Capital Market Integration and Wages

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Motivation

The impact of trade on wages occupies a salient space in the collective imagination of the economics profession.

Stolper-Samuleson Theorem has inspired a wide body of literature on the extent to which trade induces factor price equalization.

Evidence is mixed.

Trade with developing countries seen as a modes facor behind decline in relative wages of low-skilled workers in developed countries.

In the case of workers in developing countries, the evidence actually runs contrary to the theory. Trade liberalization during the 1980s and 1990s actually increased wage inequality in the developing world (Goldberg and Pavcnik, 2007).

Motivation

While many studies examine the impact of cross-border flows of goods and workers on relative wages, the literature pays far less attention to the impact of cross-border financial flows on the absolute level of wages.

Both critics and apologists for capital account liberalization have ignored the labor market.

This is surprising for at least three reasons.

Motivation

Trade in capital has salient theoretical implications for real wages just as the movement of goods and people across borders do.

1. If capital is scarce and labor abundant, opening up to free trade in capital should reduce the rental rate and increase the real wage.

2. Examining the absolute level of wages provides information about the impact of opening up on the distribution of income between capital and labor that is just as important as the information that studies of wage inequality provide about the distribution of labor income between high and low-skilled workers.

3. In the late 1980s developing countries all over the world began easing restrictions on capital inflows of all kinds, giving economists a series of before-and-after experiments with which to study the impact of factor flows on factor rewards.

   Two decades later, we still have no systematic evidence about the impact of this sea-change in policy on the average level of wages in the developing world.

   This paper provides the first systematic attempt to fill that gap.

Question

What happens to the growth rate of real wages (and productivity) in developing countries after they remove restrictions on capital inflows?

Figure 1. The Growth Rate of Real Wages Rises in the Aftermath of Capital Account Liberalizations
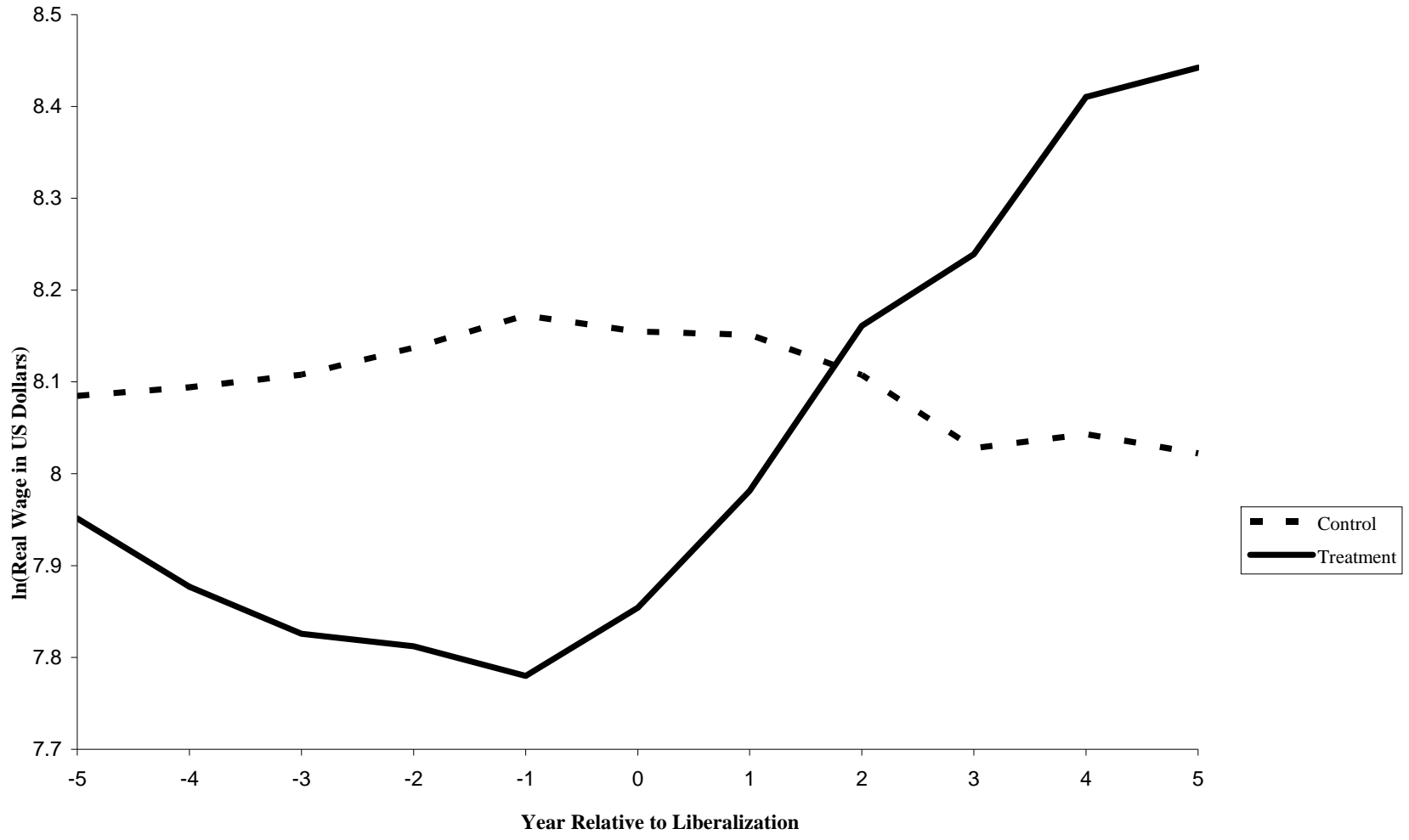
An open economy interpretation of the Solow growth model provides the cleanest qualitative explanation of the new facts we uncover.

Opening up to capital inflows reduces the rental rate in developing countries, and firms respond by increasing their rate of investment.

For a given growth rate of the labor force and total factor productivity, a higher rate of investment increases the ratio of capital per effective worker, driving up the marginal product of labor, and in turn, the market-clearing wage.

Figure 2. The Growth Rate of Productivity Rises in the Aftermath of Capital Account Liberalizations
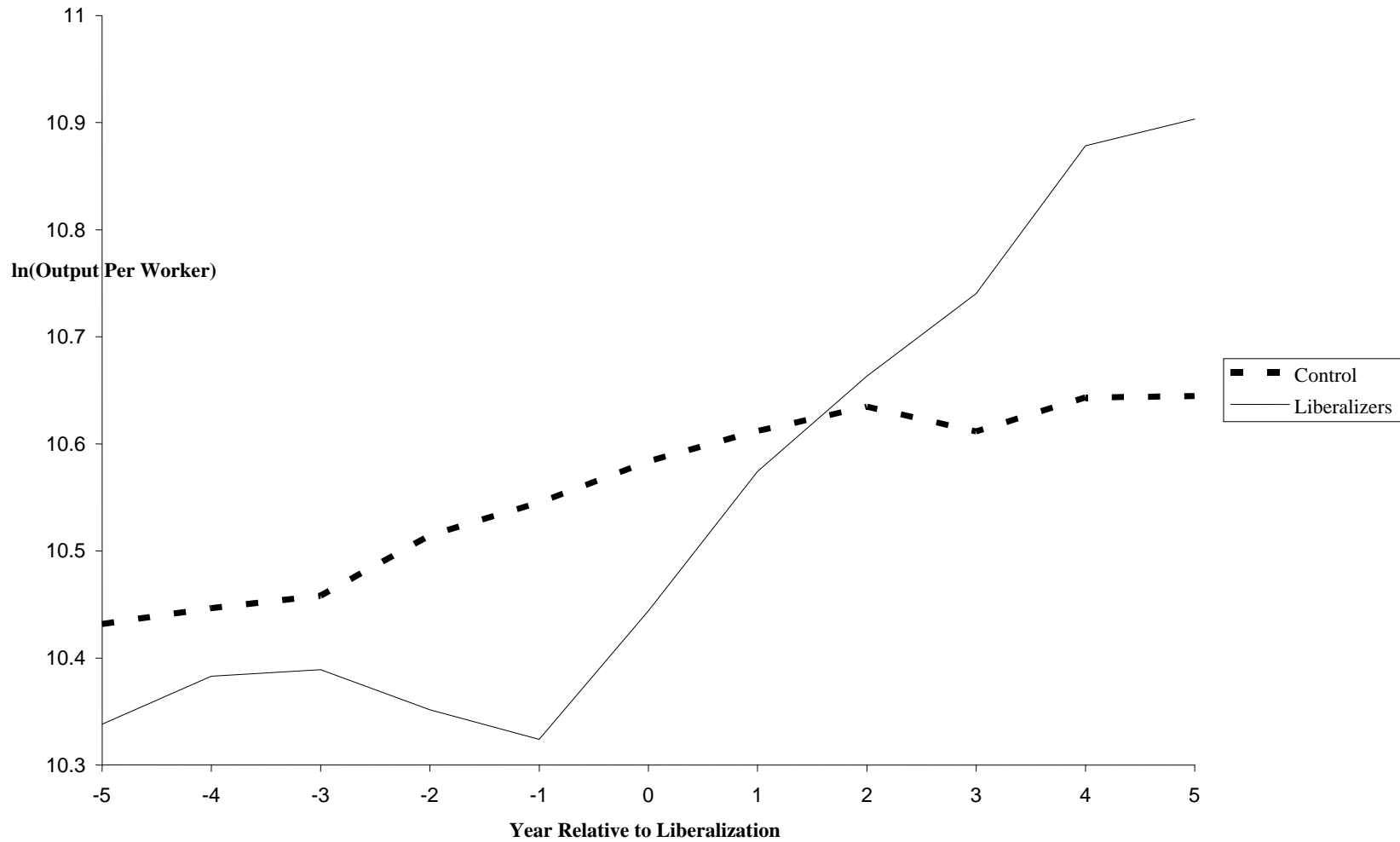
Predictions About the Impact of Liberalization on Wages

Liberalization makes capital less scarce in developing countries

Before liberalization: $f'(k_{s.state}) = r + \delta$

After liberalization: $f'(k^*_{s.state}) = r^* + \delta$

Predictions About the Impact of Liberalization on Wages

$$w = A[f(k) - kf'(k)]$$

$$\frac{d}{dt}(\ln(w)) = \frac{\dot{w}}{w} = \frac{\dot{A}}{A} - \frac{kf''(k)\dot{k}}{[f(k) - kf'(k)]}$$

$$\frac{\dot{w}}{w} = \frac{\dot{A}}{A} + \frac{1}{\sigma} \bullet \frac{f'(k)k}{f(k)} \bullet \frac{\dot{k}}{k}$$

Figure 3. Hypothetical Impact of Liberalization on the Cost of Capital, Investment and the Real Wage.

Panel A: The Cost of Capital

Interest Rate

r

r^*

t_o

t

Panel B: Ratio of Capital to Effective Labor

$ln(k)$

$\ln(k^*_{s.state})$

$ln(k_{s.state})$

t_o

t

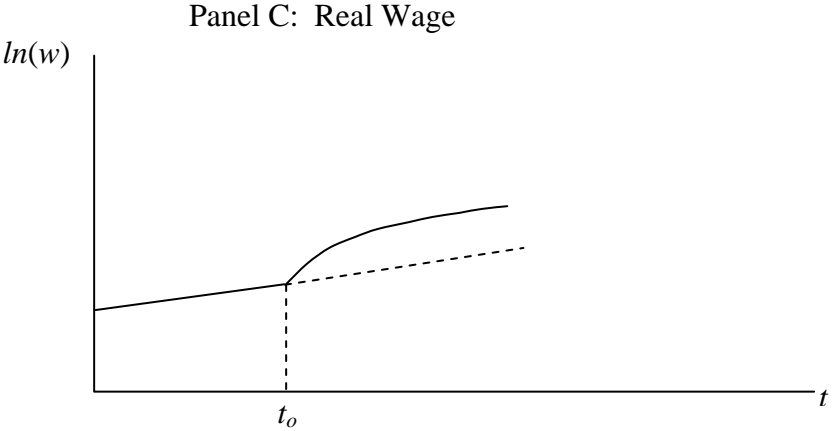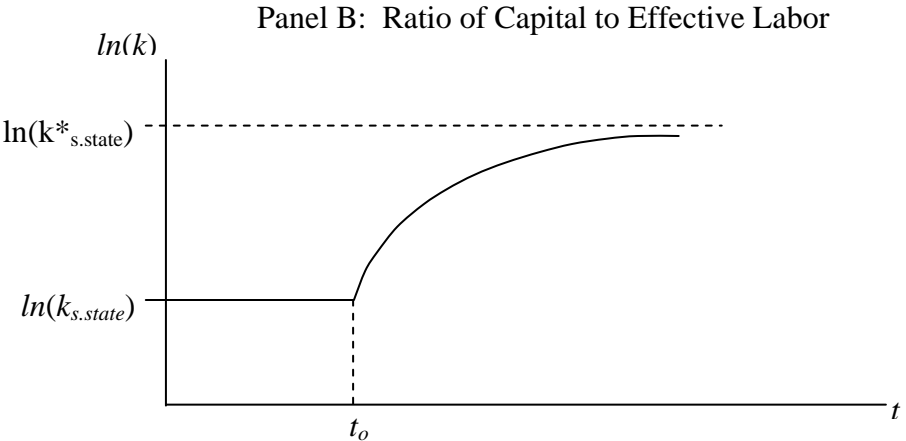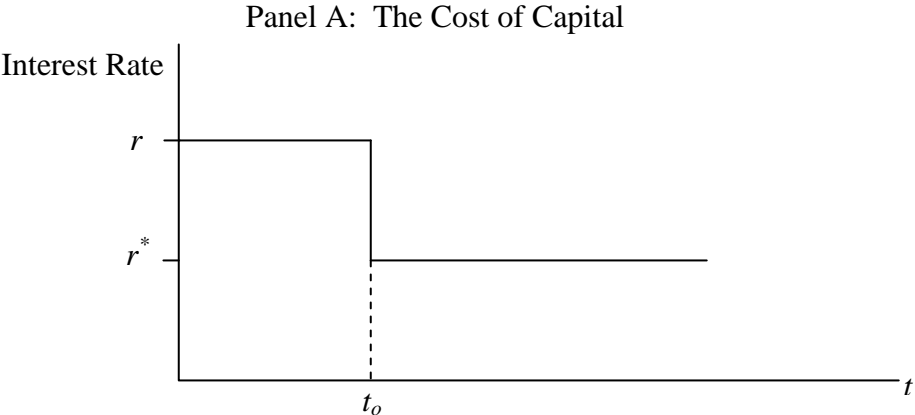Panel C: Real Wage

$ln(w)$

t_o

t

12

Table 1. In the Aftermath of Liberalizations, the Growth Rate of the Real Wage Rises Consistently Across Countries.

Country	Year of Liberalization	Liberalization Aftermath			Full Sample			Years of Data Coverage
		Mean	Median		Mean	Median	Standard Deviation	
Argentina	1989	3.9%	3.9%		-2.6%	-2.0%	32.6%	1984-2001
Brazil	1988	n.a.	n.a.		11.8%	14.9%	7.7%	1992-1995
Chile	1987	2.8%	3.0%		0.9%	4.0%	18.8%	1963-2000
Colombia	1991	5.0%	5.9%		-0.4%	-2.0%	9.1%	1963-1999
India	1986	2.4%	2.1%		-1.4%	0.0%	7.7%	1963-2002
Indonesia	1989	-8.3%	0.8%		5.9%	5.3%	16.6%	1970-2003
Jordan	1995	2.4%	1.7%		-0.2%	-0.3%	14.3%	1963-2003
Malaysia	1987	-5.4%	-4.1%		1.8%	2.0%	5.5%	1968-2002
Mexico	1989	11.7%	11.7%		1.5%	9.6%	19.3%	1984-2000
Nigeria	1995	11.5%	11.5%		1.9%	2.4%	14.8%	1963-1996
Pakistan	1991	-2.2%	-2.2%		1.2%	2.1%	10.9%	1963-1991
Philippines	1986	6.9%	10.0%		-0.1%	1.3%	12.7%	1963-1997
South Korea	1987	2.3%	5.6%		5.5%	8.4%	14.6%	1963-2002
Taiwan	1986	17.6%	16.3%		7.2%	6.4%	7.2%	1973-1997
Thailand	1987	14.7%	14.7%		5.9%	8.4%	24.0%	1967-1994
Turkey	1989	30.9%	27.0%		1.5%	3.7%	19.4%	1963-1997
Zimbabwe	1993	5.9%	4.4%		-0.7%	-0.1%	12.7%	1963-1996

Wage Data

Industrial Statistics Database of the United Nations Industrial Development Organization (UNIDO)

UNIDO provides data on total wages and salaries, total employment and output for the manufacturing sector.

Wage Data

For a given year, wages and salaries include:

(a) direct wages and salaries

(b) remuneration for time not worked;

(c) bonuses and gratuities;

(d) housing and family allowances paid directly by the employer;

(e) payments in kind.

Wage Data

Excluded from wages and salaries:

(1) employers' contributions to social security, pension and insurance schemes

(2) benefits received by employees under (2)

(3) severance and termination pay.

Wage Data

Total wages and salaries equal W*L*H, where W is the hourly wage, L is the stock of labor, and H is total hours worked for the year.

UNIDO provides no data on W or H

Divide total wages and salaries by total employment (L) to compute the average annual wage (W*H)

Wage Data

UNIDO reports the value of wages and salaries in US dollars

Deflate by the US consumer price index (CPI) to create a dollar-denominated real wage.

Data generally run from 1960 to 2003, exact dates differ by country.

502 country-year observations after taking first differences

Data Concerns

Country-year observations not independent (e.g., exogenous prod. shock)

Outliers

W or H?

Real Exchange Rate

Other Reforms

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Figure 5. Appreciation of the Real Exchange Rate Does Not Drive the Increase in Wage Growth
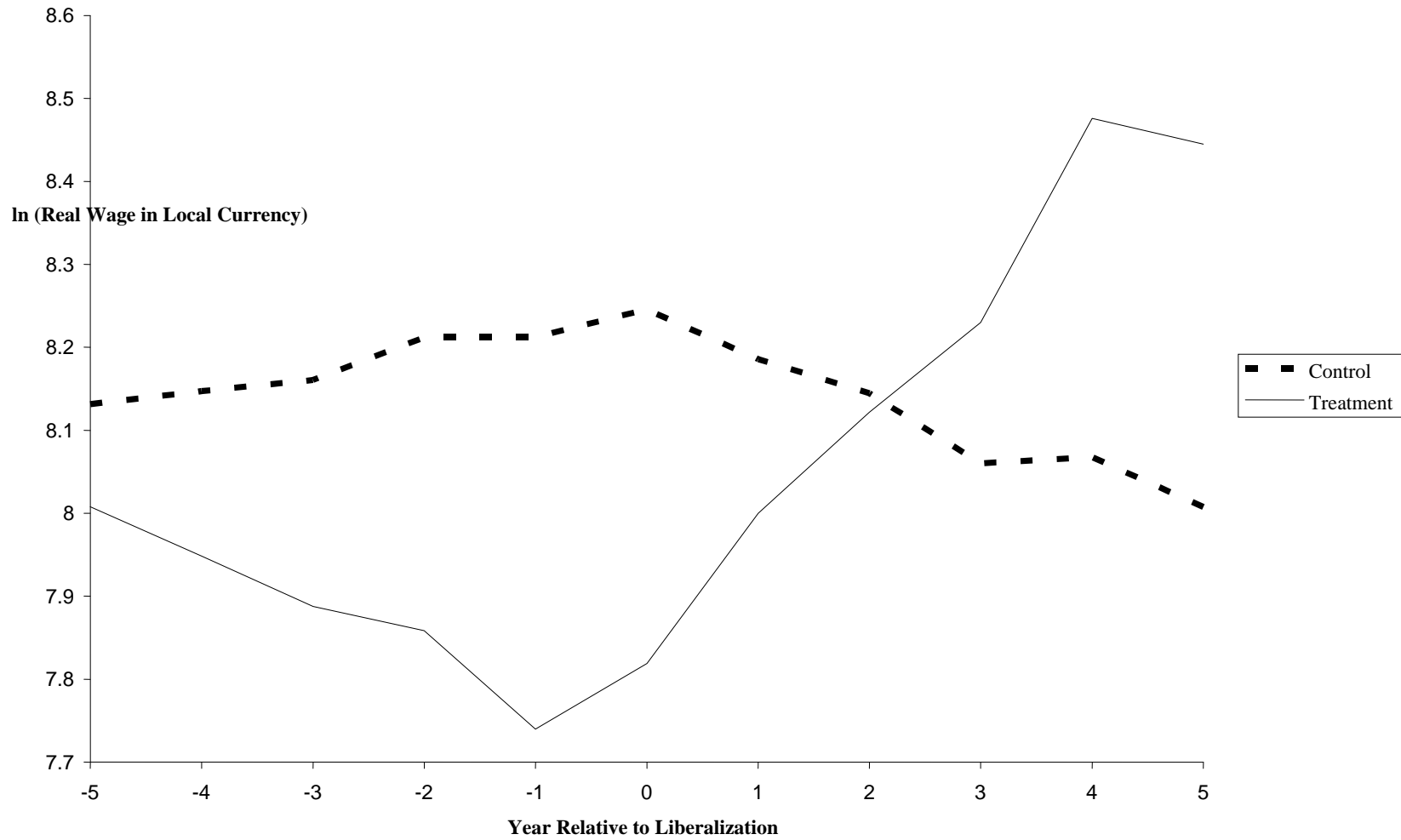
Table 2. Stock Market Liberalizations Occur Around the Same Time as Other Major Economic Reforms

Country	Year of Liberalization	Stabilization Program	Trade Liberalization	Privatization	Brady Plan Debt Relief
Argentina	November 1989	November 1989	April 1991	February 1988	April 1992
Brazil	March 1988	January 1989	April 1990	July 1990	August 1992
Chile	May 1987	August 1985	1976	1988	NA
Colombia	December 1991	NA	1986	1991	NA
India	June 1986	November 1981	1994	1991	NA
Indonesia	September 1989	May 1973	1970	1991	NA
Jordan	December 1995	May 1994	1965	January 1995	June 1993
Malaysia	May 1987	NA	1963	1988	NA
Mexico	May 1989	May 1989	July 1986	November 1988	September 1989
Nigeria	August 1995	January 1991	NA	July 1988	March 1991
Pakistan	February 1991	September 1993	2001	1990	NA
Philippines	May 1986	October 1986	November 1988	June 1988	August 1989
South Korea	June 1987	July 1985	1968	NA	NA
Taiwan	May 1986	NA	1963	NA	NA
Thailand	September 1987	June 1985	Always Open	1988	NA
Turkey	August 1989	July 1994	1989	1988	NA
Venezuela	January 1990	June 1989	May 1989**	April 1991	June 1990
Zimbabwe	June 1993	September 1992	NA	1994	NA

Benchmark Wage Specification

$$\Delta \ln(w_{it}) = a_0 + COUNTRY_i + a_1 * LIBERALIZE_{it} + a_2 * CONTROL_{it}$$
$$+ a_3 * TRADE_{it} + a_4 * STABILIZE_{it} + a_5 * PRIVATIZE_{it} + \varepsilon_{it}$$

Standard distributional assumptions about ε_{it} may not hold:

    (a) correlation of residuals across countries at a point in time

    (b) correlation of residuals within a given country over time

Main Wage Results

The coefficient on *LIBERALIZE* ranges from 0.051 to 0.086—always significant at the one-percent level (Table 3, Panel A).

The coefficient on *CONTROL* ranges from -0.011 to -0.02—never significant.

The coefficient on *STABILIZE* is -0.088 and significant at the one-percent level.

The estimate of the constant is 0.013

Statistical Robustness of Main Results

Estimates that adjust the standard errors for:
- Clustering by year (to adjust for cross-country correlation)
- Clustering by country (to adjust for serial correlation)
(Table 4, Panel A)

The coefficient on *LIBERALIZE* remains statistically significant in every specification.

The coefficient on *CONTROL* is never significant.

Country specific liberalization policy or common global shock?

Estimates adjust for Country and Year Fixed effects without Control Dummy (Table 5). The coefficient on *LIBERALIZE*→ 0.086-0.111

Economic Significance of Main Results I

The average annual growth rate of the real wage during liberalization episodes is 8.6 percent—the sum of the constant (0.013) and the coefficient on *LIBERALIZE* (0.073)

This is almost seven times as large as average wage growth in non-liberalization years (1.3 percent).

Economic Significance of Main Results II

Average annual real wage before liberalization (year [-1]): $2392.

Without liberalization the real wage at the end of year [2]: $3096

With liberalization, the real wage at the end of year [2]:$2487

Net cumulative impact of liberalization on take-home pay: $609

Equivalent to 25% of the average manufacturing worker's pre-liberalization take home pay.

Benchmark Productivity Specification

$$\Delta \ln(\frac{Y}{L})_{it} = a_0 + a_1 * LIBERALIZE_{it} + a_2 * CONTROL_{it} +$$
$$a_3 * TRADE_{it} + a_4 * STABILIZE_{it} + a_5 * PRIVATIZE_{it} + \varepsilon_{it}$$

Main Productivity Results

Every estimate of the coefficient on *LIBERALIZE* is significant (Table 3, Panel B).

The coefficient on *CONTROL* is never significant.

After accounting for other economic reforms, the coefficient on *LIBERALIZE* ranges from 0.056- 0.101.

The 10.1 percentage-point increase in productivity growth is larger than the 7.3 percentage-point increase in wage growth→ manufacturing-sector profitability increases.

Discussion

The increase in productivity growth more than matches the increase in real wage growth, but is the magnitude of either increase consistent with the neoclassical model?

$$\frac{\dot{w}}{w} = \frac{\dot{A}}{A} + \frac{1}{\sigma} \bullet \frac{f'(k)k}{f(k)} \bullet \frac{\dot{k}}{k}.$$

Conclusion(s)

Debating the costs and benefits of capital account liberalization, macro and financial economists largely ignore the implications of increased capital market integration for wages.

Yet labor income typically accounts for about two-thirds of GDP.

Almost two decades after the advent of capital account liberalization in the developing world, our paper provides the first systematic analysis of the impact of liberalization on the level of real wages.

Conclusion(s)

The combination of capital deepening and embodied technological progress drove up the productivity of workers in the manufacturing sector.

Accordingly, the demand for those workers increased, along with their real wage.

The advent of increased capital market integration increased the average take-home pay of workers in the manufacturing sector by 25 percent without eroding the profitability of capital.

Conclusion(s)

While the focus of this paper is on the level of real wages, our findings also provide important clues about the rise in wage inequality in developing countries documented by Goldberg and Pavcnik (2007).

Conclusion(s)

Liberalization raises the average standard of living for a significant fraction of the workforce in developing countries without eroding shareholder profitability.

If labor is mobile across sectors, then over time we would expect the productivity-driven wage gains in manufacturing to translate into higher incomes for workers elsewhere in the economy.

But we cannot conclude that liberalization raises aggregate welfare.

As the breadth of data on labor markets in developing countries improves, future work may produce more definitive results.

Robustness Checks/Alternative Interpretations

Suppose workers anticipate that liberalization will permanently drive up the real wage.

Labor supply might decrease in response to the positive shock to permanent income.

If this is the case then the results might be due to a decrease in labor supply as well as an increase in labor demand.

Is There a Significant Decrease in Labor Supply?

If labor supply decreases then the number of hours worked should fall.

Data on hours worked (Groningen Growth and Development Center) for: Argentina, Brazil, Chile, Colombia, Korea, Turkey, Taiwan, and Venezuela.

There is no significant change in the number of hours worked.

There is also no significant change in the stock of manufacturing sector employment (all 18 countries, UNIDO data)