

Impending Appreciation of the Brazilian Real to the U.S. Dollar:
Effects on International Cotton Markets and Trade

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In the past months, several measures instituted by the Brazilian government have been aimed at reducing inflation to prevent an impending appreciation of its domestic currency, the Brazilian real (BLR), relative to the US dollar (USD). Already, bank reserve requirements have been raised; in addition, higher taxes on consumer credit, foreign bond issues, and on overseas loans and derivatives margins have been exacted to reduce the demand for the BLR. According to Brazil's finance minister, without these measures, the BLR would be at 1.4 to the USD (The Economist, 2011). Notwithstanding these measures, analysts estimate that the BLR could move to around 1.6 by the end of 2011 (CEIC, 2011a). This anticipated level corresponds to a 10% appreciation from the current baseline level of 1.78 BLR/USD (in the next several years) that forms part of the macroeconomic assumptions utilized in the generation of baseline projections for U.S. agricultural markets by FAPRI.¹

The immediate questions pertain to realignments in trade that will accompany this policy change. Following the exchange rate appreciation of the BLR/USD, how profoundly will Brazil's cotton exports be adversely affected? With Brazilian cotton exports becoming more expensive than those from the U.S., to what extent will cheaper U.S. cotton substitute for the now more expensive Brazilian cotton in the global export market? Will other export competing countries gain as well? As for cotton importing countries from Brazil, how significantly will

¹ FAPRI provides analysis of markets and policies for Congress and other decision makers. The FAPRI team at Iowa State University and colleagues at the University of Arkansas and Texas Tech University develop preliminary estimates for international agricultural markets that are reviewed in their December workshops. Subsequently, the team at the Agricultural and Food Policy Center (Texas A&M) translates these national results into estimates of effects for representative farms around the country. In 2011, no baseline was developed jointly by FAPRI and other institutions. Texas Tech, however, maintains its International Cotton Model through its Cotton Economics Research Institute and continues to generate projections for the cotton sector of the FAPRI model.

their level of imports be altered and in what direction will it shift? And finally, are these effects on the international market of small or large order?

Tracing Exchange Rate Effects in the International Cotton Model

We utilize the International Cotton Model created by the Cotton Economics research Institute at Texas Tech University. The world fiber model includes 28 major cotton importers and exporters: (1) Asia (China, India, Pakistan, Taiwan, South Korea, Japan, Vietnam, Bangladesh, Indonesia, and Other Asia); (2) Africa (Egypt and Other Africa); (3) North America (Mexico, United States, and Canada); (4) Latin America (Brazil, Argentina, and other Latin America); (5) Australia; (6) Middle East (Turkey and Other Middle East); (7) Europe (European Union, Central and Eastern Europe, and Other Western Europe); (8) Former Soviet Union (Uzbekistan, Russia, and Other FSU). As a net trade model, the equilibrium world cotton price (A-index), polyester prices are endogenously solved by equalizing the sum of all countries' net exports and net imports. The ensuing world prices feed into the representative country models that include supply, demand and the market equilibrium for cotton and man-made fibers.

On the supply-side, we include both cotton and man-made fiber production. Area sown to cotton is modeled in two stages with the first determining gross cropping area and the second allotting this area to cotton and competing crops conditioned on economic variables such as expected net returns. Man-made fiber supply is modeled by estimating capacity and utilization separately. Cotton acreage is conditioned on the expected returns of growing cotton and competing crops, while yield is determined by cotton prices and a time trend. All cotton price support programs are taken into account in the expected net returns. On the demand side, textile consumption is initially estimated and then allocated among various fibers such as cotton, wool, and polyester (representative for man-made fiber) to come up with cotton demand based on their

relative prices. An ending stock equation is specified as a function of domestic cotton price, cotton production, and beginning stock.

Exchange rates figure prominently in the cotton export and import equations which are specified as a function of domestic and international prices. For import equations, international prices are calculated by converting world price in domestic currency equivalent after including appropriate tariffs. Similarly, in export equations, international prices are calculated by converting the world representative price into the domestic currency equivalent.

Essentially, a stronger BRL vis-à-vis the USD, moving from 1.78 BRL to 1.6 BRL, implies that Brazil will now have to pay less for every USD worth of commodity. On the flipside, Brazil's exports, when converted from local to USD in the international market, now become more expensive (need to shed more USD to buy a BRL worth of commodity). As relative prices are altered, countries' net trade positions are changed that affect the world price that feeds into production and net trade in subsequent rounds.

We run a simulation using the international cotton model to derive these effects of a stronger BRL on international cotton trade, price, and production. A current five-year baseline (2011-2015) was developed assuming continuation of current domestic and border protection policies of all countries. We then compare projected outcomes from this baseline and projected outcomes with the 10% appreciation (from 1.78 BRL/USD to 1.6 BRL/USD).

Simulation Results

Results are reported as average annual changes. In Table 1, we observe, as expected, Brazil's exports decline by 0.07% (-3,920 bales) on average following a stronger currency. Meanwhile, its imports correspondingly increase by 0.04% (+530 bales). The exchange rate appreciation

also leaves domestic production in Brazil almost unchanged (0.01%). This result is consistent with the stalled growth of the industrial production index in Brazil that grew by a mere 1.38% in July this year from a year ago as the BLR strengthened in past 12 months. Meanwhile, domestic demand for cotton driven primarily by domestic mill use continues to increase at 0.04%.

Almost all other export-competing countries take up (in thousand bales) what Brazil loses in the world cotton market with the exception of Argentina. India (+7.2); Australia (+5.06); Uzbekistan (+2.87); Other Africa (+2) and the U.S. (+1.81) gain the most in terms of expanded cotton exports in the international market, among other countries (Table 2). Lower net import levels from Brazil can be observed from the following countries (in thousand bales): Turkey (-3.41); Other Latin America (-2.96); Malaysia (-0.40); Mexico (-0.15); Vietnam (-0.17); Indonesia (-0.09); Bangladesh (-0.08); and Canada (-0.01) (Table 3). Unlike the foregoing countries, Pakistan, China, Taiwan, Other Asia (among others) continue to increase their imports amidst the BLR appreciation.

As net world trade increases by 0.04%, the A-index increases by 0.21% equivalent to roughly \$ 0.19 cents/lb.

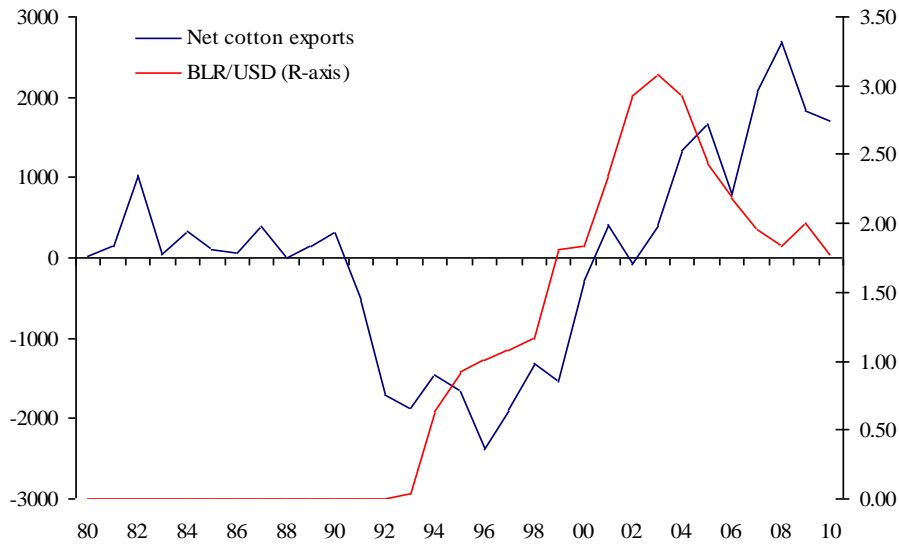
Brazil's Exchange Rate Policy and Trade

The effects, especially on Brazil's net trade position, are of small order. This, however, is not surprising. While a stronger BLR raises the cost of Brazilian cotton in the international markets, it also reduces the cost of imported inputs such as shipping costs by increasing the number of shipping containers (ERS, 2011). At the same time, the Brazilian government, in times of a stronger currency, has historically introduced reforms to support the export industry, including cotton. In fact, in 2008, the share of production eligible for price support has been increased to

as much as 64% in 2008. This shored up funds to cotton producers and helped sustain cotton exports. Such measures helped curb the adverse effects of a stronger currency on Brazil's export sector in the last ten years as seen in Figure 1.

In this recent episode of a stronger BLR, the Brazilian government has launched '*Brasil Maior*' – a plan that provides corporate tax cuts and incentives for companies in labor-intensive sectors by reducing corporate payroll contributions to Social Security from 20% to 0% until

Figure 1. Brazil's net cotton exports (in thousand 480-lb bales) and exchange rate



Sources: PS&D and IPEA

December 2012. However, these companies will have to pay a tax of 1.5% or more over gross revenues, depending on the sector (CEIC, 2011b). And because among the sectors included in *Brasil Maior* are clothing and footwear, the demand for cotton in the domestic market is expected to remain stable in the context of these policy reforms.

Policy Implications

A 10% appreciation of the BRL/U.S.\$ exchange rate in the next 5 years proves beneficial to U.S. cotton exporters. U.S. net exporters are projected to increase by 0.01% (additional 2,380 bales) from baseline projections over the period 2011 to 2015. The simulation also suggests that Brazil's top export competitors in terms of price in the global cotton market are Australia, India, Uzbekistan, U.S. and Other Africa. The effects are generally of small order owing to offsetting measures in the past by the government that have worked their way through the export sector as well as recent measures anticipated to further support the export sector in the medium-run.

References

CEIC. 2011. The Exchange Rate Dilemma in Brazil. August 29, 2011.

CEIC. 2011. A R\$20.7 Billion Plan to Enhance Brazil's Competitiveness. September 23, 2011.

ERS. 2011. Brazil's Cotton Industry: Economic Reform and Development. June 2011.

Pan, S., D. Hudson, M. Mutuc, and D. Ethridge. "Structural Models of the United States and the Rest-of-the-World Natural Fiber Market." CER # 04-03, Cotton Economics Research Institute, Department of Agricultural and Applied Economics, Texas Tech University, 2004 (Updated 2011).

Table 1. Effects of a 10% Appreciation on Brazil's Domestic Cotton Industry
(in thousand bales unless otherwise stated)

	2011	2012	2013	2014	2015	2011-2015
Imports						
Baseline	970.70	1108.89	1226.26	1325.85	1410.35	1208.41
Appreciation	970.93	1109.30	1226.81	1326.52	1411.14	1208.94
% Change	0.02	0.04	0.04	0.05	0.06	0.04
Exports						
Baseline	4149.57	5525.61	5841.30	5977.40	5780.66	5454.91
Appreciation	4149.34	5524.81	5838.26	5971.29	5771.24	5450.99
% Change	-0.01	-0.01	-0.05	-0.10	-0.16	-0.07
Production						
Baseline	9080.49	9430.76	9833.39	10404.57	10928.76	9935.59
Appreciation	9080.51	9431.01	9834.03	10406.25	10931.83	9936.73
% Change	0.00	0.00	0.01	0.02	0.03	0.01
Domestic Demand						
Baseline	12204.62	12508.90	12659.31	12952.00	13614.78	12787.92
Appreciation	12205.10	12510.32	12663.48	12960.28	13627.78	12793.39
% Change	0.00	0.01	0.03	0.06	0.10	0.04

Table 2. Effects of a 10% Appreciation on Select Countries' Net Exports and World Price

	2011	2012	2013	2014	2015	2011-2015
U.S.						
Baseline	14874.56	14775.60	14433.34	14660.95	14870.62	14723.01
Appreciation	14874.93	14776.28	14435.12	14664.80	14873.00	14724.83
Change	0.37	0.68	1.78	3.85	2.38	1.81
% Change	0.00	0.00	0.01	0.03	0.02	0.01
India						
Baseline	7108.33	7450.62	6953.43	6947.72	7480.01	7188.02
Appreciation	7109.76	7453.17	6960.57	6958.73	7493.91	7195.23
Change	1.43	2.55	7.14	11.01	13.90	7.20
% Change	0.02	0.03	0.10	0.16	0.19	0.10
Australia						
Baseline	2964.42	2896.93	3350.66	3989.53	4552.76	3550.86
Appreciation	2965.19	2898.87	3357.20	3998.02	4560.30	3555.92
Change	0.77	1.94	6.54	8.48	7.54	5.06
% Change	0.03	0.07	0.20	0.21	0.17	0.13
Uzbekistan						
Baseline	3514.34	3484.31	3379.35	3320.98	3250.41	3389.88
Appreciation	3514.83	3485.39	3382.48	3325.52	3255.53	3392.75
Change	0.49	1.09	3.13	4.54	5.12	2.87
% Change	0.01	0.03	0.09	0.14	0.16	0.09
Other Africa						
Baseline	346.08	439.71	445.03	498.28	478.25	441.47
Appreciation	346.62	440.43	447.50	501.23	481.54	443.47
Change	0.54	0.73	2.48	2.79	3.29	2.00
% Change	0.16	0.17	0.56	0.59	0.69	0.43
World Total						
Baseline	37741.36	39023.93	38770.86	39771.07	40770.80	39215.60
Appreciation	37744.74	39030.23	38789.71	39797.58	40796.09	39231.67
Change	3.38	6.31	18.85	26.51	25.29	16.07
% Change	0.01	0.02	0.05	0.07	0.06	0.04
A-index (U.S. cents/lb)						
Baseline	100.33	90.13	87.37	87.31	86.43	90.32
Appreciation	100.38	90.21	87.58	87.60	86.74	90.50
Change	0.05	0.07	0.21	0.29	0.31	0.19
% Change	0.05	0.08	0.25	0.33	0.36	0.21

Table 3. Effects of a 10% Appreciation on Select Countries' Net Imports

	2011	2012	2013	2014	2015	2011-2015
Turkey						
Baseline	3583.22	3717.25	3819.55	3991.67	4147.73	3851.88
Appreciation	3582.57	3716.10	3816.29	3986.52	4140.88	3848.47
Change	-0.64	-1.15	-3.26	-5.15	-6.85	-3.41
% Change	-0.02	-0.03	-0.09	-0.13	-0.17	-0.09
Other Latin America						
Baseline	462.51	384.41	372.22	427.91	492.28	427.87
Appreciation	462.00	383.42	369.03	423.30	486.76	424.90
Change	-0.51	-0.99	-3.20	-4.61	-5.51	-2.96
% Change	-0.11	-0.26	-0.86	-1.08	-1.12	-0.68
Malaysia						
Baseline	320.03	344.02	351.26	352.45	355.31	344.62
Appreciation	319.92	343.87	350.79	351.83	354.64	344.21
Change	-0.11	-0.15	-0.47	-0.62	-0.67	-0.40
% Change	-0.03	-0.04	-0.13	-0.17	-0.19	-0.11
Vietnam						
Baseline	1646.34	1707.66	1713.08	1760.47	1807.99	1727.11
Appreciation	1646.29	1707.60	1712.88	1760.20	1807.70	1726.93
Change	-0.05	-0.07	-0.20	-0.27	-0.29	-0.17
% Change	-0.00	-0.00	-0.01	-0.02	-0.02	-0.01
Pakistan						
Baseline	987.57	1229.64	1230.14	1085.77	934.31	1093.48
Appreciation	989.22	1233.49	1242.27	1105.68	958.95	1105.92
Change	1.66	3.85	12.12	19.91	24.64	12.44
% Change	0.17	0.31	0.99	1.83	2.64	1.19
China						
Baseline	18449.29	20241.13	20264.85	20337.83	20981.68	20054.95
Appreciation	18450.21	20242.83	20270.55	20343.54	20985.23	20058.47
Change	0.92	1.71	5.71	5.72	3.55	3.52
% Change	0.00	0.01	0.03	0.03	0.02	0.02
Other Asia						
Baseline	2151.76	1131.95	883.24	1970.13	2544.48	1736.31
Appreciation	2152.98	1133.58	887.24	1977.13	2551.81	1740.55
Change	1.23	1.63	4.00	6.99	7.33	4.24
% Change	0.06	0.14	0.45	0.35	0.29	0.26