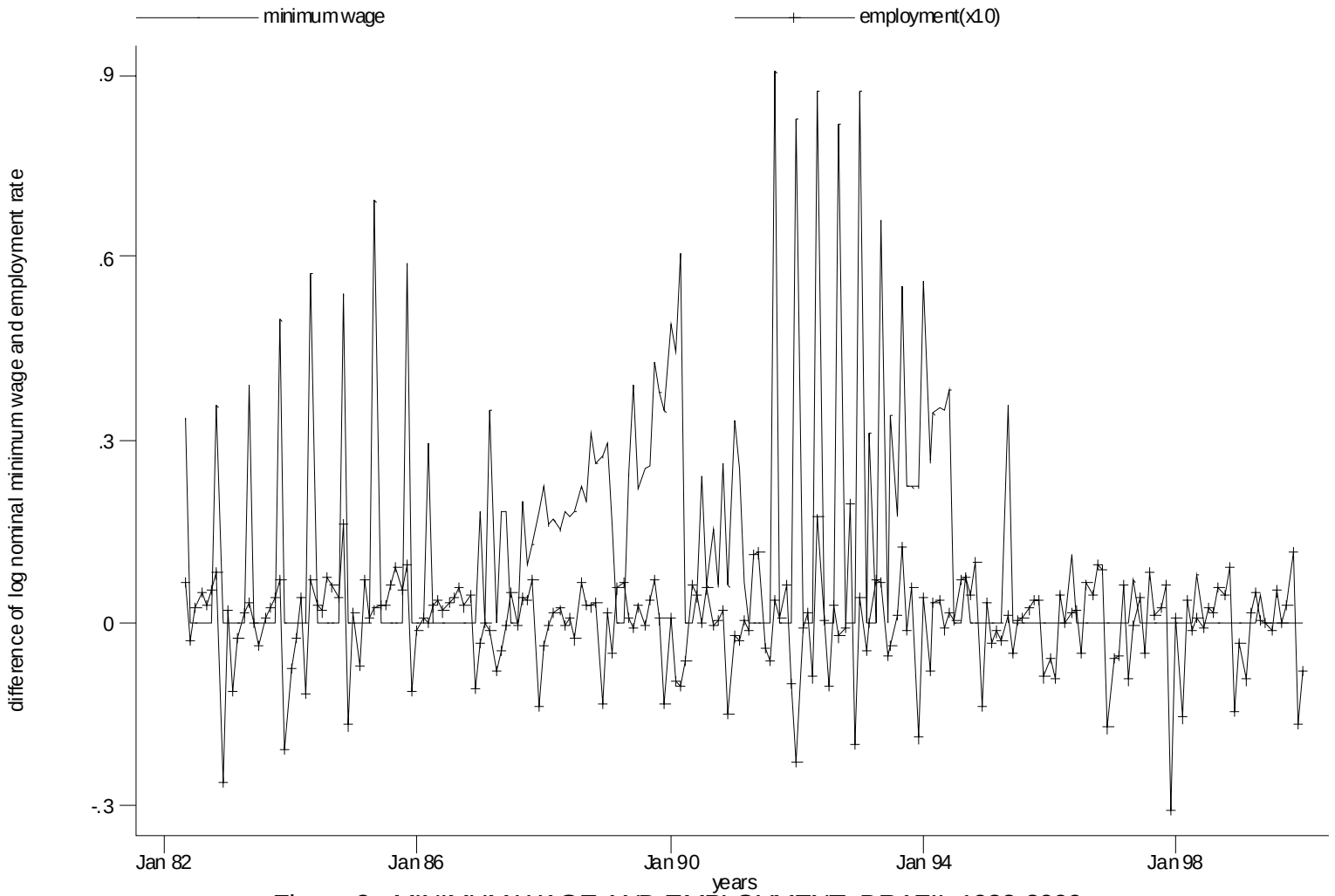

Figure 2 - MINIMUM WAGE AND EMPLOYMENT, BRAZIL 1982-2000

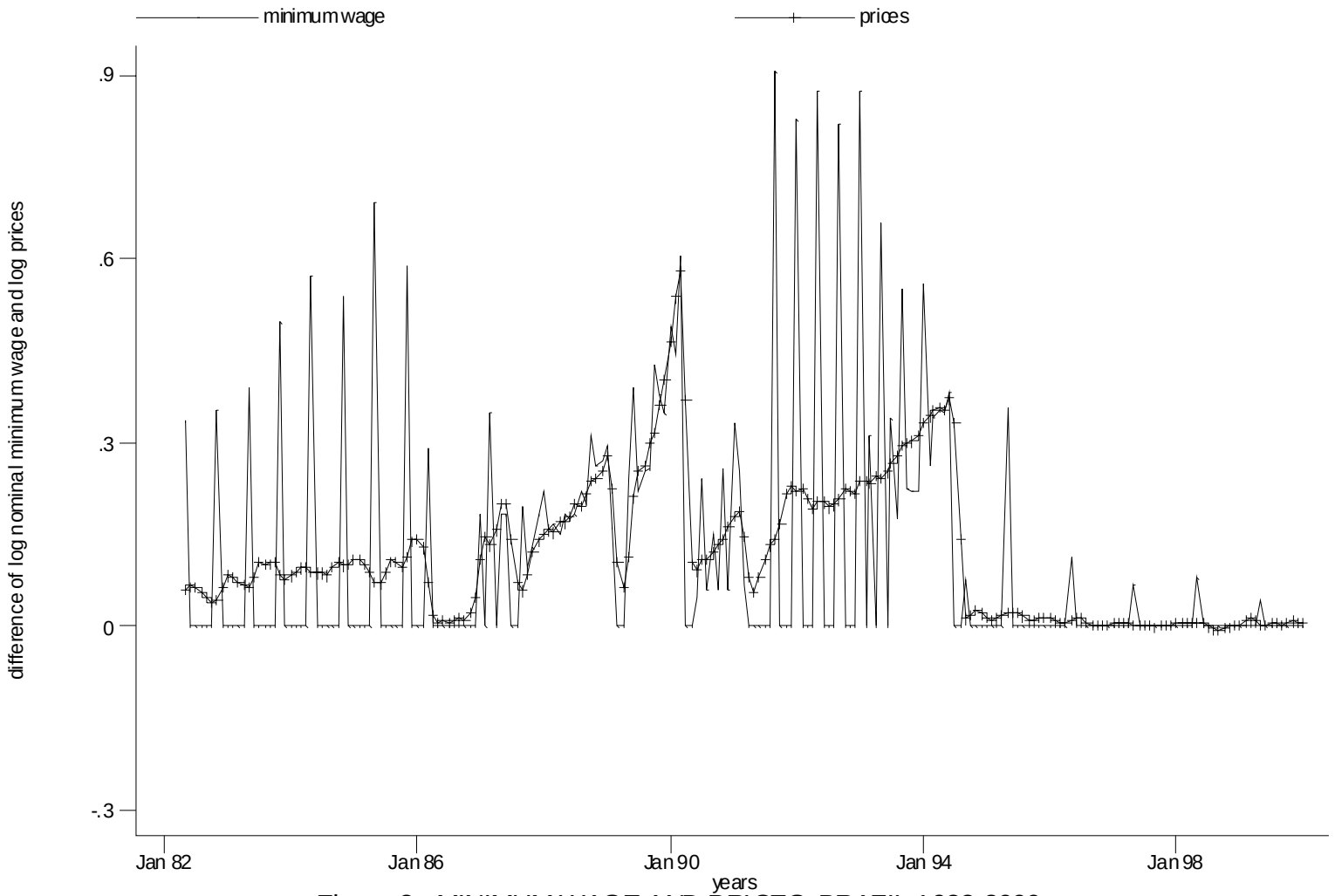

Figure 3 - MINIMUM WAGE AND PRICES, BRAZIL 1982-2000