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"CURRENCY MANIPULATION" AND WORLD TRADE

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ABSTRACT

Central bank intervention in foreign exchange markets may, under some conditions, stimulate exports and retard imports. In the past few years, this issue has moved to center stage because of the foreign exchange policies of China. China has regularly intervened to prevent the RMB from appreciating relative to other currencies, and over the same period has developed large global and bilateral trade surpluses. Numerous public officials and commentators argue that China has engaged in impermissible "currency manipulation," and various proposals for stiff action against China have been advanced.

This paper clarifies the theoretical relationship between exchange rate policy and international trade, and addresses the question of what content can be given to the concept of "currency manipulation" as a measure that may impair the commitments made in trade agreements. Our conclusions are at odds with much of what is currently being said by proponents of counter-measures against China. For example, it is often asserted that China's currency policies have real effects that are equivalent to an export subsidy. In fact, however, if prices are flexible the effect of exchange rate intervention parallels that of a uniform import tariff and export subsidy, which will have no real effect on trade, an implication of Lerner's symmetry theorem. With sticky prices, the real effects of exchange rate intervention and the translation of that intervention into trade-policy equivalents depend critically on how traded goods and services are priced. The real effects of China's policies are potentially quite complex, are not readily translated into trade-policy equivalents, and are dependent on the time frame over which they are evaluated (because prices are less "sticky" over a longer time frame).

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1 Introduction

A close relationship exists between monetary policy and international trade. Domestic monetary stimulus can enhance export opportunities for trading partners, just as contractionary policy can reduce them. Foreign exchange controls for balance of payments purposes can impede exports.[1] Central bank intervention in foreign exchange markets may, under some conditions, stimulate exports and retard imports or vice-versa, depending on the direction of intervention.

In the past few years, these issues have moved to center stage because of the foreign exchange policies of China. China has regularly intervened in international exchange markets to prevent the RMB[2] from appreciating relative to other currencies, and over the same period has developed large global and bilateral trade surpluses. Numerous public officials and commentators argue that China has engaged in impermissible "currency manipulation." President Elect Obama stated in October, 2008, for example, that China's current trade surplus is "directly related to its manipulation of its currency's value." He concurrently promised to "beef up U.S. enforcement efforts against unfair trade practices."[3] Various proposals for action against China have been put forward in Washington over the past few years, running the gamut from insisting that the Treasury Department refer the matter to the International Monetary Fund (IMF), requiring the United States Trade Representative to bring a formal complaint to the World Trade Organization (WTO), and treating China's alleged currency manipulation as a source of dumping or countervailable subsidies that would permit the imposition of antidumping or countervailing duties on Chinese imports that "materially injure" competing U.S. industries.

The prominence of the current rift over China's exchange market intervention offers an opportunity for a careful assessment of the connection between exchange rate policy and trade policy. Although we will devote considerable attention to the particulars of China's situation, we wish to emphasize that this is not simply a paper about this potentially transitory source of international tension. Rather, we seek to clarify more broadly the theoretical relationship between exchange rate policy and international trade, as well as the question of what content can be given to the concept of "currency manipulation" as a measure that may impair the commitments made in trade agreements. The analysis goes to the proper relationship between IMF obligations and WTO obligations, to the question whether trade measures have a role in the enforcement of IMF obligations, and to the

[1] The GATT, now incorporated into WTO law, permits the use of trade restrictions when "necessary" to protect foreign exchange reserves, even if those measures would otherwise contravene GATT commitments. See GATT Art. XII, Art. XVIIIB (applicable to developing countries). Over the history of the WTO and the GATT before it, a frequent source of tension has concerned the use of import restrictions ostensibly for the purpose of conserving scarce foreign exchange. Many member nations have employed such restrictions at one time or another, and numerous informal and formal disputes arose within the system. Two of these disputes resulted in rulings that balance of payments restrictions had been invoked or misused in a fashion that impermissibly restricted trade. See Republic of Korea – Restrictions on Beef, L/6503, 6504 & 6505, adopted by the GATT Council November 7, 1989; India – Quantitative Restrictions on Imports of Agricultural, Textile and Industrial Products, WT/DS90/AB/R, adopted by the WTO Dispute Settlement Body September 22, 1999.

[2] The Chinese currency is also known as the yuan or the renminbi (RMB). We will use the term RMB throughout for consistency.

[3] See http://www.reuters.com/article/vcCandidateFeed7/idUSN2949036520081030.

broader question whether trade measures are an appropriate response to exchange market policies that may impair market access commitments under trade agreements.

Our conclusions raise questions about much of what is currently being said in Washington. For example, it is often asserted that China's currency policies have real effects that are equivalent to an export subsidy. In fact, however, if prices are flexible the effect of exchange rate intervention parallels that of a uniform import tariff and export subsidy, which will have no real effect on trade. With sticky prices, the real effects of exchange rate intervention and the translation of that intervention into trade-policy equivalents depend critically on how traded goods and services are priced. The real effects of China's policies are thus potentially quite complex, are not readily translated into trade-policy equivalents, and are dependent on the time frame over which they are evaluated (because prices are less "sticky" over a longer time frame).

Section 2 provides some further background on China's current policies and the criticisms that have been leveled against them. Section 3 addresses the economic issues, focusing on the question whether exchange rate policies have the potential to frustrate trade commitments, and the task of distinguishing acceptable foreign exchange policies from unacceptable policies. Section 4 reviews the existing legal constraints on currency "manipulation," and the most prominent proposals for additional legal measures now pending, analyzing the extant and proposed options from both an economic and legal perspective. Section 5 concludes.

2 Chinese Policy and Its Critics

Governments have intervened in foreign exchange markets for decades. In any system of fixed exchange rates, the price of a currency in terms of other currencies set by the government (termed the "peg") may prove inconsistent with the market valuation of the currency. As a result, exchange traders may demand more of it than the available supply at the fixed rate, or vice-versa. When such pressures become substantial, governments must either revalue the currency, or intervene in the exchange market by buying the currency (to soak up an excess supply) or selling the currency (to relieve an excess demand). The need for intervention diminishes greatly, of course, when currencies are allowed to "float" against each other in accordance with free market forces. Most of the major currencies presently, including the dollar, the Euro, the yen and the British pound, now float.

Notwithstanding China's enormous and growing role in world trade,[4] the RMB does not float. It was pegged from 1994 until mid-2005 at a constant rate of 8.28 RMB to the dollar. In response to pressures for upward revaluation, China shifted in 2005 to a policy of loosely pegging the RMB to a basket of major currencies. Following this shift in policy the RMB has appreciated against the dollar, and the current RMB/dollar exchange rate (as of December, 2008) stands at roughly 6.83. Despite the recent appreciation against the dollar, however, a recent "blue ribbon panel" report to

[4] In 2006, for example, Chinese exports were just under $1 trillion. See PRC General Administration of Customs, China's Customs Statistics, summarized online at http://www.uschina.org/statistics/tradetable.html. The European Union now imports more goods from China than from any other trading partner. See http://ec.europa.eu/trade/issues/bilateral/countries/china/index_en.htm.

the incoming Obama administration concludes that the RMB is still "substantially undervalued."[5] And over the same period, the RMB generally depreciated against the Euro, falling from 10.06 in June 2005 to 10.79 in June 2008. With the sharp depreciation of the Euro due to the recent financial crisis, however, the RMB has appreciated and the RMB/Euro exchange rate presently stands at 9.78 (as of December 2008).

Throughout this period, China has intervened actively in foreign exchange markets to prevent the RMB from appreciating faster, selling RMB and buying other major currencies (mostly dollars). As a result of this policy, its foreign exchange reserves grew from $403 billion at the end of 2003 to over $1.5 trillion at the end of 2007.[6] Reports from earlier this year suggest that its reserves had grown to roughly $1.9 trillion by September.[7]

The effect of such exchange market intervention on international trade, and on measures of trade flows such as the trade surplus or deficit, is a matter of some theoretical and empirical controversy as will become clear in Section 3. For now, we start with an obvious and politically salient fact. If a government intervenes in exchange markets to drive down the price of its currency in relation to other major currencies, and all else remains equal, its exports can become cheaper on world markets (it may take fewer units of foreign currency to buy them) and its imports can become more expensive in its domestic market (it may take more units of domestic currency to purchase foreign goods). Following this simple observation, it is often suggested that the policy pursued by China must increase its exports and decrease its imports.

One obvious difficulty with this account is that it ignores the effect of exchange rate movements on other prices in the global economy (i.e., other things may not be equal). Indeed, it is possible to imagine that other prices adjust to offset completely the exchange rate movement, as we will discuss in Section 3. An effect on trade from exchange market intervention thus requires not simply a movement in the nominal exchange rate, but a change in the real exchange rate – the nominal rate adjusted for the purchasing power of currencies.[8] The extent to which exchange market intervention will affect real exchange rates is an empirical question, depending on such factors as the ability of other prices to adjust and the speed by which adjustment takes place.

Another difficulty with the simple argument above is that it implicitly presumes that all traded goods are priced in the currency of the country that produces them. In fact, exporters may price their goods in the currencies of the markets into which they sell, or perhaps in some third currency (such as dollars or Euros). The effect of exchange market intervention in these scenarios becomes more subtle and complex.

Section 3 will have much more to say about such matters. For the moment, however, suffice it to say that China's foreign exchange policies have been accompanied by dramatic changes in its international trade position (whether those policies have caused those changes is, to be sure,

[5] See BNA International Trade Daily, December 16, 2008.

[6] See http://www.ibtimes.com/articles/20080111/chinas-foreign-exchange-reserves-higher.htm.

[7] See http://www.iht.com/articles/ap/2008/10/14/business/AS-China-Foreign-Reserves.php.

[8] An alternative definition of the real exchange rate that is sometimes employed is the relative price of tradeables to non-tradeables. The points we emphasize in this paper are not sensitive to the choice between these two definitions, and so in what follows we stick with the definition of the real exchange rate provided in the text.

another question). China's global trade surplus rose slowly (and unevenly) from $16.7 billion in 1995 to $32.1 billion in 2004. But in 2005 its global surplus more than tripled to $102 billion, followed by another 75% increase in 2006 to $177.5 billion[9] and another 48% increase to $262.2 billion in 2007.[10]

Of perhaps lesser economic significance, yet surely of great political significance, China's trade surplus with the United States has risen steadily from $33.8 billion in 1995 to $256.2 billion in 2007. The latter figure reflects U.S. imports from China in the amount of $321.4 billion and exports of only $65.2 billion[11]. China's trade surplus with Europe follows a rather similar pattern, reaching 159.0 billion Euros in 2007.[12] In light of these figures, it is no surprise that ministers on both sides of the Atlantic have expressed concern about China's policies and have urged China to allow the RMB to appreciate.[13]

These concerns are voiced by more than just politicians and their industry constituencies. C. Fred Bergsten of the Peterson Institute for International Economics recently suggested that the RMB must appreciate approximately 40% against the dollar to correct current "global imbalances," and urged the United States to take multilateral and if necessary unilateral action to pressure China to change its ways.[14] Lael Brainard of the Brookings Institution has also been critical of China's policies,[15] as has the prominent international economist Michael Mussa, now based at the Peterson Institute.[16]

Thus, from the Administration to Congress to the think tanks, the debate in Washington seems not to be over the existence of a problem or its potential seriousness, but over the best policy response. We will discuss policy options in some detail in Section 4, but as a preliminary to that analysis we turn to some basic economic points.

3 Economic Analysis

How is the global economy affected when the government of China engages in exchange rate intervention to prevent the RMB from appreciating, and what is the appropriate response from China's trading partners? The IMF and the GATT/WTO were created to address the international spillovers or "externalities" that might arise when governments choose their economic policies

[9] Note that China became a member of the WTO in 2001. This event had no obvious impact on China's trade surplus – the surplus in 1997 and 1998 was higher that in any of the years 2002-2004. See PRC General Administration of Customs, China's Customs Statistics, supra.

[10] See http://www.ibtimes.com/articles/20080111/chinas-foreign-exchange-reserves-higher.htm

[11] See http://www.census.gov/foreign-trade/balance/c5700.html#2007.

[12] See http://www.eubusiness.com/China/eu-china-trade.08/.

[13] See, e.g., Bloomberg News, Europe Trade Gap with China Soars, Fuels G-7 Tensions, October 18, 2007, http://www.bloomberg.com/apps/news?pid=newsarchive&sid=a9afSzjz4PQs.

[14] C. Fred Bergsten, Statement before the Hearing on US Economic Relations with China: Strategies and Options on Exchange Rates and Market Access, Subcommittee on Security and International Trade and Finance, Committee on Banking, Housing and Urban Affairs, United States Senate, May 23, 2007, available online at http://www.iie.com/publications/papers/print.cfm?doc=pub&ResearchID=747.

[15] Lael Brainard, Global Views: Currency Exchange Rate Oversight Reform Act of 2007, June 14, 2007, http://www.brookings.edu/opinions/2007/0614globaleconomics_brainard.aspx.

[16] Michael Mussa, IMF Surveillance over China's Exchange Rate Policy, October 19, 2007 (mimeo).

unilaterally, and if properly functioning these international institutions should serve to internalize those externalities and thereby bring the world to the international efficiency frontier. To determine the proper policy response by other nations (or by international institutions) to intervention in the foreign exchange market, it is therefore first necessary to identify the international externalities that may be associated with such intervention. We begin by observing that these international externalities might be of two general types, relating either to *trade imbalances* or *trade volumes*.

The IMF has traditionally been assigned the role of handling global trade (or current account) imbalances, when those imbalances are associated with "fundamental misalignment" or "manipulation" of the exchange rate.[17] In IMF (2007a), the terms "fundamental misalignment" and "manipulation" are explained, respectively, in this way:

> 1)When the underlying current account is not in equilibrium (which may be due to exchange rate policies but also to unsustainable domestic policies or to market imperfections), the exchange rate is "fundamentally misaligned." In other words, fundamental exchange rate misalignment, an important indicator of external instability under the 2007 decision, is a deviation of the real effective exchange rate from its equilibrium level, that is, the level consistent with a current account (stripped of cyclical and other temporary factors) in line with economic fundamentals.

and

> 2) The IMF's Articles of Agreement provide that member countries shall "avoid manipulating exchange rates ... to prevent effective balance of payments adjustment or to gain an unfair competitive advantage over other members." But the Fund had provided little guidance on what constitutes such exchange rate manipulation. The 2007 Decision on Bilateral Surveillance that the IMF's Executive Board approved on June 15 provides guidance to the IMF's 185 member countries on the type of behavior that is at issue.
>
> The 2007 decision provides that a member would be "acting inconsistently with Article IV, Section 1 (iii)," if the Fund determined it was both engaging in policies that are targeted at and actually affect the level of exchange rate, which could mean either causing the exchange rate to move or preventing it from moving; and doing so "for the purpose of securing fundamental exchange rate misalignment in the form of an undervalued exchange rate" in order "to increase net exports."

We note that the IMF defines both fundamental misalignment and manipulation of the exchange rate in terms of the effects on the current account and net exports, and is in this sense concerned with the *impacts of exchange rate policies on trade imbalances*.[18]

[17] The precise nature and extent of the "problem" associated with global imbalances that would warrant some response is itself a point of controversy among economists, but it is often described as the risk associated with a rapid reversal of the imbalances accompanied by sudden and large exchange rate movements (see, for example, Cline, 2005 and Rogoff, 2006).

[18] Exchange rate policies are defined by the IMF as follows:

By contrast, the negotiated reciprocal market access commitments that lie at the core of the GATT/WTO are not seen as a means of correcting trade imbalances, but have instead been widely interpreted as a means of reducing policy barriers to trade and thereby expanding trade *volumes* to more efficient levels.[19] Consistent with this interpretation, formal economic models of trade agreements, without exception, take trade balances as exogenous and therefore unaffected by trade agreements.[20] It may therefore be said that the economics literature on trade agreements proceeds on the basis that trade agreements are not concerned with negotiating trade balances. Rather, it is generally accepted that the traditional concern of the GATT/WTO has been with the *impacts of commercial policies on trade volumes.*

The distinction between the traditional concerns of the IMF and those of the GATT/WTO provides a crucial starting point for the discussion that follows. In particular, we do *not* undertake our analysis from a position which sees the IMF as a failed institution and asks the WTO to "take over" the task of handling all aspects of international cooperation over exchange rate policies: such a position would imply a fundamental shift in the limits of the WTO mandate. Rather, we maintain the assumption that the IMF is the appropriate institution for addressing the impacts of exchange rate policies on trade imbalances. In this way, our economic and legal analysis presumes that there will be no fundamental change in the role of the WTO. The question we address is then how the WTO should approach the possible impacts of exchange rate policies on trade volumes.

Admittedly, this approach implies that our paper cannot speak to all corners of the policy debate on currency manipulation, because some in this debate argue that the IMF is a failed institution and that the WTO should be called upon to expand its mandate and achieve what the IMF cannot.[21] Nevertheless, even with this more limited focus, our paper still speaks to one

> As is evident from the section of the 1977 Decision entitled "Principles of Fund Surveillance over Exchange Rate Policies," exchange rate policies have been understood by the Executive Board as embracing a broad range of external policies that are specifically pursued for balance of payments purposes; e.g. the introduction of or substantial modification for balance of payments purposes of restrictions on, or incentives for, the inflow or outflow of capital. Moreover, to the extent that certain domestic policies are also pursued for balance of payments purposes, the indicators suggest that these would also be included; specifically, the pursuit, for balance of payments purposes, of monetary and other domestic financial policies that provide abnormal encouragement or discouragement to capital flows. However, domestic policies pursued for these specific purposes should be distinguished from domestic policies that only have this effect. The latter category would not be considered exchange rate policies within the meaning of the 1977 Decision. (IMF, 2006a, footnote 22).

[19] The underlying "problem" that gives rise to the need for a trade agreement has been broadly interpreted in the economics literature as deriving from the international cost-shifting motives to which governments succumb when they make unilateral trade policy choices (with cost-shifting typically occuring through terms-of-trade movements), but domestic commitment problems have also been suggested (see Bagwell and Staiger, 2002, for a recent review of this literature).

[20] Most models of real commercial policy analysis more generally also adopt the assumption that trade balances are exogenous to the choice of commercial policies, though there are exceptions (see, for example, Corden, 1985, Mussa, 1974 and 1985, and Razin and Svensson, 1983). As it happens, the leading macro-economic analyses of the potential gains from international monetary policy coordination maintain the assumption that trade balances are exogenously fixed as well (see Obstfeld and Rogoff, 2002 and Corsetti and Pesenti, 2007). On the other hand, the idea that (exogenous) changes in trade imbalances may impact the performance of trade agreements has been formally studied by Bagwell and Staiger (1990) and most recently by Agur (2008).

[21] For a recent articulation of this position, see Subramanian (2008).

very important dimension of the policy debate, namely, whether and under what circumstances exchange rate policies can be seen either to impair WTO commitments or to afford a basis for WTO-consistent unilateral responses.

As noted briefly in the previous section, proposals calling for action to deal with the perceived impacts of China's exchange rate policies include many that involve the WTO. Some of these proposals would seek a ruling against China by the WTO on some basis, while others envision unilateral responses that nevertheless raise issues of WTO consistency. But for each of these alternative proposals, a common – and critical – ingredient for practical implementation involves an analysis which would translate China's exchange rate policies (and in particular the magnitude of its exchange rate "misalignment") into equivalent real trade policies that could then be more readily evaluated under the rules of the WTO, either to identify the appropriate response by the WTO itself or to assess the WTO-consistency of unilateral responses. The economic discussion to follow will explore in some detail a number of specific issues that arise in this analysis. But before turning to that discussion, we first describe two implications of the distinct focus of the IMF and the WTO that provide guidance for what follows.[22]

First, one simply cannot presume that the IMF's definition of "exchange rate misalignment" as reproduced in the quoted passage above, which is derived from an analysis of trade imbalances, is a useful starting point for assessing the impact of exchange practices on WTO obligations. As an illustration of this point, consider the question whether exchange practices of China can be deemed to impair the market access (tariff) concessions made by China when it acceded to the WTO in 2001 (we discuss legal aspects of this issue in Section 4). To answer this question, a crucial legal issue is whether China's exchange rate policies could have been reasonably anticipated at the time of its negotiated tariff concessions. But of course, the IMF-based calculation of misalignment, being designed for a completely different purpose, does not reflect this information (i.e., it makes no attempt to measure only that portion of the misalignment that could not have been reasonably anticipated at the time that China's tariff commitments were negotiated).

As this illustration suggests, the correct definition of "exchange rate misalignment" for the purpose of characterizing the appropriate WTO response to exchange practices or the WTO-consistency of a unilateral response would depend on the legal claim being made within the context of the WTO, and need bear no relation to the IMF definition of misalignment. This point applies as well to all of the alternative approaches to defining exchange rate misalignment, which are based on some notion of "purchasing power parity."[23] The various approaches to the assessment of equilibrium exchange rates will yield different results, but none of them can be presumed as a gen-

[22] As we discuss further in Section 4, policy proposals that focus on the use of GATT Article XV raise as well the explicit issue of whether exchange rate policies frustrate the "intent" of the GATT/WTO. Our distinction noted above between the concerns of the IMF and those of the GATT/WTO has an additional and direct implication in the context of these proposals: exchange rate policies that raise problems at the IMF would not necessarily frustrate the intent of the GATT/WTO, while exhange rate policies that did not raise concerns for the IMF could nevertheless frustrate the intent of the GATT/WTO.

[23] For a description of the major approaches to determining the equilibrium value of the exchange rate and the magnitude of exchange rate misalignments, see McCown et.al. (2007).

eral matter to provide useful guidance for thinking about the question whether exchange practices impair WTO commitments. We return to consider this issue further in Section 4.

A second implication of the distinct concerns between the IMF and the WTO relates to the way in which exchange rate policies should be translated into equivalent real commercial policies for the purpose of WTO evaluation, once the appropriate magnitude of exchange rate misalignment has been determined for this purpose. Simply put, we wish to isolate the trade volume effects of exchange rate misalignment from the trade balance effects, because as we indicated above the latter are the traditional concern of the IMF while the former are most closely tied to the traditional concerns of the GATT/WTO and are hence our focus here. In what follows we therefore work with models that maintain balanced trade, not because we are asserting that trade imbalances are necessarily unaffected by exchange rate movements, but because we believe that those affects are simply not germane to the evaluation of appropriate WTO or WTO-consistent actions.[24]

To describe some of the further difficulties involved in translating exchange rate policies into equivalent real commercial policies for the purpose of judging WTO consistency, we focus for the remainder of this section on the hypothetical problem of translating a given devaluation of the Chinese RMB into an equivalent package of real commercial policies. We interpret this devaluation as capturing in a stylized way the "exchange rate misalignment" that China is being asked to address, and we abstract until Section 4 from the prior issue raised above concerning how to measure the magnitude of this devaluation (the magnitude of exchange rate misalignment) in an appropriate manner for the purpose at hand.[25]

In translating the effects of exchange market intervention into equivalent real commercial policy measures, it is helpful to begin in an environment of fully "flexible prices" and then move to an environment with "sticky prices." We thus divide the analysis to consider these two cases.

3.1 Flexible Prices

We begin under the assumption that prices are fully flexible, an assumption that in effect captures the "long run." The flexible price assumption is standard in economic models of international trade agreements (see, for example, the models surveyed in Bagwell and Staiger, 2002, Ch. 2).

The justification for this assumption when used in the economic analysis of trade agreements is not a belief that all prices are fully flexible at every moment in time. Rather, it is justified by the notion that trade agreements are primarily designed to address longer-term international problems that arise and persist over horizons for which a flexible-price assumption seems reasonable, such as the desire by nations to obtain long term improvements in their access to foreign markets. Put

[24] Logically, of course, exchange rate policies may impact trade volumes without impacting trade balances, but exchange rate policies that impact trade balances must also impact trade volumes. Here we explore the impacts of exchange rate policies on trade volumes under the assumption that trade remains balanced, isolating these trade volume effects from any further effects that would be associated with the trade balance implications of exchange rate policies. As described in the text, we do so on the grounds that the latter are germane to the IMF, not the WTO.

[25] In reality, the policy issue is not that China's exchange intervention is devaluing the RMB, but that its intervention is preventing appreciation in the RMB that would otherwise occur. For the points we make below, this distinction is immaterial, and so for pedagogical reasons we consider the simple case of a devaluation.

differently, the "GATT clock" ticks in years or even decades, not at business cycle frequencies, and at this frequency most prices are likely to be flexible. Of course, trade agreements may build in flexibility to allow governments to respond to shorter term cyclical pressures (such as the GATT "escape clause"), but such provisions by and large contemplate temporary deviations from a longer term bargain.

To proceed with the economic analysis, our basic approach is as follows. First, we ask whether exchange market intervention can be translated into equivalent trade policy measures – e.g., when a nation intervenes in exchange markets to prevent the appreciation of its currency, what is the effect on the world economy, and what trade policy/real (non-monetary) policy would have the equivalent effect? As noted above, to keep our analysis simple and focused on the main points, we take as our measure of exchange market intervention a devaluation of the intervening country's currency, brought about by an increase in its money supply, and we leave to the side any trade balance implications of the devaluation. And we further abstract from reality by supposing for purposes of illustration that there are just 2 countries in the world economy who produce and trade just 2 goods and face no transport costs between them: as will become clear, the points we make do not depend on this abstraction.[26] Second, once we have identified the equivalent trade policy, we consider at a general level what response to that policy might seem appropriate given the logic of existing international trade agreements and the mechanisms that they have devised for the control of trade externalities.

In a flexible-price world, what trade policies would exactly replicate the effects of a currency devaluation? The answer to this question is a general and well-known result in international economics (dating back to Keynes, 1931, p. 195, who first argued the point in a sticky-wage environment). The effects of a devaluation can be replicated by the introduction of a uniform ad valorem export subsidy on all export goods and import tariff on all imported goods.[27] As shall be seen, however, the effects of such policies in tandem are dramatically different from their effects in isolation.

To develop this idea using the example of China, we refer to our 2 countries as "US" and "China," and we think of US as the "home" country and China as the "foreign" country. We distinguish China magnitudes with a '$*$'. Each country produces a specialized good – we denote the good produced in US by the subscript h (for "home"), and we denote the good produced in China by the subscript f (for "foreign") – and trades with the other country in order to consume both goods. Finally, we denote by \$ the local currency (dollars) in US and by ¥ the local currency (RMB) in China, with the exchange rate between the US and China currencies denoted by e and expressed as the value of the RMB in dollars (i.e., expressed as \$/¥).

[26] For example, Helpman and Krugman (1989, Chapter 7) describe a basic model of monopolistic competition and increasing returns to scale in which firms produce many differentiated products and there is two-way trade between countries. As they observe, the effect of trade policy in the model they describe is the same as would be the case in a 2-good model of specialization and trade based on comparative advantage, which is in effect the model we describe here.

[27] See Chipman (2006) for a demonstration of this policy equivalence under flexible prices in the presence of 3 goods, 2 of which are traded, and where trade may be unbalanced. Feenstra (1985) provides an exploration of the policy equivalence between a devaluation and a tariff-cum-subsidy policy in a 2-good intertemporal small-open-economy model where agents face "cash-in-advance" constraints.

To gain an understanding of the policy-equivalence between a devaluation and the uniform tariff-cum-subsidy noted above, let us suppose for the moment that there are no trade policy interventions in the world economy. In our flexible-price world, the key observation is that the price of good f in China, denominated in RMB, which we denote by $P_f^{*¥}$, will be related to the price of good f in US, denominated in dollars, which we denote by $P_f^{\$}$, according to the international arbitrage condition

$$P_f^{*¥} = [\frac{P_f^{\$}}{e}]. \tag{1}$$

And similarly, the price of good h in US, denominated in dollars, which we denote by $P_h^{\$}$, will be related to the price of good h in China, denominated in RMB, which we denote by $P_h^{*¥}$, according to the international arbitrage condition

$$P_h^{\$} = e \cdot P_h^{*¥}. \tag{2}$$

Expressions (1) and (2) are sometimes referred to as the "law of one price" applied to international markets, because they indicate that producers must receive the same price for their product, when translated into a common currency, no matter where they make the sale.

As long as the law of one price holds (and it certainly does in the flexible price environment that we are considering at present), a devaluation of the RMB – which amounts to a drop in e – must lead to changes in the prices $P_f^{*¥}$, $P_f^{\$}$, $P_h^{\$}$ and $P_h^{*¥}$ which preserve the relationships in (1) and (2). The question we now wish to ask is, What changes in the trade policies of China could replicate the price changes associated with a drop in e?

To answer this question, we now express the international arbitrage conditions that reflect the law of one price as they must hold when China (i) offers an export subsidy to its exporters of good f, expressed in ad valorem terms as a percentage of $P_f^{\$}$, and (ii) imposes a tariff on imports of good h, expressed in ad valorem terms as a percentage of $P_h^{\$}$. Denoting the China export subsidy by s_f^* and the China import tariff by t_h^*, the international arbitrage conditions in this flexible-price (FP) setting become

$$P_f^{*¥} = [\frac{\left(1+s_f^*\right)}{e}] \cdot P_f^{\$}, \tag{FP1}$$

and

$$P_h^{\$} = [\frac{e}{\left(1+t_h^*\right)}] \cdot P_h^{*¥}. \tag{FP2}$$

According to (FP1) and (FP2), a drop in e would require the same adjustments to prices – in order to ensure that the international arbitrage conditions hold – as would a uniform rise in s_f^* and t_h^* of appropriate magnitude.[28] This is the essence of the policy-equivalence between a devaluation and a uniform tariff-cum-subsidy stated above.[29]

[28] In particular, as (FP1) and (FP2) indicate, the effects of an $x\%$ devaluation (drop in e) would be replicated by a uniform $1/(1-x\%)$ increase in both $\left(1+s_f^*\right)$ and $(1+t_h^*)$.

[29] A full accounting of this policy equivalence must also compare the government revenue effects of a devaluation and a uniform tariff-cum-subsidy, but it can be shown that these effects are also equivalent (see, for example, Chipman,

At first blush, this policy-equivalence result seems to support the argument that exchange market intervention to lower the value of the domestic currency (intervention to reduce e in this framework) justifies a trade policy response. An increase in tariffs in the WTO system may well cause tariffs to exceed tariff ceilings ("bindings" in WTO parlance) that have been negotiated by the importing nation. Any time an importing nation raises tariffs above its negotiated bindings, it violates WTO law unless it provides some acceptable form of trade compensation (as in the course of tariff renegotiations under GATT Article XXVIII). Likewise, export subsidies are generally prohibited under WTO law outside of the agricultural sector. On the surface, therefore, a devaluation seems equivalent to a set of policies that would represent clear infringement of WTO obligations.

This view has been expressed by a number of commentators. Consider, for example, recent congressional testimony regarding China's exchange rate policy by C. Fred Bergsten, Director of the Peterson Institute for International Economics (Bergsten, 2007):[30]

> [T]he administration (with as many other countries as it can mobilize) should also take a new multilateral initiative on the trade side by filing a World Trade Organization (WTO) case against China's currency intervention as a "frustration of trade commitments" or as an export subsidy. As Fed Chairman Ben Bernanke indicated in his highly publicized speech in Beijing last December, in connection with the first Strategic Economic Dialogue, China's exchange rate intervention clearly represents an effective subsidy (to exports, as well as an import barrier) in economic terms. It should be addressed as such.

But before we conclude that a devaluation should unambiguously be seen as a violation of WTO commitments, we must consider the implications of price flexibility. In fact, on that assumption, a devaluation – as well as the equivalent uniform tariff-cum-subsidy – *has no real effect on any economic magnitudes for China or any of its trading partners.* This well-known proposition simply reflects the "long-run neutrality" of money in a setting in which all prices are fully flexible.

Intuitively, real effects require changes in *relative* prices, and in our 2-country 2-good world there are 3 relative prices that together determine all the real magnitudes in the world economy: $P_h^{\$}/P_f^{\$}$, the price of good h relative to the price of good f in US (measured in any common unit of account); $P_h^{*¥}/P_f^{*¥}$, the price of good h relative to the price of good f in China (measured in any common unit of account); and $P_h^{\$}/[e \cdot P_f^{*¥}]$, the terms at which US and China trade with each other, often referred to as the "terms of trade" (again measured in any common unit of account).

Using (1) and (2) above, it may be confirmed in the absence of trade policy interventions in the world economy that the relative prices in US and China satisfy

$$\frac{P_h^{\$}}{P_f^{\$}} = [\frac{e \cdot P_h^{*¥}}{e \cdot P_f^{*¥}}] = \frac{P_h^{*¥}}{P_f^{*¥}}, \tag{3}$$

2006).

[30] The equivalence between a devaluation and a combination export subsidy/import tariff is also highlighted as a basis for equating undervalued exchange rates with a violation of WTO commitments in Subramanian (2008).

and so the equality between these relative prices is unaffected by changes in the exchange rate e. Moreover, given the long run neutrality of money, our flexible-price environment ensures that the devaluation of the RMB (the drop in e) will be matched by a proportional rise in both $P_h^{*¥}$ and $P_f^{*¥}$, and this has two implications: first, it implies that the two relative prices in (3) not only remain equal, but also remain unchanged in response to changes in the exchange rate e; and second, it implies that the terms of trade $P_h^{\$}/[e \cdot P_f^{*¥}]$ is unaffected by changes in e as well.[31] The hypothetical devaluation thus leaves all 3 relative prices unchanged (and in fact equal to each other under the no-trade-policy intervention assumption).[32]

Putting the point slightly differently, when prices are flexible, a devaluation can be thought of as simply a change in the monetary unit of account. Imagine, for example, that the Chinese government announced that henceforth and immediately every RMB will be worth two RMB. Let every price in the Chinese economy adjust to this change by doubling (including all wages, etc.), while the exchange rate between the RMB and every foreign currency falls by half (each RMB now buys half as many units of foreign currency). In this scenario, every Chinese actor would have exactly twice as many RMB to spend, and everything would cost exactly twice as much. But all relative prices would remain constant, and no individual would have any reason to alter their economic behavior.[33]

Returning now to the equivalence between a devaluation and a uniform tariff-cum-subsidy, we confront a crucial question: How is it that this combination of trade policy interventions – which when taken separately would each distort trade and have real effects even in the flexible-price environment that we have assumed here – could, when packaged together, create no distortions at all and have no real effect? The answer is that, as with a devaluation, the particular package of trade policy interventions which is equivalent to the devaluation do not alter relative prices: this follows as an implication of Lerner's symmetry theorem (Lerner, 1936).[34] The point can be confirmed using (FP1) and (FP2) above, and noting that when China offers an export subsidy to

[31] Our discussion is predicated on the assumption that the devaluation of the RMB results from "unsterilized" intervention in the foreign exchange markets that leads to a proportional increase in the money supply in China. In practice, many have observed that, with the aid of capital controls, China appears to be working to "sterilize" (neutralize) the impact of its exchange intervention on the Chinese money supply (see, for example, Obstfeld, 2007). However, consistent with our focus on the trade volume effects of exchange rate intervention under the assumption that trade remains balanced, we abstract from capital controls here. In the absence of capital controls, sterilized intervention, as distinct from unsterilized intevention, would generally not have impacts on prices as it does not effect the money supply; and whether – and if so, how – sterilized intervention can be effective in altering exchange rates in this case is a matter of some controversy (see, for example, Sarno and Taylor, 2001). For the policy points we emphasize in our economic analysis, this distinction is not central, and so we abstract from it throughout (see, however, O'Connell, 1989, for an analysis of the policy equivalence between a devaluation and a uniform tariff-cum-subsidy in the presence of capital controls, and the sensitivity of this equivalence to the presence of smuggling or customs fraud).

[32] In the flexible-price environment that we consider in this section, the lack of any relative price changes associated with a devaluation extends as well to the non-traded goods sectors which we have implicitly ignored in the text (for a treatment which includes non-traded goods, see Chipman, 2006).

[33] The same point can be (and is) made in simple macroeconomic models, where it is commonly suggested that a devaluation can stimulate output in the short run but in the long run (when prices adjust) will simply affect the price level. See Krugman & Obstfeld (2007, ch. 17).

[34] And it is here that our maintained assumption of trade balance is essential.

its exporters and imposes a tariff on its imports, the relative prices in US and China satisfy

$$\frac{P_h^{\$}}{P_f^{\$}} = [\frac{\frac{e}{(1+t_h^*)} \cdot P_h^{*¥}}{\frac{e}{(1+s_f^*)} \cdot P_f^{*¥}}] = \frac{\left(1+s_f^*\right) \cdot P_h^{*¥}}{\left(1+t_h^*\right) \cdot P_f^{*¥}}. \tag{4}$$

These relative prices are unaffected by the introduction of a *uniform* tariff-cum-subsidy package that satisfies $s_f^* = t_h^*$. Moreover, it can be confirmed that a uniform tariff-cum-subsidy maintains equality between these relative prices and the terms of trade, so that the terms of trade continues to be given by $P_h^{\$}/[e \cdot P_f^{*¥}]$ and is unaffected by the introduction of a uniform tariff-cum-subsidy package as well.[35]

Intuitively, import tariffs and export subsidies push in opposite directions in terms of their impacts on the production and consumption decisions of actors in an economy. As a general matter, the export subsidy encourages resources to migrate toward the export sector, and it discourages domestic consumption of the export good relative to the import good; an import tariff encourages resources to migrate toward the import competing sector, and it discourages domestic consumption of the import good relative to the export good. When the two policies are of equal magnitude, their effects exactly cancel out.

This discussion points to two potential errors in equating a devaluation with tariff increases and export subsidies that would violate WTO rules. A first potential error comes from *singling out* a particular component of the equivalent trade-policy package (e.g., export subsidies), and suggesting that countries should be able to respond to that component alone. The error here is that a single component of a policy package (say, an export subsidy) can have effects by itself that are not in any way implied by the overall policy package. This can be seen clearly with reference to (4), where the uniform tariff-cum-subsidy (with $s_f^* = t_h^*$) has no impact on relative prices and therefore no real effects but an export subsidy alone (with $s_f^* > 0 = t_h^*$) surely would.

As an analogy, suppose that the United States were to impose a new ad valorem sales tax of 10% on the purchase of automobiles, a product for which the United States is a net importer. It is well known that the introduction of such a sales tax would have exactly the same effect as would the introduction of a 10% tariff on imported automobiles combined with a 10% tax on the domestic production of automobiles within the Unites States. Nevertheless, armed with this equivalence result, it would clearly be misguided to think that the United States sales tax on automobiles should be deemed to violate its tariff binding on imported automobiles. To the contrary, the tax does not alter the competitive conditions between imported and domestic products, and would in fact be legal under WTO law as long as it did not discriminate between domestic and imported goods.[36]

[35] In particular, as we have assumed that US maintains free trade, the terms of trade in this flexible-price environment is given simply by the US relative price $\frac{P_h^{\$}}{P_f^{\$}}$, and by (4) this will in turn be equal to the China relative price $\frac{P_h^{*¥}}{P_f^{*¥}}$ if and only if $s_f^* = t_h^*$.

[36] The consumption tax on automobiles might conceivably support a "non-violation" nullification or impairment claim, which permits a WTO member to bring a claim against another WTO member when the latter has taken policy

A second potential error is more subtle: even if each component of the equivalent trade-policy package is included, it would be wrong to argue that countries should be able to respond to each component policy (i.e., export subsidies and import tariffs) as they would be able to respond in the WTO to each of these policies when *viewed in isolation*. This is because, unlike the uniform export subsidies and import tariffs, which as we have seen above neutralize each other in a flexible-price world and therefore have no real effects, the countervailing duty and tariff responses that would be permissible under WTO law if each of these policies were viewed in isolation can be shown to have real effects because they reinforce – rather than neutralize – each other, and hence cannot be viewed as offsetting actions in response to a devaluation in this environment.

To see this, we now express the international arbitrage conditions that reflect the law of one price as they must hold when (i) China offers an export subsidy s_f^* to its exporters of good f, (ii) in response to s_f^*, US imposes a countervailing duty t_f^{CVD}, (iii) China imposes a tariff t_h^* on imports of good h, and (iv) in response to t_h^*, US imposes a retaliatory tariff t_h^{XXIII} under GATT Article XXIII. With these policies in place, the international arbitrage conditions become

$$P_f^{*¥} = [\frac{\left(1+s_f^*\right)}{e \cdot (1+t_f^{CVD})}] \cdot P_f^{\$}, \tag{5}$$

and

$$P_h^{\$} = [\frac{e}{\left(1+t_h^*\right) \cdot (1+t_h^{XXIII})}] \cdot P_h^{*¥}. \tag{6}$$

Using (5) and (6), the relative prices in US and China must now satisfy

$$\begin{aligned} \frac{P_h^{\$}}{P_f^{\$}} &= [\frac{\frac{e}{\left(1+t_h^*\right)\cdot(1+t_h^{XXIII})} \cdot P_h^{*¥}}{\frac{e\cdot(1+t_f^{CVD})}{\left(1+s_f^*\right)} \cdot P_f^{*¥}}] \\ &= [\frac{\left(1+s_f^*\right)}{\left(1+t_h^*\right)}] \cdot [\frac{1}{(1+t_h^{XXIII}) \cdot (1+t_f^{CVD})}] \cdot [\frac{P_h^{*¥}}{P_f^{*¥}}]. \end{aligned} \tag{7}$$

Evidently, as can be confirmed with (7), these relative prices remain unaffected by the introduction of a uniform tariff-cum-subsidy package in China that satisfies $s_f^* = t_h^*$, because as we have observed above import tariffs and export subsidies push in opposite directions and therefore tend to neutralize each other in terms of their impacts on the production and consumption decisions of actors in an economy (t_h^* enters into the denominator while s_f^* enters into the numerator of the relative price expression in (7)). By contrast, these relative prices *will* be affected by the US tariff responses t_h^{XXIII} and t_f^{CVD}, because these tariff responses reinforce rather than neutralize each other (both t_h^{XXIII} and t_f^{CVD} enter into the denominator of the relative price expression in (7)).

actions that frustrate the legitimate market access expectations of the former, even when those policy actions fall outside of the explicit policy obligations negotiated in the WTO. In the flexible-price world that we are considering here, there could be no frustration of trade commitments associated with a devaluation, since there are no real effects of the devaluation whatsoever. But in a sticky-price world of the kind we consider in the next section, the non-violation argument might become more plausible.

The point is, it cannot be presumed that the impacts of WTO-consistent responses to individual policies will cancel each other out just because the impacts of the policies themselves would cancel out, and as a consequence it is not enough to consider all components of the equivalent trade policy package but to evaluate each component in isolation. Rather, the appropriate response to a devaluation – or more fundamentally, to exchange rate misalignment – must be judged in light of the overall impact of the equivalent trade-policy package.

In summary, the flexible-price world we have explored here has served as a simple environment within which to illustrate why any claim to a presumption that exchange rate misalignments violates WTO commitments should be met with some skepticism, at least if that presumption relies on the translation of misalignment to an equivalent set of policies that would represent clear infringement of WTO obligations. As we have demonstrated, if not used with care, analogies drawn between different policy packages can lead to very misleading conclusions; and an unqualified statement that a devaluation acts like an export subsidy and hence should be countervailable under WTO rules is certainly unwarranted.

A remaining question is whether the introduction of sticky prices will resurrect the case for a presumption that fundamental exchange rate misalignment violates WTO commitments. As we next demonstrate, the answer to this question appears to be "No."

3.2 Sticky prices

In the previous section we considered a flexible-price world in which exchange rate intervention has no real effects of any kind. As we demonstrated, that world is useful for establishing grounds for broad skepticism in response to unqualified claims that exchange rate misalignments are equivalent in their impacts to policies that would violate WTO commitments. But governments that systematically engage in prolonged exchange rate intervention clearly believe that their intervention serves some purpose, and thus some effects can be presumed: the question then becomes, What is the nature of these real effects and what response do they warrant?

We now consider the possibility of exchange market intervention in an environment of sticky prices, an assumption that plausibly captures the "short run." As might be anticipated, when prices are sticky, devaluations can have real effects. The macroeconomic literature that concerns itself with exchange-rate movements in a sticky-price world has focused on three different stylized assumptions with regard to the currency in which producers invoice their products: producer currency pricing (PCP), in which all producers set their prices in their own currency; local currency pricing (LCP), in which all producers set their prices in the currency of the consumers to which they sell; and dollar pricing (DP), in which all exporters set their prices in dollars.[37] Below we consider each invoicing assumption in turn, assuming sticky prices but maintaining all other features of the 2-country 2-good model analyzed above.

[37] On the empirical regularities/puzzles that have given rise to interest in these three pricing assumptions and their implications for macroeconomic modeling of exchange rate movements, see for example Engel (2002), Goldberg and Tille (2006), Corsetti and Pesenti (2007) and Devereux, Shi and Xu (2007). For a recent attempt in this literature to model the endogenous choice of currency invoicing, see Bacchetta and van Wincoop (2005).

Again, the goal is to identify the trade policy that is equivalent to the exchange market intervention, and to consider what the proper response to that trade policy might be given the logic of international trade agreements. Before proceeding, however, we must confront the following conceptual question: What assumption about prices (i.e., sticky or flexible) is to be made when evaluating the impact of the equivalent trade policies?

One possible approach is to maintain the assumption of fully flexible prices when evaluating the impacts of trade policy. Under this approach, we would seek to identify the combination of trade policies which, if introduced in the flexible-price environment of the previous section, would have exactly the same impact as a devaluation in a sticky-price environment. One might defend this approach on the grounds that although exchange rate movements occur at a frequency for which a sticky-price assumption seems plausible, the relative infrequency of trade policy changes suggests that a flexible-price assumption is more appropriate for evaluating their effects. Moreover, the purpose to which we wish to put our equivalence results is that of assessing the proper WTO response to trade policies that have equivalent effects to a devaluation, and as we have discussed above the time frame for action within the WTO is typically a period of years over which a flexible price assumption is perhaps more plausible. Notice, though, that this approach has an immediate implication – a devaluation with real effects *cannot* be deemed equivalent to a uniform tariff-cum-subsidy, as some commentators seem to suggest, because as we have already seen the introduction of such a trade policy package has no real effects in a flexible-price world.

The alternative approach is to adopt the sticky-price assumption when evaluating the impacts of trade policy and searching for trade policies which would have equivalent effects to a devaluation under sticky prices. Under this approach, we seek to identify the combination of trade policies which, if introduced into the same sticky-price environment as the devaluation, would have exactly the same impact as the devaluation. We will focus our analysis below on this approach, because it is the only approach that can possibly deliver the equivalence of a devaluation to a uniform tariff-cum-subsidy when the devaluation has real effects, and because a main focus of our analysis in this section is to scrutinize the oft-stated equivalence between a devaluation and a uniform tariff-cum-subsidy and assess the robustness of this equivalence in the presence of sticky prices under the various assumptions about the currency of invoicing. But it should be kept in mind that, in light of the conceptual question raised above, the equivalence between a devaluation and a uniform tariff-cum-subsidy in a sticky-price environment is even more tenuous and subject to qualification than our subsequent analysis suggests.

3.2.1 Producer Currency Pricing

When prices are fully flexible, it does not matter in which currency a producer invoices its products. But when prices are sticky and must be set before the relevant exchange rate level is realized, the currency of invoicing is important. We begin our sticky-price analysis by adopting the assumption (most prominently utilized by Obstfeld and Rogoff, 1995, 1996) that producers invoice their prod-

ucts in their own currency ("producer currency pricing," or PCP).[38] Throughout we will consider the impact of exchange rate movements that are unanticipated by all agents, so when we refer to a devaluation this should be interpreted to mean that the level of the exchange rate e turns out to be lower than that anticipated at the time when prices were set. Similarly, in light of our discussion above and our decision to adopt the sticky-price assumption when evaluating the impacts of trade policy and searching for trade policies which would have equivalent effects to a devaluation under sticky prices, the equivalent trade policies should also be interpreted as changes in trade policies relative to those anticipated at the time when prices were set.[39]

Prior to analyzing this case formally, it is useful to give the basic intuition. Producers set their prices in their home currency, such that their returns from sales – when translated into a common currency – are the same everywhere (the law of one price holds). An unanticipated devaluation of the RMB then occurs, so that the price of the U.S. export rises in RMB, and the price of the Chinese export falls in dollars. The ratio of the price of the U.S. good to the Chinese good thus rises in any common currency, inducing some expenditure switching between them. As shall be seen, it is possible to replicate this outcome once again with a uniform tariff-cum-subsidy combination imposed by China. But this effect differs from the effects of ordinary protectionist policies such as tariffs, in that the prices of each good across the two markets remain the same in any currency (there is no wedge driven between them). Notice also that from the U.S. perspective, the terms of trade improve (the value of the U.S. export relative to the Chinese import rises in any common currency). In traditional trade models in which governments act as national income maximizers, such a development would represent a welfare gain for the United States.

We now proceed to develop these points more formally. Under the assumption that all exporting firms (in China and US) pre-set prices in their own currency (PCP) before they know the exchange rate at which their sale will be made (and under the sticky price assumption cannot then alter their price for these sales once the level of the exchange rate is known), the pricing relationships in (FP1) and (FP2) – and therefore the law of one price – will still hold. The only difference in these pricing relationships is that, under sticky prices and the PCP assumption, $P_f^{*¥}$ and $P_h^{\$}$ are now sticky while $P_f^{\$}$ and $P_h^{*¥}$ are not: in particular, $P_f^{\$}$ and $P_h^{*¥}$ move one-to-one with the exchange rate e, and similarly $P_f^{\$}$ moves one-to-one with s_f^* while $P_h^{*¥}$ moves one-to-one with t_h^*. Hence, the *incidence* of changes in e, s_f^* and t_h^* fall entirely on $P_f^{\$}$ and $P_h^{*¥}$ in this sticky-price PCP setting.

Letting $\bar{P}_f^{*¥}$ denote the preset (sticky) level of the price of good f in China, denominated in

[38] We focus here on sticky prices, but similar points could be made in a sticky-wage setting. For example, in the sticky-wage model analyzed by Obstfeld and Rogoff (2002), a constant-elasticity-of-substitution (CES) demand structure is assumed, and with labor as the only component of marginal cost this implies that sticky wages (in the producer's currency) result in sticky prices (in the producer's currency) because the CES demand structure implies that prices are a constant markup over marginal cost. The implication is then that, for the points we emphasize here, the sticky-wage setting is analogous to the sticky-price setting with PCP invoicing.

[39] Specifically, under PCP the producer sets the price for the period in terms of its own currency before seeing the level of the exchange rate for that period, and so it is the importer price (in the importer's own currency) that changes with the realized exchange rate. By analogy, in characterizing the equivalent trade policies we are therefore assuming here that it is the importer price that changes with the realized trade policies, and we ask what realized trade policies would be equivalent to a realized exchange rate.

RMB, and letting $\bar{P}_h^{\$}$ denote the preset (sticky) level of the price of good h in US, denominated in dollars, the international arbitrage conditions become

$$\bar{P}_f^{*¥} = [\frac{\left(1+s_f^*\right)}{e}] \cdot P_f^{\$}, \tag{PCP1}$$

and

$$\bar{P}_h^{\$} = [\frac{e}{\left(1+t_h^*\right)}] \cdot P_h^{*¥}. \tag{PCP2}$$

Hence, as (PCP1) and (PCP2) confirm (in the same way that (FP1) and (FP2) confirmed in the flexible-price environment), the policy equivalence between a devaluation and a uniform tariff-cum-subsidy continues to hold in a sticky-price world when producers invoice according to PCP.

Notice that the only difference between (PCP1) and (FP1) is that, in the event of a devaluation of the RMB, $\bar{P}_f^{*¥}$ remains fixed while $P_f^{\$}$ adjusts to ensure that (PCP1) continues to hold. Similarly, the only difference between (PCP2) and (FP2) is that, in the event of a devaluation of the RMB, $\bar{P}_h^{\$}$ remains fixed while $P_h^{*¥}$ adjusts to ensure that (PCP2) continues to hold. This difference, though, carries with it an important implication that distinguishes the sticky-price PCP environment from the flexible-price world: in a sticky-price environment under the PCP assumption, a devaluation of the RMB (a drop in e) – or equivalently the introduction of a uniform ($t_h^* = s_f^*$) tariff-cum-subsidy – now raises the price of good h relative to the price of good f in both US and China, as well as the terms of trade between them, and hence has real effects.

This can be seen by using (PCP1) and (PCP2) to derive

$$\frac{\bar{P}_h^{\$}}{P_f^{\$}} = \frac{\bar{P}_h^{\$}}{[\frac{e}{\left(1+s_f^*\right)}] \cdot \bar{P}_f^{*¥}} = \frac{\left(1+s_f^*\right) \cdot P_h^{*¥}}{\left(1+t_h^*\right) \cdot \bar{P}_f^{*¥}}. \tag{8}$$

It is direct from (8) to confirm that the introduction of a uniform ($t_h^* = s_f^*$) tariff-cum-subsidy implies the pricing relationships

$$\frac{\bar{P}_h^{\$}}{P_f^{\$}} = \frac{\bar{P}_h^{\$}}{[\frac{e}{\left(1+s_f^*\right)}] \cdot \bar{P}_f^{*¥}} = \frac{P_h^{*¥}}{\bar{P}_f^{*¥}}. \tag{9}$$

Evidently, a devaluation (drop in e) – or equivalently the introduction of a uniform ($t_h^* = s_f^*$) tariff-cum-subsidy – preserves the equality across all three relative prices (the relative price in US, the terms of trade, and the relative price in China are given respectively by the first, second and third expressions in (9)) but raises these relative prices to a higher level (as indicated by the middle expression in (9)), and this implies a real effect. In particular, there is an "expenditure switching" impact of the devaluation, as consumers in US and China respond to the increase in the price of good h relative to the price of good f by shifting expenditure away from the US export good h and toward the China export (US import) good f.

Once again we may now ask: Does the policy equivalence between a devaluation and a uniform

tariff-cum-subsidy – which we have shown holds in a sticky-price environment when producers invoice according to PCP – support the argument that exchange market intervention to lower the value of the domestic currency justifies a trade policy response, at least if the sticky-price PCP environment provides a reasonable approximation of empirically relevant conditions? We suggest several reasons that the answer to this question may be "No."

First, as we have observed above and as can be confirmed from (9), the uniform tariff-cum-subsidy implied by the RMB devaluation does not introduce a wedge between relative prices in US and China. Therefore, the traditional inefficiency (dead weight loss) associated with the use of trade policy and comprising the central focus of trade negotiations is not present under the expenditure-switching effects of a devaluation. Moreover, as noted above, the terms of trade between US and China are altered as a result of the China devaluation, but this movement implies an improvement in the US terms of trade and a worsening of the China terms of trade, which runs counter to the direction of the terms-of-trade externality that is traditionally associated with inefficient trade policy protection.[40] Hence, while the equivalence between a devaluation and a uniform tariff-cum-subsidy remains valid in the presence of sticky prices and the PCP assumption, the application of this equivalence to serve as a guide for WTO action is not straightforward, because *the nature of the international problems created by the devaluation are not analogous to the international problems traditionally addressed by trade agreements.*[41]

A second qualification comes from an examination of the pricing relationship in (PCP1), and relates to the incidence issues noted above. In particular, we now emphasize an important implication of the PCP assumption in the presence of sticky prices: the implicit export subsidy associated with the hypothetical devaluation of the RMB is captured *completely* by consumers in the rest of the world. That is, when prices are sticky and the PCP assumption holds, *none* of the implicit export subsidy associated with a devaluation is collected by the exporters. This simply reflects the fact that, under the PCP assumption, exports are invoiced in the currency of the producer prior to the realization of the exchange rate, and so if the producer's currency is subsequently devalued it is the foreign consumers who experience the drop in price (in their own currency).[42] This observation has some important legal implications that we will consider in Section 4.

[40] On the inefficiency created by differences in relative prices across countries and the interpretation of the central purpose of trade negotiations as seeking to eliminate these inefficiencies, see Mayer (1981) and Bagwell and Staiger (2002, Ch. 2). As Bagwell and Staiger explain, according to the terms-of-trade theory of trade agreements, it is the pursuit of terms-of-trade improvements in a non-cooperative setting that leads countries to adopt trade policies that result in wedges between their respective relative prices that are inefficiently large from an international perspective, regardless of their underlying reasons for trade policy intervention: it is then the purpose of trade agreements to reduce the magnitude of these price wedges to internationally efficient levels.

[41] Recall too that we have already restricted our focus to trade volume effects of devaluations as opposed to trade balance effects, and *still* the nature of the problem looks quite different from that traditionally handled by trade agreements such as the GATT/WTO.

[42] At the same time, it should be pointed out that while none of the implicit subsidy is collected by exporters from China, the implied increase in export sales may still increase the profits of exporters from China (measured in local currency), if the price at which these sales are made exceeds the per-unit cost of the additional production required to meet the additional export demand. However, the magnitude (and potentially even the sign) of any profit effects associated with a given implicit subsidy level would depend on industry features such as market structure and production technologies.

Finally, it bears emphasis once again that, for the purposes of this analysis, we have sought to identify the combination of trade policies which, if introduced into the same sticky-price environment as the devaluation, would have exactly the same impact as the devaluation. However, for the reasons described previously, it is not clear that this is the only relevant thought experiment for our purposes. And under the alternative approach in which the assumption of fully flexible prices would be maintained when evaluating the impacts of trade policy, we have already noted that a devaluation with real effects *cannot* be deemed equivalent to a uniform tariff-cum-subsidy in our formal model, because the introduction of such a trade policy package has no real effects in a flexible-price world. This adds a further layer of caution to treating an equivalence between devaluations and uniform tariff-cum-subsidy packages as a guide for WTO action.

3.2.2 Local Currency Pricing

We next continue our sticky-price analysis by adopting the assumption (utilized, for example, by Betts and Devereux, 2000) that producers invoice their products in the currency of the consumers to which they sell ("local currency pricing," or LCP).[43] In combination with the assumption that firms pre-set prices before they know the exchange rate at which their sale will be made (and under the sticky price assumption cannot then alter their price for these sales once the relevant exchange rate is known), the assumption of LCP implies that the pricing relationships in (1) and (2) – and therefore the law of one price – will no longer hold.[44]

Again it is useful to set out some intuition and basic results before proceeding with the formal exposition. Producers in this case set their export prices in the currency of their foreign customers, while setting their domestic prices in their home currency. Initially, those prices are set such that the returns expected from sales in each market are the same. But then an unanticipated devaluation occurs, and producers cannot adjust their prices. U.S. exporters now earn fewer dollars on their Chinese sales (the RMB is worth less), while Chinese exporters now earn more RMB on their U.S. sales (the dollar is worth more). Here, the ratio of prices in each currency remains the same as before the devaluation and there is no expenditure switching. But the terms of trade have improved for China because its exporters now earn more RMB on each sale, while U.S. exporters earn fewer dollars. In this situation, the equivalent trade policy turns out to be a tariff only; there is no role for an export subsidy.

[43] Under LCP the producer sets the export price for the period in terms of the importer's currency before seeing the level of the exchange rate for that period, and so it is the exporter price (in the exporter's own currency) that changes with the realized exchange rate. By analogy, in characterizing the equivalent trade policies we are therefore assuming here that it is the exporter price that changes with the realized trade policies, and we ask what realized trade policies would be equivalent to a realized exchange rate.

[44] The fact that PCP predicts that the law of one price should hold at an international level even when prices are sticky while LCP predicts that it should not suggests a compelling way to choose between the two assumptions about the way that producers invoice for international transactions. In fact, there is a large body of empirical evidence (see Engel, 2002, for review of this literature) suggesting that the law of one price fails dramatically at the international level, which is why macroeconomists have been interested in studying pricing assumptions beyond PCP such as LCP (and DP, which we consider in the next subsection) that do not imply the law of one price. (See, however, Broda and Weinstein, 2007, for a contrary view regarding the empirical failure of the law of one price at the international level).

To elaborate, under LCP the producer of good f in China sets a price invoiced in RMB for local sales (in China), $\bar{P}_f^{*¥}$, and a price invoiced in dollars for sales in US, $\bar{P}_f^{\$}$, before the realization of the exchange rate e, which means that in general

$$\bar{P}_f^{*¥} \neq [\frac{\left(1+s_f^*\right)}{e}] \cdot \bar{P}_f^{\$}. \tag{LCP1}$$

As (LCP1) indicates, under LCP it will generally *not* be true that a firm in China will earn the same from the export sale of good f to US, when translated into RMB and inclusive of the export subsidy s_f^*, as it does from the sale of good f in the local (China) market. Notice too that, with $\bar{P}_f^{\$}$ pre-set before the level of e or s_f^* is known, the *incidence* of e and s_f^* fall completely on the China exporter of good f.

Similarly, under LCP the producer of good h in US sets a price invoiced in dollars for local sales (in US), $\bar{P}_h^{\$}$, and a price invoiced in RMB for sales in China, $\bar{P}_h^{*¥}$, before the realization of the exchange rate e, which means that in general

$$\bar{P}_h^{\$} \neq [\frac{e}{\left(1+t_h^*\right)}] \cdot \bar{P}_h^{*¥}. \tag{LCP2}$$

As (LCP2) indicates, under LCP it will generally *not* be true that a firm in US will earn the same from the export sale of good h to China, when translated into dollars and netting out the import tariff t_h^*, as it does from the sale of good h in the local (US) market. Note also that, in this case, with $\bar{P}_h^{*¥}$ pre-set before the level of e or t_h^* is known, the *incidence* of e and t_h^* fall completely on the US exporter of good h.

Hence, under sticky prices and LCP, consumers in China face the relative prices

$$\frac{\bar{P}_h^{*¥}}{\bar{P}_f^{*¥}}, \tag{LCP3a}$$

while consumers in US face the relative prices

$$\frac{\bar{P}_h^{\$}}{\bar{P}_f^{\$}}, \tag{LCP3b}$$

neither of which is sensitive to a devaluation (a drop in e) *or* the introduction of export subsidies or import tariffs (under the assumption, recall again, that the subsidies and tariffs are introduced into the same sticky-price environment as the devaluation). This indicates that, under LCP, there is *no expenditure switching effect* of a devaluation. Intuitively, this is because, as observed above, under the LCP assumption prices in each country are pre-set in the local currency prior to the realization of the exchange rate, and so a devaluation can have no impact on the relative prices faced by consumers in either country, as confirmed by (LCP3a) and (LCP3b).

What *is* sensitive to a devaluation is the terms of trade, which in the case of LCP is given by

$$\frac{[\frac{e}{(1+t_h^*)}] \cdot \bar{P}_h^{*¥}}{\bar{P}_f^{\$}}, \tag{LCP3c}$$

as well as the actual terms at which exporters trade when translated into a common currency, which if the law of one price held would be equal to the terms of trade but which in the case of LCP (where the law of one price is violated) is given by

$$\frac{[\frac{e}{(1+t_h^*)}] \cdot \bar{P}_h^{*¥}}{\left(1+s_f^*\right) \cdot \bar{P}_f^{\$}}. \tag{LCP3d}$$

Notice the difference between the terms of trade given in (LCP3c) and the actual terms at which exporters trade given in (LCP3d): the China export subsidy s_f^* appears in the denominator of the latter but does not appear in the former. This reflects that fact that, as noted above, the incidence of s_f^* falls completely on the China exporter of good f in the LCP setting (and under the assumption, recall again, that the subsidies and tariffs are introduced into the same sticky-price environment as the devaluation), and so s_f^* is not included when expressing the terms of trade between the two countries (which is defined to reflect the "world" prices at which the countries trade) but is included when expressing the actual terms at which exporters trade.[45]

As (LCP3a) through (LCP3d) indicate, when prices are sticky and producers invoice according to LCP, a relationship between a devaluation and a real (trade) policy equivalent can again be identified. In this case, though, the effects of the devaluation (drop in e) can be replicated by an appropriate increase in t_h^* alone: a drop in e would have an equivalent impact on each of the relative prices in (LCP3a) through (LCP3d) as would an increase in t_h^* of appropriate magnitude. Evidently, when producers invoice according to LCP, there is *no role* of any kind for a China export subsidy s_f^* in the trade policy package that would replicate the effects of a devaluation.

In sum, as reflected in the relative price expressions above, when prices are sticky and producers invoice according to LCP, a devaluation impacts only the terms of trade and the terms at which exporters trade, and it has no impact on the relative prices faced by consumers in the United States or China. An increase in the China import tariff t_h^* can by itself replicate these impacts. But an increase in the China export subsidy s_f^* can only impact the terms at which exporters trade; a China export subsidy cannot impact the terms of trade in this setting because, as observed above, the incidence of s_f^* falls entirely on exporters from China, and so it is as if China is a "small" country with respect to its export subsidy in this setting. For this reason, when prices are sticky and producers invoice according to LCP, there is no role of any kind for a Chinese export subsidy s_f^* in the trade policy package that would replicate the effects of a devaluation.

[45] If the law of one price held, this would imply that the expressions in (LCP1) and (LCP2) would be equalities, and using these equalities the expression in (LCP3d) can be shown to be equivalent to the expression in (LCP3c). But since the law of one price is violated under LCP, the expression in (LCP1) and (LCP2) are in general inequalities, and hence the expressions in (LCP3d) and (LCP3c) will in general be different.

Recalling now our earlier findings under the assumption of PCP, where the equivalence between a devaluation and a uniform tariff-cum-subsidy package was confirmed, we arrive at an important conclusion: *characterizing the equivalent trade policy package that would replicate the effects of a devaluation in a sticky-price environment hinges critically on whether PCP or rather LCP is the most appropriate assumption.* Moreover, observe in this case that, in contrast to standard tariff analysis, there are *no direct trade effects* (no expenditure switching) associated with either the devaluation or its equivalent real trade policy package.[46] Hence, even if one could be confident that LCP is the empirically relevant assumption, relying on an analogy between a devaluation and an equivalent trade policy package – in this case tariffs – and then invoking the usual effects of tariffs as a reason that the WTO should be spurred into action seems misguided here as well.

3.2.3 Dollar Pricing

Finally, we adopt the assumption that producers invoice their products for export in dollars ("dollar pricing" or DP). This assumption captures the idea that world export prices tend to be set in a "vehicle" currency only (see Goldberg and Tille, 2006, for a review of evidence supporting this assumption). In our 2-country model, the vehicle currency is necessarily the currency of one of the two trading countries, and more generally this feature need not be true (i.e., the vehicle currency could be a third-country currency). Nevertheless, our 2-country setting is sufficient to illustrate the central points that arise when producers invoice in a vehicle currency, and so we proceed under the assumption that the vehicle currency is dollars.

This case is a combination of the two above. U.S. exporters are pricing in their own currency, while Chinese exporters are pricing in the local currency of their customers. The unanticipated devaluation then has no impact on the dollar earnings of U.S. exporters on foreign sales, but increases the returns to Chinese exporters in RMB. No expenditure switching occurs in the United States (the ratio of dollar prices remains constant), and from the U.S. perspective the terms of trade remains fixed. All of the impact of the devaluation is felt in China, where there is some expenditure switching toward the export good. This effect can again be replicated by a tariff on Chinese imports, but not by an export subsidy – the subsidy would have no impact on the sticky Chinese export price.

To elaborate, under the assumption that all exporting firms pre-set prices in dollars (DP) before they know the exchange rate at which their sale will be made (and under the sticky price assumption cannot then alter their price for these sales once the relevant exchange rate is known), the pricing relationship in (PCP2) will continue to hold but the pricing relationship in (PCP1) will not: rather, for this second pricing relationship, the inequality in (LCP1) is relevant. This can be understood by

[46] There *are* real effects of the devaluation under LCP in a sticky-price environment, because the devaluation *does* alter some relative prices, namely, the terms of trade given by (LCP3c) and the actual terms at which exporters trade given by (LCP3d), and these relative price changes will, respectively, redistribute income across countries (from US to China) and redistribute profits across agents (from US exporters to China exporters). But the expenditure switching (redirection of demand) that is a central feature of standard tariff analysis is absent when producers invoice according to LCP.

noting that the assumption of DP is asymmetric: it behaves as PCP for the (dollar denominated) US, but it behaves like LCP for (RMB denominated) China.

Hence, under sticky prices and DP invoicing we have

$$\bar{P}_f^{*¥} \neq [\frac{\left(1+s_f^*\right)}{e}] \cdot \bar{P}_f^{\$}, \tag{DP1}$$

implying that the law of one price does not hold for Chinese exporters and that, with $\bar{P}_f^{\$}$ pre-set before the level of e or s_f^* is known, the incidence of e and s_f^* fall completely on the China exporter of good f. And we have

$$\bar{P}_h^{\$} = [\frac{e}{\left(1+t_h^*\right)}] \cdot P_h^{*¥}, \tag{DP2}$$

implying that the law of one price holds for US exporters and that, with $\bar{P}_h^{\$}$ pre-set before the level of e or t_h^* is known, the incidence of e and t_h^* fall completely on $P_h^{*¥}$.

Hence, under sticky prices and DP, the relative prices faced by consumers in US are insensitive to a devaluation (a drop in e) or the introduction of China export subsidies or import tariffs (under the assumption, recall again, that the subsidies and tariffs are introduced into the same sticky-price environment as the devaluation), and are given by:

$$\frac{\bar{P}_h^{\$}}{\bar{P}_f^{\$}}. \tag{DP3a}$$

On the other hand, consumers in China face the relative prices

$$\frac{\frac{\left(1+t_h^*\right)}{e} \cdot \bar{P}_h^{\$}}{\bar{P}_f^{*¥}}, \tag{DP3b}$$

which are sensitive to a devaluation. As a result, (DP3a) implies that there will be no expenditure switching effects in the US in response to a China devaluation (a drop in e) when producers invoice according to DP, but (DP3b) implies that there will be expenditure switching effects in China. Finally, in the presence of the DP assumption, the terms of trade is given by

$$\frac{\bar{P}_h^{\$}}{\bar{P}_f^{\$}},$$

and so is unaffected by a devaluation, while the actual terms at which exporters trade is given by

$$\frac{\bar{P}_h^{\$}}{\left(1+s_f^*\right) \cdot \bar{P}_f^{\$}}. \tag{DP3c}$$

As (DP3a) through (DP3c) indicate, when prices are sticky and producers invoice according to DP, a bridge between a devaluation and a real (trade) policy equivalent can again be forged.

In this case, though, as was shown to be the case also under the LCP assumption, the effects of the devaluation (a drop in e) can be replicated by a proportional increase in t_h^*: again, there is evidently *no role* for export subsidies in the equivalent trade policy package in this environment.

In sum, as reflected in the relative price expressions above, when prices are sticky and producers invoice according to DP, a devaluation impacts only relative prices faced by consumers in China, and it has no impact on the terms of trade, the terms at which exporters trade, or relative prices faced by consumers in US. An increase in the China import tariff t_h^* can by itself replicate these impacts. But an increase in the China export subsidy s_f^* impacts the terms at which exporters trade, and it cannot impact the relative price faced by consumers in China; this is because, as observed above, the incidence of s_f^* falls entirely on exporters from China (and for Chinese exporters the law of one price does not hold). For this reason, when prices are sticky and producers invoice according to DP, there is no role of any kind for a China export subsidy s_f^* in the trade policy package that would replicate the effects of a devaluation.

This finding for DP invoicing augments and reinforces the conclusion we drew above in the context of our analysis of LCP: *characterizing the equivalent trade policy package that would replicate the effects of a devaluation in a sticky-price environment hinges critically on whether PCP or rather LCP or DP is the most appropriate assumption.*

3.3 Summary

In light of our sticky-price analysis in Section 3.2 and the flexible-price analysis of Section 3.1 that preceded it, we now feel justified in drawing the following broad conclusion: the introduction of sticky prices *does not* resurrect the case for a presumption that fundamental exchange rate misalignment violates WTO commitments, a presumption that was shown to be unwarranted in a flexible-price environment. Rather, whether prices are taken as flexible or sticky, the translation and interpretation of the impacts of a devaluation into an equivalent set of trade policy actions is fraught with complexity, and ultimately can only be judged once a variety of subtle empirical questions are answered and the context of the particular legal claims being made at the WTO is spelled out. We now turn to a legal analysis of the possible claims.

4 Legal Analysis

As we documented earlier, officials in both Washington and Brussels are harsh critics of China's exchange rate policies, primarily on the grounds that they distort trade flows. The economic analysis above makes clear, however, that the effects of currency misalignment or manipulation on international trade are difficult to ascertain with confidence. The extent of any currency misalignment is controversial, and no agreement exists on the proper way to measure it. Further, and less appreciated to date, the effect of misalignment on trade (whether the result of "manipulation" or not), however it is measured, is uncertain and variable over time. Short-term effects will depend on such factors as the pricing policies of exporters, and will tend to decay over the long term as

prices adjust. Consequently, the effects of exchange market intervention on trade would be extraordinarily difficult to quantify. The economic welfare implications are also dependent on a variety of factors, and there is little reason to think that trading partners suffer systematic net harm (using the traditional measure of economic welfare) as a result of misalignment or manipulation.

Because China's exchange market practices have led to a number of proposals for action against China that are now pending, we proceed in this section to review and assess the possible options from an economic and legal standpoint. As shall be seen, the options vary considerably in their potential efficacy, in the practical challenges associated with their implementation, and in their legality under international law.

4.1 Multilateral Options

4.1.1 IMF Action

Legal Principles The IMF was conceived primarily to assist in the management of a system of fixed exchange rates.[47] But its obligations go considerably beyond that function, and it was recognized at the time of the founding that unilateral exchange market intervention might have worrisome consequences for other members. Accordingly, Article IV(1)(iii) of the Articles of Agreement of the IMF provides in pertinent part: "each member shall... avoid manipulating exchange rates or the international monetary system in order to prevent effective balance of payments adjustment or to gain an unfair competitive advantage over other members." The Articles did not define the term "manipulation," however, or the term "unfair competitive advantage."

To make these obligations effective, Article IV(3) provides that the Fund "shall oversee the international monetary system in order to ensure its effective operation, and shall oversee the compliance of each member with its obligations under [Article IV(1)]." The oversight of each member's policies pursuant to this language is known as "bilateral surveillance." In practice, bilateral surveillance involves an assessment of the policies of each member by the IMF staff, followed by consultations between the IMF and the monetary authorities of the member. The staff will convey to the member the results of its analysis on issues such as whether a fundamental misalignment exists, sometimes on a qualitative and sometimes on a quantitative basis.[48]

For many years, this process proceeded with little official guidance as to the exact content of the obligations under Article IV(1)(iii). In response to calls for more specificity within the IMF, a June, 2007 decision of the IMF Executive Board provides some interpretative analysis.[49] Annex IV of that decision defines "manipulation" as "policies that are targeted at – and actually affect – the level of an exchange rate. Moreover, manipulation may cause the exchange rate to move or may prevent such movement." Regarding the concept of unfair advantage, the Annex goes on to state that:

[47] See generally Kenneth W. Dam, The Rules of the Game (University of Chicago Press 1982).
[48] See IMF, Treatment of Exchange Rate Issues in Bilateral Surveillance – A Stocktaking, August 30, 2006b.
[49] IMF, Bilateral Surveillance over Member's Policies, Executive Board Decision, June 15, 2007b.

> "a member will only be considered to be manipulating exchange rates in order to gain an unfair advantage over other members if the Fund determines both that: (A) the member is engaged in these policies for the purpose of securing fundamental exchange rate misalignment in the form of an undervalued exchange rate and (B) the purpose of securing such misalignment is to increase net exports." Thus, a touchstone for manipulation is an effort to influence the balance of trade. A determination whether such an effort has been undertaken is to be based on "an objective assessment... based on all available evidence, including consultation with the member concerned. Any representation made by the member regarding the purpose of its policies will be given the benefit of any reasonable doubt."

As noted in the above-quoted passage, "manipulation" also requires a "fundamental misalignment." A companion staff paper to the 2007 Board decision describes "fundamental misalignment" as a situation where "the underlying current account" (defined in a footnote as the actual current account stripped of cyclical forces) differs from the "equilibrium current account" and the discrepancy is "significant." That is, the real exchange rate must be such that the balance of payments situation facing a member is significantly at odds with situation that it would face from some long-term macroeconomic equilibrium perspective.[50]

Implications With regard to the current controversy over China's exchange practices, the details of IMF surveillance and staff conversations with China are not public. It does appear that the staff has suggested to China that its currency suffers from misalignment, but had not (as of 2006) attempted to quantify its extent.[51] Any influence that IMF discussions may have had on Chinese policy are unclear, and likewise non-public, but the perceived problem clearly has not been resolved.

The question arises whether an aggrieved IMF member can achieve more under IMF auspices. The IMF lacks a formal dispute resolution mechanism akin to that of the WTO, but members may raise concerns about the practices of other members informally before the staff or formally before the Executive Board. Issues raised by economically powerful members will most likely receive particular attention, and indeed it is often suggested that the wealthy countries effectively run the IMF.[52] Hence, if major players such as the United States and the EU were to raise concerns about China's practices at the IMF (they have likely done so already), the Board and the staff will no doubt pay heed to such concerns in the process of bilateral surveillance.

For three reasons, however, the bilateral surveillance process is unlikely to have much influence on the exchange practices of a country such as China. First, as a legal matter, a violation of Article IV(1) is quite difficult to demonstrate. Under the interpretation of Article IV set forth above, manipulation to achieve an unfair advantage occurs only if a member engages in practices "for the purpose" of creating fundamental misalignment in the form of an undervalued exchange rate,

[50] IMF, Review of the 1997 Decision – Proposal for a New Decision Supplement, June 13, 2007c.

[51] See IMF, Treatment of Exchange Rate Issues in Bilateral Surveillance – A Stocktaking, August 30, 2006b.

[52] See Hector R. Torres, Reforming the International Monetary Fund – Why Its Legitimacy is at Stake, 10 J. Int'l Econ. L. 443-60 (2007).

and where the attendant "purpose" is to secure an increase in net exports. Thus, the member's intention must be established with respect to both of these criteria. And in assessing intent, the member is to be given "the benefit of any reasonable doubt." A nation such as China will surely have a plausible case that the requisite showing of "intent" cannot be made under this standard, and that its purpose in pegging the RMB is instead to maintain macroeconomic stability through a sound monetary policy. Indeed, distinguished Western economists have defended Chinese policy on precisely those grounds.[53]

Second, even if Chinese policies could be found to violate Article IV under the applicable legal standard, the history of bilateral surveillance suggests a strong emphasis in the IMF on the avoidance of confrontation, at least when powerful countries are involved. The 2007 Board decision emphasizes that "[d]ialogue and persuasion are key pillars of effective surveillance." The Fund's "assessments and advice are intended to assist that member in making policy choices, and to enable other members to discuss these policy choices with that member." Plainly, the conception of the process is far from that of an adversarial dispute process, and much more grounded on the objectives of persuasion and consensus. Indeed, Michael Mussa reports that the number of bilateral consultations pursuant to Article IV since its ratification is in excess of forty thousand. Yet, "in none of these consultations has the Executive Board ever concluded that a member was out of compliance with its obligations regarding its exchange rate policies or any other matter.[54]"

Finally, and related, the IMF has little practical leverage over a nation such as China. In principle, members of the IMF can be punished for violations through a curtailment of their access to the resources of the Fund, suspension from membership or even expulsion,[55] but there is no hint in the 2007 Board decision that such sanctions will enter the surveillance process in any serious way and no history of them being employed against ostensible violators of Article IV(1)(iii), as Mussa indicates. In modern IMF practice, the primary coercive device is the threat that a member may be cut off from IMF borrowings if it does not pursue the appropriate policies (the controversial practice of "conditionality" in IMF lending). A country such as China, however, with trillions of dollars in foreign exchange reserves, has no need to borrow from the IMF and no serious prospect of such a need in the foreseeable future. As Hector Torres suggests, such countries "feel insulated from the Fund's criticism.[56]"

In sum, if one were to believe that exchange market intervention by China is the source of an important "problem," the IMF as it presently operates seems an unlikely solution. The weak legal standards under Article IV, the emphasis on non-confrontational consensus building within the IMF, and the absence of credible sanctions for disregarding IMF advice leads us to doubt that the IMF can do much to influence the behavior of a member such as China.

[53] See Ronald McKinnon, Why China Should Keep Its Exchange Rate Pegged to the Dollar: A Historical Perspective from Japan, October, 2006 (mimeo).

[54] Michael Mussa (2007), IMF Surveillance over China's Exchange rate Policy (Peterson Institute of Economics October 19, 2007).

[55] See IMF Art. XXVI. Such sanctions have played some role historically in cases involving the failure of a member to meet its repayment obligations to the Fund.

[56] Torres (2007), p. 450.

We recognize that this conclusion may seem at odds with the assumption we have stated earlier, to the effect that the IMF is the proper venue for addressing trade-balance issues and that it is not a "failed institution." To the degree that readers reject this assumption for the reasons we give above or others, however, this simply provides a reason to reform the IMF, not a reason to abandon it. And in any event, it does not immediately follow that the WTO is the proper institution to take over the tasks of the IMF. As we have demonstrated at length in Section 3, the task of translating exchange practices into trade policies with equivalent effect is fraught with uncertainty and depends greatly on the time frame within which one operates. The substantive rules of the WTO, and its calibrated retaliation system, do not seem well suited to this task for reasons introduced above that we will now elaborate further.

4.1.2 WTO Action

Mindful of the limitations of the IMF, a number of proposals in Washington, as well as a number of commentators,[57] would seek a solution at the WTO. The possible options under WTO law are essentially three: a complaint based on GATT Article XV, a complaint predicated on the notion that Chinese practices amount to an impermissible export subsidy, and a "nonviolation" complaint.[58]

Article XV The relationship between the GATT and the IMF is the subject of GATT Article XV. Its focus is on the circumstances in which GATT members may use trade measures for balance of payments purposes, such as the use of quotas to constrain imports to conserve scarce foreign exchange, a practice that would violate GATT Article XI in the absence of a bona fide balance of payments problem (see GATT Article XII). Article XV was drafted to encourage and facilitate coordination between GATT and the IMF on issues such as the question whether a GATT member employing quantitative restrictions for ostensible balance of payments purposes is doing so legitimately.[59]

But Article XV addresses more than just the use of trade measures for balance of payments purposes. In particular, Article XV(4) states that members "shall not, by exchange action, frustrate the intent of the provisions of this Agreement."

Nothing in Article XV or elsewhere in GATT provides clear guidance, however, as to what sorts of exchange practices would frustrate its intent.[60] Likewise, Article XV(4) has never been

[57] See Aaditya Mattoo and Arvind Subramanian, Currency Undervaluation and Sovereign Wealth Funds: A New Role for the World Trade Organization (Peterson Institute Working Paper WP 08-2, January, 2008).

[58] For another skeptical assessment of the WTO options from a legal standpoint, see Gary Clyde Hufbauer, Yee Wong and Ketki Sheth, US-China Trade Disputes: Rising Tide, Rising Stakes, Policy Analyses in International Economics 78 (2006), chapter 2.

[59] See note 1 supra for some cases in which such issues arose.

[60] Ad Article XV does provide that practices which deviate from the letter of GATT do not frustrate it if there is no "appreciable departure" from its intent. The use of import licenses as part of a system of exchange controls that is acceptable under IMF rules, for example, would not violate GATT Article XI (concerning the prohibition of quantitative restrictions). Although Ad Article XV thus delineates some practices that would not frustrate the intent of GATT, it is of little assistance in identifying practices that would frustrate its intent.

interpreted by the WTO/GATT dispute system, and no case law exists on the question of what exchange practices would frustrate the intent of GATT. Plainly, however, the heart of the GATT bargain has always been the market access commitments associated with the tariff bindings under Article II. A powerful argument can be made that any exchange action that frustrates these market access commitments would qualify as a potential violation under Article XV. In addition, modern WTO law (through the Agreement on Subsidies and Countervailing Measures) embodies a general prohibition on export subsidies.[61] If the obligation of Article XV is interpreted to encompass the frustration of these other WTO obligations, an argument can be made that any exchange practice that amounts to an export subsidy is also a potential violation of GATT Article XV.

As discussed at length earlier, a familiar claim about China's exchange policies is that they produce the equivalent of an across the board tariff increase, coupled with an across the board export subsidy. We have raised a number of questions about this claim in Section 3, but to the degree that it has any validity, it affords a plausible basis for an Article XV claim.

In adjudicating such a claim the WTO dispute process is obliged to defer to the IMF on certain issues. Article XV(2) states that in all cases addressing "problems concerning monetary reserves, balances of payments or foreign exchange arrangements," GATT members must consult with the IMF and "shall accept all findings of statistical and other facts presented by the Fund relating to foreign exchange, monetary reserves and balances of payments, and shall accept the determination of the Fund as to whether action by a contracting party in exchange matters is in accordance with the Articles of Agreement of the International Monetary Fund." Thus, to the degree that a violation of GATT Article XV was thought to depend on the existence of a violation of Article IV(1) of the IMF Agreement, for example, the WTO would be obliged to defer to any determination by the Fund as to the existence of such a violation.

It is by no means clear, however, that a violation of GATT Article XV requires a violation of IMF Article IV(1). It is possible to imagine, for example, that exchange action might "frustrate the intent" of GATT even if it fell short of "manipulation" for the "purpose" of increasing net exports under IMF standards. Among other things, nothing in the notion of measures that "frustrate the intent" of GATT necessarily requires that such measures be undertaken deliberately to frustrate the intent of GATT. Perhaps it would be enough to violate GATT Article XV if exchange practices had the effect of causing or perpetuating a significantly undervalued exchange rate, and if that situation in turn could be shown to impair market access commitments or yield the equivalent of export subsidization.[62]

But this last observation returns us full circle to the economic issues discussed in Section 3. To the degree that a nation such as China maintains an exchange rate peg for an extended period of time, prices may be expected to adjust and the real effects of the exchange intervention will decay to zero. Furthermore, when one recognizes that any litigation in the WTO is likely to take several

[61] GATT Article XVI also contains some more limited obligations restricting export subsidies.

[62] Moreover, even if a linkage between violation of GATT Article XV(4) and IMF Article IV(1) were thought to be required, Article XV seemingly leaves the WTO free to make its own judgment if the Fund proved unable to make a determination.

years to resolve, there is even more reason to believe that the real effects of past Chinese policies may wash out through price changes as the case works its way through the process.

In the short run, the analysis is also complicated. Recall that, despite continued exchange market intervention, the RMB has in fact been appreciating (slowly) against the dollar over the past few years. The sticky price results we developed earlier assumed an unanticipated devaluation, yet there has in fact been no recent devaluation (against the dollar), and it would be difficult to argue that Chinese practices are unanticipated of late. To the extent that price stickiness is creating real effects nevertheless, the precise nature of those effects would depend, among other things, on how goods are priced. In the PCP case, for example, an unanticipated devaluation does induce some expenditure switching in China from the import good toward the export good, which might be interpreted as an impairment of U.S. market access for its export good. Yet, as we have observed in Section 3, the traditional inefficiency (dead weight loss) associated with the use of trade policy is not present in this case, and the terms of trade for the United States improve, the opposite of the injurious effect on terms of trade that modern economic theory imagines to be the basis for trade agreements. Could it fairly be said that such a situation frustrates the intent of GATT? Likewise, the short-term economic effects of intervention are not the same as those of a simple export subsidy as we have indicated. Hence, a complaining nation under GATT Article XV – which would have the burden of proof to make out a prima facie violation – could well have a difficult time establishing that China's practices, at the time of the proceeding, were in fact having real effects that amounted to a "frustration of the intent" of GATT.

Export Subsidization On the premise that government intervention to produce an undervalued exchange rate is the equivalent of an across the board export subsidy, some commentators have suggested that a WTO complaint might challenge China's policies as illegal export subsidization. Under the Agreement on Subsidies and Countervailing Measures (SCMs), "subsidies" contingent on export performance are indeed prohibited.

It is quite unclear, however, whether exchange practices that lower the value of the national currency can qualify as a "subsidy." Under SCMs Article 1, a necessary condition for the existence of a subsidy is "a financial contribution by a government or any public body," or else some form of "income or price support." In addition, such a measure must confer a "benefit." Finally, under SCMs Article 2 the subsidy must also be "specific."

The specificity requirement is met if exchange market intervention can indeed be characterized as an export subsidy – i.e., as a subsidy "contingent upon export performance." Article 2.3 provides that all such subsidies are "specific." Exchange market intervention, of course, does not expressly confer benefits on firms "contingent" on their export performance. All firms will operate in the environment of an altered exchange rate irrespective of their export performance. A respectable argument might be made, however, that an undervalued exchange rate tends to favor exporting firms if it has any real effects at all (assuming that prices have not adjusted to offset it). Even if not formally contingent on export performance, therefore, any export stimulus resulting from an

undervalued exchange rate is plausibly characterized as an export subsidy.

The greater hurdles are perhaps posed by the requirements of SCMs Article 1. Article 1.1 lists several types of possible "financial contributions" – direct transfers of funds by government, a government practice that foregoes revenue otherwise due, government provision of goods and services, or government payments to a funding mechanism to carry out one of these three functions.[63] One (unappealed) WTO panel report held that this list is exhaustive, and that government practices that are not among the enumerated items are not subsidies even if they provide an economic benefit to an industry. Thus, the panel concluded, government restrictions on exports, which depress their price and allow domestic industries that use the exported products as inputs to obtain them more cheaply, cannot qualify as subsidies – they do not involve a direct transfer of funds, they do not represent revenue foregone, and they do not entail government provision of goods or services.[64]

Plainly, exchange transactions by the government do entail a "direct transfer of funds" to entities trading in the foreign exchange market. But these entities are not, in general, Chinese exporters, and a further question is whether the "financial contribution" must be made to the purportedly subsidized entity (Chinese exporters). Plainly, China's participation in the exchange market does not, in general, involve a financial transaction with domestic exporters.[65] An argument can be made, however, that a direct transfer to exporters is not required. Nothing in the text requires it. Further, it is well-settled that subsidies may arise "upstream" in a chain of production, and be passed downstream in the form of lower prices from input suppliers (the softwood lumber case provides a nice example, where below market prices for timber harvesting rights are said to result in a subsidy to sawmills unaffiliated with the harvesters). To be sure, exchange market transactions do not in general involve input suppliers, but one might nevertheless argue that the upstream subsidies cases establish that the subsidized entity need not directly transact with the government. As long as there is a transaction involving the transfer of funds, and a "benefit" arises, one might argue that a subsidy exists.

An alternative argument for the existence of a "financial contribution" is the suggestion that the government may forego revenue as the result of exchange intervention. A recent countervailing duty petition filed against Chinese imports by U.S. producers of flexible magnets alleges that when China lowers the value of the RMB, it makes imports more expensive and thus foregoes tariff revenue when imports are elastically demanded.[66] Once again, Chinese exporters are not a direct beneficiary of any such situation – any revenue foregone is not owed to the government by them –

[63] Of course, a financial contribution is not essential – a subsidy may instead result from an "income or price support." This term has not yet been interpreted in dispute resolution, and conceivably might be read broadly to encompass anything that boosts the income of the purportedly subsidized entity. Such a broad interpretation, however, would clash with the finding in United States – Export Restraints that export restraints cannot constitute subsidies. And if the term "income or price support" receives a narrow reading, limiting it to programs specifically geared to such matters (as in the agricultural sector), exchange market transactions would not appear to qualify.

[64] United States – Measures Treating Export Restraints as Subsidies, WT/DS194/R, adopted August 23, 2001 (not appealed).

[65] In any case where exporters directly exchange foreign currency with the Chinese government for RMB, of course, a "direct transfer of funds" would surely be present.

[66] See Inside U.S. Trade, Vol. 25 No. 38, September 28, 2007, p. 22.

but perhaps this difficulty can be overcome for the reason given above. The economic soundness of the suggestion that exchange practices reduce revenue, however, is open to question. Clearly, in the long run, price adjustments eliminate this effect. In the short run, with local currency pricing (Chinese imports priced in RMB), devaluation has no impact on Chinese tariff revenues (all ad valorem tariffs or specific tariffs yield the same revenue in RMB per unit of imports as before and all import prices in RMB remain the same). With producer currency pricing or dollar pricing, by contrast, Chinese imports do become more expensive in RMB so that consumers may buy fewer of them. But the question whether net tariff revenue rises or falls depends on the elasticity of import demand – China might well earn more tariff revenue if demand elasticity is sufficiently low on average.

Even if a "financial contribution" can somehow be found, however, it remains to determine whether exchange practices confer a "benefit." This issue also returns us to the economic analysis of the last section. Certainly, no benefit exists if prices have adjusted to eliminate all real effects of the practice. Likewise, one might argue that no benefit exists if the exporter does not realize an increase in profits or income as a result of the practice, as in the case of producer currency pricing when an unanticipated devaluation allows the purchaser of the good and not the seller to realize all the gains. And in the case of local currency or dollar pricing, the translation of exchange rate practices into real policy equivalents leaves no role for export subsidies, as we have observed.

Of course, one can imagine exchange practices in which an export subsidy might readily be found. Suppose, for example, that a government allows exporters to exchange foreign currency earned from export sales for domestic currency, and in the process gives them an amount of domestic currency that exceeds the fair market value of the foreign currency that they exchange for it. But that is simply not the type of transaction at issue in the case of China. For these reasons, an argument that China's practices confer an impermissible export subsidy is certainly open to question.

Nonviolation Nullification or Impairment The nonviolation doctrine under WTO law allows member nations to advance claims that a foreign practice, otherwise permissible under WTO law, frustrates reasonable market access expectations associated with tariff concessions. In contrast to practices that violate WTO law, a member whose measures become the basis for a successful nonviolation complaint has no obligation to withdraw the measures, but must nevertheless provide compensation or suffer a prospect of retaliation.[67]

If one assumes that China's exchange market practices cause the equivalent of a tariff increase on Chinese imports – an assumption that is questionable given the analysis in Section 3 above – perhaps it might be argued that China's practices impair the reasonable market access expectations associated with China's negotiated tariff bindings, even if they do not otherwise violate WTO rules. For several reasons, however, it seems unlikely that the nonviolation doctrine could be successfully invoked with respect to China's exchange practices.

[67] See WTO Dispute Settlement Understanding, Art. 26.

First, the nonviolation doctrine serves to fill "gaps" in WTO obligations. The classic example of a nonviolation claim involves the introduction of a new, WTO-legal domestic subsidy to domestic producers who compete with imports of goods that are the subject of tariff bindings. But WTO law directly addresses exchange practices that "frustrate the intent" of GATT, as discussed above in connection with GATT Article XV. China would thus have a strong argument any claim that its exchange practices upset reasonable expectations is properly adjudicated under Article XV.

Second, the nonviolation doctrine has been used sparingly over WTO/GATT history. The handful of successful cases, mostly many years ago, all involved new subsidy practices or changes in tariff classifications.[68] The extension of the concept to macroeconomic practices that affect market access opportunities would be a radical departure, and would raise potentially worrisome issues about how the nonviolation concept could be contained properly.[69]

Finally, the nonviolation doctrine only protects reasonable market access expectations, and expectations are not "reasonable" if the measure that ostensibly impairs them was expectable at the time of the relevant tariff negotiations. At the time of China's accession to the WTO in 2001, China pegged its currency to the dollar and the RMB has only appreciated since that time. It would be difficult for China's trading partners to make a case that they could not reasonably expect China to have continued its exchange policy after its accession.

4.2 Unilateral Options

4.2.1 Bilateral Negotiations

The outgoing Bush administration has consistently favored diplomatic solutions to the currency dispute with China, and has resisted moves to pursue multilateral or unilateral trade measures. While the administration apparently concurs in the view that the RMB is significantly undervalued, and concurs in the view that it results in trade detriment to the United States, it also evidently believes that sterner measures would prove counterproductive.

One negotiating tool at the disposal of the administration, that it has not employed to date, relates to an oversight role of the Treasury Department under the Omnibus Trade and Competitiveness Act of 1988. Section 124 of that Act, codified at 22 U.S.C. §5304, requires the Treasury Department to conduct an annual evaluation of the exchange practices of foreign countries, and to consider whether other countries are "manipulating" their currency in the sense of the term as used in IMF Article IV(1). If it determines that manipulation is present, it is then required to initiate expedited negotiations with the country in question (unless they would threaten "vital national economic and security interests") either bilaterally or under the auspices of the IMF. To

[68] See John H. Jackson, William J. Davey & Alan O. Sykes, International Economic Relations 5th ed. (Thompson West: 2008), chapter 7.

[69] During negotiations over the charter for the International Trade Organization (ITO) in 1946, there was some discussion of the possibility that weak macroeconomic conditions might create conditions of "nullification or impairment" (presumably because export opportunities would prove lacking). Language was added to the proposed charter to accommodate this concern. See Hudec (1990), pp. 38-39. Of course, the ITO never came into being and, as noted in the text, the claim that macroeconomic weakeness might cause nullification or impairment has never been advanced in the history of GATT or the WTO.

date, Treasury has declined to determine that China has manipulated its currency, in part because it has not found that China meets the "intent" requirement found in IMF Art IV(1).[70] The latest Treasury Department report on exchange rates, released December 10, 2008, again declined to name China as a currency manipulator.[71]

Among the recent proposals on Capitol Hill is legislation that would alter the standard for finding manipulation under the 1988 Act.[72] The proposed legislation would require Treasury to find manipulation by any country with "material" global and "significant" bilateral trade surpluses, if that country has engaged in "prolonged one-way intervention in the currency markets." Under this standard, which dispenses with any need for a finding regarding "intent," Treasury would have little choice but to find China to be a "manipulator," and to then pursue the expedited negotiations contemplated by the 1988 Act.

Of all the pending proposals, this option is least problematic from a legal perspective, in that it requires no action that is questionable under WTO law, and remains respectful of IMF principles. It merely "turns up the political heat" on Treasury and on China by forcing Treasury to make a public determination that it has heretofore been unwilling to make. The harder question, which we do not purport to answer, is whether such a move would make it more likely or less likely that China will accede to pressure to allow the RMB to appreciate, and whether more rapid appreciation of the RMB will on balance benefit the U.S. economy.

4.2.2 Countervailing Duties

As discussed above, if Chinese currency practices can indeed be characterized as measures that amount to export subsidization, the possibility of a WTO complaint for violation of the SCMs Agreement arises. As an alternative to a complaint before the WTO, however, an importing nation whose import-competing industries are "materially injured" by the export subsidization or threatened with such injury has the right under WTO law to impose additional duties (termed "countervailing duties") to offset the export subsidization.

Such a policy must confront a number of legal and practical issues. U.S. law was interpreted for many years to preclude the use of countervailing duties against exports from non-market economies. The agency charged with administering the law, the Department of Commerce, reasoned that the extensive entanglement of the government with economic activity in a non-market economy makes it impossible to identify subsidies in meaningful fashion. In 2007, however, the Department reversed its position with respect to China, and held that China's economy had developed to the point that it was possible to apply countervailing duty law.[73] The Department maintains that it has the discretion to make this change in policy, but to eliminate any legal uncertainty in that regard, various bills have been introduced on Capitol Hill that would explicitly authorize the use

[70] See http://www.dnrnews.com/site/article.php?id=233
[71] See BNA International Trade Daily, December 16, 2008.
[72] See S. 1677 (110th Congress).
[73] Coated Free Sheet Paper from the People's Republic of China, 72 Fed. Reg. 17484 (April 9, 2007).

of countervailing duties against non-market economy exports under U.S. law.[74]

Even if U.S. law allows countervailing duties in the case of an economy such as China, however, other obstacles remain. First, for the reasons discussed earlier, it is hardly clear that exchange practices confer "subsidies" within the meaning of that term under WTO law. Any decision by the United States to apply countervailing duties on the basis of exchange practices would likely confront a WTO challenge, focusing on the question whether exchange practices satisfy the "financial contribution" and "benefit" requirements of SCMs Article 1. Likewise, it is hardly clear that U.S. law can be interpreted in such a way as to treat currency practices as a countervailable subsidy, although some of the proposals in Washington would amend U.S. law to cover currency practices.[75]

Second, countervailing duties are limited to situations in which subsidized import competition is causing or threatening "material injury" to a competing domestic industry. That test is not trivially satisfied, and the demonstration of material injury requires a costly proceeding before the U.S. International Trade Commission (ITC) to analyze the injury question for any "industry" in which countervailing duties are contemplated. Moreover, a countervailing duty may do little to benefit an import-competing industry. Among other things, because a countervailing duty remedy will apply only to imports from a subsidizing nation, it may have no benefits to the import-competing industry if a highly elastic supply of imports from other countries is available at a comparable price. It is thus quite unclear how many industries would elect to bear the costs and uncertainties of pursuing a countervailing duty remedy, and unclear how many could succeed if they do.

Finally, the use of countervailing duties requires that the magnitude of any subsidy be quantified. In light or the economic analysis in Section 3, accurate quantification of the extent to which currency practices translate into an equivalent export subsidy seems a Herculean task. The difficulties associated with that task would add further fodder to any WTO challenge that might be brought against the use of countervailing duties.

For all of these reasons, the countervailing duty option is open to question, although we must acknowledge one "countervailing" consideration. Because countervailing duties are a unilateral policy, they can be imposed for a time without incurring any formal international sanction even if they would later prove to be illegal under WTO law. Accordingly, for at least a few initial industries, they might afford a way to ratchet up the pressure on China to relax its currency practices on at least a transitory basis.

4.2.3 Antidumping Duties

Another proposal for unilateral action put forward in Washington would alter U.S. antidumping law to treat currency misalignment as a source of dumping. The legislation would thus empower the Department of Commerce to impose additional antidumping duties against imports from countries with misaligned currencies if the ITC determined that such dumped imports were causing or threatening to cause material injury to a competing domestic industry.

[74] E.g., H.R. 708, H.R. 1229, H.R. 2942, S. 364, S. 974 (all 110th Congress).
[75] E.g., H.R. 782, H.R. 2942, S. 364 (all 110th Congress).

The effects of currency misalignment would be included in the dumping calculation as an adjustment to the price charged for merchandise in the Untied States. For example, one much-discussed bill provides that if a nation is found to have a "fundamentally misaligned" currency, defined as a "sustained deviation... from its medium term equilibrium level," if the misalignment results from certain types of government policies (such as prolonged one-way intervention in exchange markets), and if the nation in question has not adopted "appropriate policies" to correct the situation within 90 days, then:

> The administering authority [Department of Commerce] shall ensure a fair comparison between the export price and the normal value by adjusting the price used to establish export price or constructed export price to reflect the fundamental misalignment of the currency of the exporting country.[76]

The details of how the adjustment would be performed are not specified in the legislation, but presumably the "export price" would be adjusted downward by the amount of "misalignment," so that when it is compared to the "normal value" for purposes of calculating a dumping margin, any margin of dumping would automatically increase by the amount of "misalignment." This adjustment would apparently be made regardless of how the exports are priced (in producer currency or local currency, for example), and regardless of the basis for establishing normal value (whether home market price, third-country price, or constructed value).[77]

Like the countervailing duty option, this type of response to currency misalignment will have purchase only in industries where the material injury can be satisfied, and where firms are willing to bear the costs of bringing cases. Such a policy is also highly questionable under WTO law. Dumping is a firm-level behavior, whereby exporting firms offer better prices in one market (where dumping occurs) than to customers in the home or a third country market, or where sales are made below "cost" (understood to be something approximating long run average cost, not short run variable cost). Such behavior is simply lacking under circumstances contemplated by the proposed legislation. Suppose that a Chinese firm sells a widget for 10RMB at home (F.O.B.), and sells an identical widget to the United States for 10RMB (F.O.B.), consistent with the PCP invoicing assumption considered in Section 3. From the firm's perspective, it has realized identical amounts from each transaction, but under the proposed legislation, the "export price" would be found to be less than the "normal value." A finding of "dumping" under these circumstances would do considerable violence to the concept of dumping, and might well be said to violate the requirement in the WTO Antidumping Agreement that a "fair comparison" be made between the export price and normal value (Article 2.4).

[76] S. 1607, §6(1)(A) (110th Congress).

[77] "Dumping" under WTO law involves sales in which the "export price" is below "normal value." The normal value is ordinarily the home market price of the same or similar merchandise (adjusted for any differences in the merchandise) at the same level of trade (normally the ex-factory level). When insufficient home market sales exist, or such sales are made below cost, prices to an "appropriate" third country may be used instead. When third-country prices cannot be used either, constructed value will be employed, which is defined as "cost of production" plus a reasonable allowance for general, selling and administrative expense and profit. See WTO Antidumping Agreement, Article 2.

Article 2.4 also provides that when the comparison requires a conversion of currencies (not necessary in the example above because both products are assumed to be priced in RMB), the exchange rate shall be the "rate of exchange on the date of sale." This language can be read to refer to the actual exchange rate, not some counterfactual "medium term equilibrium" rate. Indeed, as we indicated in Section 3, it is questionable whether there exists any predictable and stable relationship between the exchange rate that achieves an "equilibrium" trade balance, however that concept is defined, and the amount by which exchange market intervention affects the real prices of goods in international trade.

Finally, if currency misalignment is to be treated as a source of dumping, the thorny problem of quantifying the misalignment resurfaces, as under the countervailing duty option. The difficulties in performing this task convincingly would no doubt create further legal vulnerability.

5 Conclusion

Individual governments may engage in exchange rate intervention for a variety of reasons. The key question for the world trading system is how other governments and/or international economic institutions should respond to the international effects of this intervention. There are important circumstances under which such intervention has no real effects of any kind, in which case it is clear that no response is warranted. On the other hand, governments that systematically engage in prolonged exchange rate intervention clearly believe that their intervention serves some purpose, and in this case real effects can be presumed: the question then becomes, What is the nature of these real effects and what response do they warrant?

We have argued in this paper that the potential international effects of exchange rate policies can be usefully divided into two kinds: effects on trade balances; and effects on trade volumes. We have observed that the effects of exchange rate policies on trade balances is the traditional concern of the IMF, and we have adopted the view in this paper that the IMF is capable of carrying out its role in this regard. From this starting point, we have then asked how the WTO might address – either through multilateral action or by facilitating unilateral action – the possible impacts of exchange rate policies on trade volumes.

As we have noted, in maintaining the assumption that the IMF is the appropriate institution for addressing the impacts of exchange rate policies on trade imbalances, our paper cannot speak to all corners of the policy debate on currency manipulation, because some in this debate argue that the IMF is a failed institution and that the WTO should be called upon to achieve what the IMF cannot: this of course would imply a fundamental shift in the limits of the WTO mandate. By contrast, our economic and legal analysis presumes that there will be no fundamental change in the role of the WTO. Nevertheless, even with this more limited focus, our paper still speaks to one very important dimension of the policy debate, namely, whether and under what circumstances exchange rate policies can be seen to either impair WTO commitments or to be a specific basis for WTO-consistent unilateral responses.

Our economic and legal analysis raises numerous questions about the notion that exchange rate misalignments violate WTO commitments or could reasonably form the basis for WTO-consistent unilateral responses. Rather, whether prices are taken as flexible or sticky, the translation and interpretation of the impacts of a devaluation into an equivalent set of trade policy actions is fraught with complexity, and ultimately can only be judged once a variety of subtle empirical questions are answered.

We have used a flexible-price setting, in which the real-policy equivalents of a devaluation are most clear, to illustrate the pitfalls with singling out a particular component of the equivalent real-policy package or viewing each of the components in isolation when evaluating possible WTO- or WTO-consistent responses. And we have shown in a sticky-price setting that the identification of the real-policy equivalents to a devaluation are highly sensitive to the details of pricing behavior.

The welfare effects of undervaluation on other nations are also complex and dependent on a variety of considerations. It is highly misleading to equate them to the effects in isolation of tariff increases and export subsidies for the reasons we have discussed.

In sum, the task of untangling the complex relationship between exchange practices and trade is thus fraught with uncertainty, a fact that suggests caution in assessing claims that China's exchange practices are frustrating the WTO bargain, or that China's practices afford an economically or legally sound basis for unilateral actions such as antidumping or countervailing duties. Unilateral responses of the latter sort are perhaps the most problematic of all the proposed policies, in that the task of translating Chinese exchange practices into a quantitatively equivalent export subsidy (for countervailing duty purposes) or reduction in export price (for antidumping purposes) seems exceedingly difficult, and certainly cannot be based on existing estimates of "misalignment" generated by conventional models of equilibrium exchange rates.

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