REAL EXCHANGE RATE ADJUSTMENT VERSUS "STANDARD" INFLATION

The Case of Russia, 2000-2010

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This paper is a somewhat expanded version of the material I presented, during my visit to Russia in January 2010 in seminars at the Higher School of Economics, the Institute for the Economy in Transition, and at the USAID mission in Moscow, and subsequently in Washington at a seminar for USAID officers.

Introduction

This paper is concerned with real exchange rate issues, as they have arisen in Russia in the recent past. In a sense, it is a reflection of my own experience. My first trip to Russia took place early in the year 2000, when, under the sponsorship of USAID, I participated in a conference on economic liberalization. This was followed by a series of subsequent visits, during which I served as a sort of liaison between USAID Moscow and several economic institutions that were recipients of USAID research grants. My last visit to Russia, prior to that of January 2010, took place in 2004. The present paper represents an attempt to summarize one important aspect of the evolution of the Russian economy in the interval during which I have observed it.

I am constantly impressed, and also somewhat surprised, by the degree of confusion that exists -- in the public mind (understandable), in the general news media (understandable but troubling), and even in the financial press and the academic literature and debates (hard to

understand and at times downright disturbing) -- concerning the economics of real exchange rates. This confusion is partly explained by the fact that the real exchange rate is a relatively new concept, whose entry into the economic literature and debate dates from somewhere around 1970. But that hardly represents a good excuse for widespread confusion and misunderstanding that has lasted by now for some four decades.

Perhaps the most common point of misunderstanding is the confusion of the real exchange rate with the nominal rate. One manifestation of this is the erroneous notion that real exchange rate (RER) adjustment can take place only by way of movements in the nominal rate. That is, many people seem reluctant to recognize that RER adjustment can take place quite naturally and normally, even when a country has a fixed exchange rate.

A more subtle kind of error is reflected in the distinction between the "old" mechanism of adjustment (as it was taught pre-1970 and without mention of the RER) and the "new" mechanism, incorporating modern RER economics. We illustrate the distinction for the case of a country adjusting to a new flood of foreign exchange. This new flood can come from any of a number of sources -- surges in export volume or in the world market prices of a country's main export commodities, large inflows of capital from abroad or from foreign aid, or large receipts of emigrant remittances.

In any case, the old version of adjustment to such a surge under a fixed exchange rate system, went as follows. The flood of foreign currency (say dollars) would come into the country. Under the normal operation of a fixed exchange rate system, the Central Bank would be committed to buy such dollars at the specified rate (say 30 rubles to the dollar). These purchases would expand the supply of base money (M_0), which in turn would precipitate a likely expansion of broad money (say M_2), via the so-called money multiplier. As a consequence of this M_2

expansion, there would ensue a rise in the general price level $\bar{p}_d$. This would result in the country's exports becoming more expensive for foreign buyers, and its imports becoming cheaper (in relative terms) for domestic buyers. The resulting decline in exports and rise in imports would open a gap (a trade deficit) in the country's balance of trade.

If the surge in dollar inflows happened to be a one-time event, this induced trade deficit would bring about a loss of foreign exchange reserves, which would lead to a contraction of M_0 and M_2, and a resulting fall in the price level. In classroom and textbook exercises, where the only disturbing force is the precipitating dollar inflow, the story comes to an end when the international reserves accumulated during the temporary surge have all gone back out, and the initial equilibrium is restored.

If the surge in dollars were permanent rather than temporary, say at $100 billion per year, then a new equilibrium would be reached when the trade gap (imports minus exports) had also reached $100 billion per year. This would have been brought about by a "permanent" rise in the internal price level $(\bar{p}_d)$ just sufficient to create a $100 billion trade deficit.

The <u>new version</u> of the story differs from the old in two respects. First, it makes a sharp distinction between tradable components p_t and nontradable components p_n of the general price level $\bar{p}_d$. And second, it takes explicit account of modern monetary dynamics. In the case of a one-time surge in inflows, people will initially find themselves with higher levels of broad money (M_2) than before, but this will typically represent more real monetary balances $(M_2/\bar{p}_d)$ than they really want to hold. As they spend their excess balances, part of this spending is on tradable goods (even if $\bar{p}_d$ hasn't risen or has risen only a little), and part is on nontradables p_n, which will tend to rise in price.

For a one-time surge in inflows, the monetary mechanism may well dominate. So the dollars accumulated by the Central Bank may flow out, not because the internal price level has risen, but simply because the public is getting rid of its unwanted real monetary balances, causing imports to rise and possibly exports to fall (as people buy more exportable goods). For such a case the temporary rise in the price level of nontradables may be so small and so brief that it is not even noticed. But the Central Bank will nonetheless lose its accumulation of international reserves in the process of covering the country's induced trade deficit (imports minus exports).

On the other hand the rise in the price level of nontradables is an essential part of the adjustment to a permanent upward shift in the total availability of foreign exchange, provided other independent forces do not enter the picture to affect it. This is the story of Russia in the period from 2000 to the present. In Russia's case there were indeed important offsetting forces, but they were not strong enough to impede a major rise in nontradables prices.

Inflation of Types A and B

Nobody will begin to deny the fact that Russia's price level has risen mightily, more than tripling since 2000. Yet virtually everybody refers to this as an inflationary experience. Personally, I do not like to use the term inflation to describe what has happened in Russia. I prefer to label it directly as a natural real exchange rate adjustment in response to the vast inflows of foreign exchange that have resulted mainly from booming exports of oil and gas.

To set the stage for the discussion to follow, let us first look at Russia's nominal exchange rate with the dollar. In the first quarter of 2000 -- the time of my first visit to Russia -- the exchange rate averaged 28.5 rubles to the dollar. On my latest trip in January 2010, the rates posted on the signposts of currency exchanges all over Moscow were almost the same -- 29.2

rubles to the dollar. Reality never mirrors theory to the letter, so Russia did not have an officially fixed exchange rate over the intervening decade, but it came pretty close.

The annual average price of the dollar, in rubles, was 28.13 in 2000. It moved upward to a peak of 31.5 rubles in 2002, stayed between 27.2 and 30.7 from 2003 through 2006, then dropped briefly to 25.6 in 2007 and 24.8 in 2008, before rising back to the 28.3 ruble range in 2009. These data show that during this entire period Russia's exchange rate with the dollar was only very briefly and modestly outside the range of 28 rubles, plus or minus 10%. So the nominal exchange rate was not fixed, but the forces of the market plus the interventions of the Central Bank came close to simulating what would have happened under a quasi-fixed exchange rate system, maintaining a limiting 10% band around a central value of 28 rubles to the dollar.

So we are going to think of Russia as having this sort of quasi-fixed exchange rate during the decade. How then can we interpret the rise in its price level to over three times its January 2000 value? There can be no doubt about the price level rise, but it is very clear that Russia was not suffering from inflationary disease of the standard type.

"Standard" Inflation (Type A) Syndrome

a) loss of international reserves

b) depreciation of the currency

c) expectation of further depreciation

d) people reduce their holdings of monetary balances (M/P) in real terms.

Real Exchange Rate Adjustment (Type B) Inflation Syndrome

a) international reserves increase

b) currency appreciates in real terms

c) no flight from the currency (i.e., no expectation of nominal depreciation)

TABLE 1

Key Data on Exchange Rates, Money and Prices

Russia, 1st Quarter 2000 and 1st Quarter 2010

		First Qtr. 2000 (1)	First Qtr. 2010 (2)	Ratio (2)÷(1) (3)
a)	Nominal Exchange Rate (rubles per dollar)	28.46	29.90	1.05
b)	Consumer Price Index (CPI) (2005= 100)	46.85	158.97	3.39
c)	Base Money (M_0) (billions of rubles)	n.a.	3986.10	
d)	Broad Money (M_2) (billions of rubles)	768.40	15996.50	20.82
e)	Producer Price Index, U.S. (2005 = 100)	82.36	115.67	1.40
f)	USPPI in rubles (e)×(a)	2343.77	3458.45	1.48
g)	Producer Price Index, Germany	89.04	107.54	1.21
h)	German PPI in rubles	2500.99	4453.33	1.78
i)	Russia's Tradables Price Movement = [(f)+(h)] ÷ 2			1.63
j)	Exports of Goods & Services (billions of dollars)	25.74	101.45	3.95
k)	Total International Reserves Minus Gold (millions of dollars)	11.46	423.32	36.95
l)	Real Exchange Rate (based on U.S. and German PPIs and Russian (PI))	100.00	48.10	0.48

Source: IMF, International Financial Statistics.

d) people increase their holdings of real monetary balances (M/P)

In Russia's case, the country's international reserves (measured in dollars) rose to more than 35 times their 2000 level, the real price of the dollar fell to less than half its initial level (i.e., the ruble more than doubled in real value), there is no flight from the currency, and the public's holdings of real monetary balances have risen to more than 6 times their starting point in the first quarter of 2000.

There can be no doubt whatsoever, that if we are going to use the term inflation to describe Russia's price-level experiences in the past decade, we have to call it type B inflation, meaning real exchange rate adjustment, and certainly not type A (standard inflation).

Obviously inflation has bad consequences for most people. If you survey Russian citizens concerning their attitude toward the last decade's rise in the price level, an overwhelming majority would say that it was bad. Yet if you ask the same people, did the Russian economy and society benefit from its booming exports of oil and gas, nearly everybody would say yes. Most people would not come close to recognizing that the price level rise was tightly linked to the oil-export boom. They think of these as two separate events, not a "package" but as quite independent phenomena.

To emphasize that they really are a "package", I made a hypothetical calculation of what the consequences would have been, had Russia's Central Bank actually managed to keep the price level constant over the decade. Then, instead of the price level more than tripling, we would have seen the nominal price of the dollar fall to less than a third of its actual final value. One should think of this counterfactual scenario as one which ended in exactly the same real equilibrium as the one we actually observe. The only difference is that in the actual case, the real exchange rate adjustment took place through a large rise in the price level. In our counterfactual

case, the same adjustment of the real exchange rate would be achieved through a fall in the nominal price of the dollar.

If you asked people in Russia today, whether they would prefer the present situation versus an alternative in which the price level had been stable but the nominal exchange rate had gone to 9 rubles to the dollar, most would probably pick the present situation. But they would almost certainly be groping in a thick fog as they reached for an answer, for subtle economic issues are involved.

In the first place, the counterfactual scenario in our exercise simply replicates the current real equilibrium at a different price level. So in real terms everything, or nearly everything, is supposed to be the same in the two scenarios being compared. Russians who perceived this would probably say they were indifferent between the two options.

But those with more finely-tuned economic antennae would go a step further, and inquire into the path by which the economy would likely have moved from its initial 2000 level to: a) its present situation, or b) the alternative scenario of the same real equilibrium but maintaining the overall general price level constant. It is here, in the comparison of time paths, that one can easily end up much preferring the actual evolution (with the price level tripling) vis-a-vis the alternative scenario (with the nominal exchange rate being cut to a third of its initial level).

On Deflationary Pressures -- General and Sectoral

In standard macroeconomic analysis, it is very widely accepted that it is wise to avoid, or at least to strenuously combat, strong deflationary pressures. This is an almost sacred tenet of the Keynesian and neo-Keynesian literature, but it is also strongly held by most modern monetarists. Milton Friedman in particular blamed most of the suffering of the Great Depression on the fact that the Federal Reserve permitted the nominal money supply of the United States to

undergo a major decline, which in turn led to strong deflationary pressures during the early years of the depression.

The point of agreement among all these schools is that there exist a certain downward rigidity of wages and of certain important components of the price level. As a result of this rigidity (or very slow adjustment), deflationary pressures (downward shifts of demand for goods and services), are reflected only partly in reduced nominal prices and/or wages. The other part consists of a fall in aggregate output and employment. To aim at keeping total aggregate demand from falling has thus been a hallmark of economists' advice concerning macroeconomic policy in situations of actual or potential recession.

The development of real exchange rate economics added a new twist to this standard story. Namely, we now really have two price levels -- that of tradables, p_t and that of nontradables, p_n. The tradables price level is linked to the world price level by the relation $p_t = Ep^*$. Here p^* is the world price level expressed, say, in dollars, and E is the nominal exchange rate of E rubles per dollar.

In the actual case, a good estimate of the movement of p_t would be a rise of about 63%. This takes the U.S. and German producer price indexes as separately representing world prices. These are converted into rubles using the respective nominal exchange rates of rubles vis a vis the dollar and the Euro (see footnote 3, infra). For the alternative scenario we would have this tradables price level fall to a little less than half its 2000 value, compared with its rising by 63% in the actual scenario. Hence the producers of tradables within Russia would have had to adjust to a fall in the ruble price level of world tradables to somewhere in the neighborhood of half its initial level, or worse. It is hard to imagine that this could have been a smooth and easy adaptation.

Some components of the tradable sector -- mainly agricultural and mineral products -- have prices which have historically been quite volatile. These particular sectors seem to have managed to adapt to this volatility without generating huge swings in employment in the process. The reason for this is that in both agriculture and mining there is a big element of economic rent in the price structure, combined with substantial inelasticity of supply in the short to middle run. Hence even with wide swings in prices, farmers in the corn belt plant corn, and those in the wheat belt plant wheat, and owners of operating oil wells tend to extract petroleum at a rate that is mainly dictated by technical considerations. Prices have to get very low before it becomes worthwhile to leave crops unharvested or to try to shut down operating oil wells.

But at the other extreme among tradable goods we have manufactures. Here the short run supply is quite elastic, where even entire shifts can be added or subtracted in many operations in response to, say, a 20 or 30 percent upward or downward move in the price of the product. Manufacturers may try to convince workers to accept lower wages, when demand for their products falls, but typically only very limited success results from such efforts. If asked to vote as to whether to accept a 10% reduction in pay, or to take a 10% reduction in employment, workers typically vote massively for the latter option. This is partly because it is pretty clear on whom this unemployment will fall -- typically those with less seniority and/or lesser skills. This particular group (i.e., 10 or maybe 20 percent of the workforce) will vote for the paycut, but the rest will quite likely find it in their self-interest to vote for the cut in employment. These preferences and self-interests are there even when no vote is actually taken, so the end result is that cyclical drops in labor demand are almost always much more reflected in reductions in

employment than in wage cuts.[1]

All the above is standard analysis of how labor markets work in cyclical downturns. But this standard analysis always talks about the labor market as a single unit. What we are going to do now is to consider the labor market as being split into two parts -- covering those employed in the tradables sector on the one hand, and those employed in the nontradables area for the other.

Now consider the case, applicable to Russia, of a large and lasting surge of foreign currency receipts under conditions of a fixed (or quasi-fixed) exchange rate. The world price level of tradables p^* is determined in the world market. If this world price level remains constant, as in textbook cases, the internal price of tradables $p_t (= Ep^*)$ will also stay roughly constant given the quasi-fixity of the nominal exchange rate, E. In the actual case of Russia, p_t rose by something like five-eighths over the decade. Nothing was actually operating to push down the level of nominal wages. No deflationary pressure entered the picture, certainly not on

[1] In countries with active systems of unemployment compensation, of course, this fact creates a situation where an initial 100 workers actually end up receiving more total income when employment is cut back by 10% at the same wage vis-a-vis an alternative scenario where the wages paid by their employer are cut by 10% but all 100 remain employed. The employer's outlays stay the same, supplemented by the income received by the unemployed.

p_n [2] (which had to much more than triple, given that the average of all prices, $\bar{p}_d$, itself more than tripled) and also as we have just seen, not on p_t.

The alternative scenario in which the price level was kept constant would have entailed the nominal exchange rate E falling from 28 in 2000 to something less than 9 in 2010. With world tradables prices rising by five-eighths, the internal price level of tradables would have to fall from an initial level of 100 to around 50 (= 1.63/3.39). Obviously, this would mean an incredibly massive deflation of the internal price level of tradables. Subsectors of tradables in which there were substantial amounts of economic rent and the underlying supply curves were quite inelastic (agriculture and mining) might be able to handle this without generating large amounts of unemployment. But it is extremely difficult (I would say almost impossible) to imagine Russian manufacturing being able to absorb such a substantial deflationary pressure without generating massive unemployment in the process.

So even if the final equilibrium of the Russian economy were to be exactly the same, in real terms, in the alternative and the actual scenarios, the path through time of the Russian economy, and in particular its manufacturing sector, would in all likelihood have been vastly

[2] It is easy to talk in theory or in the classroom about the price level of nontradables, p_n, but it is next to impossible to find data on it. The reason is that most of the prices we see at the local market level are mixtures of tradable and nontradable components. The taxi ride looks like a pure nontradable, but many of its components (the gasoline, the tires, the car itself) are tradables. Thus the price of the taxi ride is a mixture of tradable and nontradable components. So too are the prices of restaurant meals, houses, hotel stays, and most other items which are themselves neither imported nor exported. The index of nontradables prices is thus a sort of Platonic ideal, clear in concept but hard to identify in practice. This does not pose an insurmountable hurdle to economists, however, as for most purposes they are concerned with the ratio p_t/p_n. Fortunately, p_t/CPI moves up and down in tandem with this ratio though with lower amplitude. This fact permits us to work with a definition of the real exchange rate as p_t/CPI (= Ep*/CPI), as we have done here.

different, with much more unemployment being generated along the way in the tradable (particularly manufacturing) sector than turned out to be the case under the actual scenario.

We certainly do not know whether the authorities in Russia's Central Bank and in its economic ministries actually ever thought of an alternative scenario in which the general price level was held constant while the tradables price level plummeted. What we have shown here is that had they thought about that alternative and had they gone through an analysis similar to ours above, they surely would have rejected that idea.

In sum, people in Russia should clearly prefer the actual course of events, with the general price level more than tripling and the nominal exchange rate constant, to an alternative in which the general price level would have been kept stable while the nominal price of the dollar fell to about a third of its initial level!!!

Moreover, I think this exercise puts in very clear relief the distinction between what I have called type A ("standard") inflation and inflation of type B (generated by real exchange rate appreciation with a fixed or quasi-fixed exchange rate).

On "Ratchet-Type" Inflations

The preceding exercise causes one to think of a simple extension of the old maxim of monetary policy, telling the authorities to work to resist and where possible offset deflationary pressures operating to push down the absolute level of prices. The new maxim would tell them to work in the same way to resist and offset downward pressures on either the general price level of the tradables sector or that of the nontradables sector. Thus if the equilibrium ratio p_t/p_n were to rise by 25%, this would lead under this scheme ideally to p_t going to 125 while p_n

stayed constant at 100. If this episode were followed in turn by one in which p_n/p_t rose by 25%, this would ideally evolve with p_t staying at 125 and p_n rising from 100 to 125.

Under such a ratchet-type inflation, no major sector price level ever goes down, but ideally only one of the two goes up at a time, it being the one whose relative price has risen. What we see in the Russian case in the period that we are examining is that the general price level has multiplied by more than 3, while the tradables sector price level, as best we can estimate it, has only gone up by around 63%. This does not represent a "perfect" implementation of a ratchet inflation policy, but it is pretty close. What happened in the Russian case was that rather than keep p_t constant, the authorities kept E roughly constant (within a range of plus or minus 10%). As a consequence the actual movement of p_t in Russia (as we can roughly estimate it), was a arise of some 63%.[3]

To test the idea of ratchet inflation in other countries, I turned to data assembled by Professor Stella Chan, in a paper entitled "Real Exchange Rate Adjustments in a Fixed Exchange Rate System". Our Table 2, drawn from Table 1-1 of that paper, presents data from 27 episodes

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[3] Among real exchange rate professionals, it is widely accepted that wholesale (WPI) or producer (PPI) price indexes are the best available proxy for the tradables price level. This judgment results from the fact that tradables receive significantly more weight in WPI and PPI indexes than they do in consumer (CPI) price indexes. Thus a standard definition of the real exchange rate (rubles per dollar) takes a country's nominal exchange rate with, say, the dollar, multiplies it by a wholesale or producer price index from, say, the U.S., then divides it by, in this case, Russia's CPI or its GDP deflator. The latter are both general price indexes which give full weight to nontradables. The tradables price index which we have used in this paper is obtained from the movements of the U.S. and the German producer price indexes, both translated into rubles using the nominal exchange rates -- rubles per dollar and rubles per Euro.

If this exercise is performed assuming world tradables prices follow the U.S. producer price index, the Russian price level of tradables would have risen by 48%. If the German producer price index is taken as the measure of world tradables prices, the Russian price level of tradables would turn out to have risen by 78%. Our figure of 63% is simply the average of these two figures [(48+63) ÷ 2], and considers the U.S. and German producer price indexes to be two independent estimates of the "world price level of tradables".

in developing countries, all of them being episodes during which the movement of the nominal exchange rate was less than 3% per year. For thirteen of these cases, the nominal exchange rate remained entirely fixed throughout the episodes, for four of them it appreciated a bit, and for ten there was a slight depreciation, but all of them can reasonably be classified as reflecting what I have called a quasi-fixed exchange rate.

Table 3 looks at the 19 cases in which the real exchange rate appreciated. Note that in every single one of these cases, the consumer price index went up. This, of course is the way in which it is expected to move when the RER appreciates in a country with a fixed exchange rate. Now, if the CPI were to remain stable, an RER appreciation would have to entail the tradables price level falling. This did indeed occur in three of the nineteen cases, but to a quite modest degree. What this says is that in cases where the needed adjustment could come either from the general price rising, or the tradables price level falling, or some combination of the two, we observe "some combination" in only three cases. The big message from Table 3 is that when RER appreciation is called for, it quite regularly and naturally takes place through the general price level rising.

In all but three cases, the internal tradables price level (p_t) also rose. This means that RER adjustment required that the general price level (CPI) rise by more than p_t. Here we have a distinct flavor of ratchet inflation, with the movement of p_t providing a baseline, so that real exchange rate appreciation could only actually come about to the extent that the CPI moved up by significantly more than p_t.

If the nominal exchange rate (NER) were flexible, some or all of the real exchange rate adjustment could come through NER falling. Our selection just of episodes with fixed or quasi-

fixed nominal rates gives little scope for this avenue of adjustment. There was a tiny downward adjustment of the nominal rate (-1.0 percent per year) in the China I episode (see Table 2). The driving force for negative movements in p_t in the other two cases (Argentina II and Jordan I) was a decline in p*, the world price index of tradables.[4]

Table 4 lists the eight cases in which the real exchange rate depreciated. Here one should recall that the "natural" movement of the general price level would be downward in such cases, if nominal exchange rates were fixed and the world price level of tradables did not change. In the actual event, however, the general price level fell in only one of these cases, and then by only 1.3% per year over a period of some 2 1/3 years.

Here we have another manifestation of what I have called "ratchet-type" inflations. One cannot get into the minds of Central Bank officials to perceive their motivation. But the observable results are consistent with the idea that they act in such a way as to prevent sharp declines either in the CPI or in internal price level of tradables.

This evidence from other countries whose nominal exchange rates, like that of Russia during 2000-2010, did not change very much, is consistent with their Central Banks behaving in a fashion similar to the behavior that we have attributed to the Russian Central Bank.

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[4] Professor Chan in her study used the SDR-WPI, which is a relatively sophisticated measure for p*. It takes five wholesale or producer price indexes -- those of the U.S., Germany, Japan, the UK and France as independent estimators of the world price level of tradables, and assigns them the same relative weights as the IMF uses in its definition of the SDR (= special drawing rights, which might be called the IMF's world currency). In calculating the real exchange rate of a country, we normally choose a specific currency (in our case the dollar) in which to measure "foreign currency". Once we've made this choice, the separate estimates of the world price of tradables (in this case those coming from Germany, Japan, the UK and France) have to be expressed in dollars before their weighted average is taken. The rather sharp downward movements of p* in Argentina II and Jordan I, are largely explained by there being significant appreciation of the dollar vis-a-vis the other major currencies during those episodes.

TABLE 2

Real Exchange Rate Adjustment With Fixed or Quasi-Fixed Nominal Rates

(data are average percentage changes per year during each episode)

Country	Episode	CPI	p_t	NER	RER	p*
Argentina I	01/91-06/94	19.3	0.7	2.1	-15.7	-1.5
Argentina II	04/05-08/98	0.6	-5.1	0.0	-5.6	-5.1
Argentina III	06/98-01/01	-1.3	3.1	0.0	4.4	3.1
China I	01/94-08/98	10.4	-1.1	-1.0	-10.5	-0.1
China II	01/02-03/05	2.2	12.0	-1.1	9.5	13.1
Egypt I	01/82-05/90	15.8	2.5	0.0	-11.5	2.5
Egypt II	03/91-06/99	9.3	0.8	0.9	-7.7	-0.1
Egypt III	01/04-10/07	8.1	4.4	-2.9	-3.7	7.3
Haiti	02/79-09/85	11.6	2.3	0.0	-8.3	2.3
Honduras I	03/79-02/85	9.4	1.5	0.0	-7.1	1.5
Honduras II	02/85-04/81	3.4	9.6	0.0	6.0	9.6
India	06/98-04/06	4.2	3.5	0.8	-11.8	4.3
Indonesia	10/90-07/97	7.9	4.5	4.5	-3.2	0.0
Jamaica I	07/73-10/77	16.2	7.2	0.0	-7.8	7.2
Jamaica II	07/79-10/83	14.5	2.3	0.0	-10.6	2.3
Jordan I	07/95-04/98	5.4	-4.5	0.6	-9.4	-5.1
Jordan II	02/02-11/07	3.9	8.8	0.0	4.7	8.8
Korea	07/86-05/96	6.1	2.1	-1.3	-3.8	3.4
Malaysia	02/02-03/05	1.5	9.9	0.0	8.2	9.9
Mexico	01/88-01/94	7.3	0.1	1.1	-6.7	-1.0
Pakistan	03/02-04/07	6.3	9.1	0.2	2.6	8.9
Paraguay	08/78-12/83	16.0	4.2	0.0	-10.2	4.2
Peru	12/01-07/07	2.2	6.8	-1.5	4.5	8.3
Thailand	12/88-06/97	5.1	1.5	0.3	-3.4	1.2

Table 2 (continued)

Country	Episode	CPI	p_t	NER	RER	p*
Venezuela I	05/74-12/76	9.8	4.4	0.1	-4.9	4.3
Venezuela II	12/76-07/79	8.2	13.2	0.0	4.6	13.2
Venezuela III	07/79-11/83	13.0	2.1	0.0	-9.6	2.1

CPI = Consumer Price Index
p_t = Nontradables price level inside the country
NER = Nominal exchange rate
RER = Real exchange rate
p* = World price index of tradables prices in U.S. dollars.

Source: Stella (Man-Ching) Chan, Essays on Real Exchange Rate Adjustments in a Fixed Exchange Rate System (UCLA Ph.D. Dissertation, December, 2008), Chapter I, Table 1-1.

TABLE 3

Price Level Movements When the Dollar Gets Cheaper in Real Terms

(data are average percentage changes during each episode)

Country	CPI	p_t	p*
Argentina I	19.3	0.7	-1.5
Argentina II	0.6	-5.1	-5.1
China I	10.4	-1.2	-0.1
Egypt I	15.8	2.5	2.5
Egypt II	9.3	0.8	0.1
Egypt III	8.1	4.4	7.3
Haiti	11.6	2.3	2.3
Honduras I	9.4	1.5	1.5
India	4.2	3.5	4.3
Indonesia	7.9	4.5	0.0
Jamaica I	16.2	7.2	7.2
Jamaica II	14.5	2.3	2.3
Jordan I	5.4	-4.5	-5.1
Korea	6.1	2.1	3.4
Mexico	7.3	0.1	-1.0
Paraguay	16.0	4.2	4.2
Thailand	5.1	1.5	1.2
Venezuela I	9.8	4.4	4.3
Venezuela III	13.0	2.1	2.1

Source: Table 2

TABLE 4

Price Level Movements When the Dollar

Gets More Expensive In Real Terms

(i.e., local currency depreciates)

(data are average percentage changes per year during each episode)

Country	CPI	p_t	p^*
Argentina III	-1.3	3.1	3.4
China II	7.2	12.0	13.1
Honduras II	3.4	9.6	9.6
Jordan II	3.9	8.8	8.8
Malaysia	1.5	9.9	9.9
Pakistan	6.3	9.1	8.9
Peru	2.2	6.8	8.3
Venezuela II	8.2	13.2	13.2

Source: Table 2.