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# North-South Customs Unions and International Capital Mobility

*Eduardo Fernandez-Arias*
*Mark M. Spiegel*

North-South trade accords
can serve as "credibility-
enhancing" mechanisms for
the treatment of foreign
investment, inducing
additional inflows of foreign
capital.

The presence of sovereign
risk changes the tradeoffs
between trade creation and
diversion, enhancing the
potential for welfare-
increasing, trade-diverting
North-South regional trade
accords. North-South
integration involves different
issues than did previous trade
accords, but a nation still
does best by the integration
that yields the greatest gains
from trade.

## Summary findings

The primary distinction in a North-South trade accord is likely to be that the Southern nation experiences more capital scarcity than its Northern trade partner. So the trade accord's impact on the Southern trading partner's ability to attract capital may have welfare implications for both nations.

Fernandez-Arias and Spiegel extend the traditional analysis of customs unions to allow for international capital movements. Their results indicate that trade accords may affect the ability of Southern nations to attract capital and may divert capital between Southern nations.

Moreover, the welfare implications of North-South trade accords may differ from those that predict the North American Free Trade Agreement's (NAFTA) minor third-country effects, holding factor endowments constant.

The key implications of North-South trade accords such as NAFTA are generally perceived to involve their impact on investment flows. Fernandez-Arias and Spiegel try to understand the channels through which trade accords can affect North-South investment flows.

A potential link between trade accords and investment flows may be how the accords affect the ability of the Southern partner government to make commitments about the treatment of foreign investment. They show that these accords can affect both the magnitude and pattern of inward foreign investment and production, implying the possibility that both trade and financial diversion can stem from a bilateral regional trade accord.

Novel effects that emerge under sovereign risk must be addressed when assessing the welfare implications of trade accords. The greatest gains from integration are still achieved when integration takes place between the countries with the greatest potential gains from trade. But Fernandez-Arias and Spiegel make a distinction: these gains now include both current trade and inter-temporal trade through foreign investment.

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# North-South Customs Unions and International Capital Mobility

*Eduardo Fernandez-Arias*
International Economics Department
The World Bank

*Mark M. Spiegel*
Department of Economic Research
Federal Reserve Bank of San Francisco

## I. Introduction

The recent debate concerning the North American Free Trade Agreement (NAFTA) in both policy circles and the popular press suggested that the primary impact of the regional trade accord would not be a small reduction in already low tariff levels between the NAFTA partners, but a fundamental change in the attractiveness of Mexico as a location for investment, resulting in a large amount of capital movement between the Northern and Southern trading partners. This claim was popularized by such opponents of NAFTA as Ross Perot who claimed that NAFTA would create a "large sucking sound" as capital flowed from North to South in response to the trade accord. Indeed, there is some evidence that "financial diversion" has taken place in response to North-South integration, both in the case of Portugal and Spain in the EEC and Mexico under NAFTA [Primo Braga (1993)].

Despite the consensus that the impact of trade accords on capital movements is potentially important, the issue seems to have received less attention in the standard literature on the welfare implications of customs unions,[1] which center on the trade-off between trade creation and trade diversion.[2] We should note that this is even true of more recent analyses of trade accords which stress both strategic issues [McLaren (1993), Bagwell and Staiger (1993)] and the political-economic implications of trade accords [Grossman and Helpman (1993)]. The reason for this gap in the literature is probably historical. Prior to NAFTA, successful regional trade

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[1]See Lipsey (1960) and de Melo et al (1993) for extensive early and more recent surveys.

[2]Notable exceptions include Miyagiwa and Young (1986) who explicitly introduce factor mobility into their analysis of customs unions in a different context, and Manchester and McKibbin (1994) who analyze the implications of an ad hoc decrease in Mexico's risk premium as a result of the NAFTA accord.

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areas tended to be between Northern countries, such as the EEC and the US-Canada free trade area. As the first major North-South free trade area, the NAFTA raises issues which are not central to North-North trade accords.

The primary distinction in a North-South trade accord is likely to be that the Southern nation is physical capital scarce relative to its Northern trade partner. Consequently, the impact of the trade accord on the ability of the Southern trading partner to attract capital may have welfare implications for both Northern and Southern nations. In this paper, we extend the traditional analysis of customs unions to allow for international capital movements. Our results indicate that trade accords may affect the ability of Southern nations to attract capital, and may divert capital between Southern nations. Moreover, the welfare implications of North-South trade accords may differ from those which predict minor third-country impacts of NAFTA holding factor endowments constant [Safadi and Yeats (1993)].

We begin by introducing a model of a bi-lateral free trade accord between a Northern and Southern nation which relies on capital from the North for production in its foreign sector. The model is one where the Southern nation faces a standard timing-inconsistency problem concerning levels of taxation on foreign investment. The Southern nation then commits to national treatment, or equal levels of taxation, towards foreign investments under the trade accord. We then show that the trade accord can be an effective mechanism for achieving enlarged levels of commitment towards foreign investments and therefore can generate additional capital inflows from the North.

There is some anecdotal evidence that Southern nations already understand the potential of bi-lateral and multilateral treaties as a mechanism for achieving greater international credibility. Mexico has explicitly committed to national treatment and codified numerous investment regime liberalizations towards its NAFTA

partners under the NAFTA accord, even though it had previously underwent a large reform program in 1989 [Hufbauer and Schott (1992)]. Apparently, the reason for repeating these liberalizations under NAFTA was that tying their commitments to the trade accord provided an explicit mechanism for penalizing their violation towards investors from NAFTA partner countries. For example, prior to the NAFTA accord, Hufbauer and Schott (1992) predicted that "Since regulations are more easily changed than laws, the United States and Canada are likely to seek commitments from Mexico in the NAFTA to make regulatory reform more permanent." Along similar lines, Chile offered to unilaterally commit to some liberalizing policies under the Uruguay round of the GATT.[3] The ability to use trade accords as credibility-enhancing mechanisms may therefore be an aspect of regional trade accords which may be particularly important in North-South agreements.[4]

We next examine the implications of a trade accord between a Northern nation and a Southern nation in a 3-country model of foreign direct investment in which Northern investors choose the magnitude of investment in the Southern partner nation and an alternative potential Southern target nation. We demonstrate that the standard analysis of trade-diverting customs unions must be adjusted to account for changes from the union in the risk characteristics of the trading partners. The union enhances the safety of investments in the Southern partner nation, increasing the

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[3]We thank Andres Velasco for providing this example.

[4]Perroni and Whalley (1993) interpret the same liberalizations as concessions to larger entities in return for insurance against trade wars. These two interpretations do not necessarily conflict; if a mutually beneficial agreement requires these liberalization "concessions," a Southern trade partner may be unable to achieve the agreement in the absence of the greater commitment capacity the accord brings in the context of our analysis below.

gains experienced by the Northern partner nation from trading with its Southern partner. This enhances the potential for the regional trade accord to be welfare increasing, even when trade is diverted from a more productive alternative Southern location for production.

The remainder of this paper is divided into three sections. Section 2 introduces the basic model and demonstrates how the trade accord can affect the credibility of the Southern partner government and the magnitude of its capital inflows. Section 3 examines the 3-country case with both trade creation and diversion. Section 4 concludes.

## II. A Simple Two-period Model of Foreign Direct Investment Under a Trade Accord
### 2.1 Setup

In this section, we introduce a simple two-period model of foreign direct investment from a Northern nation to a Southern nation enforced by a bi-lateral trade accord. We assume that there are 2 countries in the accord, which we call the Northern partner and the Southern partner. The Southern partner nation produces a single good, $s$, and exports that good to the Northern partner. For simplicity, we assume that all output is exported, so that the Southern partner government is only interested in maximizing domestic income. In the absence of a trade accord, the Northern partner charges its "most-favored-nation" tariff of $\bar{\tau}$ on all imports of $s$, including those from the Southern partner.

We take the exports of the Northern partner as numeraire, and assume that the Northern partner nation is large relative to the Southern partner nation. The Southern partner enjoys a tariff advantage under the trade accord. Exports originating in the Southern partner nation earn price $P(1+\bar{\tau})$ (the consumer price inclusive of the tariff) under the accord, and $P$ in its absence.

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The Southern partner nation is endowed with a domestic sector which produces quantity $s_s$ of good $s$, where $s_s$ is taken as exogenous. The foreign sector produces quantity $s_n$ of good $s$ using its imported foreign capital $K_n$, which is determined below, according to the constant returns production function:

(1) $$s_n = AK_n$$

where $A$ is a constant.

The Southern partner charges a tax on the output of domestic and foreign owners of capital, and is assumed to have made a "pledge" of national treatment towards foreign investment. Formally, we model the implications of this pledge as a commitment to tax domestic and foreign output at the same rate, which we designate as $t$. In the absence of a trade accord, the only mechanism which binds this commitment is the value that the Southern partner government places on its "goodwill" in the international community.[5] We model the penalty for loss of goodwill as a proportion of the value of the economic resources of the economy. Since the importance of goodwill is uncertain to investors, and likely to be affected by external parameters, we specify this proportion as a stochastic function, $\phi\Omega$, where $\phi$ is an exogenous positive constant fraction and $\Omega$ is distributed according to the density function $f(\Omega)$ along the interval $[0,1]$,[6] $f'>0$. Note that since $f(\Omega)$ is invariant with respect

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[5]National treatment is assumed only for concreteness; the results hold true for any given tax pledge $t$. Here we assume that the nationality of foreign investors cannot be observed and, therefore, the loss of "goodwill" applies equally to all foreign investment and all Northern investors equally benefit from the accord. In practice, some degree of nationality discrimination favoring firms associated with the Northern partner nation is likely to be feasible.

[6]The restriction to the unit interval is done for notational simplicity and without

to *t*, a Southern partner nation choosing to abrogate national treatment will choose to fully tax the proceeds of the Northern subsidiary.[7]

The strategic interaction between the North and the South has the following extensive form: In the first stage, Northern investors choose the magnitude of capital, $K_n$, to extend to the Southern partner. In the second stage, $\Omega$ is realized and the penalty faced by the Southern partner for violating her pledge of national treatment to foreign investors is determined. In the third stage, the Southern partner decides whether to comply with its pledge of national treatment or to tax foreign investment at a higher rate. We assume that all government revenues are distributed lump-sum to domestic agents.

*2.2 Southern Partner Government Taxation Decision.*

To insure sub-game perfection, we begin with the stage three decision of the Southern partner concerning compliance with national treatment. The Southern partner government is assumed to levy a domestic tax of rate *t* on output $(t < 1)$, which we take as given.[8]

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any loss of generality (provided that $\phi\Omega$ is in the unit interval) since we have placed no restriction on the form of *f(Ω)*.

[7]While our simple specification yields full taxation under violation of national treatment, actual expropriation of foreign investment is relatively rare, particularly recently [Kobrin (1984)]. Nevertheless, this simplification drives none of the qualitative results.

[8]The analysis begs the question of the "optimal tax" for maximizing government revenues from the foreign sector. However, we do not pursue the analysis here both because domestic taxes are the outcomes of much more complicated processes and because even within the confines of this simple model we found that the optimal level

The Southern partner government then chooses whether to comply with national treatment and charge $t$ to its foreign investors or to violate national treatment and fully tax foreign sector output. We assume that the Southern partner nation is expelled from the trade accord under violation of national treatment. Consequently, under compliance, Southern partner nation income is equal to:

$$(2) \qquad W = P(1+\bar{\tau})[ts_n + s_s],$$

while under full taxation income satisfies:

$$(3) \qquad \hat{W} = P[s_s + s_n](1 - \phi\Omega).$$

The trade accord therefore enhances the potential penalty for violation of national treatment. In the absence of the trade accord, only the goodwill penalty can be applied. Under the trade accord, however, violation leads to the goodwill penalty plus the loss of terms of trade advantage.

Define $\Omega^*$ as the realization of $\Omega$ which leaves the Southern partner government indifferent between compliance with national treatment and full taxation of the foreign sector $(W=\hat{W})$. The existence of such a realization $\Omega^*$ requires the realistic assumption that the probability of violation of national treatment is strictly between $0$ and $1$, so that $0<\Omega^*<1$. This is ensured by assuming that in the absence of country risk, investment would earn positive profits. $\Omega^*$ satisfies:

$$(4) \qquad \Omega^* = \frac{1}{\phi}\left[1 - (1+\bar{\tau})(ts_n+s_s)/(s_n+s_s)\right].$$

Equation (4) demonstrates the characteristics of the Southern partner government taxation decision. First, the larger is the foreign sector output $s_n$, ceteris paribus, the more likely is full taxation, since the gains from full taxation

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of $t$ turns out to be very poorly behaved as a function of $\bar{\tau}$.

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are larger. This is similar to the "opportunism" case in Cole and English (1991). Second, the risk of full taxation is decreasing in the level of the national treatment tax rate, $t$. The intuition behind this result is that the larger is the level of the domestic tax rate on the foreign sector, the lower the additional gains from full taxation. Third, since both the gains from, and the penalties for, violation of national treatment are proportionate to the price level, the price level does not enter as an argument. Finally, the risk of violation of national treatment is decreasing in the tariff advantage enjoyed under the trade accord, $\bar{\tau}$.

We can then define $\theta$ as the probability that the Southern partner complies with national treatment. $\theta$ satisfies:

$$(5) \qquad \theta = \int_{\Omega^*}^{1} f(\Omega)d\Omega.$$

Combining equations (4) and (5), $\theta$ is a function of $K_n$ and $\bar{\tau}$. We can then characterize the relationship between $\theta$ and $K_n$ and $\bar{\tau}$ as:

$$(6) \qquad \partial\theta/\partial\bar{\tau} = f(\Omega^*)(1/\phi - \Omega^*)/(1+\bar{\tau}) > 0.$$

$$(7) \qquad \partial\theta/\partial K_n = - f(\Omega^*)(1+\bar{\tau})A(1-t)s_s/\phi(s_n+s_s)^2 < 0.$$

*2.3 Northern Agents' Investment Decision.*

The Northern investors are assumed to be risk neutral and have access to international capital markets at rate $r$. We assume that the investment of the representative owner of foreign capital in the Southern partner nation is sufficiently small that its liability associated with this investment is not limited. Since individual foreign investors are small relative to the Southern partner nation, they also take $\theta$ as given when making their investment decision. The zero-profit condition then satisfies:

(8)
$$\theta(1-t)P(1+\bar{\tau})A = r$$

The above expression implicitly defines the equilibrium solution $K_n(\bar{\tau})$. As a notational convenience, we can express the price earned by the Southern partner nation as $P(1+\tau)$, where in the absence of the accord $\tau=0$ and under the accord $\tau=\bar{\tau}$. Substituting $\tau$ for $\bar{\tau}$ in (6), (7), and (8) and totally differentiating yields:

(9)
$$\frac{dK_n}{d\tau} = - \frac{\theta/(1+\tau) + (\partial\theta/\partial\tau)}{\partial\theta/\partial K_n} > 0.$$

There are two independent channels, which are captured by the numerator of (9), through which an increase in $\tau$ serves to attract foreign capital. The first term reflects the terms of trade improvement experienced by the Southern partner nation. The second term reflects the decrease in the probability of expropriation due to the enhanced potential penalty associated with the price effect of losing the trade accord. The greater are the price benefits of the accord to the Southern partner nation as measured by $\tau$, therefore, the greater is the increase in the penalty for expropriation and hence the increase in the magnitude of capital inflows.

### 2.4 Impact on Southern Partner Income

While the small country assumption maintained in this section precludes any welfare implications for the North, the current setting provides a good overview of the income implications of the trade accord for the Southern Partner nation.

Define $E(U)$ as the expected income earned by the Southern partner nation. $E(U)$ satisfies:

(10)
$$E(U) = \theta W + \int_0^{\Omega^*} \hat{W}f(\Omega)d\Omega.$$

Invoking the envelope theorem, differentiating $E(U)$ with respect to $\tau$

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yields:

$$(11) \qquad \frac{\partial E(U)}{\partial \tau} = P\theta(ts_n + s_s) + [\theta P(1+\tau) + \int_0^{\Omega^*} (1-\phi\Omega)f(\Omega)d\Omega]\frac{dK_n}{d\tau}$$

Equation (11) identifies two channels through which the welfare of the Southern partner nation is affected by the trade accord: The first term reflects the direct positive increase in earnings due to the tariff advantage. The second term reflects the increase in expected revenue from the foreign sector due to the increase in foreign investment, defined by equation (9). Both of these terms are positive.

It is interesting to note the characteristics of the Southern partner nation which would cause it to experience greater income gains from the trade accord. First, the increase in income will be greater the greater is the magnitude of trade with the Northern partner nation. This stems both from the direct price effect on Southern exports and from the impact of the trade accord on the magnitude of capital inflows the Southern partner nation can attract, as shown in (9). Second, the Southern partner will experience greater benefits from the trade accord the greater is the initial safety of the Southern partner nation. Since increasing $\tau$ enhances the payoff under compliance with national treatment and fails to affect the payoff under violation, the impact of a change in the initial safety of the Southern partner nation will be a greater increase in the magnitude of capital inflows.

## III. Extension to Two Potential Target nations

### 3.1 Setup

In this section, we extend the analysis to allow the trade accord to affect the pattern of investment across the South. This requires us to treat the Southern partner country as "large" in terms of having market power with respect to the price of its export good. To accomplish this in as simple a manner as possible, we assume

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that there are two potential locations of production: Country $A$, the Southern partner nation, and country $B$, an alternative location, that can be thought as the rest of the South. We assume that the output of the two nations are perfect substitutes and maintain the assumption that individual northern firms behave competitively, despite the fact that their country has market power in aggregate. We also maintain the above assumption that all output is exported to the Northern partner nation, so that exports from country $A$ earn price $P(1+\bar{\tau})$ while exports from country $B$ earn price $P$.

Let $s_n^Z$ reflect the output of the foreign sector of country $Z$ $(Z=A,B)$. We assume that the production function for $s_n^Z$ satisfies:

$$(12) \qquad\qquad s_n^Z = zK_n^Z; \qquad (Z=A,B; \; z=a,b).$$

where $a$ and $b$ are constants representing the productivity of the Southern target countries $A$ and $B$ respectively, while $K_n^Z$ is the magnitude of foreign capital attracted by country $Z$.

Let $s^Z$ reflect the total output of exportables in country $Z$, $s^Z=s_n^Z+s_s^Z$, where $s_s^Z$ represents the output of country $Z$'s domestic sector and let $s$ represent aggregate industry output, $s=s^A+s^B$. The demand for the output of the Southern nations is assumed to be a downward-sloping function of output. Market demand satisfies $P(1+\bar{\tau})=D(s)$, where $D'\leq 0$.

As in equation (4), the zero-profit conditions for foreign investments in countries $A$ and $B$ with country $A$ in the trade accord satisfy:

$$(13a) \qquad\qquad \theta^A(1-t^A)P(1+\bar{\tau})a = r.$$

$$(13b) \qquad\qquad \theta^B(1-t^B)Pb = r.$$

In addition to the producer terms of trade, $P$, there are four determinants of the magnitude of foreign investment which will be attracted by the target countries. The first is country risk, determined by $\theta^A$ and $\theta^B$, the probabilities that

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countries $A$ and $B$ will comply with national treatment. The second is $t^A$ and $t^B$, the tax rates faced in the two countries given compliance. The third determinant is the relative productivity in countries $A$ and $B$, determined by parameters $a$ and $b$. The last determinant is the magnitude of the terms of trade advantage enjoyed by the Southern partner nation, $\bar{\tau}$.

### 3.2 Target nation taxation decision.

We again assume that both Southern nations have committed to national treatment towards foreign investors. We also assume that each nation faces a penalty of losing a $\phi^Z \Omega$ share of its output for violation of national treatment where $\phi^Z$ is an exogenous constant fraction and $\Omega$ is defined as above.[9]

Let $W^B$ represent the payoff to country $B$ from choosing compliance with national treatment. $W^B$ satisfies:

$$(14) \qquad W^B = P(t^B s_n^B + s_s^B).$$

Alternatively, let $\hat{W}^B$ represent the payoff to country $B$ from choosing complete taxation, which satisfies:

$$(15) \qquad \hat{W}^B = P(s_n^B + s_s^B)(1 - \phi^B \Omega).$$

Let $\Omega^{B*}$ represent the realization of $\Omega$ which leaves country $B$ indifferent between compliance and complete taxation $(W^B = \hat{W}^B)$. $\Omega^{B*}$ satisfies:

$$(16) \qquad \Omega^{B*} = \frac{1}{\phi^B}\left[1 - (t^B s_n^B + s_s^B)/(s_n^B + s_s^B)\right].$$

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[9]Allowing the countries to have different distributions of $\Omega$ would produce qualitatively the same results and would only be relevant in terms of diversification potential, which we do not focus on in this paper.

When making its taxation decision, country $A$ must consider the additional loss from losing the benefits of the trade accord. Let $W^A$ represent the payoff from complete compliance with national treatment. $W^A$ satisfies:

$$(17) \qquad W^A = P(1+\bar{\tau})(t^A s_n^A + s_s^A).$$

Alternatively, let $\hat{W}^A$ represent the payoff to country $A$ from choosing complete taxation, which satisfies:

$$(18) \qquad \hat{W}^A = P(s_n^A + s_s^A)(1 - \phi^A \Omega).$$

Let $\Omega^{A*}$ represent the realization of $\Omega$ which leaves country $A$ indifferent between compliance and complete taxation $(W^A = \hat{W}^A)$. $\Omega^{A*}$ satisfies:

$$(19) \qquad \Omega^{A*} = \frac{1}{\phi^A}\left[1 - (1+\bar{\tau})(t^A s_n^A + s_s^A)/(s_n^A + s_s^A)\right].$$

As noted in the previous section, a positive probability of full taxation requires a parameter restriction.[10] To motivate this parameter restriction, we make the assumption that under national treatment investment in countries $A$ and $B$ would earn positive profits in the absence of country risk. This is ensured by the constraint:

$$(20) \qquad (1-t^Z)zP \geq r; \qquad (Z=A,B; \ z=a,b).$$

$\theta^A$ and $\theta^B$ can then be found by substituting $\Omega^{A*}$ and $\Omega^{B*}$ respectively for $\Omega^*$ in equation (5) above. Totally differentiating with respect to $K_n^A$ and $K_n^B$ yields:

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[10]Alternatively, we could have generalized the analysis to include zero foreign investment in the form of corner solutions.

$$(21) \qquad \frac{\partial \theta^A}{\partial K_n^A} = -f(\Omega^{A*})(1+\bar{\tau})a(1-t^A)s_s^A/\phi^A (s_n^A+s_s^A)^2 < 0$$

and:

$$(22) \qquad \frac{\partial \theta^B}{\partial K_n^B} = -f(\Omega^{B*})b(1-t^B)s_s^B/\phi^B (s_n^B+s_s^B)^2 < 0.$$

As above, we express the price earned by the Southern partner nation as $P(1+\tau)$, where in the absence of the accord $\tau=0$ and under the accord $\tau=\bar{\tau}$. Substituting $\tau$ for $\bar{\tau}$ and totally differentiating yields:

$$(23a) \qquad \frac{\partial \theta^A}{\partial \tau} = f(\Omega^{A*})(1/\phi^A - \Omega^{A*})/(1+\bar{\tau}) > 0.$$

$$(23b) \qquad \frac{\partial \theta^B}{\partial \tau} = 0.$$

## 3.3 Implications for International Capital Flows

We can again examine the impact of the trade accord by conducting comparative static exercises concerning the implications of an increase in $\tau$. We show in the appendix that the comparative static results satisfy:

$$(24a) \qquad \frac{dK_n^A}{d\tau} = -\left[\theta^A + \frac{\partial \theta^A}{\partial \tau}(1+\tau)\right]\left[\frac{\partial \theta^B}{\partial K_n^B}P^2 + \theta^B bP'P\right]/\Delta > 0.$$

$$(24b) \qquad \frac{dK_n^B}{d\tau} = \left[\theta^A + \frac{\partial \theta^A}{\partial \tau}(1+\tau)\right]\left[a\theta^B P'P\right]/\Delta < 0.$$

where $\Delta$ is the determinant of the matrix of the system shown to be positive in the appendix and $P'=\partial P/\partial s \leq 0$.

The comparative static exercises demonstrate that the impact of the trade accord is an increase in investment in the Southern partner nation and a decrease in investment in the other Southern nation. The magnitude of this impact for both

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nations is increasing in $\theta^A$, the probability of compliance by country $A$ with national treatment, and $\partial\theta^A/\partial\tau$, the increase of this probability due to increases its terms of trade advantage under the trade accord. Consequently, the trade accord, by enhancing Southern partner credibility through granting it a tariff advantage, generally increases investment in the Southern partner nation at the expense of the Southern non-partner nation.

It is easy to show by contradiction that the expansion in output in country $A$ must be larger than the contraction in output in country $B$, resulting in a price decline. Assume that $P$ does not decline. Equations (10a) and (10b) imply that in equilibrium both countries would be riskier ($\theta^Z$ would be smaller). This is possible only if investment increases in both countries, which implies higher output and a decline in price. More formally, recall that the change in output with respect to $\tau$ in country $Z$ $(Z{=}A,B)$ satisfies $z\partial K_n^Z/\partial\tau$. The relative output change in the two countries satisfies:

$$(25) \qquad -\frac{b(dK_n^B/d\tau)}{a(dK_n^A/d\tau)} = \frac{ab\theta^B P'}{ab\theta^B P' + aP(\partial\theta^B/\partial K_n^B)} < 1$$

which demonstrates that aggregate output increases.

However, the impact on aggregate foreign investment is ambiguous depending on the relative productivity of the Southern partner. By equations (21a) and (21b):

$$(26) \qquad -\frac{dK_n^B/d\tau}{dK_n^A/d\tau} = \frac{a\theta^B P'}{b\theta^B P' + P(\partial\theta^B/\partial K_n^B)}.$$

Examining equation (26), if $a{\le}b$ (the Southern partner is less efficient than the rest of the South), the increased output must be supported by increased investment. If $a{>}b$, however, the superior productivity of the Southern partner may lead to smaller aggregate foreign investment from the North. In this case, while Southern aggregate output expands, investment from the rest of the South is diverted more than fully.

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The potential for investment diversion will also depend on the relative size of the Southern partner nation to other potential Southern locations for investment. To see this, let $\lambda$ represent the relative size of the Southern partner nation within the South, $\lambda = s^B/(s^A + s^B)$, and $\varepsilon$ represent the elasticity of Northern demand, $\varepsilon = -D's/D$. Substituting into (24) then yields:

$$(27) \qquad -\frac{dK_n^B/d\tau}{dK_n^A/d\tau} = \frac{a\theta^B \varepsilon\lambda}{b\theta^B \varepsilon\lambda + m.}$$

where $m = -(\partial\theta^B/\partial K_n^B)(P^2/s^A) > 0$ and bounded.

If the Southern partner nation represented the entire South, $\lambda$ converges to $0$ and the offsetting effects vanish. For more moderate values of $\lambda$, the results depend on the value $\varepsilon\lambda$. Smaller aggregate investment would result if the Southern partner is more productive $(a > b)$ and $\varepsilon\lambda$ is large enough (i.e. demand is highly elastic and/or the Southern partner is relatively small within the South). An interesting extreme case is obtained when the Southern partner is extremely small within the South (i.e. $\lambda$ is close to $I$). In that case it is easy to obtain that in the limit equation (21a) converges to equation (9). In general, the expressions obtained in the previous section correspond to the limiting cases $\lambda = I$, or the Southern partner being "small" within the South.


### 3.4 Welfare Analysis

#### 3.4.1 Impact on Northern Partner Welfare

Finally, we turn to the question of the welfare implications of the trade accord. Since citizens of countries $A$ and $B$ do not consume the output of the industry and production is competitive with the world rate of interest $r$ taken as given, there are two channels for the trade accord to affect welfare in this simple model: By affecting consumer surplus in the Northern partner nation, and by affecting the

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expected magnitude and distribution of Southern income.

We begin by analyzing the welfare impact of the trade accord on the Northern partner nation. As we showed above, the existence of the trade accord will result in a diversion of investment from country $B$ to country $A$. See Figure 1. Let $P_0$ and $P_1$ represent the equilibrium consumer price in the absence and presence of the trade accord respectively. The trade accord achieves a reduction in the price paid by consumers in the Northern trade partner from $P_0$ to $P_1$. However, only imports of the non-partner nation, represented in the graph by $s_1^B$, are subject to tariff. Assuming that all tariff revenues are repatriated to consumers, then, the net impact of the trade accord on Northern partner consumer surplus is equal to the area of region III (reflecting the mitigation of the trade distortion), plus area V (reflecting the price reduction in the portion of trade subject to tariffs, $s_1^B$) minus area IV (reflecting the reduction in tariff revenue in the portion not subject to tariffs, $s_1^A$, in excess of the price decline).

We analyze the impact of the trade accord formally by positing that the accord yields an advantage of terms of trade advantage of $\tau$, where $0 \leq \tau \leq \bar{\tau}$, and then integrating the implications of changes in $\tau$ from $0$ to $\bar{\tau}$. Let $\Delta W_N$ represent the resulting welfare change in the Northern partner nation. We show in the appendix that $\Delta W_N$ satisfies:

$$(28) \qquad \Delta W_N = \int_0^{\bar{\tau}} \left[ \Psi \left[ \theta^A + \frac{\partial \theta^A}{\partial \tau}(1+\bar{\tau}) \right] - Ps^A \right] d\tau$$

where $\Psi$ is defined in the appendix. $\Psi > 0$ is a necessary, but not sufficient, condition for $\Delta W_N > 0$.

$\Psi$ is of ambiguous sign due to the loss in tariff revenue from country $B$ resulting from trade diversion under the trade accord. This loss is increasing in $b$ and $\theta^B$, two terms which reflect the attractiveness of country $B$ as a location for

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production. Given that $\Psi$ is positive, which necessarily holds when the Northern partner nation benefits from the accord, (26) demonstrates that $\Delta W_N$ is increasing in both $\theta^A$ and $(\partial\theta^A/\partial\tau)$. Integration with country $A$ is more likely to be welfare enhancing for the Northern partner country the greater the security of investments in the Southern partner nation, and the greater the positive impact of the trade accord on the riskiness of investments in that country.

The intuition behind this result follows from the traditional customs union analysis of the trade-off between trade creation and trade diversion. Lowering the sovereign risk of your trading partner enhances your gains from trade with that trading partner. In the traditional literature, the welfare analysis of trade-diverting customs unions centers on choosing the proper customs union partner, i.e. that with which you will enjoy the greatest gains from trade. The trade accord, by enhancing the environment for foreign investment in country $A$, actually enhances the gains from trade with that country.

Moreover, the degree to which the trade accord enhances the penalty faced by the Southern partner nation for non-compliance with national treatment is directly increasing in the gains from trade between the Northern and Southern partner. Consequently, the impact of the accord on sovereign risk provides an independent reason that the potential for welfare gains are increasing in the gains from trade between the two partners.

### 3.7.2 Impact on Southern income.

The trade accord will affect the income of the two Southern nations through its impact on the value of the output the domestic sector of those nations and through its impact on tax revenues generated by foreign direct investment. Note that expected revenues must include payoffs in states where expropriation takes place.

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Define $E(U^Z)$ as the expected income earned by country $Z$ $(Z=A,B)$. $E(U^Z)$ satisfies:

$$(29) \qquad E(U^Z) = \theta^Z W^Z + \int_0^{\Omega^{Z*}} \hat{W}^Z f(\Omega) d\Omega; \qquad (Z=A,B).$$

Invoking the envelope theorem, differentiating $E(U^A)$ with respect to $\tau$ yields:

$$(30) \qquad \frac{\partial E(U^A)}{\partial \tau} = P\theta^A (t^A s_n^A + s_s^A) + P' \frac{\partial s}{\partial \tau} \frac{E(U^A)}{P} + a \frac{dK_n^A}{d\tau} \left[ \theta^A (1+\tau) t^A + \varphi^A \right]$$

where:

$$(31) \qquad \varphi^Z = \int_0^{\Omega^{*Z}} (1-\phi^Z \Omega) f(\Omega) d\Omega; \qquad (Z=A,B).$$

Equation (30) identifies three channels through which the welfare of the Southern partner nation is affected by the trade accord: The first term reflects the direct positive increase in earnings due to the tariff advantage. The second term reflects the decline in terms of trade suffered by the Southern partner nation due to the increase in supply. The third term reflects the increase in expected revenue from the foreign sector due to the increase in foreign investment. While the first and third terms are positive, the net impact on the Northern partner nation is ambiguous because of the negative terms of trade effect captured by the second term.

Similarly, differentiating $E(W^B)$ with respect to $\tau$ yields:

$$(32) \qquad \frac{\partial E(U^B)}{\partial \tau} = P' \frac{\partial s}{\partial \tau} \frac{E(U^B)}{P} + b \frac{dK_n^B}{d\tau} \left[ \theta^B t^B + \varphi^B \right] < 0.$$

The components of (32) are analogous to the final two components of (30). The first term reflects the decline in terms of trade suffered by country $B$ due to an increase in supply from the South, while the second term reflects the decrease in country $B$'s expected revenue from its foreign sector, due to the decrease in its foreign

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investment. These two effects are both negative, leading to the unambiguous result that the trade accord reduces the welfare of the alternative Southern nation.

With the possible exception of a large drop in market price due to the erosion of monopoly power, then, the accord favors the Southern partner nation and harms the other Southern nation. The impact on the South as a whole is therefore ambiguous. Combining equations (30) and (32) and simplifying yields:

$$(33) \quad \frac{\partial E(U^A + U^B)}{\partial \tau} = P\left[\theta^A(t^A s_n^A + s_s^A) + a\frac{dK_n^A}{d\tau}\left[\theta^A(1+\tau)t^A + \varphi^A\right] + b\frac{dK_n^B}{d\tau}\left[\theta^B t^B + \varphi^B\right]\right]$$

$$+ \frac{P'}{P}\frac{\partial s}{\partial \tau}\left[E(U^A) + E(U^B)\right].$$

Equation (33) indicates the ambiguity in the impact of the trade accord on Southern welfare as a whole. The second term in (33) is unambiguously negative, reflecting the deterioration in the terms of trade for the South due to the increase in output. To the degree that the trade accord erodes the ability of the South to exercise its monopoly power, it can lead to a deterioration in Southern terms of trade. Consequently, holding all else equal, the trade accord will be more likely to be welfare increasing for the South as a whole the greater is the elasticity of demand for its exports in the North.

Looking at the first term in (33), we see the direct impact of the increase in terms of trade for the Southern partner nation and the tradeoff between the impact of the increase in investment in the Southern partner nation and the decrease in investment in the alternate nation. This term is of ambiguous sign. Nevertheless, it is interesting to note that the term is increasing in $\theta^A t^A$ and decreasing in $\theta^B t^B$.

Holding all else equal, the welfare impact on the South as a whole is greater the larger is the relative tax rate weighted by the probability of compliance with national treatment in the Southern partner nation. The intuition behind this effect is that shifting output from a high tax country to a low tax country, holding capital inflows constant, results in a net loss in Southern tax revenues. This can also be understood as an "erosion of monopoly power" effect. The ability of country $B$ to tax its foreign sector and still attract capital inflows is hindered by the quality of the environment of country $A$ as a haven for foreign investment. The trade accord, by enhancing this environment, can actually harm the income of the South as a whole.
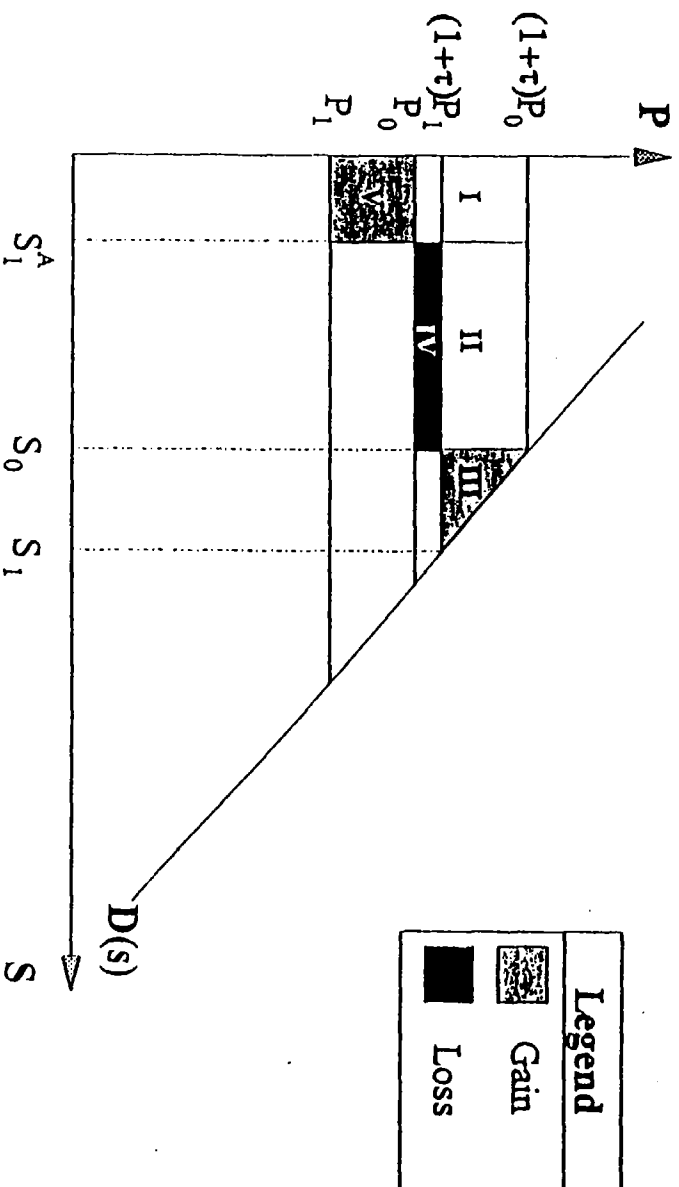
## IV. Conclusion

The general perception is that the most important implications of North-South trade accords such as NAFTA are likely to concern their impact on investment flows. In this paper, we have made an initial effort to understand the channels through which trade accords can affect North-South investment flows. Our analysis shows a potential link between trade accords and investment flows through the impact of the accords on the ability of Southern partner governments to make commitments concerning treatment of foreign investment. We show that these accords can affect both the magnitude and the pattern of inward investment and production, implying the possibility of both trade and financial diversion stemming from a bilateral regional trade accord.

While the paper demonstrates that novel effects emerge under sovereign risk which must be addressed when assessing the welfare implications of trade accords, the qualitative policy conclusions from the paper are similar to those in the old trade-diverting customs union literature [Viner (1950)]: The greatest gains from integration still are achieved when integration takes place between the countries

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which have the greatest potential gains from trade. The distinction introduced here is that these gains now include both current trade and inter-temporal trade through foreign investment. For example, in our welfare analysis in the previous case, the possibility of Northern partner welfare loss from the accord was greatest when the "net-of-expropriation-risk" high productivity target nation was not included in the accord. Consequently, while North-South integration highlights different issues than those in previous trade accords, a nation still does best by integrating with those which yield it the greatest gains from trade.

**Figure 1**

**Impact of RTA on Northern Consumer Surplus**

$P$

$(1+\tau)P_0$

$(1+\tau)P_1$
$P_0$
$P_1$

I

II

III

IV

$S_1^A$

$S_0$

$S_1$

$D(s)$

$S$

| Legend | |
|--------|------|
| | Gain |
| | Loss |

## APPENDIX

### 1. Comparative Static Exercises

Substituting $\tau$ for $\bar{\tau}$ and totally differentiating (13a) and (13b) yields:

$$
(A.1) \quad
\begin{bmatrix}
(1+\tau)\left[\dfrac{\partial\theta^A}{\partial K_n^A}P + \theta^A P'a\right] & \theta^A bP'(1+\tau) \\[2em]
\theta^B aP' & \dfrac{\partial\theta^B}{\partial K_n^B}P + \theta^B bP'
\end{bmatrix}
\begin{bmatrix}
dK_n^A \\[1em]
dK_n^B
\end{bmatrix}
=
\begin{bmatrix}
- P\left[\theta^A + \dfrac{\partial\theta^A}{\partial\tau}(1+\tau)\right] \\[1em]
0
\end{bmatrix}
d\tau.
$$

The determinant of the matrix satisfies:

$$
(A.2) \quad \Delta = P(1+\tau)\left[\left(\dfrac{\partial\theta^A}{\partial K_n^A}\right)\left(\dfrac{\partial\theta^B}{\partial K_n^B}\right)P + P'\left[a\theta^A\left(\dfrac{\partial\theta^B}{\partial K_n^B}\right) + b\theta^B\left(\dfrac{\partial\theta^A}{\partial K_n^A}\right)\right]\right] > 0.
$$

Solving:

$$
(A.3) \quad \dfrac{dK_n^A}{d\tau} = - P\left[\theta^A + \dfrac{\partial\theta^A}{\partial\bar{\tau}}(1+\tau)\right]\left[\dfrac{\partial\theta^B}{\partial K_n^B}P + \theta^B bP'\right]/\Delta > 0.
$$

$$
(A.4) \quad \dfrac{dK_n^B}{d\tau} = a\theta^B P'P\left[\theta^A + \dfrac{\partial\theta^A}{\partial\tau}(1+\tau)\right]/\Delta < 0.
$$

### 2. Derivation of equation (28):

Let $W_N$ represent welfare in the Northern partner nation, and $\tau$ represent the tariff advantage enjoyed by the Southern partner nation under the accord. Northern partner welfare satisfies:

$$
(A.5) \quad W_N = [\tau Ps^B + (\bar{\tau}-\tau)Ps^A] + \int_0^S D(x)dx - (1+\bar{\tau})Ps
$$

where $D(x)$ represents the Northern partner country demand curve. The impact of the

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trade accord can be represented by increasing $\tau$ from $0$ to $\bar{\tau}$. Let $\Delta W_N$ represent the resulting welfare change in the Northern partner nation. $\Delta W_N$ satisfies:

$$\text{(A.6)} \qquad \Delta W_N = \int_0^{\bar{\tau}} \left[ P\left[ \bar{\tau}\frac{ds^B}{d\tau} + (\bar{\tau}-\tau)\frac{ds^A}{d\tau} - s^A \right] - \frac{dP}{d\tau}\left[ s^B + (1+\tau)s^A \right] \right] d\tau.$$

Substituting for $(\partial P/\partial \tau)$ and simplifying, we obtain:

$$\text{(A.7)} \qquad \Delta W_N = \int_0^{\bar{\tau}} \left[ P\left[ (\bar{\tau}-\tau)\frac{ds^A}{d\tau} + \bar{\tau}\frac{ds^B}{d\tau} \right] - P'[(1+\tau)s^A + s^B]\frac{ds}{d\tau} - Ps^A \right] d\tau$$

Substituting from equations (A.3) and (A.4), the solutions for $dK_n^A/d\tau$ and $dK_n^B/d\tau$, and simplifying yields:

$$\text{(A.8)} \qquad \Delta W_N = \int_0^{\bar{\tau}} \left\{ \Psi\left[ \theta^A + \frac{\partial \theta^A}{\partial \tau}(1+\tau) \right] - Ps^A \right\} d\tau$$

where $\Psi$ satisfies:

$$\text{(A.9)} \qquad \Psi = aP^2/D\left[ \frac{\partial \theta^B}{\partial K_n^B}\left[ P'[(1+\tau)s^A + s^B] - P(\bar{\tau}-\tau) \right] + \theta^B bP'\tau \right].$$

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