

**EXCHANGE CONTROLS AND HYPERINFLATION  
AS EFFICIENT GOVERNMENTAL RESPONSES  
TO EXTERNALLY IMPOSED TRADE LIBERALIZATION**

by

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## INTRODUCTION

The disasters represented by World Wars I and II taught the world's militarily dominant countries that classical colonialism was no longer profitable. In a world of competing major powers able to inflict massive destruction on one-another, it no longer paid to assert military dominion over militarily weaker nations. The "gunboat diplomacy" that dominated the world before WWI, and persisted in isolated regions during the interwar period, was essentially abolished soon after the end of WWII. Old colonial dependencies that had not been legally constituted protectorates or territories became relatively independent nations, with new responsibilities for their own collective defense and new rights of domestic self-determination. And, of course, the form and language of international cooperation and control radically changed.

In particular, the post-WWI and post-WWII periods witnessed the steady spread (in both the East and the West) of economically ideologized international paternalism, where militarily dominant nations came to collectively impose what they professed to be economically efficient policies on militarily weaker nations.<sup>1</sup> These newly imposed policies became confidently regarded by the

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<sup>1</sup>The leader of a dominant country rationally pre-commits to an all-or-nothing offer, and thus always wins the implicit bargain with the other countries. Although there is generally more than one actively competing leader (e.g., East vs. West, cold-war, competition), each leader implicitly makes a single set of offers, the nature of which determines the particular allies obtained by that leader. Thus, when we say that the leader of a dominant nation "imposes" a policy on a weaker nation allying itself with that leader, we mean that the leader's all-or-nothing offer contains this policy.

Note also that both the pre- and the post-WWI forms of international cooperation are internationally (1st degree) discriminating monopolies despite the appearance of simple competition between alternative dominant countries. This is because, in both cases, the dominant leaders exhibit rationally predatory reactions to an adversary's attempt to attract away a relatively weak country in the former's conceded "sphere of influence". The basic difference is that the Postwar reactions are self-constrained to be economically, rather than militarily, predatory and therefore fail to satisfy the "punishment" condition required for an internationally dictatorial ("colonial") solution (Thompson-Faith).

Although, from the same source, the social equilibrium is Pareto optimal in either case when there is costless strategic communication and complete information, the present paper is concerned with an incomplete information case arising from the non-dictatorial strategies of the post-colonial world leaders. The obvious military costs unique to the colonial world, which are the unavoidable costs of strategic communication unique to such a world, are obviously passed on to

leaders of the dominant countries, and a supporting mainstream economic literature, as beneficial to the weaker nations, the latter often being relatively poor and presumed to be so because of their historically less public-spirited, or less informed, political leaders.

Many social critics, however, have regarded the newly imposed economic policies as some sort of neo-colonialism, basing their conclusion largely on the empirical observation that the most dependent of the weaker nations (especially those in Central Europe, Africa, and Latin America) have typically under-performed the more independent (especially Far-Eastern) nations.<sup>2</sup> Western economists, of course, have found little difficulty in serving as such critics when examining the policy-impositions of the East, easily seeing that the economic retardation of Central Europe and various Latin American countries has been due to defects in Soviet economic ideology and that the self-professed paternalism actually amounted to a thinly veiled form of colonialism. But they have refused to view the self-professed paternalism of the West in this light. This is largely because the critics of the dominant countries in the West have never provided a rational economic argument to

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the various colonies and become a source of what is called "colonial exploitation". The question addressed in this paper is whether the incomplete information that has not-so-inevitably arisen in the post-colonial world has produced an endogenous form of exploitation.

<sup>2</sup>That economic ideology, not physical dependency, is the source of the relative economic failures, at least in the West, is strongly indicated by the relative economic success of the legally constituted, relatively old style, military dependencies (e.g., the remaining U.S. territories and protectorates, the members of the British Commonwealth, and, most recently, the members of France's West African Monetary Union).

The generally progressive increase in the post-WWI growth rates as we proceed further and further away from the United States into increasingly ideologically independent Latin America similarly supports the neo-colonial exploitation charge. And here, too, the exceptions help isolate the negative effect of ideology: First, the fact that the empirical relationship ends abruptly at Argentina helps the argument in that this nation, being the farthest from the U.S. in the Western Hemisphere, has become the Hemisphere's outpost of a decidedly anti-U.S., quite interventionist (fascist), ideology. And the relatively high growth rate of exceptionally anti-ideological, but still relatively nearby, Costa Rica similarly supports the hypothesis that it is ideological, not physical, domination that retards economic development.

buttress their neo-colonialist inference.<sup>3</sup>

The central purpose of this paper, beyond attempting to supply a simple framework within which we may understand the entire set of novel international economic institutions introduced during the 20th century, is to provide a theoretical and empirical model predicting the economic effects of imposing policies based upon Western economic ideology on its economically dependent nations. Our model will clearly support the charge of neo-colonialism, the claim that the self-professed post-WWI Western paternalists have been "exploiting" (i.e., inefficiently redistributing from) their poorer national dependents. Nevertheless, in sharp contrast to the Marxian beliefs and revolutionary political goals of other critics, our Hegelian belief is that the Western powers, once informed of the genuinely exploitative effects of their imposed trade-liberalizations, will voluntarily adopt simple policy reforms completely eliminating the unconscious redistribution, or at least alter the policies of our international agencies so as to increase the welfare of all of the concerned nations.

## **I. THE PRIMARY WESTERN POLICY IMPOSITION AND SMALL-COUNTRY RESPONSE**

### **A. General Specification and Preliminary Critique**

The heart of Western economic ideology is the presumption that the standard competitive model is sufficiently realistic that it can be immediately applied to the construction of socially

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<sup>3</sup>The old "exploitation" arguments, which stem from the terms-of-trade pessimism of Prebisch and Singer, employ no clear means of exploitation and fail to explain why investors in industries with unfavorable price trends are not compensated with higher current returns. Later arguments (e.g., Kemp and Ohyama) have introduced discriminatory export taxes to raise at least a theoretical possibility of genuine exploitation, but such taxes are neither widespread nor consistent with anything resembling the existing level of paternalism.

Probably the most persistent economic argument is that large multinational corporations come to dominate the politics of the smaller countries. Of course, substantial political power is essential for heavy investors in any country to protect their investments from effective expropriation. So the empirical observation is not persuasive. Moreover, theoretically, since several alternative multinational companies compete, prior to making their investments, for the rights to enter a small country, there is no grounds for believing that the winning multinationals either initially underpay for their future political favors or insufficiently contractually constrain their future exploitative activities.

optimal economic policies. Internationally, this means that small nations, who can be assumed to have no individually significant effect on the world prices of traded commodities, should, in their own national interests, as well as the collective interest of the rest of the world, adopt free-trade policies. Because of the strength of this ideology,<sup>4</sup> the near-universality of effectively high tariffs by small nations has been taken, for well-over two centuries now, as a reflection of: (a) the inefficient political influence of special interest groups in these nations, (b) the unavailability of more efficient modes of taxation, or (c) widespread economic ignorance.

However, none of these tariff-rationalizations is defensible. Regarding the political influence argument, there is no apparent reason for domestic interest groups to take their transfers in the form of substantially inefficient tariff protection, especially in a way that unfailingly repeats itself around the observed world. Moreover, as we have elaborated elsewhere (Thompson-Hickson), high tariffs have often been regularly imposed upon imports for which there is no obvious protective effect (i.e., no clear import-substitute) and therefore no identifiable political support from an economic interest group. Secondly, regarding the 2nd-best taxation argument, since numerous non-protective tariffs have also been regularly prohibitive, tax-revenue-benefits could also not have been reasonably expected to accrue to the tariff-imposing country. The only inference left is that the

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<sup>4</sup>Many activist economists deny any strong adherence to this ideology. Modern "liberal" economists profess an unrelenting interest in egalitarian or employment goals as critical components of their recommended trade policies. Pragmatic economists profess an acceptance of "infant industry" or "ailing industry" protection. Our problem with these denials and professed policies is that, as theoretical arguments, they are generally unsound because alternative, more direct, policies (specifically, lump-sum redistribution, monetary or fiscal policy, or domestic investment subsidization) exist to more efficiently address their specified market failures. There is no apparent reason for international economic efficiency to be sacrificed to achieve an indirect, only possible, solution to either one of their allocation problems, especially since their societies refuse to adopt a direct, more certain, solution to the alleged problems. Besides, empirically speaking, these economists, knowing the theoretical weakness of their arguments, will almost always oppose small-country protectionism as a practical matter, as can be easily verified by a quick survey of textbooks in either international or basic economics.

Eclectic, uncommitted, or unconcerned economists are obviously not relevant to our critique in that our characterization of "economic ideology" is implicitly restricted to activist economics, whose adherents consistently express unambiguous policy recommendations.

tariff-imposing countries are systematically ignorant. However much comfort such an inference may give to the sellers of economic ideology, it is not clear how any universally and pragmatically evolved policy could possibly reflect widespread ignorance of the benefits of that policy relative to a recurrently tested policy alternative.

A counter-ideological, Pareto-optimality-based, social-evolution-justified, explanation of these historic tariffs, also developed in detail elsewhere (Thompson-Hickson), is that such tariffs are necessary if a country is going to internalize the "defense-externality" imposed by the importation of consumer durables. Such imports: (i) add to the country's coveted capital stock, and therefore its overhead defense costs,<sup>5</sup> and, (ii) cannot be practically taxed with anything but an import tariff.<sup>6</sup>

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<sup>5</sup>This externality is derived from the national-defense equilibrium sketched on the first page of Thompson (1974b), with the underlying political efficiency argument developed in Thompson (1979) and the further underlying, complete-and-perfect information-based, social theory developed in Thompson-Faith. Nevertheless, particularly relevant to the current study is a generalization to include certain, incomplete information, societies, which we label "brutocracies". In such a society, the ruling social hierarchy contains a large number of individuals with such little respect for the political constitution and the welfare of people outside of their narrow socio-political clique that they pose a substantial revolutionary threat to their own government. The brutal Duchies of Renaissance Italy (e.g., Sedgwick), which inspired the unusually tough-minded political writings of Machiavelli, provide us with a graphic sample of this relatively unusual form of government.

The leader of a brutocracy is necessarily concerned with the possibility of a domestic uprising. But the leader never knows which, if any, of several possible alternative cliques will actually stage a coup. Representing, *en masse*, a large part of the ruling hierarchy, the alternative ruling cliques are essential to the administration of the state. Although alternative leaders of such states compete by showing how brutal they can be to their domestic political enemies, a coup is avoided only if those in a position to stage one receive incomes not too far below what they estimate they could earn as part of a ruling clique. Since income is notoriously difficult to measure while observable consumption is not, a visible increase in consumption by an existing ruling clique creates a special problem in such states. Members of alternative ruling-cliques will take any such increase in consumption as a measure of: (a) how much better they could live if they were in power, or (b) an unwarranted increase in the resource drain going to the existing ruling clique. In either case, to avoid an increased probability of a coup at a given level of defense expenditure, the alternative ruling cliques must all receive compensatory income increases. To the existing ruler, this effect creates a special kind of defense-externality. Both luxury taxes on domestic purchases of consumer durables and import tariffs, which in any case are concentrated on consumer durables, will be extremely high in such states.

Historically, then, it is no accident that mercantilist writers, whose one recurring tenet was the restriction of luxury consumer goods, were most active in the 16th and 17th centuries, when brutocracy, a chief export of Renaissance Italy, came to dominate the imperializing governments of Europe. With the massive, rifle-equipped, citizen national armies of the 18th, 19th and early 20th

## **B. The Initiating Policy Imposition**

Prior to WWI, ideology, including the defense-externality-ignoring ideology of free trade, was not used to impose economic policies on dependent countries without also militarily defending and controlling the central governments of these dependencies. Classical colonialists were not restrained by grants of either military independence or local autonomy to the dependent countries.<sup>7</sup> As we have said, the World Wars changed all this. In particular, the "Versailles system" set up at the end of WWI, which imposed artificially low import tariffs upon each defeated nation, granted both local autonomy and limited military independence to the defeated nations of Central Europe. The imposed tariff reductions, being ideologically based and therefore impervious to

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centuries replacing the capital-intensive, cannon-centered professional armies of the 16th and 17th centuries, nationally humanistic "rights of man" correspondingly arose to compensate the once-again important citizens (Hickson-Thompson, 1996). Brutocracy became increasingly restricted to regions of the world in which old rivalries between extended aristocratic families could not be easily eliminated. Even there, however, the subsequent, more humane, leaders of these coup-threatened states, although maintaining notoriously high tariffs and luxury consumption taxes, moved their capitals to ruling palaces, such as Versailles and Delhi Palace, or at least to relatively beautiful walled cities (St. Petersburg, Vienna, etc.) In modern times, the creation of Brasilia and the expensive beautifications of the capital center at Buenos Aires exemplify the force, wherein leaders employ such sites to both improve their abilities to monitor potential coups and help equalize the relatively high living standards of the members of the entire ruling class.

<sup>6</sup>Of course, several, usually poorer, nations have substantially adopted the economic ideology of a dominant neighbor. In such a cases (e.g., modern Mexico), the ideologized country will independently work to adopt internally inefficient policies. This will magnify the losses already imposed on dependent nations by the unconsciously redistributive paternalism of the dominant nation. For the policies resulting from this paternalism (e.g., freer trade) are excessive even when the dependent is not ideologically biased toward the policies. Political repression and eventual military problems are the predictable consequences.

More generally, while institutional history prior to WWI displayed a predictable regularity in which weaker nations both learned and benefited from their geographical proximity to a dominant nation (Hickson-Thompson, 1991), quite the opposite has been true of the post-WWI period!

<sup>7</sup>Thus, for example, Teddy Roosevelt, a hopelessly ideologized progressive, could, in 1904, proclaim a "corollary" to the Monroe Doctrine unilaterally establishing the U.S. as the exclusive police department of the Western Hemisphere. In contrast, following the official abandonment of this "corollary" in the Clark Memorandum of 1930, Franklin Roosevelt further reassured the nations of Latin America of U.S. respect for their military independence through his still-effective "good neighbor policy", which eschewed U.S. military intervention other than to protect U.S. lives and property.

induced increases in local defense costs, were ostensibly for the benefit of everyone. Except for a temporary hiatus -- the uniquely successful Dawes' Plan era from 1924 through 1927, during which reparations were paid out of tariff revenues so that the dominant countries had a unique incentive to permit higher tariff rates -- this new policy of externally imposing artificially low tariff rates on sovereign nations rapidly spread to other economically dependent nations, the GATT arising after WWII to further institutionalize the system, which induced weaker nations to adopt lower tariff schedules in return for the right to export to the dominant countries as "most favored nations" (i.e., without facing discriminatorily high tariff rates).

### C. The Primary Small-Country Response

A second novelty of post-WWI international economics is the immediate post-WWI emergence of peacetime foreign exchange controls, or simply "exchange controls".<sup>8</sup> Not accidentally, as we shall see, these costly controls were introduced by the self-same Central European dependents upon whom the WWI victors had imposed low tariffs. Moreover, the controls, alongside of externally imposed tariff reductions, spread across the world to other militarily weak nations, persisting in tandem to this date. Thus, when a small modern nation suffers a continuing deficit in its balance-of-payments at its officially fixed exchange rate, a deficit substantially due to the external imposition of low-tariffs, the country seldom voluntarily allows the price of its domestic currency to fall in foreign money markets (or lowers its domestic money supply) sufficient to eliminate the deficit. Rather, despite the almost universal disapproval of economists, the small modern nation attempts to maintain an overvalued exchange rate and ration,

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<sup>8</sup>Rationalizing wartime foreign exchange controls is a straightforward application of a pre-existing wartime efficiency-argument, which we will have occasion to summarize in Subsection II.B.1 below.



among its existing importers, whatever foreign reserves are earned by its existing exporters.<sup>9</sup>

Like the small-country tariffs mentioned above, these obviously costly, long-lamented, post-WWI exchange controls have remained largely unexplained by economists.<sup>10</sup>

Yet the strangely ignored empirical relationship between the novel exchange-control and novel tariff-imposition features of post-WWI international economics -- exchange controls having consistently followed upon the heels of externally imposed tariff reductions -- has a quite straightforward theoretical interpretation: A small country's internally efficient, policy-neutralizing, response to an externally imposed tariff reduction is simply to maintain, rather than devalue, its initial exchange rate. Since imports are then cash-constrained by exports because exports do not change while imports are in greater demand, imports must be rationed back to their initial level, assuming no change in loans from abroad. So the country efficiently achieves -- with an overvalued exchange rate and import rationing -- what it can no longer achieve with tariffs.<sup>11</sup>

Economists examining the empirical effects of externally imposed tariff reductions have apparently been thrown-off by the fact that the tariff-imposing countries -- seeing overvalued

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<sup>9</sup>Post-WWII Germany and Japan, as we shall explain in footnote 16 below, form a theory-confirming exception. Based upon the unique post-WWII constraints imposed on these countries by the U.S., wherein exchange controls were excluded as a viable response to the imposition of low tariffs, the unique and wholly predictable response of Germany and Japan to externally imposed tariff reductions has been to rationally undervalue their exchange rates.

<sup>10</sup>The usual "explanation" is that differential import license fees are a convenient way to interpersonally price discriminate between different foreign buyers (e.g., Ellis or Bhagwati). But differential tariffs to different importers are at least as convenient. In fact, discriminating tariff reductions -- in preference to discriminatory import license fees -- are regularly granted to members of defense alliances, for whom the relocation of a consumer good within the alliance is of little military consequence and therefore of little tax consequence in an efficient alliance.

<sup>11</sup>The neglect of this obvious historical regularity by academic economists is certainly not due to the inability of economists to see the straightforward, Marshall-like, equivalence between tariffs and observed exchange-controls. (See, e.g., Bhagwati.) Rather, the neglect is likely due to professional hubris, a profession-serving unwillingness to view small-country trade restrictions as the result of political-economic efficiency rather than political-economic illiteracy. The general effect of such hubris on the traditional field of international economics is elaborated upon in our concluding section.

exchange rates, and corresponding pressures toward effective tariff-restoration via import rationing, emerge from the imposition of lower tariffs -- have often delayed the imposition of exchange controls by financially supporting their desired increase in import demand through foreign exchange loan-subsidizes to the recalcitrant dependents. In such cases, months, even years, may pass before the loan-subsidies cease and exchange controls emerge. Thus, although the high tariffs of the 1924 Dawes' Plan had succeeded in inducing the dependent nations to immediately dismantle their costly exchange control systems -- and although the Dawes system was uniquely successful in collecting reparations debt and inducing Central European growth -- the political unpopularity of the scheme forced it to be replaced after 1927, under both U.S. and League of Nations pressure, by a more "enlightened" system, one that both respected national autonomy and imposed lower tariffs. To support the post-1927 system, foreign exchange loans from these sources were increasingly extended to Central Europe until the middle of 1931. Then, after France's highly publicized refusal of another loan increase and the sudden failure of the Austrian Credit-Anstalt, exchange controls were, once again, immediately reintroduced throughout Central Europe (Ellis).

Economists examining the welfare effects of trade liberalization have been similarly thrown-off by the related fact that the empirically measured social benefits of a loan-subsidized free-trade policy are generally quite positive in the short run, especially when the defense expenditures of the loan recipient do not correspondingly increase. In the latter case, which is quite likely, the costs of an excessive importation of coveted consumer goods will show-up in the form of future military problem. Indeed, the main ostensible beneficiaries of continuing international loan subsidies (Central Europe after WWI and the Middle East, Africa, and Latin America after WWII) have almost all subsequently suffered relatively extreme military problems.

Besides the above timing evidence (where exchange controls follow the external imposition of tariff reductions), an additional tip-off that observed exchange-control systems are efficient

small-country responses to externally imposed tariff reductions is that the only substantial import license fees, like tariffs, are fees applied to the importation of consumer durables (Bhagwati).<sup>12</sup>

The remainder of the text of this paper concerns the dominant-country reactions to the abilities of the weaker countries to use exchange controls to neutralize the above-described, ideologically inspired, externally imposed tariff-reductions.

## II. DOMINANT-COUNTRY REACTIONS

As explained in Subsection B.1 below, exchange controls generally play a vital role in financing national emergencies. Therefore, international agreements preventing dependent nations from adopting exchange controls are generally regarded as violations of national sovereignty. Consequently, dominant countries have been able to induce weaker nations to loosen their exchange controls only by inducing these countries to freely select trade-expanding policies as rationally advancing their immediate national interests. Yet directly subsidizing trade is obviously not in the interest of the dominant countries.<sup>13,14</sup>

Therefore, restricting to footnotes those cases in which a pro-trade ideology is "successfully" imposed upon some dependent nations, the only way for a dominant nation to loosen the exchange controls of the weaker nations is to offer them a cost-effective system of trade enhancement. In fact, dominant-country reaction commitments, financial as well as military, have arisen after both World Wars to lower the emergency defense costs of the smaller nations, thereby

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<sup>12</sup>While the defense-externality rationalizing such license fees also applies to the importation of producer durables, the producer-durable defense-externality is ordinarily internalized through existing income and profit taxation (Thompson, 1974b).

<sup>13</sup>This follows from the famous Bickerdike Theorem, which holds regardless of existence of external diseconomies from international trade.

<sup>14</sup>The same is true of trade-conditioned loan subsidies. Since a dependent country's benefits from accepting such a loan subsidy must exceed the foregone benefits of the original trade restriction, the Paretian inefficiency of the entire operation implies that the dominant countries will come to experience net losses from such subsidy programs.

lowering the defense-externalities and rationally chosen exchange-control levels of the smaller countries. Two cases naturally arise. In the first case, defense-support commitments are sufficiently inexpensive to the dominant countries that the small countries are induced to substantially abandon their exchange controls.

**A. Cost-Effective Systems of Trade Enhancement: The Inexpensive Commitment Case**

In this case, again where the dominant countries are in a position to cost-effectively commit themselves to providing weaker nations with military or emergency-finance benefits sufficient to induce a widespread eschewal of exchange controls and corresponding acceptance of the imposed tariff reductions, the inexpensively provided defense benefits so substantially reduce the dependent countries defense externalities that the dominant countries can directly eliminate the weaker countries desires for substantial exchange controls. Regarding overhead military benefits -- e.g., where the U.S. has come to provide nuclear defense for the NATO and ANZUS countries -- exchange-controls have, *pari passu*, disappeared with the emergence of commitment to provide such benefits.

Regarding reliable systems of emergency finance for the militarily weaker nations, which will be elaborated upon in the following subsection, various gold exchange standards were easily provided through the financial commitments of the dominant countries throughout most of the 1924-71 period. We shall find that such gold standards, through their salutary effect on defense costs, regularly reduced the extent and severity of existing exchange controls.

Although dominant nations often offer the smaller nations direct "commitments" to provide emergency loan support, either through collateralizable international loans or through emergency lines of credit, such commitments are relatively unreliable. Here, the World Bank and the IMF, both of which grew out of the various post-WWI international lending systems, have worked to shore up these weak pre-emergency loan commitments. In general, however, the costs of establishing reliable and substantial emergency support commitments have often been too high to induce all, or even most,

of the smaller countries to substantially eliminate their exchange controls. This is true despite the fact that artificially low exchange controls are typically part of the "price" for a commitment to provide countries with emergency financial support. For example, various membership privileges -- through the same ideological inspiration responsible for the externally imposed tariffs -- are typically denied IMF members who seriously ration their foreign exchange. Nevertheless, there are several eras, including the past 25 years, during which the quality of the available emergency defense systems did not warrant charging a price that would effectively eliminate exchange controls.

Thus, after 1971, when the IMF could no longer conveniently offer its weaker members the opportunity to fix the gold values of their currencies, emergency finance costs, and thus defense-externalities, substantially increased. Substantially lowered exchange controls could no longer be either expected or demanded of these members. So exchange controls substantially tightened. Similarly, immediately after Europe abandoned the gold standard in the early-mid-1930s, the most Europe-dependent of the Latin American countries (Costa Rica, Nicaragua, Argentina, Bolivia, Brazil, Chile, Colombia, and Paraguay) all introduced substantial exchange controls (U.S. Tariff Commission). Exchange controls thus appear to abound whenever the abilities of the dominant-countries to supply the smaller nations with defense-cost-lowering institutions are particularly weak.

Although emergency finance commitments are weaker during these periods, they still remain, currently in a form of IMF and World Bank loan-conditionality, to help the dependent countries maintain relatively fixed exchange rates. This weak-commitment structure however, is only part of a dominant-country reaction structure specified in the following subsection.

#### **B. Dominant Country Reactions During Weak-Commitment Eras**

Regarding these weak-commitment periods -- where, for example, a gold exchange standard is too costly to establish and therefore does not constrain the actions of the IMF -- we now consider the largely uncommitted, ideologically rationalized, dominant-country reactions to the exchange controls adopted by the smaller nations. It is these ideologically rationalized reactions that account

for our theoretically derived, and empirically observed, hyperinflations. More generally, and perhaps much more importantly, our general weak-commitment equilibrium, which will contain our final theory of hyperinflation as a special case and emerge near the end of Section III below, has non-hyperinflating countries rationally adopting either excessively loose or non-existent exchange-controls, representing an almost complete submission to the unconsciously exploitative, joint GATT-IMF, plan of trade liberalization.<sup>15</sup>

In any case, understanding regular hyperinflation requires that we first consider yet another economic novelty of the post-WWI era, viz., the introduction of permanently inconvertible paper money. More specifically, before outlining our imposed-trade-liberalization explanation for a small country's rational adoption of predictable peacetime hyperinflation at the end of this Section, and then elaborating upon our explanation in Sections III-V, we must resolve certain persistent issues concerning the theory of inconvertible paper money.

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<sup>15</sup>While the model assumes that the small countries are internally efficient, or "rational", the leaders of certain smaller nations must be pro-trade ideologues in order to induce those nations to accept the international financial system as beneficial. A dominant country then rationally subsidizes small-country loans that are contingent on the political leadership of the small country, thereby saddling the small country with an ideologically inspired, authoritarian leader. Relative underdevelopment is the wholly predictable outcome (Hickson-Thompson, 1991; Thompson, 1996). We have already noted the cases of Mexico and Argentina. In the former system, the monetary bureaucracy is also typically ideologized; so the system typically suffers a market-clearing exchange rate, no hyperinflation, and increasing internal instability. The system acts, both theroretically and empirically, just as would a rational system with a low defense externality and an exogenously increasing internal security problem.

In the contrasting, Argentine system, the old oligarchic families are still in control of the bureaucracy. So the basic model still applies in that an internally efficient incentive still exists to employ a domestic and fiscal monetary policy that retains an overvalued currency and an effectively high set of import charges. Hyperinflation, we shall see, is the natural consequences of their ensuing rational interaction with the ideologized IMF. While the numerous economic studies of Argentine-type currency problems, continuing without let-up into the current decade (Cavallo and Cottani, Edwards, Leijonhufvud and Heyman), predictably lay the blame at the feet of these old oligarchies or the related bureaucracies – more or less explicitly condemning them for corruption, irresponsibility, or simple economic ignorance – what we are suggesting is that the old oligarchies or bureaucracies are actually responding in nationally optimal fashions to an unfortunate IMF attempt to impose are unconsciously exploitative ideology on these nations.

1. *Monetary Background* First of all, a potential "last-period problem" exists for all inconvertible paper money economies. The world's last sale of a real asset in exchange for an inconvertible paper currency is apparently conferring a worthless object on the seller, who should then be unwilling to surrender a positive amount of any valuable real asset in exchange for the paper. The value of such currency in the next-to-last transaction should then also be zero, etc., etc., up to the present period. So it appears that inconvertible paper currency should be value-less, which would certainly eliminate its potential usefulness as a medium of exchange. Nevertheless, once we recognize that the sovereign governments issuing such money also have an independent power to tax, we can see that the government can give positive value to its currency, even in the last private transaction with that currency, by requiring its future ad valorem taxes to be paid with that particular currency. Fiat money exists because it is a tax-anticipation note. Acknowledging this tax-payment demand for currency also simplifies our discussion of fiscal policy. For tax-increases are then contractionary, not merely because of the probable intergenerational redistribution-effect of the tax-increase (Thompson, 1967), but also because of the certain money-demand-increasing-effect of the tax-increase. Macroeconomic tax policy can then be viewed as a form of monetary policy.

Secondly, regarding the governmental production of money of any sort, the reason that successful sovereigns have -- ever since the 7th century BC emergence of constitutional democracies -- insisted upon creating their own monies (following the argument of Thompson (1974a, fn. 4; 1979, Part IIB)) is that emergency money-creation, like conscription and rationing-supported price-controls, is essential to the survival of any continually consensual (e.g., non-totalitarian) independent state.<sup>16</sup> Without access to a flexible set of authoritarian over-rides to the narrowly

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<sup>16</sup>The fear of a remilitarization of Germany and Japan after WWII thus led the U.S. to soon eliminate the rights of these re-democratized countries to impose rationing-supported foreign exchange controls. So these countries -- which are consequently not "independent nations" as we have characterized them -- could not respond as other countries to the externally imposed post-

rational decisions of a time-inconsistent legislature, the legislature would continually surrender property in order to rationally appease various potential aggressors, to the point that the state's property would all soon be in the hands of the aggressors. In other words, a broadly rational pre-commitment to defending the entire property of the state requires the state's military leader to impose emergency sacrifices on the members of the state, sacrifices that the members are generally unwilling to make because the then-necessary sacrifices generally exceed the benefits of retaining the disputed property. Only in the presence of such authoritarian over-rides are rational aggressors deterred from attempting to acquire property initially controlled by the consensual state.

Thirdly, the financial advantage of a fully convertible paper currency, such as was common under the "classical", pre-WWI, gold standard, is the ability of the government to suspend conversion payments during a defensive emergency and then subsequently resume the original conversion payments soon after the end of the emergency (Hickson-Thompson, 1991; Thompson, 1990, 1995). Since the price level substantially increases during the emergency suspension and monetary expansion, the post-emergency resumption produces a corresponding post-emergency deflation. It is the expectation of the post-emergency deflation that provides a survivable sovereign with the requisite cumulative increase in the state's emergency purchasing power. For only then does each emergency increase in the state's nominal money supply, by inducing an increase in the rationally expected future deflation rate, exceed the correspondingly induced increase in the emergency price

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WWII tariff reductions. Their only possible response was to undervalue their currencies. Although representing an alternative, tight-money, route to the restriction of imports under fixed exchange rates, this undervaluation policy is nationally inferior to the currency overvaluation policy we have been describing. For an undervalued exchange-rate implies a continual subsidy to foreign investment and – again using the Bickerdike theorem – a welfare and terms-of-trade loss to the subsidizing country. Indeed, the corresponding benefits to most of the rest of the world – the artificially low prices of imports from Germany and Japan and the artificially high supplies of world savings from those countries – are still being enjoyed by the rest of the world. Nevertheless, the increasingly obvious allocative distortions of this ideologically progressive post-WWII "solution" leads us to compare it quite unfavorably to the ideologically regressive, high-tariff-accepting, lump-sum-reparations-generating, Dawes solution.



level.

Contrast this to the potential cumulative increase in emergency purchasing power of a simple inconvertible paper currency, where there is no rational expectation of a post-emergency deflation. The emergency price-level then rises more than in proportion to the emergency money-supply (Thompson, 1974b). This yields the state an expected cumulative increase in emergency purchasing power that must be less than the state's initially existing real currency supply (Thompson, 1990, 1995), a number which is itself a universally tiny fraction of the state's real wealth.<sup>17</sup> In our modern world, only a nuclearly defended state can afford such a monetary system.

A small modern nation must rely on relatively expensive methods (conventional weapons, armies, and domestic redistribution) to deter potential aggressors. Therefore, with no small nation able to maintain the asset stocks necessary to sustain a convertible paper money, a small consensual nation must obtain the financial support of dominant states, at least in order to help them fix the values of their currencies relative to that of a dominant state. Temporary small-country emergencies, usually politically inspired rebellions or negative shocks in export revenues, can then be financed by authoritarian monetary or credit expansions under the rational expectation that post-emergency monetary contractions and deflations will, at least partially, restore the original value of the country's currency (Thompson, 1990, 1995). As under full convertibility, adopting such a "fixed exchange rate" regime has enabled small countries to generate a rational expectation of post-emergency deflations and hence emergency price-level increases that fall short of emergency money-supply increases. Although seldom able to fully restore the original exchange rate -- at least during the 1919-1924 and 1971-present periods, for which indirect gold convertibility has not been an available option -- the expectation of a sufficient post-emergency deflation is all that is required

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<sup>17</sup>Alternatively, from Thompson, 1990, the government's income flow from any, regularly expected, simple inflation tax is less than 1/2 of 1% of its flow of tax receipts.

to supply the country with its requisite increase in emergency purchasing power.<sup>18</sup> Each emergency expansion in the money supply, although then accompanied by a rational expectation of only a partial future deflation back toward the pre-expansion price-level, will nevertheless generally exceed the emergency-induced expansion in the domestic price level.

However, since dominant states then help determine, if only through contingent lending, the exchange rates of the smaller states, dominant states will – unless otherwise informed – use their necessary influence over the smaller states exchange rates to liberalize their trade, obviously benefiting from the resulting terms-of-trade effects while unconsciously imposing a substantial – "Ugly-American"-style – increase in defense costs on the smaller states.

2. *Background on Secular Inflation.* Switching to a permanently inconvertible paper money, whether or not it is disciplined by partially fixed exchange rates, would certainly not, by itself, induce hyperinflation. Since the well-known "inflation tax" (Friedman-Samuelson) on the non-interest bearing paper money issued by the government generates particularly significant welfare costs in the hyperinflation case, it generally pays the government to set up an independent peacetime monetary authority with an incentive to provide the country with an optimal, typically quite modest, peacetime inflation rate (Thompson, 1981). This, complemented by an empirical study (Lohani and Thompson), establishes for us the expectation of a government's ability to achieve a statically optimal inflation rate.

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<sup>18</sup>Under the administrative rules of the Bretton Woods System, which grew up in the late 1940s and 1950s and hit its prime throughout the early- mid-1960s, the IMF was forced to tax small countries that devalued their currencies. This gave the post-emergency rulers of a small country substantial incentives to deflate their economies back toward the original price levels and exchange rates. Predictably, small country inflation rates became relatively low under this system. Under the subsequent systems, wherein IMF loan-support has become increasingly contingent upon deflationary macroeconomic policies (Dell, Edwards), the requisite post-emergency deflations have been achieved by the re-emergence of an only sometimes desirable, pre-Keynesian, banker-inspired, form of macroeconomic "thought", which is perhaps best described as "inflationophobia" (Thompson, 1981).

Certain capital-theoretic errors, predominant in the hyperinflation literature since the paper of Cagan, are responsible for the idea that significant governmental tax revenue, or seignorage, is available from hyperinflation. (These errors are described in Thompson, 1990, where it is shown that the maximal flow of government revenue from hyperinflation is less than 1/2 of 1% of the flow of ordinary tax revenue.) The myriad of economists assuring us that hyperinflation results from the need to complement the ordinary tax system in order to acquire the purchasing power necessary for the government's survival are quite wrong. Even if the welfare cost of hyperinflation did not more than offset this tiny revenue gain, any such government would immediately collapse upon reaching its first, even minor, negative fiscal shock. We thus search the literature in vain for a rational explanation of peacetime hyperinflation.

Nevertheless, we can find a clue in the external conditions commonly preceding these costly hyperinflations.<sup>19</sup> As observed in post-WWI Central Europe, and in post-WWII Africa and Latin-America as well, all regular hyperinflations have followed the conjunction of: (1) externally imposed tariff reductions, and (2) liberalization-contingent international lending by the dominant countries. Although traditional economic thought certainly does not indicate how our apparently paternalistic international institutions could ever inflict such misery on their ostensible beneficiaries, the observed conjunction suggests that hyperinflation is somehow a theoretically predictable small-country response to these unique aspects of Post-WWI international economic institutions. Indeed, given this familiar pair of policy impositions, a bit of reflection on the above economic arguments reveals hyperinflation to be an inevitable consequence of any extreme attempt to liberalize trade.

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<sup>19</sup>Since hyperinflation obviously destroys almost all of the emergency-finance function of money, a function critical to the survival of consensual states, hyperinflating governments have invariably been quickly brought under the direct control of their military authorities. Nevertheless, these military governments – like the essentially money-less military governments of ancient Mesopotamia, the later Roman Empire (Thompson, 1990), and modern Brazil – may succeed by being sufficiently enlightened to grant legislative authority to civilians during peacetime.

3. *Rationalizing Hyperinflation: A Sketch* Consider a country with an exceptionally high defense-externality and a correspondingly high initial tariff rate.<sup>20</sup> The external imposition of a low tariff rate, e.g., a tariff in line with the world's less threatened countries, then induces the imposed-upon country to rationally avoid the policy as above, i.e., by adopting a relatively extreme degree of import rationing while maintaining the initial exchange rate. Such rationing quickly alerts the ideologized supporters of the fixed-exchange-rate system (e.g., the IMF) to demand a more "realistic", less "overvalued", exchange rate of the country, or lose its existing emergency loan support. A quantitatively significant, externally imposed, currency devaluation thus becomes a necessary part of effective trade liberalization, which is in turn necessary to keep the economists (and the politically powerful foreign exporters) happy. Loan commitments, or lines of credit, supporting the country's fixed exchange rate are then promptly extended to compensate the country for her reluctant acceptance of the currency devaluation.

However, since the small country's post-devaluation flow of imports is significantly excessive, the country rationally generates a one-shot monetary expansion at the first available excuse, one designed to restore the original cumulative stock of imports by creating a larger-than-original overvaluation of the country's currency. This again awakens the international ideologues<sup>21</sup> and induces another, correspondingly larger, devaluation in order to, at least temporarily, recreate an equilibrium in the foreign exchange market. A "crawling peg" thus begins, providing alert foreign exporters the opportunity to sell on relatively favorable terms during the time intervals between the induced devaluations and the subsequent monetary expansions. The small country res-

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<sup>20</sup>Empirically, all regularly hyperinflationary countries are "brutocracies," as characterized above in note #5. Nevertheless, several brutocracies have effectively escaped at least one of our two sufficiency conditions and thereby completely escaped hyperinflation.

<sup>21</sup>Although the small-country's monetary injection following the previously imposed devaluation cannot help but be regarded by these ideologues as macroeconomically perverse (in that it responds to one expansionary policy shock with another), little is heard of the perversion because they are responding by adopting the same sort of perversion.

ponds again by rationally increasing her subsequent rate of monetary expansion above the preceding rate in order to again induce a compensatory reduction in her subsequent imports. The international agency increases the crawl to a trot in order to keep up with the compensatory monetary expansions, although cumulative imports do not yet significantly increase from the original level. The process, however, continues until the trot becomes a gallop, progressing to a point that each subsequent increase in the money supply is sufficiently allocatively painful that the small country would prefer an increase in her cumulative flow of imports to a further increase in her actual inflation rate, finally acceding to an inflation rate that does not exceed the agency's preceding devaluation rate, i.e., an equilibrium rate of hyperinflation.

Painful inflation is thus the only way for the international economic ideologues and foreign exporters to achieve, at least partially, their goal of trade liberalization.

All this is elaborated in Section III below. Section IV then provides a series of empirical tests of the above theory, including (a) an explanation of an anomaly uncovered by Krueger regarding the dynamic interaction between devaluation and hyperinflation; and (b) a multiple regression analysis in which the regressor representing our theory repeatedly out-performs all competing regressors.

Finally, Section V presents a series of simple graphs displaying both the power of the theory and how a unique, non-monetary, variate can be used to reliably forecast a country's peacetime rate of hyperinflation.

### III. A MODEL OF HYPERINFLATION

We begin by reviewing the above sketch in order to further specify the general argument. There is, again, only one way for an international agency to prevent a one-shot money-supply increase, and correspondingly stringent system of small-country exchange controls, from completely neutralizing the trade-increasing effect of an externally imposed tariff reduction and correspondingly forced devaluation. It is to respond by promptly imposing a second, inflation-

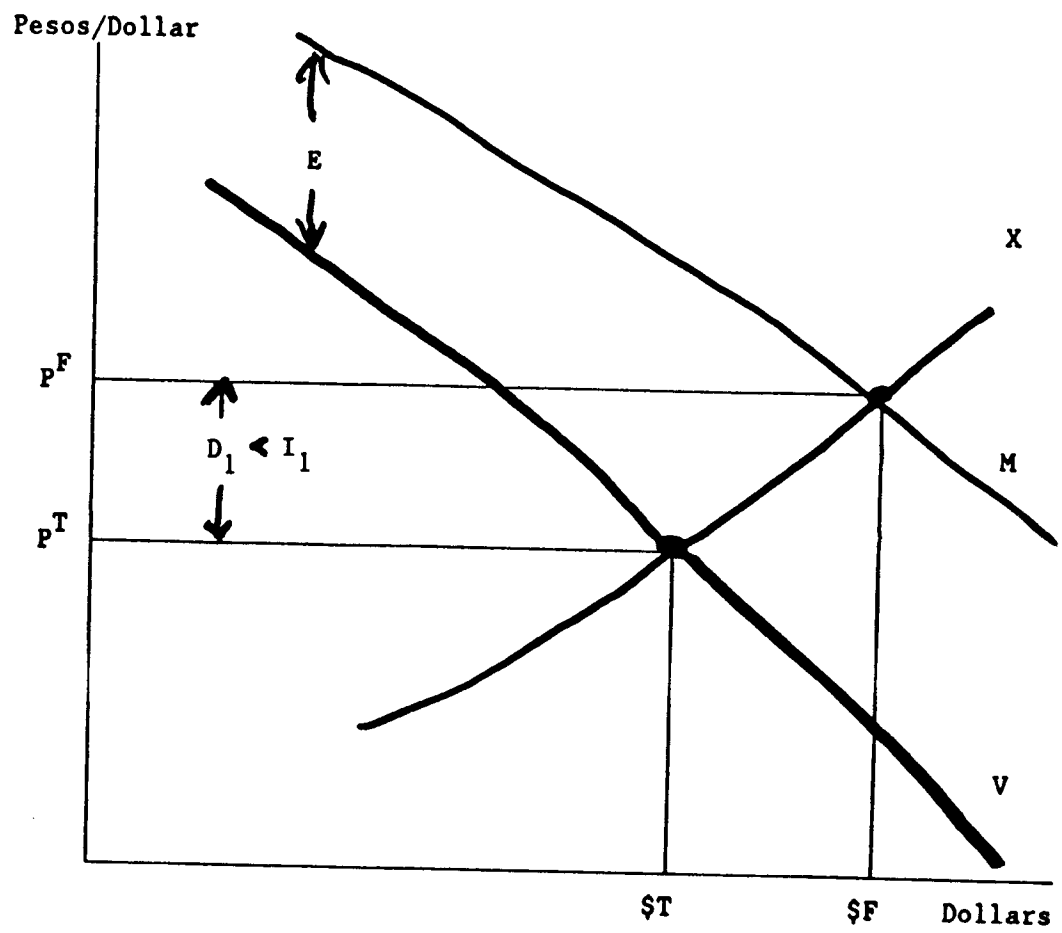
neutralizing, devaluation.<sup>22</sup> Since the initial monetary increase had exceeded the initially imposed devaluation in order to correct for the temporary, devaluation-induced, increase in the stock of imports, this second devaluation must likewise exceed the first devaluation. (The initial monetary increase should be assumed to rationally anticipate the subsequent response of the international agency and therefore to be all the larger in order to squeeze the intended trade-contraction into the requisite time-period.) The second monetary increase, which must again await the satisfaction of other loan contingencies, will therefore exceed the first monetary increase. Acceleration in the rate of inflation is thus implied. As the resource costs of inflation become more and more significant, however, the small country's return to using monetary expansion to reverse the devaluation-induced trade-increases become smaller and smaller. Sooner or later, the small country's rate of monetary expansion will cease to exceed the previous, inflation-neutralizing, devaluation. At that point, the successive devaluations will equal the successive monetary increases. Trade will increase because the temporary, post-devaluation, trade-increases will not be completely reversed by the temporary, post-monetary-expansion, trade-decreases. The international agency, their private supporters and economically ideologized administration, will therefore get part of their desired trade expansion. The small country, although suffering substantially from the hyperinflation, will have limited the trade expansions to the post-devaluation, pre-monetary-expansion, time intervals. So neither party totally surrenders to the wishes of the other, and the hyperinflation is quite stable.

The above argument can be illustrated with a simple pair of graphs. First, Figure 1 contains a familiar set of international currency demand and supply curves for a dependent country, say Argentina.  $M$  is Argentina's flow demand-price for dollars to finance its steady level of imports from the United States.  $X$  is Argentina's flow supply-price of dollars from its exports to the

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<sup>22</sup>In contrast, a gold standard more-or-less explicitly taxes a country for any such monetary increase and thereby induces a partially "successful" trade liberalization.

FIGURE 1



United States. The free-trade equilibrium peso price of a dollar is  $P^F$ , while the corresponding dollar value of trade is  $\$F$ . The average defense-externality created by a dollar of U.S. imports,  $E$ , lowers the social value of dollars for Argentine imports to  $M - E = V$ . Of course,  $E$  is also the average of the tariffs on Argentine imports, which are reduced with exports in dollar value to  $\$T$  by the optimal tariff system. Since Argentina has no influence over the dollar price of traded commodities,  $\$F - \$T$  is also a measure of the real reduction in trade induced by the optimal tariff. Meanwhile, the tariff-induced reduction in Argentina's demand for dollars lowers the equilibrium value of a dollar in terms of pesos to  $P^T$ .

Although the tariff reduces the peso price of imports, there is no change in the real terms of trade. Again, Argentina is too small to effect the world's relative prices between traded commodities. Domestically, of course, the prices of the taxed Argentine imports of consumer durables efficiently increase, while the domestic prices of exports all necessarily fall by the exact same percentage as the fall in the price of dollars. The lower equilibrium value of dollars relative to pesos in moving to the tariff-induced optimum is simply a reflection of an appropriately lower value of transforming certain U.S. goods into Argentine goods. Although Argentine imports generating no defense-externality and entering free of any tariff are correspondingly less expensive in Argentina, world sellers of such goods to Argentina have the same incentive as before because the lower price of such goods in Argentina is exactly offset by the higher-price of Argentine pesos.

Enter the GATT, which, on threat of eliminating the entire gains from trade going to countries like Argentina, forces an elimination of the tariff in hopes of increasing the equilibrium dollar value of trade to  $\$F$ . Argentina efficiently responds by simply maintaining her exchange rate at its original, fixed, level of  $P^T$ . This enables her to ration the induced excess demand for dollars among the competing importers, allowing free trade in imports other than consumer durables while charging license fees to importers of consumer durables, creating an average import license fee of  $E$ , and thereby restoring the original allocation.



But the IMF, the international agency in charge of facilitating the desired fixing of the exchange rate, is affected by the same political influences and the same economic ideology as the GATT. It regards the exchange-rate as "overvalued" because of the existence of the above exchange controls, i.e., the rationing of foreign currency among competing domestic importers. To "correct" the situation, or "reform" Argentine exchange-rate policy, the IMF insists on an Argentine devaluation of the peso equal to  $D_1$  in order to achieve a "realistic", free-market-clearing, trade-liberalizing, exchange rate of  $P_F$ . Otherwise, various pre-existing IMF loans, designed to encourage smaller countries to maintain a fixed exchange rate by offering foreign-currency lines of credit at sub-market fees, will be withheld from Argentina.

Once the "reformed," market-clearing, exchange rate is fixed, and Argentina has its line of credit, she responds by increasing her domestic money supply by at least  $P^F - P^T$ , which shifts both the  $M$  and  $X$  curves up by the same percentage amount as the increase in the money supply. The excess demand is then rationed back as above, which restores the original allocation, only at a correspondingly higher price level.

But note that, since the IMF-imposed austerity policy following the devaluation temporarily prevented Argentina from expanding her money supply, Argentina will have to increase her money-supply by more than the  $(P_F - P_T)$  peso devaluation in order to restore her original accumulation of consumer durables.

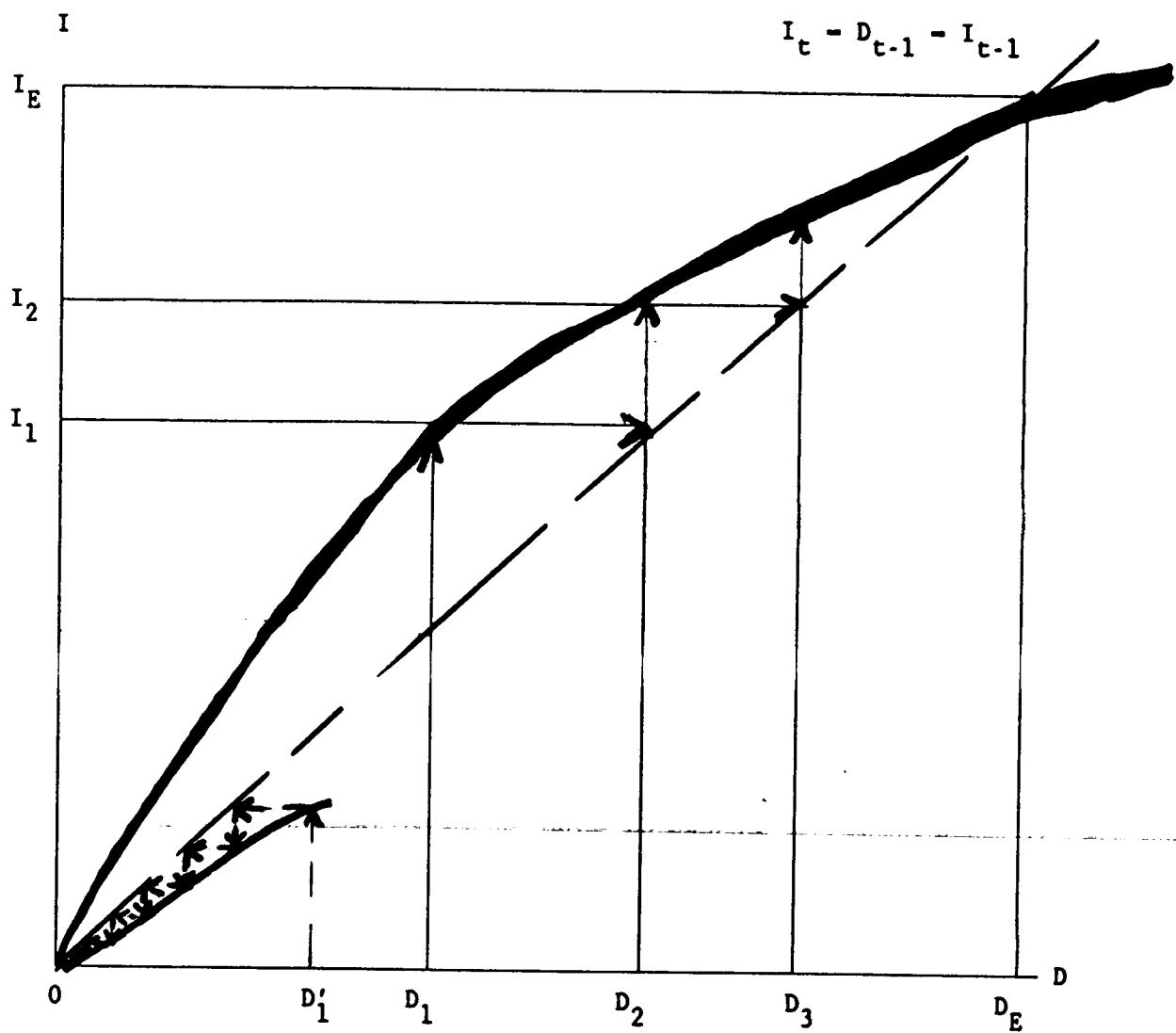
The best the IMF can again respond with is a restoration of Argentina's pre-inflation real exchange rate, the sooner the better because of the abnormally low post-inflation trade flow.<sup>23</sup>

Figure 2 provides a graphical description of the entire devaluation-inflation sequence, where  $I_t$  represents the  $t^{\text{th}}$  inflation rate while  $D_{t+1}$  represents the subsequently imposed, equal, devaluation rate in the above-described sequence. The Figure shows how the accelerating early stages of the

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<sup>23</sup>Any larger currency devaluation is, as discussed in footnote 16), perverse in creating a demand-constrained, rather than a supply-constrained, trade reduction.

FIGURE 2



hyperinflation finally leads to an equilibrium at  $I^E$ , an exceptionally high, necessarily quite costly, inflation rate.

Note that the argument is critically dependent upon the durability of the unwanted imports. For the catch-up effect, where  $I_t > D_t$  for all  $I_t < I^E$ , appears only because the current inflation offers the opportunity, albeit temporary, to compensate for the excessive imports during the immediately preceding, post-devaluation period. (If this catch-up possibility were not present, even a tiny cost of inflation would make  $I_1 < D_1$ , in which case the successive inflation rates would be smaller and smaller, as illustrated on the broken-line path of Figure 2, finally inducing a solution inflation rate of zero!)

Since each early step is therefore noticeably larger than the previous, which is in turn noticeably larger than a fraction ( $1/2$  if the supply and demand curves have the same elasticity) of the initially observed average tariff rate (typically around 40% in the high-tariff countries), the eventually optimal inflation rate over a single devaluation-inflation cycle, as illustrated in Figure 2, is obviously a substantial multiple of the high-tariff rate. Even if the observed devaluations occurred only quarterly, and the costs of inflation rose very rapidly so that  $D^E$  were only twice  $D_1$ , the annual inflation rate would be  $4 \times 1/2 \times 2 \times 40\% = 160\%$ . We're not talking about low inflation rates.

Although triple-digit inflation is conventionally regarded as "hyperinflation", our theoretical definition of "hyperinflation" does not signify an inflation number; it signifies instead an initial series of accelerating inflation rates, followed by a regular, abnormally high, average rate of inflation.<sup>24</sup>

Note that the steps in our inflationary process are not part of a learning dynamic. The entire

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<sup>24</sup>Cagan's 50% per month definition was designed to capture Germany's 1923 experience, which, as discussed in Thompson (1990), was a learning-affected episode for an economy headed toward a zero demand for, and zero price of, domestic money. Because a shock occurred that headed off this growing expectation, the price of marks did not fall to zero. This entirely different experience, this remarkable 1/2-year of German history, however, will not be analyzed in the current paper.

sequence is a perfect equilibrium. Even when the actors know the entire process and where it will end up, they will go through the same gradual process to arrive at the equilibrium.<sup>25</sup>

### Further Quantification

Our subsequent econometric specification will be aided by a further quantification of the theory.

Using Fig. 1, letting the flows there represent daily flows, following an initial devaluation,  $D_1$ , the small country's desired exports (and therefore imports) have been exceeded (assuming a linear export-supply curve), by

$$(1) \quad \Delta Q = D_1 \frac{dQ}{dP} \cdot m,$$

where  $m$  is the number of days following the devaluation before the country can practically respond with a monetary expansion (because of final loan contingencies, meeting-lags, etc., during which time nominal interest rates, not prices, theoretically rise to reflect the expected response). After these  $m$  days, the country has, say,  $n$  days before a second imposed devaluation triggers another cycle,  $n$  days to reduce the flow of trade by initially increasing the money supply and price level. In particular, if the country is to compensate for the previously excessive imports, its trade flow must be reduced to where there is no change in cumulative exports, or to where the above increases in exports equals  $nC$ , or

$$(2) \quad \Delta Q = nC,$$

where  $C$  is the compensatory, or "catch-up", reduction in the daily flow rate of imports. So the inflation has not only to restore the original flow incentives by increasing the supply price of exports by  $D_1$ , it has also to reduce the daily flow rate of exports by  $C$ , which

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<sup>25</sup>The idea of modeling the interaction between a firm and a trade-liberalizing government as a perfect equilibrium is, as one should expect, not a novel one. See e.g., Matsuyama, who, under the influence of the standard literature, considers only the possibility of infant industry protection. Interestingly, Matsuyama ends up arguing against such protection despite its optimality because, under the same influence, he believes the government is so incompetent that it is unable to withhold protection after the industry has grown up. In any case, neither inflation nor two-way optimization are part of Matsuyama's study.

requires an additional increase in the domestic price-level of  $C/\left[\frac{dQ}{dP}\right]$ . The optimal price level therefore increases by

$$\begin{aligned} I_1 &= \Delta P_1/P = D_1 + C/\left[\frac{dQ}{dP}\right] \\ &= D_1 + \frac{\Delta Q}{n} \frac{1}{\left[\frac{dQ}{dP}\right]}, \text{ using (2).} \\ &= D_1 + D_1 \frac{m}{n}, \text{ using (1), or} \end{aligned}$$

$$(3) \quad I_1 = D_1 \left[ 1 + \frac{m}{n} \right].$$

This occurs over a period of  $m+n$  days. The initial annual inflation rate therefore equals  $\frac{365}{m+n}$  times the above number. With a desired tariff rate of 40%, and so initial devaluations of approximately 20%, equal lags, and quarterly devaluations, this rate again calculates to 160%.

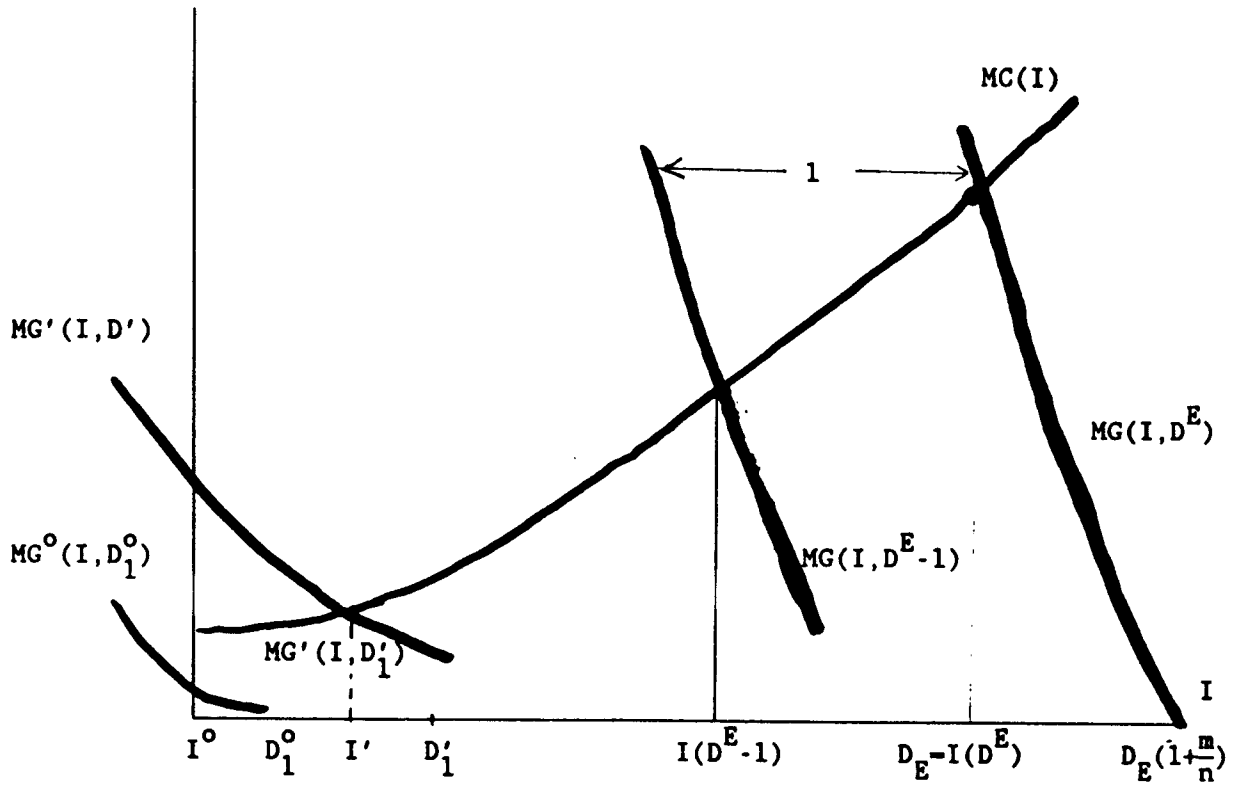
An immediate empirical implication of the above explanation for hyperinflation is that the inflation rate, rather than being steady, proceeds in predictable spurts. In particular, the inflation rate is relatively moderate immediately following a devaluation; then greatly accelerates, then slows up again before the next devaluation. In other words, inflation proceeds at its most moderate rate both before and after a currency devaluation. This very special dynamic pattern among hyperinflating countries was uncovered years ago by Anne Krueger and, to our knowledge, has heretofore gone completely unexplained.

Positive marginal welfare gains from some inflation exist when the corresponding average flow of imports is above the optimal level.<sup>26</sup> Figure 3 illustrates these marginal gains, as can be

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<sup>26</sup>Although this induced increase in trade has the small country importing more durable goods, which by itself would lower the overall demand for imports in succeeding periods, perishable-good imports are also induced by the incomplete price-level adjustment, as is a representative mix of

FIGURE 3



calculated from the triangular losses in Figure 1, where  $MG(I_t, D^E)$  represents the marginal gains from an inflation rate of  $I_t$ , given the equilibrium rate of periodic devaluation,  $D^E$ . Of course, in a hyperinflationary equilibrium: (a) there are marginal costs of inflation, where  $MC(I)$  represent these costs; and (b)  $D^E$  has risen to where the  $MG(I, D^E)$  has been forced up to where the optimal inflation rate is only  $D^E$ .

As determinable from Figure 1, if  $D$  were set below  $D^E$ , say at  $D^E - 1$ , then since  $MG(I_t - 1, D^E - 1) = MG(I_t, D^E)$ , the resulting optimal inflation rate,  $I(D^E - 1)$ , would, as shown in Figures 2 and 3, exceed the previous devaluation rate (again,  $D^E - 1$ ), and so the inflation-devaluation cycle would continue until  $D^E$  were again reached.

Finally, once the equilibrium is reached, i.e., where  $D^E = D_t = I_t = I^E$ , the annual inflation rate,  $INF$ , is given by

$$(4) \quad INF = \frac{365}{n+m} \cdot D^E$$

Notice, however, from Figures 1 and 3, that if a country's  $E$ , and therefore  $MG(I_t, D_1)$ , were sufficiently low, presumably because it is covered by a dominant country's defense commitment, it would have an  $I = 0$  corner solution, simply accept the initial devaluation, and exhibit a zero hyperinflation rate. Such countries would be identified by their freedom from exchange controls. Less obviously, as also illustrated in Figure 3, suppose a country's  $E$  were sufficiently low that its initial level of  $I(D_1)$  were positive but below  $D_1$ . As shown in Figure 2, both its eventual inflation rate and induced devaluation rate would be zero. (A perfect-equilibrium path is illustrated as the eventual no-inflation solution in Figure 2.) Such countries would be distinguished by only occasional bouts of inflation, ordinarily innocuous exchange controls, and relatively free trade.

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durable and perishable exports. Since no alteration in the prior durability of the traded goods is implied, the original sequence of demand and supply curves is retained.

Thus, in either one of these low-E cases, the trade-liberalizers "win" the game, eventually forcing their desired, socially excessive, amount of trade on the countries and making it stick by imposing currency devaluations that are simply too costly to avoid because of the need to hyperinflate to obtain any significant relief. Viewed in this light, the hyperinflators represent the visible casualties of the system. All the rest are invisible. Eliminating the visible casualties may be "achieved" if the IMF cuts the returns to each bout of inflation, by cutting the length of time that the small country has to enjoy an "overvalued" exchange rate. Of course, if the IMF had sufficient benefits to offer the small countries, such as the indirect gold-convertibility offered under the Bretton Woods system, the IMF could simply resume its old system of taxing the inflating countries. But, in the post-Bretton Woods world, such a tax, or even a shortening of the inflation-devaluation lag, would risk the defection of the high defense-externality, hyperinflating, countries. Nevertheless, the late 1980s did indeed see a substantial reduction in this lag (Edwards). Correspondingly, the number of annual devaluations rapidly increased during this period. Using equation (3) above, and examining the empirical results below, the result was a sharp increase in the equilibrium rates of hyperinflation. The subsequent and sudden elimination of the worst of these hyperinflations in the early 1990s may thus be a reflection of a continuing aggressiveness by the IMF and resulting reduction of the returns to a single round of inflation to where it is, as illustrated in Figures 2 and 3, no longer sufficient to support a hyperinflationary solution. However, as noted below, there is an alternative, quite reasonable, hypothesis to explain the relief from hyperinflation during the early 1990s.

#### IV. STATISTICAL ANALYSIS

The above theory suggests that a country's observed annual inflation rate,  $INF$ , can be predicted by: (1) its level of military conflict,  $MC$ , a country at war optimally increasing its money supply to help finance the wartime emergency; and (2) its peacetime defense externality,  $E$ , interacted with its dependency on international agencies,  $I$ .



As we have just seen, the effect of  $E$  on  $INF$  is extremely nonlinear. To accommodate this, we constructed the following nonlinear index: Letting the extent of a country's exchange controls measure the extent to which it attempts to avoid imports (see Appendix I), we ranked all 100 some-odd countries in each of our samples from 0 to 6, giving each country an  $E$ -ranking based on the existence, comprehensiveness, and severity of its exchange control system. The anti-log of the raw measure,  $T = e^E$ , then served as our relevant externality measure.

Similarly critical was our measure of a country's dependency on international agencies,  $I$ . A country received a dummy level of unity if it were a member of the GATT, and a "zero" otherwise. But if its exports were a small fraction of its income, its dependency on GATT policies could not be assumed to be large (in particular, its willingness to incur inflation to avoid GATT policies could not be assumed to be large). So our GATT-influence measure was a 0-1 dummy times one plus the log of one plus the share of exports in the country's GDP (the logarithmic weighting being due to an otherwise exaggerated effect of the trade weight because the variance of the raw weight typically exceeded the variance of the primary dummy variable). Similarly, a country that was not an IMF member (Eastern Europe and several small African countries with financial and military ties to France granting the latter internal monetary control) received a "zero", while IMF members received a "one". The extent of the dependency of an IMF member, measured by the extent of the government's short-term debt to foreign lenders relative to its GDP (or, more specifically, one plus the log of one plus this variable), was then multiplied by the zero-one dummy variable to obtain a final measure of IMF-dependency.  $I$ , then, the mathematical product of these two weighted dummy variables, was our measure of a country's hyperinflation-relevant dependency on international institutions.

The interaction between the above, inflation-predicting, variables,  $IT$ , i.e., the product of the international-agency-dependency measure and the expanded defense-externality measure, was

thus taken to be our critical inflation-predictor.

A "military conflict" variable was constructed by first examining whether the country had become engaged in a war within two-years of the period in question, and continued the war throughout the period. If so,  $MC = 3$ . If not, but the country was politically unstable, as measured by whether it had a war during part of the decade in question, we gave the country a "2". If neither, but the country was not covered by a dominant country's nuclear umbrella (i.e., was a member of NATO or ANZUS), we gave the country a "1". The remaining countries received a "zero". Finally, to obtain our "war" variable,  $W$ , we doubled it to approximately equalize its variance with that of our exchange-control dummy and weighted the variable by the severity of its current financial drain, one plus the log of one plus the increase in the country's fiscal deficit relative-to-income over the period in question.

To force our  $IT$ - and  $W$ -centered theory to statistically compete with existing, rather vaguely expressed, alternatives, which have proxies that can be variously expressed by the weights on each of our variables, we simply generated a maximum likelihood approximation to our general inflation function, expressed as a quadratic approximation of  $F(W,T,I)$ . In other words, we ran the following least squares regression on an international cross-section of 100 some-odd countries for which data was available:

$$INF = C + aI^2 + bI + cT^2 + dT + fIT + gW^2 + hW + iTW + jIW,$$

where the small letters signify estimated coefficients and the capital  $C$  is a constant term. For the latest year for which data was available, 1989, the regression results appear on Table 1.

As predicted by our theory, the  $W$  and  $IT$  variables explain most of the variation. Moreover,  $IT$  was, by far, the single most powerful predictor of inflation.

Going back to the preceding, more peaceful period, 1986-88 (the period following the drop in oil prices in 1986), we ran another regression of the same form. Similar results appeared, as

reported in Table II. IT was again the single most powerful predictor among the 9 competitors, and the  $R^2$  was again in the .98-9 region. Finally, for the 1970s we again ran our test regression for the relatively stable, 1976-78, period. As reported in Table III, similar results occurred. IT was -- for the third-straight test -- again the most powerful of the 9 competing variables!

## V. GRAPHICAL SUMMARY

There is an alternative way to illustrate the power of the theory. This is to simply plot Inflation against IT, including all IMF and GATT members who were not at war (e.g., Graph 1), comparing it to a plot (e.g., Graph 2) of Inflation against our exchange-control index, T, for non-members (implying  $I = 0$ ). The idea is to check to see if inflation is not somehow generating severe exchange controls or if there was some common causation between inflation and exchange controls. For these non-members, as we had hoped, there was no visible increase in INF with T (see Graph 2). Graphs 3 and 4 present the same contrast for the earlier 1986-1988 period. Graphs 5 and 6 present the same, stark, contrast for the 1970s sample.

In words rather than numbers, what is going on here is quite simple. There are only a few countries with persistently stringent peacetime exchange controls. These countries are, in all likelihood, trying to avoid an external imposition, if only because of some onerous treaty condition, of low import tariffs. Now some of these countries have no serious peacetime inflation. These are predictably the countries that are not directly dependent on that theoretically deadly combination of ideologues located at the GATT and the IMF. But if a country has persisted in maintaining stringent exchange controls and has also lived with a substantial dependency on both the GATT and the IMF, peacetime hyperinflation is -- empirically as well as theoretically -- essentially guaranteed.

## VI. CONCLUSIONS

### 1. On Economic Ideology: A Test for Political-Economic Hubris

Very few of us are surprised when we find functional members of our broader society adopting beliefs that grossly exaggerate the relative benefits of engaging in exchange with an

organization to which they belong. We should therefore not be surprised to find similar hubris in the political-economic beliefs of members of the economics profession. Consider, for example, how standard political economic beliefs predict the reaction of a typical, tariff-supporting, federal politician to suggestions of barriers to internal, interstate trade. Inherited political economy tells us that approximately the same political failure that explains observed barriers to international trade also predicts that the politician will support analogous domestic barriers to interstate trade. But actual politicians almost universally condemn interstate trade barriers!

We suspect that few economists would go so far as to agree with us that the above politician (or his staff) has a subconscious, Pascalian, sense of economic efficiency, one reasoning that since the defense-externality is the same wherever in the federation the traded property is located, the tax rate on the property should be the same wherever in the federation the property is located. Economic ideology is hubristic. It is in the professional self-interest of economists to heavily discount the likelihood of such Pascalian rationality on the part of our elected officials.

Nevertheless, we expect that fair-minded economists would readily acknowledge the failure of the standard political-economic paradigm to explain the above-noted asymmetry regarding observed trade barriers. We correspondingly invite these economists (and who else would still be reading this paper?) to compare the received ideology of international economics with the political economic theory of this paper as alternative ways to enlighten our views of the actual world economy.

a. *Does Economic Ideology Enlighten Our View of the Past World Economy?* Consider the "Dollar Shortage" arising after WWII, wherein virtually all independent foreign nations allowed their post-war money supplies to rise in their already-booming economies to where there was dollar

rationing and domestic exchange controls.<sup>27</sup> This largely unpredicted phenomenon has never been explained to be the result of economically efficient governmental policy. Yet the great postwar expansion of GATT, and the correspondingly widespread imposition of artificially low tariff rates, could have led to no other response from independent nations seeking to efficiently internalize their respective defense externalities. Moreover, as the U.S. nuclear umbrella was extended to various nations around the world during the late 1950s, exchange controls and the "dollar shortage" gradually dried up, but only in those regions. Again, nothing in standard economics prepares us to predict or explain either this drying-up or the maintenance of exchange controls in third-world countries.

Or consider explaining the fact that hyperinflation, although quite predictably prevalent among the seriously tariff-constrained countries in both the 1919-24 and post-1971 periods, was essentially non-existence in the 1925-71 period. We can naturally attribute this latter inflationary stability to the international gold standard that was ordinarily offered to the tariff-constrained countries during the intermediate period. The opportunity to tie their currency-values to gold, and consequent willingness to pre-submit themselves to a devaluation-tax in order to establish a superior system of emergency finance, plausibly raised the costs of inflation to where the tariff-constrained economies were seldom willing to forego the above emergency-finance benefits for a slightly beneficial reduction in trade. In contrast, the voluminous literature on hyperinflation is either mum on this basic issue of the timing of hyperinflationary eras or embarrassingly admits that the relatively large fiscal deficits characterizing the 1924-71 period directly contradict the standard argument that fiscal exhaustion is the cause of hyperinflation.

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<sup>27</sup> Recall, from footnote 16, that Germany and Japan, being only semi-independent and unable to employ exchange controls to avoid the U.S.-imposed tariff reductions, had to rely on an undervalued exchange rate, and an implicit export surplus, to reduce their imports toward internally-optimal levels.

b. *Does Economic Ideology Enlighten Our View of the Present World Economy?* The recent break-up of the Soviet Union, by dramatically reducing the external support for domestic rebel-groups throughout the Third World, has dramatically decreased the defense-externality faced by each of these countries. As our theory predicts, the severity of exchange controls in the early 1990s substantially diminished in numerous countries. And the optimal and actual extent of hyperinflation has correspondingly dramatically fallen since the early 1990s. However, the predictable response of the militarily dominant countries has been to impose lower GATT and related tariffs during the 1993-94 period. So, while the early 1990s has been a refreshingly stable and world-efficient period, and international economists are busy congratulating themselves for both "reforming" the exchange rate mechanisms and the "inflation-causing fiscal excesses", the old systems of harsh exchange controls and unfortunately rational hyperinflation have already begun their predictable return in this summer of 1995.

c. *Does Economic Ideology Enlighten Our View of the Future World Economy?* Finally, with an eye to the next century, consider a world with a single, dominant empire, where there is no international competition forcing the dominant country to acknowledge the claims of the other countries. Standard international economics forecasts more of the same, as indicated by the lack of any serious response by international institutionalists to the recent emergence of the U.S. as the sole, potentially world-dominant, world leader. Nevertheless, there is little reason for a genuinely world-dominant imperial leader to exaggerate its paternalism, and correspondingly little reason for the country to eschew either direct military intervention, internal policy controls, or simple rental demands. Exchange controls and hyperinflation would, like most of the other 20th century economic "innovations" we have been discussing, be efficiently eliminated from a straightforward world empire.

## **2. Optimal Policy**

In any case, the economic policies of international agencies such as the GATT and IMF should not be predicated on international paternalism. Each country should be assumed to be fully capable of acting in its informed self-interest. Small-country trade barriers would then be assumed to be rational and efficient as a matter of course. The GATT and other free-trade associations, would then be restricted to using various tax-subsidy policies to prevent various countries from exploiting their effects on prices to achieve monopoly gains from the countries. And the IMF, with the usual cooperation from the World Bank, would be restricted to using conditional loans and lines of credit to assist members in their attempts to finance national emergencies, especially through the fixing or stabilizing of their exchange rates. Since the encouragement of small-country trade liberalization -- in particular exchange-rate devaluation -- works against the justifiable role of the IMF and World Bank, trade liberalization should be eliminated from all IMF and World Bank loan conditions.

## APPENDIX I

### Explanation of Variables

The following variables are determined as below and then assigned to the countries reported in the data tables. The first table is for the sample period 1976-78, the second table is for the period 1986-88, and the last for the period 1989.

#### The Variable E

In order to gauge the magnitude of each country's exchange control, we have developed a qualitative measure, which we call E, of the extent of each country's import licensing. Based on information reported in the International Monetary Fund's Annual Report on Exchange Arrangements and Exchange Control, we have determined the value of E according to the following formula:

- E = 6 if every category of imports requires an import license and many categories of consumer goods are prohibited.
- E = 5 if every category of imports requires an import license but just a few categories of consumer goods are prohibited.
- E = 4 if every category of imports requires an import license but no category of consumer goods is actually prohibited.
- E = 3 if import licenses are required for a very wide range of categories of consumer goods.
- E = 2 if import licenses are required for only a few categories of luxury consumer goods.
- E = 1 if import licenses are required for only a few categories of consumer goods.
- E = 0 if no import licenses are required whatsoever for any category of goods.

#### The variable MC

In order to measure the extent of instability in a particular country we have developed a qualitative "military conflict" variable, called MC, to measure it. Based on information reported in the SIPRI Yearbook we have determined the value of MC based on the following criteria:

- MC = 3 if the country is presently experiencing military conflict, or the country has experienced or will experience significant military conflict within a 2-year period of the sample period.
- MC = 2 if the country has experienced significant conflict during the sample period decade.



- $MC = 1$  if the country is not a member of the defense pacts mentioned on category 0 but has experienced no significant conflict during the sample period decade.
- $MC = 0$  if the country is a member of NATO, ANZUS or SEATO and has experienced no significant conflict within the sample decade.

#### **The variables IMF and GATT**

The variables IMF and GATT are qualitative measures of a country's membership in the International Monetary Fund and the General Agreement of Trade and Tariffs respectively, according to the following rule.

$IMF = 1$  if country is a member of the IMF and 0 otherwise.

$GATT = 1$  if country is a member of the GATT and 0 otherwise.

#### **The variables INF, x, gdf and ofd**

The following three quantitative variables are based on data reported in the World Bank's World Tables and World Debt Tables Star Retrieval System

- $x$  measures the importance of a country's foreign trade and is measured by the log of one plus the average value of the country's exports divided by the average value of its GDP for the sample period.
- $def$  measures the extent of the increased vulnerability of a country as reflected in the change in its government's fiscal solvency. Thus  $def$  is defined as the log of one plus the change in the government deficit over the sample period divided by GDP.
- $ofd$  measures the extent of the dependency of the country on international agencies, and it is defined as the log of one plus the accumulated government guaranteed short term external debt plus any accumulated interest arrears at the end of the sample period.
- $INF$  is the average inflation for the sample period.

#### **The variables I, T and W**

Based on the above variables we determine the following variables as follows:

$$I = IMF \ GATT \ (ofd + 1) \ (x + 1),$$

$$T = \text{antilog}(E),$$

$$W = 2MC(def+1).$$

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TABLE 1

1989-1990

Dependent Variable is INF

	<u>Regressor</u>	<u>Coefficient</u>	<u>T-Ratio</u>
	C	221.913	3.804
	SQI	-.310	-4.361
	I	-1.942	-.830
	SQT	.019	3.327
	T	9.277	5.324
	IT	.481	11.788
	SQW	177.374	8.599
	W	-386.289	-6.11
	TW	-10.132	-5.173
	IW	4.560	2.497
$R^2$		.975	
Mean of Dependent Variable	107.487		

TABLE 2

1986-1988

Dependent Variable is INF

	<u>Regressor</u>	<u>Coefficient</u>	<u>T-Ratio</u>
	C	21.548	1.789
	SQI	-.174	-2.464
	I	-2.686	-1.298
	SQT	.005	3.427
	T	-.458	-1.370
	IT	.092	4.158
	SQW	.115	.350
	W	-7.659	-1.388
	TW	.167	1.369
	IW	2.169	2.847
$R^2$		.990	
Mean of Dependent Variable	38.240		

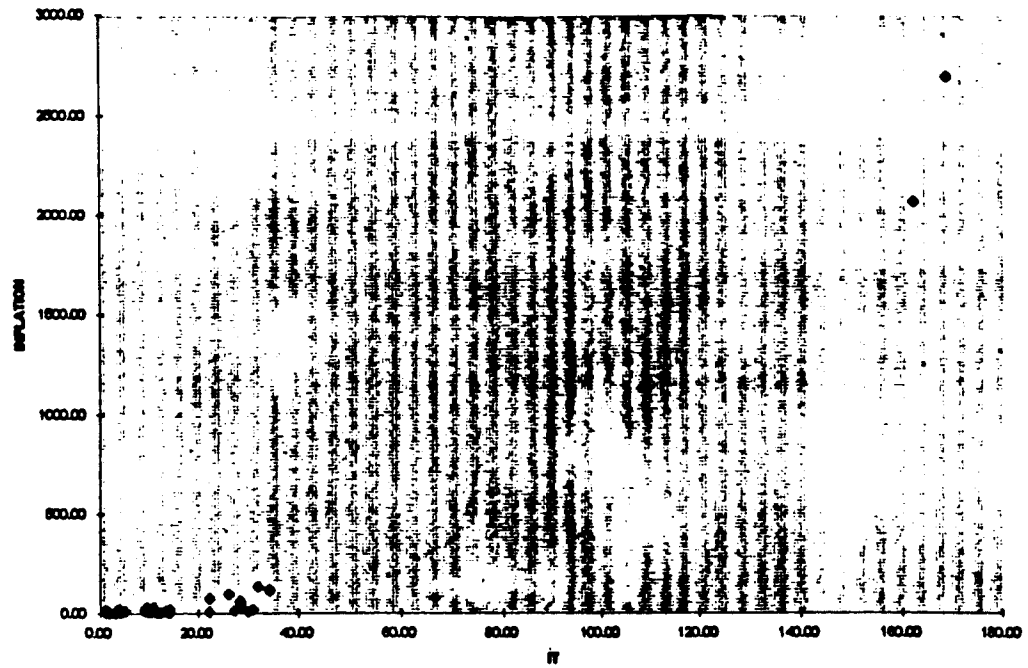
TABLE 3

1976-1978

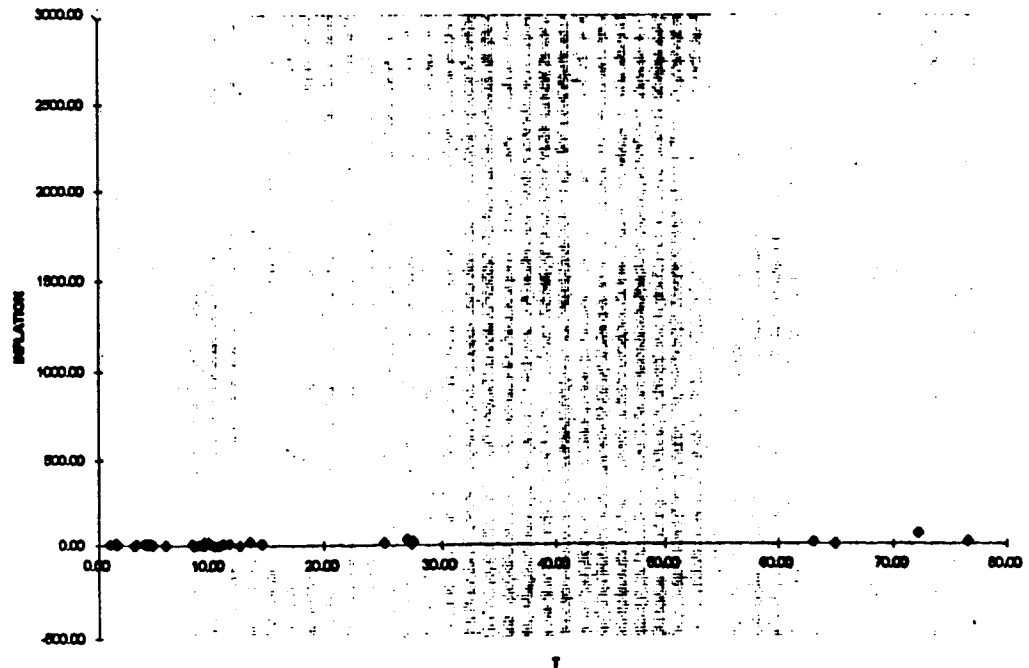
Dependent Variable is INF

<u>Regressor</u>	<u>Coefficient</u>	<u>T-Ratio</u>
C	10.652	2.701
SQI	-.060	-.321
I	.140	.109
SQT	.008	11.509
T	-.425	-3.397
IT	.152	12.246
SQW	.295	.656
W	1.516	.576
TW	-.122	-2.797
IW	-.516	-1.871
<b>R<sup>2</sup></b>	<b>.933</b>	
Mean of Dependent Variable	14.985	

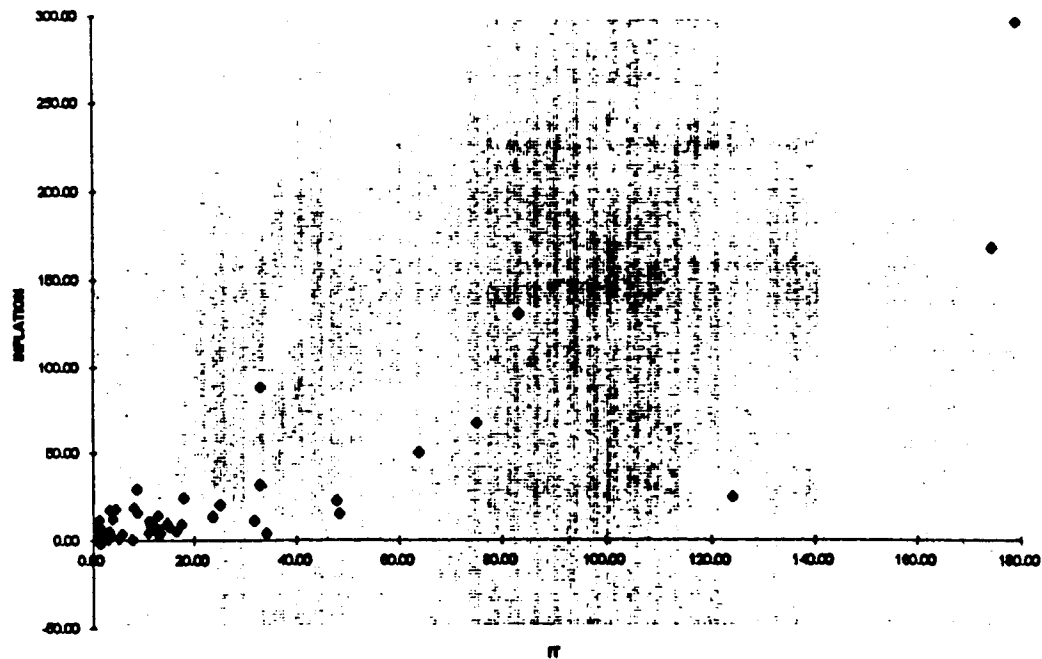
GRAPH 1: INFLATION AND EXCHANGE CONTROLS:1980 (IMF MEMBERSHIP)



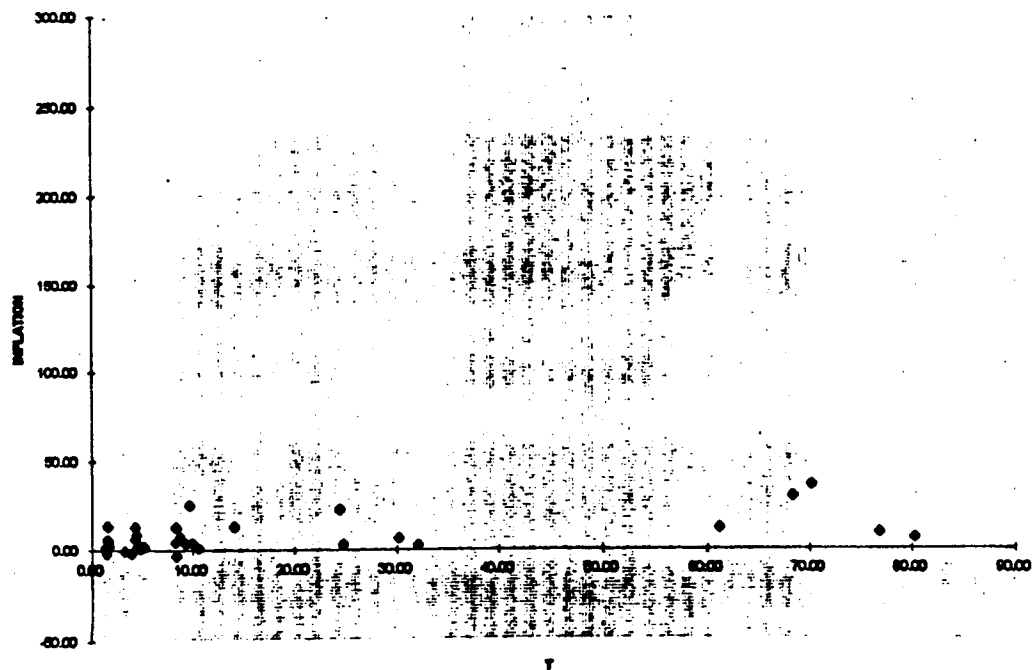
GRAPH 2: INFLATION AND EXCHANGE CONTROLS:1980 (NON-IMF MEMBERSHIP)



GRAPH 3: INFLATION AND EXCHANGE CONTROLS: 1966-88  
(IMF-MEMBERSHIP)

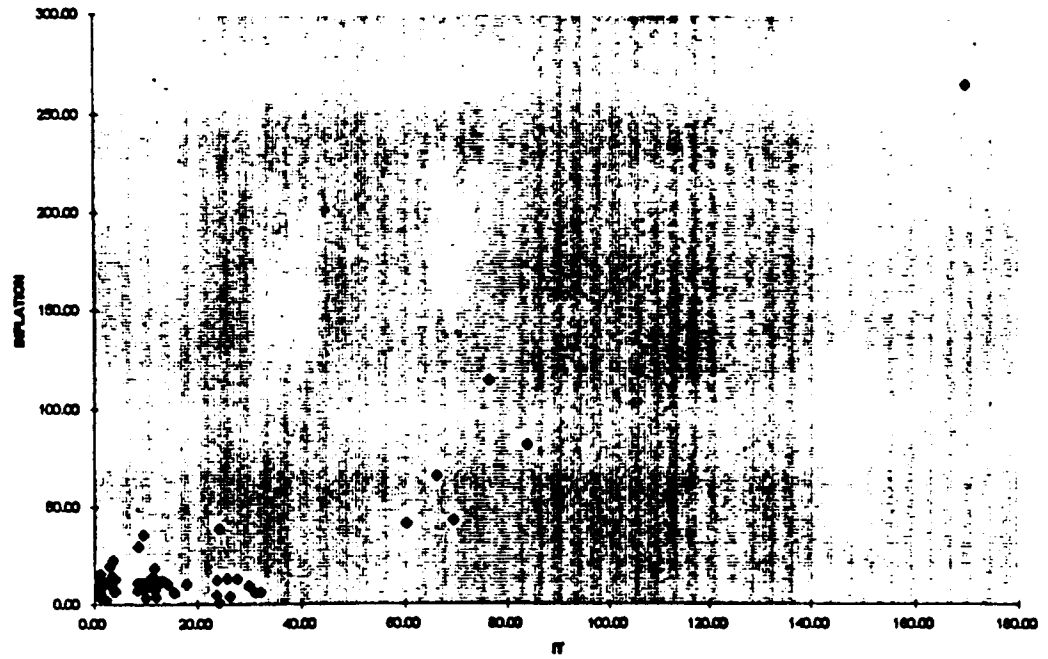


GRAPH 4: INFLATION AND EXCHANGE CONTROLS: 1966-88 (NON-IMF MEMBERSHIP)





GRAPH 5: INFLATION AND EXCHANGE CONTROLS:1976-78  
(IMF-MEMBERSHIP)



GRAPH 6: INFLATION AND EXCHANGE CONTROLS:1976-78 (NON-IMF MEMBERSHIP)

