The Phillips Curve and Minimum Wage Rates in LDC's:

The Brazilian Experience

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I. Introduction

Macedo (1977) and Morley (1982) have argued that LDC's labour supply schedules are not linear, but highly elastic at low wage levels and increasingly rigid as the wage increases. The condition for the equilibrium intersection to move from the elastic to the rigid zone is that labour demand should grow consistently faster than population. This, together with high GDP growth rates, seems an accurate description of Brazilian developmens in the late 1960's and 1970's. In this fast growing environment, stagnant real levels of the government-determined minimum wage rate would not affect average real earnings. Unfortunately, no definitive empirical test of this proposition has been offered, and alternative hypotheses have been advanced (Taylor, et al., 1980; *Bacha,* 1982). Here, we use a model introduced by McCallum (1974) and previously applied by Holden and Peel (1979) and Hojman (1983) to estimate a Phillips curve, and transform this model to explain real wage changes as a function of excess labour demand, expected inflation, and the minimum wage rate. The conclusions seem to confirm Macedo's and Morley's views and further, the minimum wage coefficient appears to be always negative (both when assumed constant and when assumed time-dependent), though never statistically significant.

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for other exogenous influences such as capital stock and technical progress, then:

$$(1) \quad w_t = a_1 + b_1 \ln(W/P)_{t-1} + c_1 \hat{p}_t + d_1 T,$$

$$b_1 < 0 \qquad c_1 > 0$$

To assess the impact of the minimum wage rate (MIN/P), Equation (1) can be solved for ln (W/P), and ln (MIN/P) can be introduced as an additional right-hand variable.

$$(2) \quad \ln (W/P)_{t-1} = a + b T + c w_t + d \hat{p}_t + e \ln(MIN/P)_{t-1},$$

$$c < 0, \qquad d > 0$$

If coefficient e is assumed to be time-dependent, so that the influence of the minimum rate on the average wage declines gradually over time (e = E/T):

$$(3) \quad \ln(W/P)_{t-1} = a + b T + c w_t + d \hat{p}_t + E \ln(MIN/P)_{t-1}/(T-1)$$

III. Partial adjustment

A more general model is obtained by introducing the twice lagged left-hand variable on the right-hand side, and expressing the regressors in first differences D, $D\hat{p}_t = \hat{P}_t - \hat{P}_{t-1}$

$$(4) \quad \ln(W/P)_{t-1} = A \ln(W/P)_{t-2} - b + c Dw_t + d D\hat{p}_t + e D\ln(MIN/P)_{t-1}, \quad 0 < A < 1$$

Equations (2) and (3) are special cases of the above, for which A = 1. A special version of Equation (4) where A is constrained to be equal to unity can be obtained by lagging Equation (2) a fur-

jected at the usual significance levels (this is consistent with an absence of money illusion). According to this equation, the equilibrium wage for $\hat{p}_t = 0$ fell slightly from 312 to 310 during the estimation period. The actual real wage rose from 241 to 297 (all values in Cruzeiros per month at 1970 prices). Since, despite its increasing during the period, the actual real wage stayed below equilibrium, a dramatic increase in formal sector employment was possible.

V. The real wage equation

The best estimates for Equation (2) are:

Naive expectations

(IV, AR1 ; SER: 0.0651 ; DW: 1.607 ; Rho: 0.706(5.010))

$$\ln(W/P)_{t-1} = \underset{(0.337)}{0.1399} + \underset{(0.999)}{0.00402}\ T - \underset{(2.998)}{0.00381}\ w_t + \underset{(1.916)}{0.00279}\ \hat{p}_t + \underset{(1.901)}{0.1917}\ \ln (MIN/P)_{t-2}$$

Rational expectations

(IV, AR1 ; SER: 0.0594 ; DW: 1.609 ; Rho: 0.678(4.564))

$$\ln(W/P)_{t-1} = \underset{(0.820)}{0.3014} + \underset{(1.291)}{0.00444}\ T - \underset{(3.483)}{0.00388}\ w_t + \underset{(1.989)}{0.00287}\ \hat{p}_t + \underset{(1.680)}{0.1525}\ \ln (MIN/P)_{t-2}$$

According to the above estimates of Equation (2), the best regressor is the rate of money wage increases (which represents structural labour market forces). Both expected inflation and the minimum wage rate are statistically significant only at the ten percent level. There are no substantive differences between the

first two right-hand variables play a significant role, but the latter does not, thus confirming Macedo's and Morley's views on the irrelevance of minimum rates. However, the fact that equilibrium wages stagnated despite fast GDP growth possibly reflects both a very high rate of urban population growth, and a capital bias in the industrialization process.

Table 1

ESTIMATED COEFFICIENTS AND t STATISTICS OF THE REAL WAGE EQUATION (EQUATION (4)), 1952-1977

$$\ln(W/P)_{t-1} = A\ln(W/P)_{t-2} - b + cDw_t + dD\hat{p}_t + eD\ln(MIN/P)_{t-1}$$

Coefficient	Eq.(4.1)	Ea.(4.2)	Eq.(4.3)	Eq.(4.4)	Eq.(4.5)
A	0.5473	0.6285	0.6382	0.6369	0.6419
	(4.605)	(3.417)	(4.727)	(4.755)	(4.869)
-b	0.4550	0.3830	0.3682	0.3743	0.3646
	(3.708)	(2.062)	(2.680)	(2.760)	(2.726)
c	-0.00332	-0.00305	-0.00364	-0.00382	-0.00364
	(10.00)	(5.166)	(9.640)	(9.638)	(10.41)
d	0.00213 *	0.00039**	0.00256*	0.00257*	0.00255*
	(4.214)	(0.327)	(3.346)	(3.312)	(3.392)
e	-0.0183	-0.0513	-0.0088***	-0.0476	
	(0.759)	(1.163)	(0.0883)	(1.424)	
Estimation method	AR1	IV,AR1	IV,AR1	IV,AR1	IV,AR1
SER	0.0337	0.0478	0.0357	0.0363	0.0349
$\bar{R}^2$	0.881				
DW	1.399	1.827	1.636	1.929	1.637
Rho	0.811	0.661	0.723	0.708	0.717
t for Rho	(6.604)	(3.998)	(4,833)	(4.535)	(4.870)
Durbin's h	1.92	1.27	1.28	0.25	1.25

* Naive expectations
** Rational expectations
*** Time-dependent coefficient (see Equation (3))

zil, Oxford, Oxford University Press, 1980.

World Bank, *Brazil: Human Resources Special Report,* 1979.