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CUBA: DOLLARIZATION AND DEVALUATION[1]

Luis R. Luis

Cuba faces a chronic balance of payments crisis aggravated by the COVID 19 pandemic and U.S. sanctions. The balance of payments crisis in turn is reflected in severe shortages of foodstuffs, medicines and other essential goods. These difficulties are structural in nature, and the government has responded by launching in January 2021 long delayed monetary restructuring and a massive devaluation of the official exchange rate of the Cuban peso. At the same time the government for some years has maintained a policy of dollarization whereby the dollar or an artificial substitute thereof is used by residents to buy necessities and household goods. This dollarization policy is unique among neighboring countries in Latin America in its aims and operations.

In this paper I start by looking at the dollar scarcity in Cuba aggravated by external shocks in 2019-2021. I then present a rational expectations model of dollarization that takes into account the dual-currency monetary system in Cuba. An extension is made to account for the rigid funding of dollarization through remittances. Lastly evidence regarding dollarization in the last decade is examined including price-setting in monopoly dollar stores.

THE DOLLAR CRUNCH

There is a paucity of official statistics required to precisely gauge the balance of payments. Detailed figures for services and transfers in the current account have not been published for many years while no data is available for the capital account. The lack of capital account data makes it very difficult to understand external trade activity especially services exports where accrued amounts differ extensively from cash payments. Monetary data is rudimentary as are even basic data on prices, wages and the activity of private firms.

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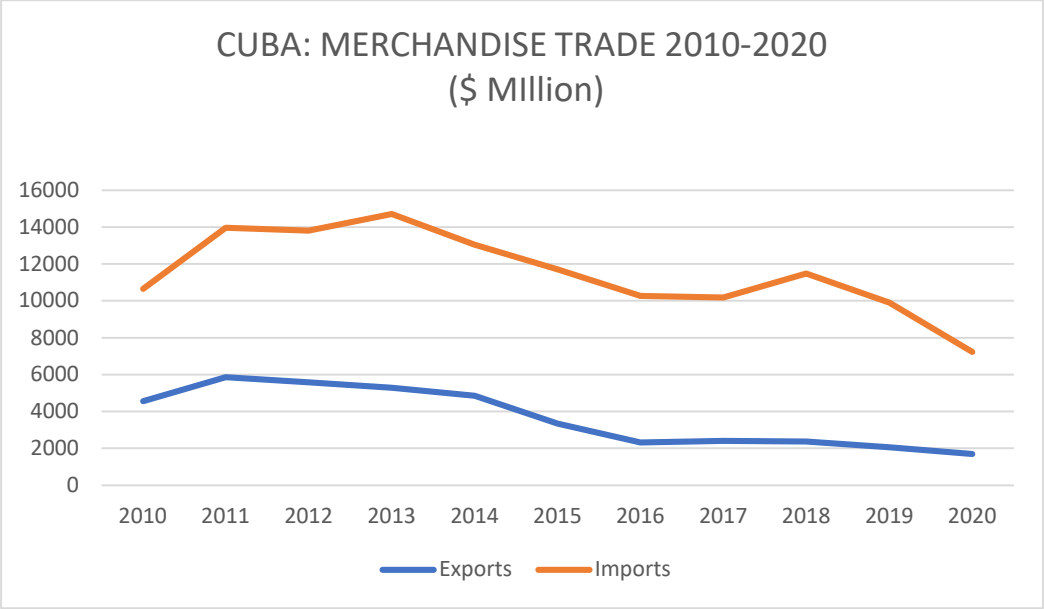
Figure 1



Source: ONEI, Anuario Estadístico 2020, Sector Externo.

Figure 1 shows merchandise exports and imports of goods as reported by the Oficina Nacional de Estadística e Información (ONEI). The reduction in imports is dramatic from a peak of $14.7 billion in 2011 to $7.2 billion in 2020. This halving of imports denotes the sharp dollar crunch facing the economy from its inability to raise sufficient revenues from overall exports as well as its lack of access to foreign credit. Merchandise exports in 2020 are only at 30% at their level earlier in the past decade.[2] However, weak goods exports are not the major part of the dollar crunch. The major problem is a sharp fall in services export receipts mainly from Venezuela (Luis 2020). This follows the failure of Venezuela to pay in dollars for medical, security and other services which Cuba invoices at a very high price. Venezuela accounted for close to 90% of billed exports of Cuban professional services in 2018. Weakness in tourism has been also a factor as a result of US restrictions and a feeble European market while the pandemic shut-down the island to foreign visitors. It is unlikely that remittance inflows weakened before the pandemic struck in April 2020.

The dollar crunch has led to a calamitous shortage of essential imported foodstuffs especially grains and meats to satisfy the minimum needs of the population. Foodstuffs imports were $1.9 billion in 2020, ONEI (2020). Estimated current account receipts in 2020 from nickel, tobacco and miscellaneous manufactured exports plus remittances are $4.7 billion. This suggests basic foodstuff imports may be acquired though at the cost of severe shortages of manufactured goods, raw material and even high priority medical and pharmaceutical products. Variations in monthly

[2] Hernandez-Cata (2019) presents an analysis of the long-term travails of Cuba's merchandise exports.

cash flow from exports and remittances can pose severe problems which would have to be met from declining international reserves. Cuban assets in international banks declined by $1.1 billion in 2020 to $1.8 billion and are down $1.26 billion since the end of 2018 (BIS 2020). These are sobering figures.

The dollar crunch is reflected in the foreign exchange market. Cuba has in place restrictions on currency transactions and maintains a fixed official exchange rates for the CUP or Cuban peso at CUP24 = $1. The CUP was devalued on January 1, 2021 from the previous official rate of CUP1 = $1. At the same time CUP merged with the CUC or convertible peso which was set at CUC 1 = CUP 24. Previous to the devaluation accounting rules for firms required use of a $1 = CUP 1 rate for transactions involving dollars. However, dollar transactions for the population were set at CUC 1 = $1 while the currency traded in the black market at lower values. After the elimination of a 10% tax on dollar transactions in July 2020 the CUC traded close to its nominal value. As the dollar crunch intensified in the Summer of 2020, and the government tightened required use of the U.S. currency for purchases in state stores via special dollar accounts, the dollar soared in the black market with bids at year end 2020 at CUP 32 = $1. By early September 2021 dollar bids were reported at CUP 60 = $1.[3]

DOLLARIZATION MODEL

Dollarization is a general term denoting the use of the U.S. dollar or another hard currency such as the euro for transactions and as a store of value in a given economy. There may be complete dollarization such as in Panama, Ecuador and El Salvador where the dollar is legal tender and the currency is the one used for domestic transactions. In many other countries in Latin America and elsewhere partial dollarization takes place as the population increases dollar holdings as protection against inflation, devaluation and financial instability. During the 1990's Cuba had an episode of dollarization as the currency was allowed to be used for a variety of transactions during the special period. In recent years Cuba is experiencing dollarization as individuals hold dollar assets mainly obtained from remittances. In what follows I provide an explanation of dollarization and the exchange rate on the basis of a rational expectations model. This model first considers a general approach to dollarization whereby residents hold dollar assets in bank accounts or in currency. Later I will introduce changes in the model that result from changes in Cuban banking regulations that effectively freeze dollar holdings by residents in the banking system by means of non-convertible hard-currency accounts.

The model is derived from a simple rational expectations model of currency substitution. This model follows a long line from Calvo and Rodriguez (1977), Dornbusch and Fischer (1980) and more recently Kumah and Mwase (2015). Hernández-Catá (2021) formulates an alternative model with exchange rate expectations under a fixed-rate regime applied to the case of Cuba.

The model specifies that individuals and firms hold assets in three different currencies, M, C, domestic currencies and D, U.S. dollars. Equations (1) to (3) are portfolio demand functions by

[3] https://eltoque.com/tasas-de-cambio-de-moneda-en-cuba-hoy

individuals and firms for each of the three currencies. The arguments of the equations are i, r and i_d, interest rates for the three currencies and expectations about the change of the exchange rate, e* (representing Δe). W is the overall wealth of the population, equal to the sum of the three currencies. Equation (4) is the current account balance representing the flow of dollars, D* (representing ΔD) , while P is the price level, R remittances. In this last equation the current account balance is a function of the real exchange rate, remittances and income from dollar assets. E is the expectations operator. Variables are expressed per unit of time.

$M = m(i, r, i_d, E(e^*))W$ (1)

$C = c(r, i, i_d, E(e^*))W$ (2)

$eD = f(i_d, i, r, E(e^*))W$ (3)

$D^* = g(e/P) + i_dD + R$ (4)

The dynamics of this model can be obtained by differentiating equations (1) – (3) and solving for the expected change in the exchange rate, E(e*). The solution is a function:

$E(e^*) = h(eD/W, M/W, C/W)$ (5) Where $h_1 > 0, h_2, h_3 < 0$

Equation (5) means that the expected change in the exchange rate is a function h of the holdings of dollars and the two domestic currencies. Equations (3) and (5) drive dynamics of the system and determine the slope of the curves in Figure 2 and Figure 3 when the current account is in balance and E(e*) = 0. The slopes are:

$de/dD = - e/D$, $de/dD = - i_d/g_{e/p}$ for Figure 2 and $de/dm = - h_2/h_1D > 0$, $de/dc = -h_3/h_1D > 0$ for Figure 3.

FIGURE 2

DOLLAR HOLDINGS AND THE EXCHANGE RATE

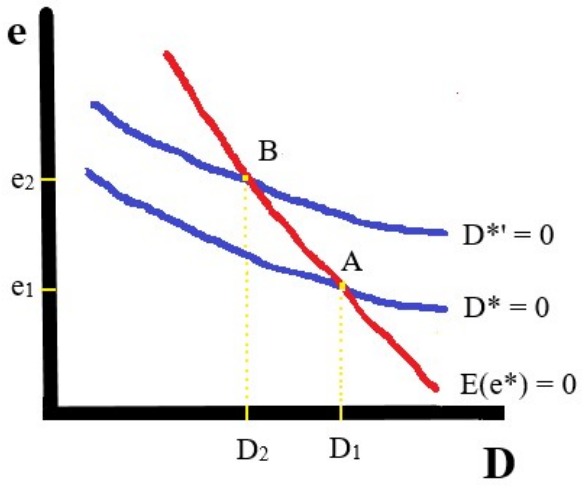


Figure 2 shows the dynamics of dollarization as related to the exchange rate and expectations of change in the exchange rate. The graph shows dollar holdings of individuals and firms in the **D** horizontal axis and the exchange rate in domestic currency for dollars (CUCs per dollar for example) in the **e** vertical axis. The blue curve D* = 0 shows 0 net dollar receipts from trade and transfers such as remittances for values of the exchange rate when there are no expectations of change in that variable.[4] It means the current account is balanced. The red curve E(e*) = 0 shows the points at which the expected exchange rate change is 0 given levels of the actual rate and dollar holdings by the population. The shape of this curve depends on decisions by individuals and firms as to the proportions of dollars and domestic currencies held. Point A in the graph is an equilibrium where the public is holding D_1 dollars at exchange rate e_1. Dollarization measured in dollars is D_1 while measured in domestic currency it is e_1 x D_1. Official exchange rates in Cuba are below e_1 meaning they are overvalued versus the unobserved equilibrium. It also means the country has a deficit in the current account.

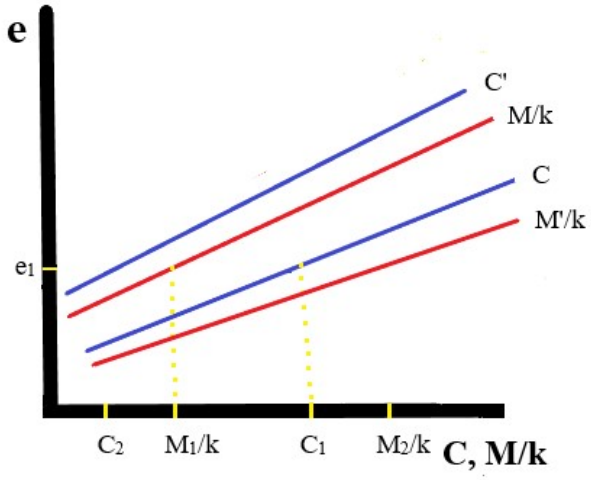
What happens when there is a shock such as the COVID 19 pandemic or U.S. limits on remittances that reduces the supply of dollars to the economy by restraining exports and transfers? The D = 0 curve shifts up to D' = 0 meaning that it takes a lower priced domestic currency, that is, a devalued currency to reach equilibrium in the current account, satisfy desired dollar holdings by the population and stability of the exchange rate. The shock changes expectations and induces a devaluation. The new equilibrium point is B at a newly devalued exchange rate of e_2 and dollar holdings D_2. Since D_2 is less than D_1 the economy is less dollarized. There are fewer dollars coming from abroad to dollarize the economy.[5]

[4] I assume there are no capital account transactions in this simple model. This can be handled by shifts in the D = 0 curve for exposition purposes.

[5] In terms of local currency, the economy could be less or more dollarized depending on the portfolio preferences of the population and monetary policy. In Figure 2, the economy is slightly more dollarized valued in local currency at B than at A.

FIGURE 3

CUPs and CUCs



What happens to the population's holdings of local currency? In our model we have two local currencies as in Cuba during 2010-2020. One is M (the CUP or Cuban peso), the other C (the CUC or convertible peso). These two are related by an official internal rate of exchange k. The central bank maintains k stable by offering to buy and sell local currencies at this rate as necessary. This allows the population to modify their holdings of M and C. Schedules C and M/k in Figure 3 show holdings of the two local currencies at different exchange rates given expectations of 0 change in the exchange rate. At the equilibrium exchange rate of e_1 reached in Figure 1 individuals and firms hold $M_1/k + C_1$ in local currency. Government regulation and controls can make the C currency less attractive, for example by restricting its use in stores that sell popular consumer goods. This will cause the curve C to shift upwards to C', and the public will lower its holdings of C to C_2. This is offset by the central bank exchanging C by M and the public will hold the same total amount of local currency as before ($M2/k + C_2$). This shows in essence the monetary aspect of currency unification, and it is not a difficult task for the central bank although a big challenge for managers and accountants. A far more daunting problem is how to deal with the dual exchange rates of the peso.

REMITTANCES AND DOLLARIZATION

Remittances from relatives abroad provide funding for dollarization in Cuba. There are no official statistics on remittances to Cuba. Transfers from the United States sent by Cuban Americans are estimated at $3.3 billion in 2017 (Luis 2019). This estimate is based on cross section data for 20 countries and is subject to a wide confidence interval. The dollarization model above assumes that remittances R in the current account equation (4) are exogenously

determined by senders. Studies of remittances to developing countries show that a key determinant of these flows is the relationship of migrants to their home country (Yang 2011). Recent migrants tend to have closer connections with their country of origin and account for heftier transfers per remittent. The Cuban case is interesting because of the interaction of national policies of both the Unites States and Cuba designed to influence the level of such transfers. The U.S. currently sets limits on the quarterly amount allowed to be transferred to relatives as well as restrictions on the financial institutions in Cuba that are allowed to receive electronic transfers (U.S. Department of the Treasury 2019). Imposition of such restrictions shows as an upward shift of the D curve on Figure 1. This leads to a lower value of the equilibrium peso rate and results in lower dollar assets held by the population.

There are also restrictions in Cuba that come about from the design and operations of the Cuban financial system. Electronic transfers of dollars to residents since late 2019 must take place via deposits in so-called MLC accounts or "freely convertible currency" accounts. These in effect are accounts that allow dollar and other hard-currency deposits to be used exclusively in MLC stores that currently sell a wide range of consumption items ranging from electric appliances to basic foodstuffs, clothing and personal hygiene items. Dollars in MLC are traded in parallel currency markets in the form of magnetic cards. Otherwise the dollar MLC deposits are non-convertible into dollars and only can be used in MLC stores or withdrawn in CUPs at the official exchange rate.

MLC stores are operated by an agency of the state. The Secretary General of the Cuban Communist Party stated in April 2021 that MLC stores have expanded in recent years "to incentivize remittances by Cuban citizens abroad sent to their families" (Castro 2021). The stores are a retail monopoly for the sale of imported items not available in regular state stores. The state has also an import monopoly restricting supply in private markets. Limited imports by private small firms were allowed in 2021 only through state agencies. MLC stores have thus considerable market power to set dollar prices at profit maximizing levels. Remittance senders are aware of the high prices paid by relatives in MLC stores. Changes in MLC store prices, P_d, relative to international prevailing levels, P_I, influence remittances by altering the benefits from cash remittances relative to alternatives such as transfers in kind or by way of cryptocurrency. This requires rewriting equation (4) where $R = u(P_d/P_I)$ as follows:

$$D^* = g(e/P) + i_d D + u(P_d/P_I) \qquad (4A) \qquad u_1 < 0$$

Equation (4A) indicates that remittances fall with an increase in prices in dollar stores in Cuba compared to international prices. Changes in P_d/P_I will also impact portfolio holdings of currency as determined by portfolio equation (3).

Equation (4A) leads to the relation between the exchange rate and prices of goods sold in dollars in the island. The slopes of the curves for balance of payments equilibrium D*=0 and stable exchange rate expectations E(e*) are as follows:

$$de/d(P_d/P_I) = - u_{pd/pI} /g_e > 0 \quad \text{and} \quad de/d(P_d/P_I) = - eu_{pd/pI}/D > 0.$$

FIGURE 4

Dollar Prices in Cuba vs International Prices

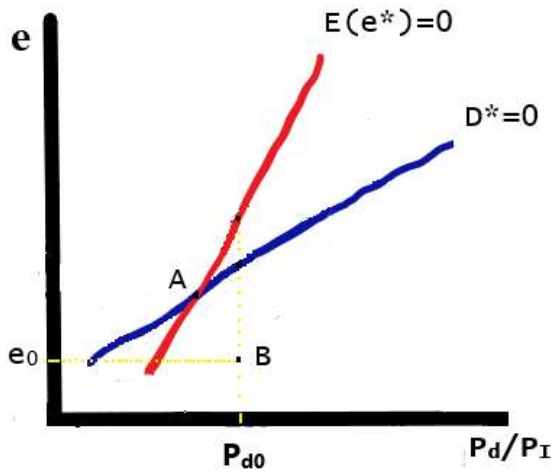


Figure 4 describes exchange rate expectations and current account equilibrium taking into account prices in the dollarized Cuban economy. At an equilibrium point such as A, the current account is in balance, and the change in the exchange rate is expected to be 0. At the official exchange rate of e_0 and dollarized prices of P_{d0} the economy is at B which means there is a current account deficit and rising devaluation expectations. Since state companies running MLC stores have monopoly power P_d will exceed P_I in inverse proportion to the elasticities of demand for the products sold in the stores. As stores reportedly evolve in 2021 from selling mostly appliances to selling foodstuffs and personal products with less elastic demand the difference between P_d and P_I will increase as long as MLC stores maximize profits as a monopolist.[6]

[6] The exact relation for a profit-maximizing monopoly is $P_d = P_I (1-m)/(1+1/€)$ where m is the gross margin of the foreign retailer and € is the price elasticity of demand for the product in the importing country.

MONETARY UNIFICATION AND DEVALUATION

The Cuban government on January 1, 2021 launched a massive monetary restructuring, unifying its two domestic currencies, the Cuban peso (CUP) and the convertible peso (CUC) and simultaneously devaluing the official rate of the CUP from $1 = CUP 1 to $1 = CUP 24. Holders of CUCs were given six months to exchange money balances into CUCs a provision later extended to 12 months. These monetary measures were accompanied by a complex array of provisions regarding wages and salaries, prices of regulated products, tariffs of public services and reductions of subsidies (Mesa Lago 2021).

Although there are no official statistics to assess the monetary aspects of unification, testimony by Cuban residents and official reports (Granma 2021) indicate that the exchange of CUCs for CUPs is proceeding smoothly as explained by the model. Firms will have to adapt to new accounting standards, but the fusion of bank accounts is reportedly proceeding well.

The more important questions are whether the major monetary moves launched at the outset of 2021 will help stabilize exchange rate expectations, improve the current account balance and alter the path of dollarization.

According to the model expectations about the dollar rate in the foreign exchange market depend on resident holdings of national and foreign currencies. Cuba retained a fixed exchange rate after the January 1, 2021 devaluation, and observations about the foreign exchange market arise out of the parallel currency market. Table 1 shows time series for the official and parallel exchange rates for the CUP in 2010-2021. The table shows the value of the parallel rate of the dollar by mid-October 2021, indicating a near tripling of its value after the large devaluation of the peso on January 1, 2021. On a weighted-basis calculated using a 6% weight for the parallel market (Vidal 2021) the average devaluation in 2021 reaches 830%. A different weighting method using estimates for the share of CUCs in the money supply in 2017 of 39% reduces average devaluation.

There is no available monetary data to gage the holdings of CUPs and dollars in the economy. However, the relative holdings of dollars rose markedly against holdings of the domestic currencies after the end of 2020 when valued at the new official rate of $1 = CUP 24 and even more markedly at the parallel rate of $1 = CUP 64 at the end of the third quarter of 2021. The volatility of the parallel rate of the CUP denotes unsettled expectations for the currency arising partly from the external shocks affecting the economy in 2021 most importantly the pandemic's and US restrictions' impact on travel and remittances.

TABLE 1

Cuba: Exchange Rates (CUP/$), 2010-2021

	Official	Parallel	Average	Devaluation-%
2010	1.0	24.0	2.4	0.0
2011	1.0	24.0	2.4	0.0
2012	1.0	24.0	2.4	0.0
2013	1.0	24.0	2.4	0.0
2014	1.0	24.0	2.4	0.0
2015	1.0	24.0	2.4	0.0
2016	1.0	24.0	2.4	0.0
2017	1.0	24.0	2.4	0.0
2018	1.0	24.0	2.4	0.0
2019	1.0	24.0	2.4	0.0
2020	1.0	32.0	2.9	20.2
2021*	24.0	67.0	26.6	829.4

Source: ONEI, eltoque.com and author's estimates.

*Mid-September

DOLLARIZATION TRENDS

Cuba has a dollarized economy with residents using the dollar or its sometime weak substitute, the convertible peso. Dollar deposits in the banking system originally converted into CUCs vanished as the CUC lost its convertibility.[7] Full-backing in dollars for the CUC was withheld in 2004 (Vidal 2012). Since 2020 dollar deposits in the banking system or MLC deposits cannot be converted into dollars but can be used to purchase wares in MLC stores. There are active parallel dollar markets in the island where trading in goods, services and currencies take place. A stock of dollar currency in the island informally held by the public as well as pre-paid MLC magnetic cards is used in transactions. There are no publicly available statistics on MLC accounts. The central bank only publishes statistics on peso-denominated M2A and currency in circulation. Dollarization can be assessed only indirectly by the use of indicators correlated with dollar transactions, flows and assets.

[7] Dollar deposits by foreign firms in Cuba were also substituted by "certificados de liquidez" with limited convertibility.

Table 2
Cuba: Dollarization Indicators 2011-2020

	Transaction Indicator	Dollar Supply Indicators	
	Household Consumption in Private Businesses (CUP MM)	BIS liabilities to Cuba ($ MM)	Visits by Expatriates (M)
2011	2711	4110	350.0
2012	3394	2747	384.2
2013	4078	2270	373.4
2014	4680	2608	361.2
2015	6599	2083	390.1
2016	7688	2038	427.7
2017	8495	3593	517.6
2018	9557	3784	600.3
2019	10674	2954	624.0
2020	10668	1834	150.4

Sources: ONEI, Cuentas Nacionales; BIS.org/locationalstatistics and ONEI, Tourism Statistics.

Household consumption in private business is an indicator of dollar pricing in the economy as trade in the private sector is mostly priced in CUCs or dollars and payable in one of the two currencies. The official CUC/dollar rate was fixed at parity during the last decade. In nominal peso terms private business transactions expanded four-fold in 2011-2020 (Table 2) and a little over three-fold in real terms adjusted by the peso CPI.

International banking statistics show a halving of dollar assets held by Cuban banks during 2011-2016 and a recovery in 2016-2018 after debt forgiveness and rescheduling with members of the Paris Club of creditor countries. After 2018 weakness in trade with Venezuela, U.S. sanctions and the onset of the pandemic resulted in an additional halving of foreign currency assets held in international banks by the end of 2020 with a further decline in 2021. Cuban bank assets in foreign banks are a counterpart to local deposits in dollars and other hard currencies. This means that formal deposit dollarization of the economy, measured in dollars, has weakened since 2018. The same conclusion does not apply to dollarization as a proportion of total deposits measured in pesos because of the 2300% maxi-devaluation of the official peso at the beginning of 2021.

Informal dollarization is hard to gage. Visits by Cuban expatriates provide an indicator of dollar currency supply. After a steady rising trend of visits boosted by the Obama opening of bilateral relations in 2015, the closing of airports in Cuba and flight restrictions by the U.S. resulted in only 150,000 visits in 2020 as against a peak of a little over 600,000 annual visits in 2018-2019. Remittances in dollar currency are mostly conveyed by expatriate visitors. The dwindling of visitors is an indicator of faltering dollar cash flows into the hands of residents.

Electronic remittances are being slowed down by U.S. regulations that ban transfers through Cuban government agencies controlled by the military and by the Cuban government's unwillingness to charter independent money-transfer agencies. The Cuban Government's decree of June 10, 2021 banning deposits of dollar currency in Cuban banks (MINCEX 2021) also adds difficulties to transferring money from abroad. To be sure, formal remittances continue to flow through third countries in Europe, Canada and Latin America. This increases the cost of remittances to relatives abroad who now must convert dollars into euros, Canadian dollars, pounds sterling and other convertible currencies.

Another factor slowing remittance flows is the earmarking of formal transfers into the special MLC accounts. This restricts the use of formal dollar assets and forces utilization of deposits in government run special stores.

DOLLAR PRICING

Dollar stores are a monopoly of the state. It can thus set prices based on the demand it faces from consumers. Profit maximization can be seen as a mechanism to optimize implicit taxation on consumers. A point raised in this paper is whether or not such behavior has an impact on the flow of remittances which is financing dollarization via MLC or dollar stores. Let us look at some evidence regarding pricing in MLC stores.

Table 3
MLC Stores Selective Price Analysis - August 2021

Item	MLC Store	WalMart	P-MC	Lerner Index	Elasticity	Gross Margin %
Nescafe 350g	$15.70	$10.48	$7.45	0.47	-2.1	71.1
Rice Long Grain 1lb	$1.51	$0.72	$0.94	0.62	-1.6	131.0
Rice Cooker H.B.	$44.00	$29.92	$20.44	0.46	-2.2	68.3
Samsung 55" TV	$785.00	$497.99	$392.88	0.50	-2.0	78.9

Source: Author's calculations based on reported prices and walmart.com

A comparison of prices in MLC stores with international prices presents difficulties. Most items listed in notices published outside MLC stores are generic without a listed brand. In order to assure quality uniformity four items that can readily be compared were selected. The comparison price is the listed price in Walmart.com. The marginal cost (MC) is assumed to correspond to the price less the average gross margin derived from the Walmart Annual Report for the fiscal year ended on January 2021 (Walmart Inc. 2021). The estimated margin is 27%. This means, for example, that a bottle of Nescafe that sells for $15.70 at an MLC store compares to a price of $10.48 at WalMart and a marginal cost of $10.48/1.27 or $8.25. The difference between MLC price and MC is $7.45 (Table 3). Our sample produces an average gross margin of 87% ranging from 68% to 131%. The highest margin is on long grain rice which correspondingly shows the lowest demand elasticity. The Lerner Index, a measure of monopoly power that ranges between 0 and 1, is P-MC divided by P. The demand elasticity can be readily

calculated from the Lerner Index on the assumption that profit is being maximized at the listed MLC price.[8]

Observations from this small sample and from prices of generic goods listed in MLC stores indicates a high gross margin over costs which exceed 80%. It is the lack of competition and the absence of private imports which enables MLC stores to maintain such a high margin. The sharp high margin for long grain rice implies that dollar stores show monopolistic behavior setting higher margins for the less elastic demand.

Items on Table 3 average a 66% premium from the WalMart price. Why would Cuban emigrants send remittances to relatives through the Cuban banking system that reduce purchasing power two-thirds from the U.S. price? For some the alternative is to send cash transfers through informal channels. Others prefer to send appliances and foodstuffs carried by travelers to the island.

Dollar supply indicators in Table 2 signal lower transfers to Cuba in 2020. This comes about from the curtailment of travel to Cuba because of the pandemic and U.S. limits on air flights. Monopolistic pricing in dollar stores linked to formal remittances is likely another deterrent though data is not available to gage the impact of these different elements.

There is a link among dollar stores and informal markets for both imported goods and foreign currency. Local residents that do not receive remittances purchase dollars in the parallel market. As it is not allowed to make bank deposits in dollar (or in national) currency residents buy digital dollars via MLC magnetic cards in the black market. The so-called MLC dollar in the third quarter of 2021 has traded at a 15% to 17% premium to dollar currency, corresponding to the transaction cost of using a third currency such as euros for deposit into MLC bank accounts.

Note that as the spread between the MLC parallel dollar and the official rate of 24 pesos widened beyond 180% at the end of the third quarter of 2021 pricing in dollar stores became exorbitant for local residents with peso incomes. This has made dollar stores widely unpopular in the island.

CONCLUSION

Cuba is facing an acute dollar shortage as a result of longstanding weakness in exports, weak services revenues from Venezuela, U.S. sanctions on travel and remittances and especially the shutdown of tourism by the pandemic. External balance, dollarization and a dual-currency exchange rate are analyzed in a simple rational expectations model. External shocks placed pressure on the government to finally carry out a massive devaluation and currency unification in January 2021. Currency unification has been smooth as suggested in the model. Informal markets for the dollar signal expectations of a weakening currency following shocks as implied in the model. Dollarization is tightly controlled by restricting dollar holdings to non-convertible bank accounts. The model hypothesizes that monopoly pricing in dollar stores discourages

[8] Lerner Index = - 1/€ where € is the price elasticity of demand.

remittances, the main mechanism funding dollarization. While remittance indicators clearly point to a contraction in 2020-2021, available data does not allow to separate the impact of the different elements involved including both Cuban and U.S. restrictions on remittances.

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