

INT-2182

CA

CEPAL (2182)

FOR PARTICIPANTS ONLY

28 August 2001

ENGLISH ONLY

---

ECLAC

Economic Commission for Latin America and the Caribbean

Seminar "Development Theory at the Threshold of the Twenty-First Century  
Commemorative event to mark the centenary of the birth of Raúl Prebisch

Santiago, Chile, 28 - 29 August 2001



## **OPENNESS AND FACTOR SHARES**

**Francisco Rodríguez, Daniel Ortega**

This document was prepared by Mr. Francisco Rodríguez, Oficina de Asesoría Económica y Financiera, Asamblea Nacional, Venezuela and Mr. Daniel Ortega. The opinions expressed in this document, which has been reproduced without formal editing, are of the sole responsibility of the authors and may not coincide with those of the Organization.



# Openness and Factor Shares<sup>a</sup>

Daniel Ortega<sup>y</sup> and Francisco Rodríguez<sup>z</sup>

(This Draft: August 2001)

## Abstract

There exists a positive correlation between an economy's exposure to international trade and Capital's share in National Income. The correlation holds for most regions of the world, high- and low-income samples, and is robust to various controls for factor endowments. Furthermore, it is present within 28 industries, which suggests that it is not due to reallocation of factors towards more capital intensive sectors. One possible explanation for this finding is that openness hurts the bargaining power of labor relative to capital. We provide evidence in favor of this hypothesis. Specifically, the correlation is more important for countries with stronger labor unions, that is, the loss in bargaining power is more important when the union has more to lose.

## 1 Introduction

Perhaps one of the main contributions of the centre-periphery school to the study of development was the rich description they built of the interrelationships between participation in international trade and the distribution of income and power within them. Throughout his work, Prebisch emphasized the feedbacks that took place between an economy's integration

---

<sup>a</sup>We thank Harry Kelejian, John Haltiwanger, and seminar participants at the University of Maryland and IESA for useful comments. Errors are ours.

<sup>y</sup>Dept. of Economics, University of Maryland, College Park, MD 20742. E-mail: ortega@econ.umd.edu

<sup>z</sup>Dept. of Economics, University of Maryland, College Park, MD 20742 and Economic and Financial Advisors Office of the National Assembly, Venezuela. Email: rodriguez@econ.umd.edu

into the world economy and its internal distributive structures. In contrast with neoclassical economists, Prebisch did not restrict himself simply to the study of the effect of international trade on relative prices but was rather interested on the effect it had on the relations of power that determined what he called the structural distribution of income (Prebisch, 1981, p. 75). However, this dimension of the analysis of international trade –its effect on the distribution of political power –has been greatly absent in recent developments. Despite the great amount of material that has been written about the effects of trade openness, only a small part of the literature has been devoted to studying the effects of trade on income distribution in developing countries, and very few papers have discussed the effect of openness on the distribution of power.

This paper documents the empirical finding that national and manufacturing capital shares increase with the degree of openness and proposes an explanation that relies on the process of intra-firm bargaining between capital and labor. We use a panel dataset on capital shares and show that the positive association we find is independent of factor endowments, contrary to what standard trade theory predicts. The Heckscher-Ohlin model of trade has the implication that capital shares and openness should be positively related in capital abundant countries and negatively related in labor abundant ones, we do not find evidence that this symmetry is true. In particular, the fact that the correlation seems to be independent of the pattern of trade and of terms of trade shocks, suggests that the explanation should be sought in the process of determination of domestic factor prices.

Our empirical finding is very robust; it is not driven by outliers, it does not depend on particular regions being over represented in our sample as is usually the concern in most cross country panel data studies, it is robust to the inclusion of several controls suggested by the theory, and it does not depend on industry mix effects where openness leads to a reallocation of the economy's resources to sectors that are more capital intensive. We also argue that this is a causal relationship, and provide evidence for this using the terms of trade as an instrument for openness.

We argue that increased trade alters the bargaining game that workers and employers play in such a way that after adjustments to wages and employment are made, capital ends up

with a higher share. The basic intuition<sup>1</sup> is that increased international trade is associated with a lower domestic price of imported goods, which reduces the marginal value of an additional unit of labor in the import-competing industries and therefore reduces the share of the surplus that labor will obtain in the process of negotiation. The notion being captured is that the bargaining power of labor is hampered by international trade (See Rodrik, 1997 and references therein); although in the model there is a parameter  $\beta$  which is kept fixed that represents the bargaining power of labor relative to capital, the results regarding the outcome of the wage negotiation suggests a potential differentiation between endogenous and exogenous bargaining strength. In order to examine this hypothesis further, we use data on union membership to sort countries according to labor's ex-ante bargaining power and find support for the idea that the channel of causation is indeed the capital-labor bargaining process within the firm.

Despite the fact that there has been panel data available on capital shares at the national and industry level for some time (UN and UNIDO have published this data since 1984) and that most (if not all) trade theories have direct implications for its determinants and evolution, it has not been utilized for testing these theories in any cross-sectional time-series econometric analysis.

Historically, it has also been recognized that the factor distribution of income is important in itself. Several recent theories of interest groups argue that the political-economic equilibrium of modern societies depends crucially on how national income is allocated between capital and labor (see Rodríguez, 1999; more references); also, under empirically plausible assumptions about the distribution of factor ownership, the factor distribution is central to the determination personal income inequality, in particular, if capital is concentrated in the hands of relatively few, then increases in the capital share have important inequality effects.

The paper is organized as follows: The next section presents and discusses the basic empirical findings, the third presents a simple model that helps to account for the observed correlation independently of factor endowments or other determinants of the pattern of trade, the fourth probes deeper into the relationship using information about union participation, and the last provides concluding remarks. Appendix 1 contains a discussion of the theoretical

---

<sup>1</sup>See Mezzetti and Dinopoulos (1991).

background of the empirical strategy, and Appendix 2 has summary statistics of our data.

## 2 Empirical Evidence

In order to frame our empirical approach it is useful to begin from basic accounting definitions. The capital share is defined as the ratio of capital income to total income, and therefore by construction depends on factor prices and endowments; this can be easily seen from the identity:

$$\theta = \frac{rK}{rK + wL} = \frac{K/L}{K/L + w/r} = g \frac{K}{L}; \frac{r}{w} \quad (1)$$

where  $g_1$  and  $g_2$  are both positive.

Theories about the effect of openness (or any other variable) on capital shares must specify an effect of openness on either the capital labor ratio or the relative return to capital. For example, the textbook Heckscher Ohlin model takes  $K$  and  $L$  as fixed and hypothesizes an equilibrium relationship between a country's factor prices and its level of openness: a country will have a higher relative price of its abundant factor the more open it is. In contrast, neoclassical growth theory hypothesizes that the efficiency gains from trade raise the marginal product of capital and therefore lead to higher physical capital accumulation. In other words, alternative theories will specify capital abundance and relative factor returns as functions of openness and other determinants; in reduced form:

$$\begin{aligned} \frac{K}{L} &= \mathfrak{R}(t; X) \\ \frac{r}{w} &= \mathfrak{e}(t; Y) \end{aligned}$$

where  $t$  is a summary description of policy, geographical and other impediments to trade and  $X$  and  $Y$  refer, respectively, to other determinants of factor endowments and factor returns. This simple framework allows us to characterize alternative theories as different forms for the  $\mathfrak{R}(t)$  and  $\mathfrak{e}(t)$  functions. The Heckscher Ohlin model predicts that the capital share will increase in the capital labor ratio and that openness will increase the capital share

in countries that export the capital-intensive good, specifically<sup>2</sup>:

$$d_i^{\otimes} = \frac{\otimes}{1 - \otimes} \frac{dK}{K} + \frac{1}{\otimes_1 - \otimes_2} \frac{dL}{L} + \frac{1}{p} \frac{dp}{p} + \frac{1}{t} \frac{dt}{t} \quad (2)$$

where  $\otimes_1$  and  $\otimes_2$  are the capital shares of the importing and exporting sectors respectively,  $p$  is the (exogenous) price of the importable good and  $t$  is 1 plus the ad valorem trade restriction, which may be policy-induced but can also be caused by geographical, cultural or institutional impediments to trade.

We will start out from the general specification in (2) and will therefore estimate a linear version of:

$$d_i^{\otimes} = \frac{\otimes}{1 - \otimes} \left( \frac{dK}{K} + \frac{1}{\otimes_1 - \otimes_2} \frac{dL}{L} + \frac{1}{p} \frac{dp}{p} + \frac{1}{t} \frac{dt}{t} \right) + \frac{dk}{k} \quad (3)$$

where  $k$  is  $K/L$  and  $other$  stands for additional controls that improve our empirical proxy for factor endowments.

## 2.1 Cross-National Data

We use a large panel that includes 176 countries and spans the period from 1960 to 1999. Our capital share data includes the UN economy-wide capital share and the manufacturing capital share from UNIDO. We run the regressions with five year averages of the data in order to reduce noise from cyclical fluctuations. The basic specification is

$$\log \frac{kshare_{it}}{1 - kshare_{it}} = \otimes_0 + \otimes_1 trade_{it} + \sum_{j=1}^J \otimes_j x_{jit} + \epsilon_i + \epsilon_t + \epsilon_{it}^2 \quad (4)$$

for  $i = 1::N$  ;  $t = 1::T$

where the  $x_j^0$ s are a series of control variables ("other") and our baseline specification assumptions about the disturbances are:  $\epsilon_i$  &  $\epsilon_t$  fixed, and  $\epsilon_{it}^2 \gg iid(0; \frac{1}{2})$ : We take the logit transform of the capital share to avoid biases arising from use of a bounded dependent variable on unbounded regressors (see Davidson and MacKinnon, 1993).

The basic result is that the effect of openness on capital shares is positive and significant. It is present as soon as one controls for factor endowments (as suggested by the specification

<sup>2</sup>This expression is formally derived in Appendix 1.

of a Heckscher-Ohlin model, our proxy for  $\kappa$  is GNP per capita) and is robust to alternative controls<sup>3</sup>.

It is present for both the UN's economywide Capital Share (Table 2-1)<sup>4</sup> and UNIDO's manufacturing capital share (Table 2-2). The tables report fixed effects specifications including various controls that may improve our proxy for factor endowments; although they give similar results, we do not report the random effects specifications since the Hausman tests typically reject the null of RE=FE, and we choose to keep the consistent estimate.

[Tables 2-1 and 2-2 Here]

We include several additional regressors besides the trade ratios in order to improve our proxy for factor endowments that attempt to capture factor market efficiency aspects. [Human Capital, Population Density, Political Freedom (Rodrik paper on Democracy and openness), Population aged over 65, Public Expenditure in Education, Female Labor Force Participation and Life Expectancy. [More]

As (3) suggests, we should also find a relationship between a country's terms of trade and the capital share, in particular, the coefficients on openness and terms of trade should have a different sign. We have data for an index of terms of trade which is difficult to compare across countries, therefore, there is a stronger reason for dropping the Random Effects specification from the analysis. Tables 2-3 and 2-4 present the results of including terms of trade into the equations of Tables 2-1 and 2-2. The key finding is that the coefficient on openness remains positive and significant for all specifications, so that the effect of trade on the capital share is not due to terms of trade shocks.

[Tables 2-3 and 2-4 Here]

## 2.2 Sectoral Data

One possibility for explaining the pattern that we observe in the capital shares as openness changes may be due to changes in the industry mix of the economy, that is, perhaps more trade induces a reallocation towards more capital-intensive sectors, inducing an increase in

<sup>3</sup>The results presented in this paper hold up using annual data and are available upon request.

<sup>4</sup>Unless otherwise indicated, all tables report  $t$ -statistics in parentheses below the appropriate coefficient.



the average capital intensity of the economy and thus an increase in the capital share. The UNIDO manufacturing dataset consists of data from 28 industries across 74 countries for the period 1960 to 1999, it comes from industrial surveys conducted in each country according to a common standard which makes the data comparable across borders. We estimate an equation like (4) with the sector-specific capital shares as the dependent variable and the complete list of controls as in column 4 of Table 2-1. Table 2-5 presents the results of these regressions omitting the coefficients and t-statistics on the control variables.

[Table 2-5 Here]

Out of 28 coefficients, 28 are positive and only 6 are not statistically significant. These results are supportive of the idea that the correlation observed at the aggregate level is not due to industry-mix effects, instead, it suggests that openness is associated with changes at the industry level.

### 2.3 Heckscher-Ohlin Effects

Thus far we have essentially identified a robust correlation between trade openness and capital shares at the industry level<sup>5</sup>. Here we divide the sample into capital abundant and labor abundant countries<sup>6</sup> and check to see whether there is evidence of Heckscher-Ohlin effects. Table 2-6 presents our results for national and manufacturing capital shares.

[Table 2-6 Here]

H-O theory predicts that for capital abundant countries the coefficient should be positive and significant, whereas for labor abundant ones it should be negative. We find a positive coefficient for both groups although insignificant for the low income economies. We also include an interaction term between openness and per capita GNP (Table 2-6) and find a positive coefficient which is insignificant for the manufacturing capital share. Our interpretation of this evidence is that there are weak H-O effects, but that the H-O story is insufficient to explain the patterns observed in the data.

<sup>5</sup>Of course, there might be reallocation towards more capital intensive technologies or firms within an industry, and our data does not allow us to exclude this possibility.

<sup>6</sup>For this first regression, a labor abundant country is one that has below average GNP per capita.

Davis (1996) argues that a country's pattern of trade does not depend on its relative factor abundance with respect to the whole world but instead with respect to its Cone of Diversification, that is, perhaps a group of very poor countries are trading amongst themselves, so one may find a labor abundant country (in terms of the world average) exporting capital intensive goods. This suggests that H-O may still be present and one would not identify it in a regression such as that reported in Table 2-6. We run the same regression for each quintile in the world income distribution and find that in all quintiles (except the third and fourth, where it is not statistically different from zero) the relationship is positive and significant [See table 2-7], H-O would imply that if one were to find a negative coefficient it should be for the countries at the very bottom of the distribution. We also estimate the model by region and find the same result for all regions except for subsamples including South, Central Asia and Eastern Europe where there is a dominant presence of communist or transition economies. For these economies it is plausible that there is not any significant bargaining over wages and employment, so our story would not be appropriate.

[Table 2-7 Here]

Lastly, we would like the data to tell us what our definition of a 'poor' or 'rich' country should be, so we run a nonlinear regression of the form:

$$\log \frac{kshare_{it}}{1 - kshare_{it}} = \alpha_0 + \alpha_1 trade_{it} + \alpha_2 (trade_{it} \times lgnppc) + \epsilon_i + \epsilon_{it}$$

and define  $lgnppc = \alpha_1 = \alpha_2$  as our threshold for defining labor abundant versus capital abundant countries. We find that the threshold implied by the data is outside of our sample (too low) which we interpret once again as evidence that H-O effects are insufficient to explain the patterns in the data.

## 2.4 Causality

Trade ratios are endogenous. We are interested in identifying an effect of openness on capital shares beyond that which comes from their feedback. Our model of Tables 2-3 and 2-4 suggests that terms of trade might serve as a good instrument for identifying the pure effect of openness on the capital share. For any particular economy, it is reasonable to assume that

its terms of trade are exogenous, and also that they affect the incentives to trade. Whether they are excludable from the capital share equation is to be determined from the data. Tables 2-8 and 2-9 present our estimation results instrumenting openness with terms of trade and two lags of openness and also the corresponding exclusion restriction tests.

[Tables 2-8 and 2-9 Here]

The evidence indicates that in fact terms of trade are a good instrument for openness and that it is excludable from the equation. More importantly, the positive correlation result remains.

### 3 A Wage Bargaining Model

All models of international trade have direct or indirect implications for the relationship between capital shares and openness. We've seen what H-O theory predicts, but we should note that this is a shared feature also of the trade models that incorporate frictions in the labor market to generate unemployment: the characteristics of each economy's labor market determine its comparative advantage (and thus its pattern of trade) and with it, a particular correlation between capital's share and openness. Here we present a partial equilibrium model of wage bargaining in the spirit of McDonald and Solow (1981) that illustrates a mechanism that generates a positive relationship between openness and the capital share regardless of the economy's pattern of trade; rather, it requires a labor union and an import competing firm. The model is basically due to Mezzetti and Dinopoulos (1991).

Consider the problem of bargaining over wage and employment between a labor union and a firm that faces competition from abroad in its product market. There are two games that are being played simultaneously: a Cournot game between the domestic and foreign firms<sup>7</sup>, and a bargaining game between the labor union and the domestic firm. The bargaining process is assumed to follow Nash's cooperative solution and is therefore efficient (on the

---

<sup>7</sup>Note that this does not imply that the economy is large, only that the domestic firm has monopoly power in the home market; therefore, the "rest of the world" will take the domestic firm's decisions into account when deciding how much output to export.

contract curve)<sup>8</sup>. Technology is such that the productivity of labor is fixed at  $\bar{w}$ , and the price of the 'outside' good is equal to 1. We assume further that the sector in question is small relative to the rest of the economy.

Firms produce output according to the production function  $f^i(x_i) = x_i$  for  $i = H; F$ , where  $x$  is the level of employment for  $H = \text{Home}$  and  $F = \text{Foreign}$ . We assume this simple linear technology for simplicity (as long as  $\partial f^i / \partial x_i > 0$  for all  $x$  the results shouldn't change. [check]). The labor demand curve is thus the marginal revenue curve.

We assume that the union cares both about employment and the level of the wage rate, that is, its utility function is  $u = u(x_H; w)$  where  $w$  is the negotiated wage. We will specialize this function to<sup>9</sup>:

$$u(x_H; w) = (w - \bar{w})^\alpha x_H \quad (5)$$

The revenue function is  $R(x_H; x_F) = P(x_H + x_F)x_H$ , where  $P(t)$  is the inverse demand function facing the firm. We assume  $R_{11} < 0$  and  $R_{12} < 0$ : The domestic firm's profits are thus given by:

$$\pi(x_H; x_F) = R(x_H; x_F) - wx_H \quad (6)$$

We assume that if there is no agreement employment in the sector is zero, therefore, the threat points for both the union and the firm are zero. Thus we have the Generalized Nash Product:

$$[R(x_H; x_F) - wx_H]^{1-a} (w - \bar{w})^\alpha x_H^a \quad (7)$$

with  $a \in [0; 1]$ : The interpretation of  $a$  is the union's relative bargaining power, which we take to be exogenous. Maximizing (7) with respect to  $w$  and  $x_H$  we get:

$$(1 - a)x_H(w - \bar{w}) = a[R(x_H; x_F) - wx_H] \quad (8)$$

and

$$(1 - a)[w - R_1]x_H = a[R(x_H; x_F) - wx_H] \quad (9)$$

<sup>8</sup> Brander and Spencer (1988) have analyzed the case where the union sets the wage rate and the firm unilaterally sets the employment level, see McDonald and Solow (1981) for a discussion of the empirical relevance of efficient versus inefficient solutions to the wage bargaining process.

<sup>9</sup> This particular utility function does not have an axiomatic support in the political process that governs this bargaining process. McDonald and Solow derive a form like:  $x_H(\bar{A}(w) - w)$  where  $\bar{A}(t)$  is the union's utility from the wage and  $w$  is a constant that captures the disutility of work and unemployment benefits.

which, taken together yield the expression for the contract curve (CC):

$$\frac{1}{\pm}(w - \bar{w}) = w - R_1 \quad (10)$$

as usual, the contract curve is the locus of tangencies between the union's indifference curves and the firm's isoprofit curves in  $w - x_H$  space<sup>10</sup>. Note that the slope of CC depends on the value of  $\pm$ :

$$\frac{dw}{dx_H}_{CC} = \pm \frac{R_{11}}{1 \mp 1} = \pm \frac{R_{11}}{1 \mp 1} \begin{matrix} < 0 & \text{if } \pm > 1 \\ > 0 & \text{if } \pm < 1 \end{matrix}$$

so that the weight the union places on the wage determines the slope of the contract curve. Rearrange (9) and obtain:

$$w = (1 - \alpha)R_1 + \alpha P \quad (11)$$

Which is the Nash Bargaining Locus (NBL) and is simply the weighted average of the marginal revenue curve and the inverse demand curve. Note that:

$$\frac{dw}{dx_H}_{NBL} = (1 - \alpha)R_{11} + \alpha P_1 < 0$$

The foreign firm takes the home country's trade policy as given as well as the bargaining process between the domestic firm and the union. Its profits are given by:

$$\pi^F(x_H; x_F; t) = R^F(x_H; x_F) - \bar{w}^F x_F - t x_F \quad (12)$$

where  $R^F(x_H; x_F) = P(x_H + x_F)x_F$ , and we assume  $R_{22}^F < 0$  and  $R_{21}^F < 0$ : The optimality condition for the foreign firm is therefore:

$$R_2^F = \bar{w}^F + t \quad (13)$$

An equilibrium is a triple  $(x_H; x_F; w)$  such that (10), (11) and (13) are satisfied simultaneously, this is illustrated by point E in Figure 1, which is self-explanatory.

We are now ready to characterize the response of the equilibrium to a change in the tariff rate,  $t$ . Intuitively, the response of output ( $x_H$ ) to changes in parameters should depend on how heavily the union weights employment versus wage increases. A union that cares very little about employment, may be willing to sacrifice some of its members' jobs in exchange for

<sup>10</sup>See Mezzetti and Dinopoulos (1989) for a simple derivation from the slopes of these curves.

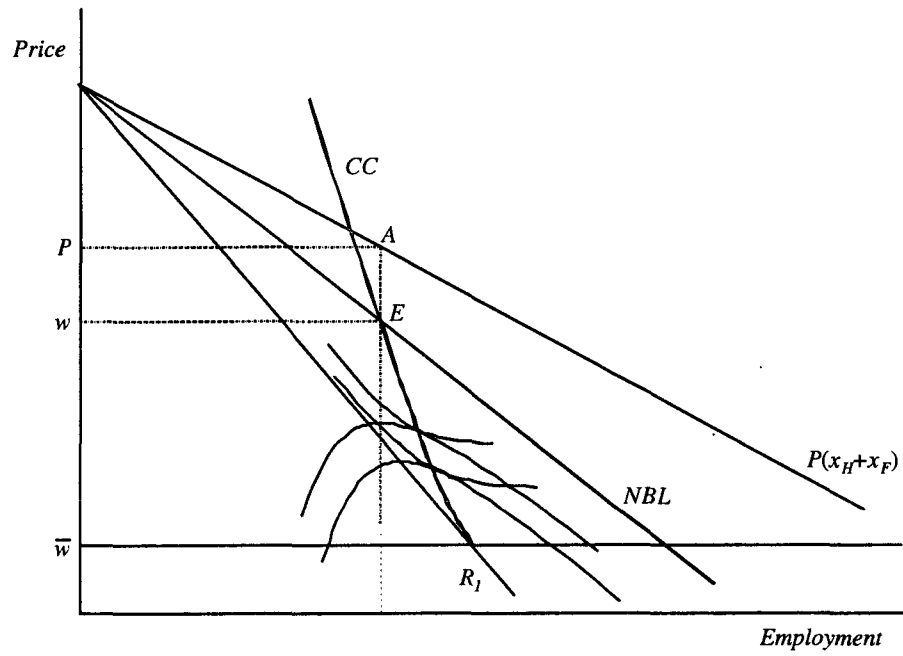


Figure 1: Equilibrium of the Wage Bargaining Problem.

better wage hikes. Here we consider the case where  $\pm > 1$ , so that the union cares relatively more about wages than employment.

Totally differentiating the three equilibrium conditions and writing them in matrix form we get:

$$\begin{matrix} 2 & & & & 3 & 2 & 3 \\ & R_{11} & & R_{12} & (1 \pm) & & \\ \frac{6}{4} & \pm(1 \pm a)R_{11} \pm aP_1 & & \pm(1 \pm a)R_{12} \pm aP_2 & 1 & \frac{7}{5} & \frac{6}{4} & \frac{0}{5} \\ & R_{21}^a & & R_{22}^a & 0 & dw & & 1 \end{matrix} \begin{matrix} dx_H \\ dx_F \\ dt \end{matrix} = \begin{matrix} 0 \\ 0 \\ 1 \end{matrix}$$

and denote the matrix of coefficients by A. From simple calculations we obtain:

$$\text{Det}(A) = \pm \frac{1}{\pm} (P_1)^2 + \frac{[(x_H + x_F)P_{11} + 2P_1][(1 \pm a) + \pm a]P_1}{\pm} = \Phi$$

which is negative under the assumptions given before. By application of standard linear algebra methods, we have:

$$\frac{dx_H}{dt} = \frac{1}{\Phi} \left[ R_{12} + \frac{1 \pm}{\pm} [(1 \pm a)R_{12} + aP_2] \right] < 0 \quad (14)$$

$$\frac{dx_F}{dt} = \pm \frac{1}{\Phi} \left[ \frac{1}{\pm} aP_1 + (1 \pm a) \frac{1}{\pm} R_{22} + aR_{12} \right] < 0 \quad (15)$$

$$\frac{dw}{dt} = \frac{1}{\Phi} aP_1 (R_{11} \pm R_{12}) > 0 \quad (16)$$

note that (14) will be positive if the demand for the ...nal good is concave (for details see Mezzetti and Dinopoulos, 1989). The key result is that an increase in protection increases the equilibrium wage; intuitively, increasing tariffs lowers the incentive for the foreign ...rm to export to the domestic economy, this leads to higher market power by the domestic ...rm, which is associated with higher profitability, and therefore higher surplus over which to bargain, so everything else constant, wages must go up. The ambiguity in the sign of (14) reflects essentially two opposing forces, one is the increase in the domestic price induced by the reduction in foreign exports which tends to increase domestic output, the other, which tends to reduce it, is the increase in the wage due to the negative slope of the Contract Curve (union's preference for wages).

If these two forces exactly offset each other, then unambiguously, there is an increase in the labor share. Figure 2 illustrates what happens when equilibrium domestic output

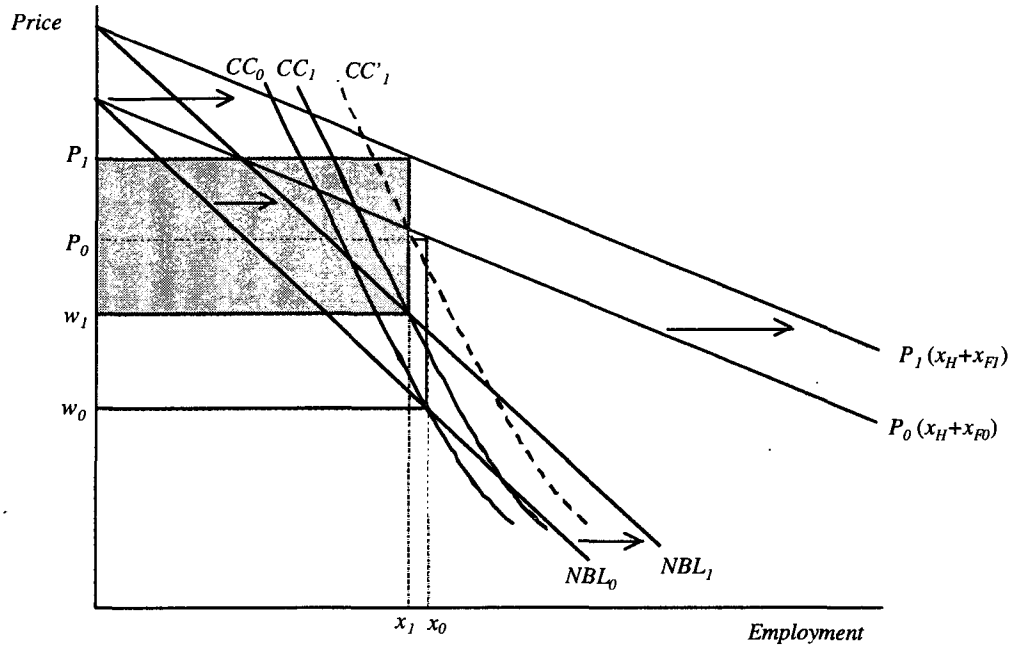


Figure 2: Effect of an Increase in  $\tau$ .

falls: All three curves shift rightward in response to the increase in the tariff<sup>11</sup>, at the initial equilibrium wage ( $w_0(t_0)$ ) the capital share is given by the light shaded area, and at the new wage  $w_1$  it is given by the darker area, this illustrates a case where the capital share falls in response to an increase in protection.

The figure can only illustrate possibilities. A formal derivation of the response of the capital share is necessary to establish the conditions under which it will be positive or negative. The main point that we wish to make is that the bargaining power of labor is increased with protection.

[Formal derivation]

An alternative illustration of the effects of trade on the capital share (also in Mezzetti and Dinopoulos, 1989) can be given in the case where the domestic firm has the option to shift

<sup>11</sup> Note that if the Contract Curve shifts to  $CC_1^0$  the increase in the wage is less pronounced and employment is higher in the new equilibrium.



production abroad. An increase in tariffs increases the cost to the firm of shifting production to a foreign plant, and thus increases labor's power in the wage bargain.

This simple partial equilibrium explanation provides a rationale for the relationship we observe between the capital share and trade openness, it illustrates the possibility that labor market conditions are such that the bargaining power of labor is hurt relative to that of capital, thus resulting in an increase in capital's share of income. The widely known upheavals created by protesters during the various WTO meetings have been originated to a great extent in defensive action taken by international labor union organizations, which suggests that labor unions indeed feel at a loss in the face of the process of trade liberalization.

## 4 Trade Union Membership

If it is true that trade openness has a negative impact on the bargaining power of labor, then it should also be true that stronger unions, or countries with more powerful trade unions, should see a stronger decline in labor's share relative to the rest when the economy is opened up to trade. The model presented above has the implication that the effect on openness on the capital share should be larger for countries/time periods where labor enjoys more bargaining power (as captured by the parameter  $\alpha$ ). This section probes deeper into our hypothesis using data on trade union membership from Artecona and Rama (2001)<sup>12</sup>. The empirical proxy for ex ante bargaining power that we use is total trade union membership as a percentage of total employment. Artecona and Rama (2001) is the first effort to centralize and organize the large amount of information that is dispersed in a number of sources on labor market institutions. After intersecting the data with our own, we are left with 410 observations on union membership.

We estimate a model like (4) on observations with above and below average union membership and expect a larger point estimate on openness for the above average subsample than for the below average. Table 4-1 presents results for the economywide capital share and Table 4-2 for the UN's manufacturing capital share.

[Tables 4-1 and 4-2 Here]

---

<sup>12</sup>We thank Martin Rama for providing us with their data on union membership.

For the economywide capital share, the coefficient on openness for the below average subsample is statistically different from zero in only one case, whereas for the above average group it is always statistically greater than zero in three out of four cases. However, the point estimates are not always larger for the above average subsample. On the other hand, for the manufacturing capital share the evidence is much stronger: the point estimate is strictly larger for the above average subsample, and three out of four coefficients for the below average are not statistically different from zero.

Although the evidence is not conclusive, our interpretation is that it suggests very strongly that in fact labor does lose bargaining power as the economy becomes more open (due to policy or other factors).

## 5 Concluding Remarks

We have documented that there is a robust positive association between openness and the share of capital in income and argued that it is not due to changes in the industry mix, whereby the economy becomes more capital intensive due to a shift of resources towards capital intensive sectors. This finding has several implications. For one thing, it suggests that there are important frictions in factor markets which have strong implications for the predictions of the standard Heckscher-Ohlin model of trade. In particular, the efficiency gains from international trade may not materialize but with a significant lag. One of the most important policy debates that has arisen in recent years has been whether the trade liberalization policies of the 90's have produced the welfare effects they were expected to produce or not; many critics argue that after 10 years the balance is not favorable, specially in regions like Latin America, where per capita GDP growth fell from 2.9% per year in the first half of the 90's to 0.8% per year in the second half. Aside from the obvious fact that the economy's performance depends on more than its trade policies, these figures have called into question the old widespread view that unrestricted liberalization was the appropriate trade policy prescription. If factors are specialized in the short run, then changing environments will change prices and quantities of existing activities, and therefore the return to these existing activities; the economy's response to incentives to reallocate its productive resources may be too slow to expect significant efficiency gains in the very short run.

The evidence that we present here points in the direction of the process of intra-firm bargaining as the main channel through which openness affects the functional distribution of income. International trade alters the conditions under which bargaining over surpluses takes place between capital and labor and it does so in a way that is favorable to capital. The underlying assumption of imperfect product and factor markets implies that technology adoption, the expansion into new areas of business and the destruction of existing activities are assumed to take time, which precludes the possibility that some of the efficiency gains of increased trade materialize quickly. The implication of this is that the design of policy should take into account the contracting environment of the economy, in particular when there is reason to believe that the distributional consequences of specific policies may substantially affect their effectiveness. It has been documented that the distribution of asset ownership is generally very unequal (see Wolf, 1995) so if the functional distribution shifts in favor of capital, the personal income distribution will become more unequal as well.

## 6 Appendix 1. Theoretical Background

### 6.1 Heckscher-Ohlin Theory

The economy in a textbook Heckscher-Ohlin framework is described by two factors of production ( $K$  and  $L$ ), two goods (1 and 2) and two countries (H and ROW). The trade policy of ROW is given and H is assumed to be small with respect to ROW. Let the zero profit conditions in each industry of the home country be given by :

$$\begin{aligned} rK_1 + wL_1 &= p_1 t F(K_1; L_1) \\ rK_2 + wL_2 &= G(K_2; L_2) \end{aligned} \tag{17}$$

where subscripts indicate industry,  $p_1$  is the international price of the importable good and  $t$  is one plus the ad valorem trade restriction. Note that we have assumed, without loss of generality, that good 1 is the importable good. This restriction may be policy-induced but can also be caused by geographical, cultural or institutional impediments to trade. It is straightforward to establish from total differentiation of (3) and substitution of the competitive factor

price conditions

$$r = p_1 t F_K = G_K \quad (18)$$

$$w = p_1 t F_L = G_L$$

that:

$$\frac{dr}{r} + \frac{dw}{w} = \frac{1}{\theta_1 + \theta_2} \frac{dp}{p} + \frac{dt}{t} \quad (19)$$

so that trade restrictions (increases in the prices of importables) lead to increases in the relative rental rate and, by (1), to increases in capital shares whenever the importables industry is capital intensive. This will occur when H is specialized in the labor intensive good, which in turn can only happen if H's capital labor ratio is lower than that of ROW.

Differentiating (1) and substituting (5) gives us:

$$d\theta = \frac{\theta}{1 + \theta} \frac{dK}{K} + \frac{1}{\theta_1 + \theta_2} \frac{dp}{p} + \frac{dt}{t} \quad (20)$$

Again, capital's share decreases (increases) with openness when the importables (exportables) industry is capital intensive.

Equation (6) suggests several important considerations for estimation. First, it is important to note that the coefficient on trade restrictions is expected to be positive in the Heckscher-Ohlin framework only if the country is capital abundant; otherwise it will be negative. This in turn implies that we should expect the sign of the coefficient on openness to differ between countries that have a higher capital-labor ratio than the rest of the world and those for which it is lower. Second, the absolute value of the coefficient may but need not depend on how much a country's endowments differ from those of the rest of the world. This characteristic is shared by most models of international trade: predictions about the relationship between capital shares and openness depend on the pattern of trade countries that export the capital intensive good will exhibit an opposite relationship to those that import it. In the case of the Heckscher-Ohlin theory the pattern of trade is fully determined by factor endowments.

## 6.2 Multiple Good Versions of H-O

Davis (1996): There are different cones of diversification. What matters is where a country stands relative to its cone of diversification. The empirical implication of this is that there may be countries that are extremely labor abundant relative to the world average, but that still export the capital intensive good because they belong to a "low capital-labor ratio" diversification cone and are at the upper scale within this spectrum.

Xu (2000): There are non-tradable goods. An increase in openness can lead to a fall in the number of goods that are non-traded. This gives rise to a non-linear effect of openness on inequality: In a labor abundant country, at low levels of tariffs, tariff reductions can lead to increases in inequality, but at high levels of tariffs these can lead to falls in inequality. This is because, if non-traded goods are capital intensive for the South, trade liberalization can lead to an increase in the demand for them from the North (which raises inequality) and to a decrease in home demand for them (which lowers inequality). The non-linear effect will emerge from the combination of these two.

In other theories (Reddy-Dube, for example) these restrictions can have an effect on the rental-wage differential that is independent of factor intensities.

## 6.3 Trade and Unemployment Models

There is a strand of literature that goes beyond the full employment assumption by incorporating various market frictions. In terms of our simple framework, this amounts to theorizing about the determinants of the relevant labor endowment (along with factor prices) and thus the capital share.

### 6.3.1 Labor Unions

Brecher and Long (1989) extend the classic 2E2 minimum wage model of Brecher (1974) to a fully unionized economy. Their economy has monopoly power in trade (large economy) and the union sets the wage (always above the maximum consistent with full employment) to maximize an objective function which depends on employment and the real wage.

The key finding is that barriers to trade (generally anything that leads to a reduction in the volume of trade) leads to a leftward shift on the general equilibrium labor demand

curve, which implies a reduction in the equilibrium real wage (set by the union) and a corresponding increase in employment. The net effect on the labor share depends on the (aggregate) elasticity of substitution between capital and labor.

Rodrik (1997) argues that openness leads to an increase in the wage elasticity of the demand for labor curve, and therefore to a reduction in the bargaining power of labor unions. Panagariya (1999) demonstrates in the context of the 2E2 and 3 E 2 models of trade, that this result is not general and that it holds true only under certain assumptions.

### 6.3.2 Other Frictions (Search, Asymmetric Information)

Davidson, Martin and Matusz (1993, 1999) and Hosios (1993) introduce search unemployment into an otherwise standard trade model. They show that there exist generalized versions of the typical H-O results, in particular, the Stolper-Samuelson theorem.

Brecher (1992) introduces efficiency wages into a model of trade.

## 7 Appendix 2. Summary Statistics (Five-Year Average Data: Whole Sample)

Variable	Obs	Mean	Std.Dev.	Min	Max
Kshade	524	0,42	0,16	0,10	0,89
Netrdgnf	1075	72,31	46,66	2,70	394,28
Human	716	4,16	2,81	0,04	12,14
Lgnppc	716	8,00	1,08	5,63	10,37
Enpopdns	1404	235,16	1237,43	0,10	21730,50
Politica	966	4,08	2,18	1,00	7,00
sppop65u	1435	5,57	3,63	0,00	17,87
sexpdtot	981	4,33	2,19	0,30	18,40
female	1384	36,45	10,61	3,88	55,02
spdynle0	1432	61,04	11,83	31,22	79,78

## References

- [1] Artecona, R. and M. Rama. (2001). "A Database of Labor Market Indicators Across Countries". Work in Progress, World Bank.
- [2] Brander, J. and B. Spencer. (1988). "Unionized Oligopoly and International Trade Policy". *Journal of International Economics* 24, 217-234.
- [3] Brecher, R. (1974). "Minimum Wages and the Pure Theory of International Trade". *Quarterly Journal of Economics* 88, February 98-116.
- [4] \_\_\_\_\_, (1992). "An Efficiency Wage Model with Explicit Monitoring". *Journal of International Economics* 32, 179-191.
- [5] \_\_\_\_\_, and N. V. Long (1989). "Trade Unions in an Open Economy: A General Equilibrium Analysis". *The Economic Record* September, pp.234-239.
- [6] Davis, D. (1996). "Trade Liberalization and Income Distribution". NBER Working Paper # 5693, August.
- [7] Davidson, R., and J. MacKinnon. (1993). "Estimation and Inference in Econometrics". Oxford University Press.
- [8] Davidson, C., L. Martin and S. Matusz. (1988). "The Structure of Simple General Equilibrium Models with Frictional Unemployment". *Journal of Political Economy* 96, 6 1267-1293.
- [9] \_\_\_\_\_.(1999). "Trade and Search Generated Unemployment". *Journal of International Economics* 48, 271-299.
- [10] Hosios, A. (1993). "Factor Market Search and the Structure of Simple General Equilibrium Models". *Journal of Political Economy* 98, 2 325-355.
- [11] McDonald, I. and R. Solow. (1981). "Wage Bargaining and Employment" *American Economic Review* 71:5, pp.896-908.

- [12] Mezzetti, C. and E. Dinopoulos. (1989). "Domestic Unionization and Import Competition". Working Paper No. 337, University of California, Davis.
- [13] \_\_\_\_\_. (1991). "Domestic Unionization and Import Competition". *Journal of International Economics* 31, 71-100.
- [14] Panagariya, A. (1999). "Trade Openness: Consequences for the Elasticity of Demand for Labor and Wage Outcomes" Mimeo, University of Maryland.
- [15] Rodriguez, F. (1999). "Inequality, Redistribution and Rent-Seeking". Mimeo, University of Maryland.
- [16] Rodrik, D. (1997). "Has Globalization Gone too Far?". Institute for International Economics, Washington D.C.
- [17] Xu, B. (2000). "Trade Liberalization, Wage Inequality and Endogenously Determined Nontraded Goods". Mimeo, University of Florida.



Table 2 | 1 : Dependent Variable: Logit Transform of Nationwide Capital Share  
(Fixed Effects Regressions)

	1	2	3	4
Openness	0:00525 (3:74)	0:00863 (4:26)	0:00828 (4:07)	0:00722 (3:50)
Human K		̇ 0:02080 (̇ 0:62)	̇ 0:01988 (̇ 0:59)	̇ 0:00368 (̇ 0:11)
Log GNP	̇ 0:01674 (̇ 0:48)	0:00182 (0:02)	0:01877 (0:16)	̇ 0:00516 (̇ 0:04)
Pop Density		̇ 0:00102 (̇ 1:73)	̇ 0:00107 (̇ 1:81)	̇ 0:00105 (̇ 1:81)
Political			0:03032 (1:32)	0:02583 (1:03)
Pop >65				̇ 0:00511 (̇ 0:16)
Exp Educ				̇ 0:06782 (̇ 3:15)
Female LF Partic				̇ 0:01362 (̇ 1:04)
Life Exp				̇ 0:00937 (̇ 0:55)
Time Dummies	NO	YES	YES	YES
No. of Obs.	322	215	215	204
No. of Groups	94	68	68	65

Table 2 : 2 : Dependent Variable: Logit Transform of Manufacturing Capital Share  
(Fixed Effects Regressions)

	1	2	3	4
Openness	0:00469 (2:94)	0:00764 (4:21)	0:00852 (4:34)	0:00833 (4:09)
Human K		0:00002 (0:00)	0:00446 (0:11)	0:00661 (0:16)
Log GNP	0:07174 (1:70)	0:1362 (1:01)	0:16335 (1:21)	0:21346 (1:42)
Pop Density		0:00041 (1:83)	0:0001 (0:33)	0:00009 (0:31)
Political			0:03269 (1:54)	0:04541 (2:03)
Pop >65				0:02942 (0:77)
Exp Educ				0:00673 (0:31)
Female LF Partic				0:00585 (0:44)
Life Exp				0:03886 (2:02)
Time Dummies	NO	YES	YES	YES
No. of Obs.	338	301	297	279
No. of Groups	100	88	87	84

Table 2 i 3 : Dependent Variable: Logit Transform of Nationwide Capital Share  
(Fixed Effects Regressions)

	1	2	3	4
Openness	0:00817 (3:60)	0:00596 (2:40)	0:00598 (2:39)	0:00497 (2:00)
Terms of Trade	1:43869 (2:84)	1:51846 (2:30)	1:52132 (2:29)	0:88133 (1:18)
Human K		i 0:00405 (i 0:09)	i 0:00451 (i 0:10)	0:00962 (0:21)
Log GNP	0:01353 (0:26)	i 0:28569 (i 1:79)	i 0:28535 (i 1:78)	i 0:24205 (i 1:44)
Pop Density		i 0:00571 (i 3:57)	i 0:00571 (i 3:55)	i 0:00482 (i 3:02)
Political			i 0:00341 (i 0:11)	i 0:02047 (i 0:58)
Pop >65				i 0:00696 (i 0:16)
Exp Educ				i 0:07816 (i 2:84)
Female LF Partic				i 0:01963 (i 1:16)
Life Exp				i 0:01804 (i 0:74)
Time Dummies	NO	YES	YES	YES
No. of Obs.	188	166	166	156
No. of Groups	75	67	67	64

Table 2 | 4 : Dependent Variable: Logit Transform of Manufacturing Capital Share  
(Fixed Effects Regressions)

	1	2	3	4
Openness	0:00529 (2:35)	0:01010 (3:90)	0:01102 (4:13)	0:01018 (3:53)
Terms of Trade	0:42973 (0:71)	0:11741 (0:16)	0:13047 (0:18)	0:31926 (0:38)
Human K		0:03566 (0:60)	0:02250 (0:37)	0:02208 (0:35)
Log GNP	0:04112 (0:69)	0:31568 (1:70)	0:33791 (1:81)	0:48948 (2:42)
Pop Density		0:00051 (1:65)	0:00029 (0:59)	0:00021 (0:41)
Political			0:03365 (1:20)	0:04336 (1:38)
Pop >65				0:05613 (0:98)
Exp Educ				0:02231 (0:79)
Female LF Partic				0:00089 (0:05)
Life Exp				0:03153 (1:14)
Time Dummies	NO	YES	YES	YES
No. of Obs.	264	234	231	214
No. of Groups	99	87	86	83

Table 2 j 5 : Dependent Variable: Logit Transform of Sector Capital Share  
(Fixed Effects Regressions)

	Coef. on Trade	t-stat	NObs	NGroups
Beverages	0:01121	(3:90)	272	81
Fabricated Metal	0:00857	(3:31)	275	84
Food	0:01010	(2:89)	284	85
Footwear	0:00435	(1:26)	247	74
Chemical Industry	0:01511	(4:57)	249	73
Iron	0:01191	(2:70)	219	65
Leather	0:00512	(1:42)	238	72
Electric Materials	0:01367	(3:85)	252	74
Non Ferrous Metals	0:01102	(2:20)	206	62
Other Chemicals	0:00982	(4:39)	260	76
Other Manufacturing	0:00783	(1:96)	264	78
Other Metal	0:01340	(4:18)	262	79
Plastic	0:00543	(2:12)	249	72
Pottery	0:00116	(0:26)	221	65
Printing	0:00767	(2:15)	259	78
Profesionals	0:00982	(2:31)	215	63
Textiles	0:00594	(1:66)	253	73
Tobacco	0:01601	(3:89)	248	73
Transportation	0:01760	(4:25)	251	74
Wearing Apparel	0:00815	(2:57)	252	75
Furniture	0:01159	(3:60)	264	79
Glass	0:01137	(2:98)	232	66
Non Electricity Materials	0:01021	(2:81)	245	73
Paper	0:01394	(4:62)	261	76
Primary Extraction of Coal	0:01803	(3:13)	171	55
Re...nery	0:00376	(0:53)	199	61
Rubber	0:00281	(0:80)	246	72
Wood	0:01148	(3:81)	258	75

Table 2 | 6 : Dependent Variable: Logit Transform of Capital Share  
(Fixed Effects Regressions)

	Nationwide Capital Share			Manufacturing Capital Share		
	All	Low	High	All	Low	High
Openness	̇ 0:01003 (̇ 1:11)	0:00502 (1:13)	0:01002 (4:03)	0:00728 (0:81)	0:00531 (1:25)	0:00906 (3:46)
GNP*Open	0:00211 (1:96)			0:00013 (0:12)		
Human K	̇ 0:00738 (̇ 0:22)	̇ 0:02079 (̇ 0:15)	̇ 0:03672 (̇ 1:09)	̇ 0:00684 (̇ 0:17)	̇ 0:22864 (̇ 2:08)	0:07732 (1:77)
Log GNP	̇ 0:20363 (̇ 1:24)	̇ 0:81893 (̇ 2:31)	0:69026 (3:57)	̇ 0:22490 (̇ 1:26)	̇ 0:54142 (̇ 2:08)	0:11845 (0:47)
Pop Density	̇ 0:00155 (̇ 2:47)	̇ 0:00193 (̇ 0:37)	̇ 0:00079 (̇ 1:59)	̇ 0:00014 (̇ 0:29)	̇ 0:00328 (̇ 2:16)	̇ 0:00026 (̇ 0:84)
Political	0:02162 (0:87)	0:06736 (0:98)	0:09406 (2:95)	0:04522 (2:01)	0:08213 (2:30)	̇ 0:00734 (̇ 0:23)
Pop >65	0:01581 (0:48)	0:00399 (0:03)	0:00103 (0:03)	0:03043 (0:78)	0:09561 (0:67)	0:00611 (0:15)
Exp Educ	̇ 0:06812 (̇ 3:20)	̇ 0:08687 (̇ 1:56)	̇ 0:03972 (̇ 1:66)	̇ 0:00682 (̇ 0:31)	0:00321 (0:10)	0:00111 (0:04)
Fem. LF Part.	̇ 0:01571 (̇ 1:21)	̇ 0:00066 (̇ 0:02)	̇ 0:00670 (̇ 0:46)	0:00548 (0:40)	̇ 0:04186 (̇ 1:20)	0:04327 (2:39)
Life Exp	̇ 0:00283 (̇ 0:17)	0:06174 (1:18)	̇ 0:00640 (̇ 0:28)	0:03950 (1:98)	0:08091 (2:35)	0:05581 (1:59)
No. of Obs.	204	70	134	279	121	158
No. of Groups	65	34	46	84	50	55

Note: GNP\*Open is Log(GNP per capita)\*Openness, "Low" and "High" refer to below and above average per capita income

Table 2 i 7 : Dependent Variable: Logit Transform of Nationwide Capital Share  
(Fixed Effects Regressions)

By Quintile	1st	2nd	3rd	4th	5th
Openness	0:0127 (1:91)	0:0113 (2:28)	i 0:0017 (i 0:65)	0:0056 (1:75)	0:0112 (3:53)
Log GNP	i 0:0022 (i 0:01)	0:1666 (0:59)	0:3674 (2:18)	i 0:224 (i 0:95)	0:0623 (0:95)
No. of Obs.	46	37	51	75	113
No. of Grps	22	24	32	45	34

By Region	easia	scasia	oecd	laam	ssa	mena	eucas
Openness	0:0064 (1:78)	0:0028 (0:35)	0:0070 (3:07)	0:0070 (2:20)	0:0109 (2:34)	0:0090 (1:91)	i 0:0021 (i 0:58)
Log GNP	i 0:3083 (i 3:35)	i 0:1608 (i 1:65)	0:0882 (3:09)	0:0663 (0:65)	0:1674 (1:50)	i 0:2753 (i 1:61)	i 0:1820 (i 0:94)
No. of Obs.	27	7	105	49	63	32	39
No. of Grps	7	2	22	15	23	8	17

Note: easia=East Asia, scasia=South and Central Asia,  
oecd=OECD, laam=Latin America, ssa=Sub-Saharan Africa  
mena=Middle East and North Africa, eucas=Eastern Eur. & Cent. Asia

Table 2 j 8 : Dependent Variable: Logit Transform of Nationwide Capital Share  
(First Difference IV Regressions, Excl. Rest. Test)

	(A)				(B)			
	1	2	3	4	1	2	3	4
Openness	0:029 (3:2)	0:025 (3:2)	0:025 (3:2)	0:021 (2:4)	0:029 (1:8)	0:024 (1:9)	0:024 (1:9)	0:019 (1:6)
TOT					0:062 (0:0)	0:177 (0:2)	0:171 (0:2)	0:294 (0:3)
Human K	j 0:001 (j 0:0)	0:005 (0:1)	0:005 (0:1)	0:017 (0:3)	j 0:001 (j 0:0)	0:005 (0:1)	0:005 (0:1)	0:017 (0:3)
Log GNP	j 0:366 (j 1:5)	j 0:153 (j 0:7)	j 0:154 (j 0:7)	j 0:160 (j 0:7)	j 0:365 (j 1:5)	j 0:159 (j 0:7)	j 0:159 (j 0:7)	j 0:167 (j 0:8)
Pop Dens.		j 0:003 (j 0:9)	j 0:003 (j 0:9)	j 0:003 (j 0:9)		j 0:003 (j 1:0)	j 0:003 (j 1:0)	j 0:003 (j 1:0)
Political			0:002 (0:1)	0:001 (0:0)			0:004 (0:1)	0:004 (0:1)
Pop >65				j 0:001 (j 0:0)				j 0:001 (j 0:0)
Exp Educ				j 0:034 (j 0:9)				j 0:035 (j 1:0)
F. LF Prt.				j 0:012 (j 0:5)				j 0:013 (j 0:5)
Life Exp				j 0:007 (j 0:2)				j 0:004 (j 0:1)
No. Obs.	96	94	94	88	96	94	94	88
No. Gps	53	52	52	48	53	52	52	48

Note: (A) uses  $TOT_{it}$ ,  $Open_{i(t-1)}$  and  $Open_{i(t-2)}$  as instruments,  
(B) uses only  $Open_{i(t-1)}$  and  $Open_{i(t-2)}$  as instruments



Table 2 | 9 : Dependent Variable: Logit Transform of Manufacturing Capital Share  
(First Difference IV Regressions, Excl. Rest. Test)

	(A)				(B)			
	1	2	3	4	1	2	3	4
Openness	$\hat{0}:006$ ( $\hat{0}:6$ )	$\hat{0}:004$ ( $\hat{0}:5$ )	$\hat{0}:004$ ( $\hat{0}:4$ )	$\hat{0}:004$ ( $\hat{0}:5$ )	$\hat{0}:014$ ( $\hat{1}:1$ )	$\hat{0}:007$ ( $\hat{0}:8$ )	$\hat{0}:009$ ( $\hat{0}:9$ )	$\hat{0}:008$ ( $\hat{0}:9$ )
TOT					1:205 (1:1)	0:664 (0:7)	0:900 (0:9)	0:905 (0:9)
Human K	$\hat{0}:022$ ( $\hat{0}:3$ )	$\hat{0}:014$ ( $\hat{0}:2$ )	$\hat{0}:009$ ( $\hat{0}:1$ )	$\hat{0}:011$ ( $\hat{0}:2$ )	$\hat{0}:051$ ( $\hat{0}:6$ )	$\hat{0}:028$ ( $\hat{0}:4$ )	$\hat{0}:030$ ( $\hat{0}:4$ )	$\hat{0}:030$ ( $\hat{0}:4$ )
Log GNP	$\hat{0}:233$ ( $\hat{0}:7$ )	$\hat{0}:143$ ( $\hat{0}:6$ )	$\hat{0}:137$ ( $\hat{0}:53$ )	$\hat{0}:202$ ( $\hat{0}:7$ )	$\hat{0}:098$ ( $\hat{0}:3$ )	$\hat{0}:130$ ( $\hat{0}:5$ )	$\hat{0}:111$ ( $\hat{0}:4$ )	$\hat{0}:192$ ( $\hat{0}:7$ )
Pop Dens.		0:000 (0:2)	$\hat{0}:000$ ( $\hat{0}:1$ )	0:000 (0:0)		0:000 (0:4)	0:000 (0:1)	0:000 (0:1)
Political			0:051 (1:7)	0:049 (1:6)			0:059 (1:8)	0:057 (1:7)
Pop >65				0:022 (0:3)				0:012 (0:2)
Exp Educ				$\hat{0}:056$ ( $\hat{1}:7$ )				$\hat{0}:054$ ( $\hat{1}:6$ )
F. LF Prt.				0:029 (1:2)				0:032 (1:2)
Life Exp				0:031 (1:0)				0:039 (1:1)
No. Obs.	140	138	136	125	140	138	136	125
No. Gps	79	78	77	71	79	78	77	71

Note: (A) uses  $TOT_{it}$ ,  $Open_{i(t-1)}$  and  $Open_{i(t-2)}$  as instruments,  
(B) uses only  $Open_{i(t-1)}$  and  $Open_{i(t-2)}$  as instruments

Table 4 | 1 : Dependent Variable: Logit Transform of Nationwide Capital Share  
(Fixed Effects Regressions)

	Below Average				Above Average			
	1	2	3	4	1	2	3	4
Openness	0:007 (3:1)	0:004 (1:1)	0:004 (1:0)	0:005 (1:4)	0:007 (2:8)	0:01 (2:8)	0:008 (2:6)	0:004 (1:1)
Human K		0:028 (0:3)	0:032 (0:4)	0:064 (0:7)		0:025 (0:7)	0:052 (1:6)	0:013 (0:4)
Log GNP	0:164 (2:5)	0:376 (1:7)	0:370 (1:7)	0:517 (2:2)	0:065 (1:3)	0:209 (0:5)	0:435 (1:3)	0:134 (0:4)
Pop Dens		0:006 (3:0)	0:006 (2:9)	0:005 (2:8)		0:000 (0:0)	0:001 (0:4)	0:001 (0:3)
Political			0:008 (0:2)	0:071 (1:7)			0:161 (3:7)	0:082 (1:4)
Pop > 65				0:069 (1:1)				0:069 (1:6)
Exp Educ				0:098 (2:2)				0:072 (2:0)
F. LF Prt.				0:022 (0:9)				0:056 (2:4)
Life Exp				0:122 (3:3)				0:012 (0:5)
No. Obs.	97	72	72	69	86	69	69	69
No. Gps	39	31	31	31	33	27	27	27

Note: Above and Below average refers to average trade union membership.

Table 4 | 2 : Dependent Variable: Logit Transform of Manufacturing Capital Share  
(Fixed Effects Regressions)

	Below Average				Above Average			
	1	2	3	4	1	2	3	4
Openness	0:0002 (1:0:1)	0:006 (2:0)	0:004 (1:2)	0:003 (0:8)	0:007 (1:6)	0:016 (3:4)	0:016 (3:7)	0:012 (2:3)
Human K		0:212 (1:2:1)	0:246 (1:2:4)	0:283 (1:2:7)		0:013 (1:0:2)	0:025 (1:0:5)	0:000 (0:0)
Log GNP	0:205 (2:5)	0:322 (1:1:3)	0:221 (1:0:9)	0:641 (1:2:1)	0:094 (1:1)	0:458 (1:1:0)	0:999 (1:2:2)	0:693 (1:1:5)
Pop Dens		0:0004 (1:1:2)	0:001 (1:1:1)	0:001 (1:1:0)		0:005 (1:0:9)	0:005 (1:1:1)	0:007 (1:1:5)
Political			0:078 (2:0)	0:081 (2:0)			0:143 (3:0)	0:072 (1:3)
Pop >65				0:075 (0:9)				0:089 (1:7)
Exp Educ				0:041 (0:9)				0:084 (1:1:7)
F. LF Prt.				0:023 (1:1:0)				0:029 (0:9)
Life Exp				0:038 (1:3)				0:068 (2:0)
No. Obs.	138	123	119	113	85	79	79	79
No. Gps	61	55	54	52	34	33	33	33

Note: Above and Below average refers to average trade union membership









