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**Foreign Exchange Queues, Informal Traders,
and a Zero Premium in the Black Market:
A Cape Verdean Puzzle**

Prepared by Jan-Peter Olters[1]

Authorized for distribution by Emilio Sacerdoti

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Abstract

During 1996–98, several indicators hinted at the apparent unsustainability of Cape Verde's exchange rate peg. The country, faced with a considerable backlog of approved but unmet applications for foreign currencies, tolerated a parallel market. Street traders, however, demanded only negligible premiums (if any at all) for foreign exchange. By integrating the emigrants' transfer decisions into a basic Mundell–Fleming-type model, the author conjectures that this puzzle can be explained with the increasing use of transfer channels outside the banking system, leading to unrecorded inflows of foreign exchange. Analysis of the relevant balance of payments data appears to support this result.

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I. INTRODUCTION

1.   It generally holds true that the persistent existence of a considerable backlog in approved but unmet applications for foreign exchange obliges the government of a small open economy (that has decided to operate under the constraints of a fixed exchange rate regime) to eventually devalue its currency—unless, of course, it opts for the forceful market correction of its fixed parity. With a chronic excess demand for foreign currencies, reserves would eventually be exhausted, thus wrecking the authorities' efforts at defending the parity. The following example, however, suggests that a foreign exchange queue per se does not necessarily signify an impending financial crisis; it could—under certain conditions—be consistent with an overall equilibrium.

2.   The diagnosis of an overvalued currency can easily be substantiated if there are concomitant signs of (*i*) declining foreign reserves, (*ii*) increasing interest rates, and (*iii*) rising black[2] market quotes for foreign currencies. However, some scepticism is not entirely inappropriate when street traders do not ask for any premium in the parallel market, even though they understand that a considerable foreign exchange queue has been building in the banking sector. This was the situation facing the policymakers in Cape Verde in 1995–98, requiring them to address the immanent devaluation question. Over this period of time, the value in the backlog of unmet applications accumulated to a level of approximately 8 percent of GDP. Yet, the informal market, having foreign exchange immediately available, offered rates that remained essentially identical to the ones posted by the commercial banks (which would, however, deliver the foreign funds only with a considerable delay).[3]

3.   Several ad hoc explanations for this outcome appear plausible and deserve a closer look. The situation may either result from "artificial" excess demand—in which case the queue would consist of a large fraction of anticipatory or fictitious requests[4]—and/or from the availability of more foreign capital than had been believed and officially recorded. In the latter

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[2] In the following, no distinction will be made between *black, informal,* or *parallel* markets; all three terms capture the idea of "unlicensed" traders in this market and are used synonymously.

[3] During the first six months of 1998, the spread differed a little across currencies, with premiums generally well below the 4 percent mark and mostly close to zero. Periodically, several currencies even exhibited small discounts. For more detailed information on the foreign exchange queue, the development of foreign exchange reserves, and the exchange rate, see Figure 1 and Sacerdoti et al. (1999).

[4] In such a case, individuals and firms would apply for foreign exchange simply on the basis of their calculations that the actual cost of applying for foreign exchange is very low, whereas the benefits of having foreign exchange at one's disposal could, in view of the queue's very existence, be quite considerable.

instance, importers (or travellers) would access the informal market rather than going through the bureaucratic obstacles encountered when requesting foreign exchange at the country's commercial banks.[5]

4.　　This paper aims at solving the interesting puzzle of Cape Verde's foreign exchange market. The text begins with a short section describing those features of the Cape Verdean economy that are believed to be most relevant in the context of the subsequent analysis. After summarizing the general lessons learnt from previous attempts to impose foreign exchange rationing in Section III, the subsequent one will introduce a simple model of Cape Verde's monetary relationships (the formal presentation can be found in the Appendix) and assess the plausibility of the inherent results. Section V will conclude the argument.

II. CAPE VERDE'S MARKETS FOR FOREIGN EXCHANGE

5.　　The lack of natural resources has constrained Cape Verde's economic development, severely impeding the authorities' various attempts at broadening the country's productive base, either through the use of activist policies[6] (1975–91) or those that more heavily rely on the market's indirect incentive structures[7] (since 1992). In spite of the progress made in implementing a comprehensive structural adjustment program, the mid-Atlantic island republic remains highly import dependent, with exports constituting only a small (albeit increasing) fraction of imports. This imbalance has left the country with an endemic trade deficit.

6.　　Traditionally, Cape Verde has been highly dependent on transfers from abroad, usually worth more than about one-fifth of GDP. Among those, more than half are workers' remittances, and about another third shipments of international food aid. The country has benefited, to a very significant degree, from its extensive expatriate community—located mainly in the U.S. and Portugal—and from its reputation of being efficient in implementing donor-supported projects. These transfers have tended to offset a large part of Cape Verde's large trade deficits.

7.　　Pivotal to the current government's ongoing liberalization program remains the objective of integrating Cape Verde's economy with the rest of the world. In this context, it has sought to create a sound macroeconomic framework, within which it could make the local

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[5] With the Cape Verdean escudo, at the time, being an inconvertible currency, it was not possible for importers to exchange their funds at commercial banks abroad.

[6] See, for instance, the relevant sections in Foy (1988) and Mayer (1990).

[7] See, for example, the IMF's "Recent Economic Development" documents; Sacerdoti et al. (1999) and Plant et al. (1996). For a detailed discussion on the informal sector and, in particular, the development of a more formalized microenterprise sector in Cape Verde, cf. Sananikone (1996).

Figure 1. Cape Verde: Selected Monetary and External Indicators

Net Foreign Assets, the Foreign-Exchange Queue, and Effective Exchange Rates

Legend:
- NFA (commercial banks)
- Central-bank reserves
- REER (right scale)
- Foreign-exchange queue
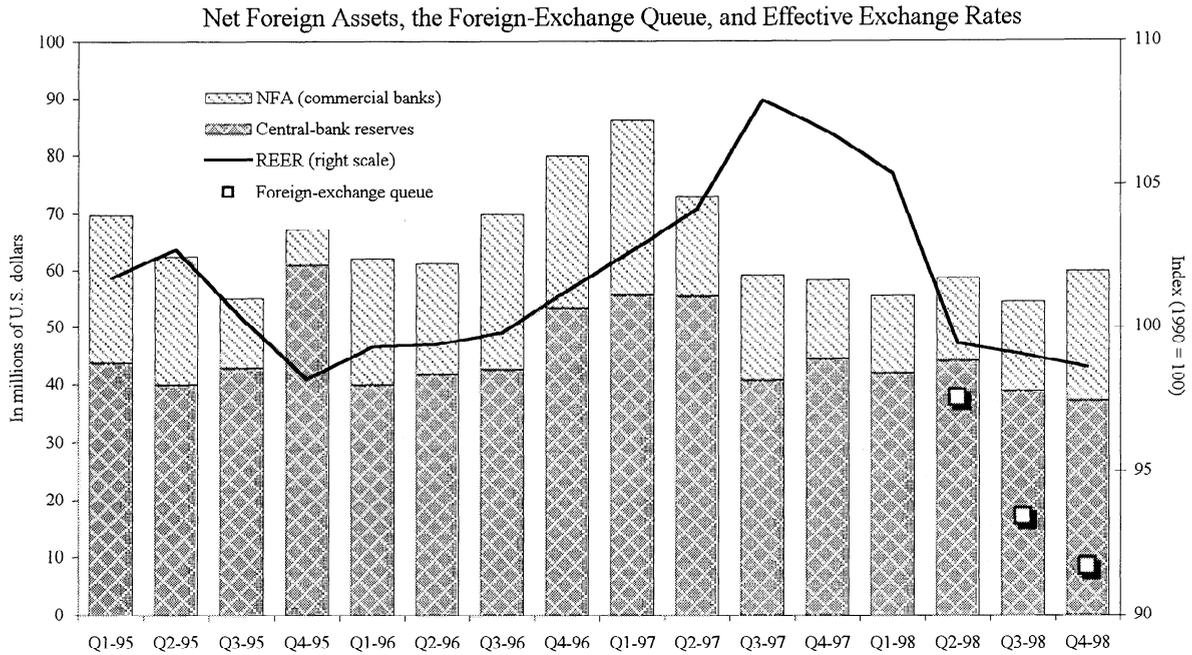
Unrequited Transfers and the Current Account

Legend:
- Official transfers
- Private transfers
- Current-account deficit (excl. off. transfers)
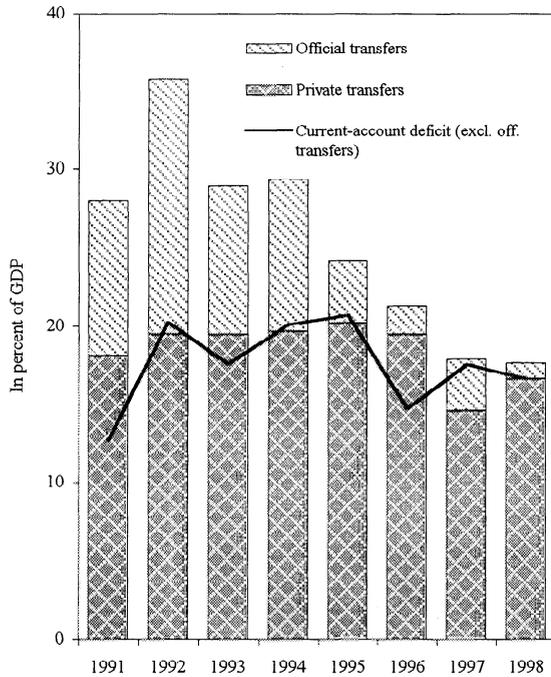
The Informal Market's Premiums on Selling Foreign Exchange

Just prior to... Just after...
the switch of the escudo's peg.

June 5-11, 1998   July 6-9, 1998

Legend:
- Portuguese escudo
- U.S. dollar
- Deutsche mark
- Dutch guilder
- French franc
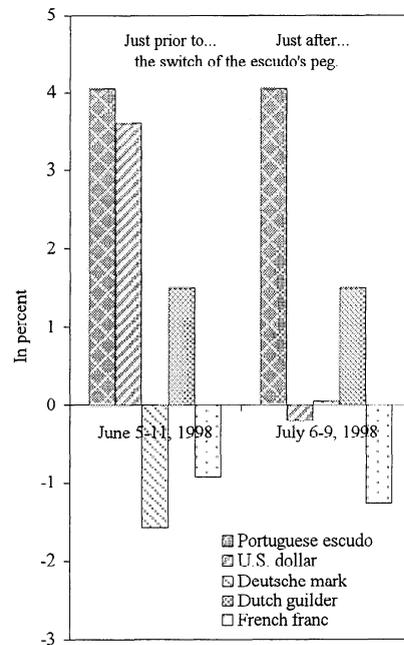
Sources: Cape Verdean authorities; and IMF, *Information Notice System.*

currency convertible. In mid-1998, Cape Verde started this process by replacing its previous nominal anchor—a basket of mainly European currencies—with the Portuguese escudo (and, half a year later, with its successor currency). In exchange for Cape Verde's agreement to abide by the Maastricht criteria, the Lisbon government has provided a precautionary credit line. At the same time, Cape Verdean citizens have been permitted to open foreign currency accounts, partly as an attempt to pull the informal market back into the formal one.

8.   Parallel to the government's announcement of legal changes to its foreign exchange regime and its program of fiscal consolidation, the Cape Verdean authorities were recording a sharp drop in workers' remittances, especially in 1997 and the first six months of 1998; this decline was thought to explain the acceleration in the accumulation of the foreign exchange queue that had been building since 1995. However, the correspondingly smaller supply of foreign currency should, if anything, have widened—not narrowed—the difference between the rates in the parallel and formal foreign exchange markets.

9.   One conceivable explanation—to be explored in greater detail below—would have devaluation fears, prevalent in 1997 and early 1998,[8] inducing expatriate Cape Verdeans to bring or send remittances, in foreign cash, directly into the country, rather than transfer funds through the banking system into local currency-denominated accounts. (If that were the case, these would have remained unrecorded by the official statistics—leading to the decline in "recorded" transfers—while increasing the supply of foreign currencies offered in the informal market. Subsequently, the additional funds would have brought their prices down, thus narrowing the differential between the official and black market rates.)

10.   Any formal explanation of such a relationship would need to provide answers to yet another peculiar correlation typifying Cape Verde's capital market. While inflation rates were decelerating steadily towards Western European levels during 1996–98, nominal interest rates remained constant at double-digit levels, implying rising real rates. The demand for credit, however, remained high, and—given the existence of a formal credit ceiling—in excess of supply. Yet, few real sector investment projects appeared to warrant such a degree of profitability.

11.   Because of its recent history of central planning, many markets in Cape Verde have tended not to be coordinated through changes in prices but through rationing (the process of liberalization is still ongoing). Consequently, the formal analysis of Cape Verde's foreign exchange market relations needs to capture the most crucial aspects of this country's

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[8] As it turned out, these fears were not entirely unwarranted. When, at end-March 1998, the government announced the switch of the peg from a basket of mainly European currencies to one with the Portuguese escudo (Esc), effective on July 5, 1998, it simultaneously devalued the Cape Verde escudo (CVEsc) by 6 percent vis-à-vis the basket. On the actual day of the switch, the preannounced exchange rate of Esc 100 per CVEsc 55 was, however, confirmed.

transition economy. Unmodified "textbook" models give only partial—and therefore potentially misleading—results.

III. PREVIOUS CONTRIBUTIONS

12.   Arching over the narrowly defined policy puzzle of the Cape Verdean capital market situation are two broader questions, both of which are discussed in the literature (albeit to a limited extent). The first one concerns the social role that black markets play in an economy with capital controls or, as is the case in this example, foreign exchange queues. Frequently, governments show their tacit consent to these operations by openly tolerating the illegal traders. The second, more crucial question pertains to the compatibility concerns raised by the combination of a fixed exchange rate regime, the restricted flow of capital, and the government's general development goals.

13.   Like many other industrializing countries, Cape Verde left the informal foreign exchange market in a state of legal limbo (illegal but disregarded), suggesting that the consequences of its existence were considered not to be overly negative. Quite to the contrary, as, for instance, Pitt (1981) argues. He characterizes the parallel market's social role, quite narrowly, as an instrument that enables welfare-enhancing[9] smuggling activities. Greenwood and Kimbrough (1987), by contrast, motivate the existence of a black market with a cash-in-advance requirement that forces individuals to accumulate foreign currency before they can consume. In either version, these authors are able to demonstrate the existence of a positive correlation between the continued, unimpeded operation of black markets and the country's overall economic welfare. Chopra and Montiel (1986), who develop a simple "new classical" structural model for small developing economies, also observe that a change in the availability of foreign exchange—demanded for the purpose of importing intermediate goods—positively affects real output, even if such increases are perfectly anticipated.

14.   A thought-provoking answer to the compatibility problem (generated by the concurrent existence of fixed exchange rates, foreign currency queues, and output growth) is given by McDermott (1989), who has shown that foreign currency rationing in an economy with rigid nominal wages and a fixed exchange rate tends to result in chronic unemployment, particularly if raw materials are imported. He argues that the resulting restriction of imported inputs reduces the marginal product of labor, rendering the rigid wage level as unsustainable. The outcome is even more detrimental to an economy's welfare if firms hoard input factors in anticipation of further liquidity restrictions and bottleneck situations. While production would be relatively stable over time, output levels are far lower than would otherwise be the case. More important for the analysis of the Cape Verdean situation is McDermott's (1989) conclusion that currency restrictions will lead to a deterioration of the current account as the restriction of the imported production factors reduces the country's export value while

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[9] The increased supply of imported inputs increases production, employment, exports, and, subsequently, the central bank's foreign reserve position.

inventory demand puts further pressure on scarce international reserves. As a result, only the politically unpopular measure of devaluing one's currency can set the real wage equal to labor's marginal product.

IV. CAPE VERDE'S CAPITAL MARKET

15.   The positive correlation between the existence of an informal foreign exchange market and real output levels can easily be derived with the simple short-run model[10] developed below, which largely follows the lines of Mundell (1960) and Fleming (1962). It is, however, modified to take into account several peculiarities of Cape Verde's institutional setup. More important, the model can provide a basic framework with which the country's capital market puzzle can be explained in an internally and externally consistent manner. The results will naturally touch upon the underlying devaluation question referred to in the introductory paragraphs of this paper. In order to keep the model from being unnecessarily cumbersome, the underlying microeconomic optimization problems—except the one relating to the composition of transfers—will not be explicitly modelled.

A. Assumptions

16.   The model (represented graphically on page 12 and formally in the Appendix) is based on several important assumptions. Following the traditional assumption of a "small, open economy," it will be presumed that the relevant interest rate level is determined by the "world market." It will furthermore be supposed that the government and the central bank have committed themselves to using monetary policy instruments solely for the purpose of defending the fixed parity of the nonconvertible currency.[11]

17.   For reasons of analytical simplicity, several supplementary assumptions will be made. First, because Cape Verde is a developing country with a relatively small degree of income inequality (if compared to other countries with similar per capita GDP values), private consumption will be viewed mainly as "subsistence purchases" (which implies that the price elasticity of demand is relatively low, intertemporal decision-making processes play only a minor role, and changes in tax rates are likely to have only limited macroeconomic effects). As a result, aggregate consumption will be modelled as an exogenous variable. Second, all policy parameters (except money supply, which the central bank adjusts to maintain the peg) are taken as given. Third, total unrequited official transfers are considered beyond a policymaker's

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[10] Given the large output gap characterizing the Cape Verdean economy, it is argued that the distance between the "equilibrium" and the "potential" output levels is sufficiently significant to justify the use of short-run, or demand-driven, approaches.

[11] This assumption (relevant until mid-1998) implies that domestic economic agents cannot borrow from foreign financial institutions, even if the conditions offered abroad are significantly more favorable than the ones at home.

control and are assumed constant. And finally, this model will abstract from any inflation differentials between the domestic economy and its trading partners, so that real and nominal exchange rates can be used interchangeably. Interest rates, unless otherwise indicated, will refer to their real values.


Table 1. Notation

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cT	cash transfers	r	interest rate
cT'	cT in domestic currency ($= \hat{e}^*cT$)	r_d^*	domestic equilibrium interest rate
C	aggregate consumption	$\tilde{r}_d$	actually observed interest rate†
CA	current account (incl. cT)	r_d	actually observed interest rate
CA'	current account (excl. cT)	$\check{r}_{dc}$	nominal interest rate ceiling
De	demand for foreign exchange	r_{dc}	real equivalent of $\check{r}_{dc}$
e	exchange rate*	r_w^*	world equilibrium interest rate
$\hat{e}$	fixed exchange rate*	r_{wd}	domestic equivalent of r_w^*
$\hat{e}^*$	actual black market rate*	R^{CB}	central bank reserves
$\hat{e}'^*$	implicit black market rate* if $cT = 0$	S	aggregate savings
$E\hat{e}$	expected official rate*	Se	supply of foreign exchange
$E\hat{e}^*$	expected black market rate*	T	officially recorded private transfers
$E\hat{e}'^*$	exp. implicit black market rate*	T'	T in domestic currency ($= \hat{e}T$)
EX	exports	$\check{T}$	total unrequited private transfers
G	government expenditure	Y	aggregate output
I	aggregate investment	β_x	estimates
IM	imports	γ, λ	responsiveness parameters
M	money supply	φ_x	summary notations
M^D	money demand	π	inflation rate
NX	net exports	ρ_{DR}	risk premium (devaluation)
Q_E	foreign exchange queue	ρ_{PD}	risk premium (default)
Q_M	excess demand for loanable funds	Ψ	set of relevant policy parameters
$PP(\check{T})$	purchasing power of total transfers	Ψ^{CB}	central bank's policy rule

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* Variable is defined as domestic currency per unit of foreign currency.
† Actually observed interest rate were the economy closed.

Figure 2. Cape Verde's Capital Market (Perceived vs. Actual)
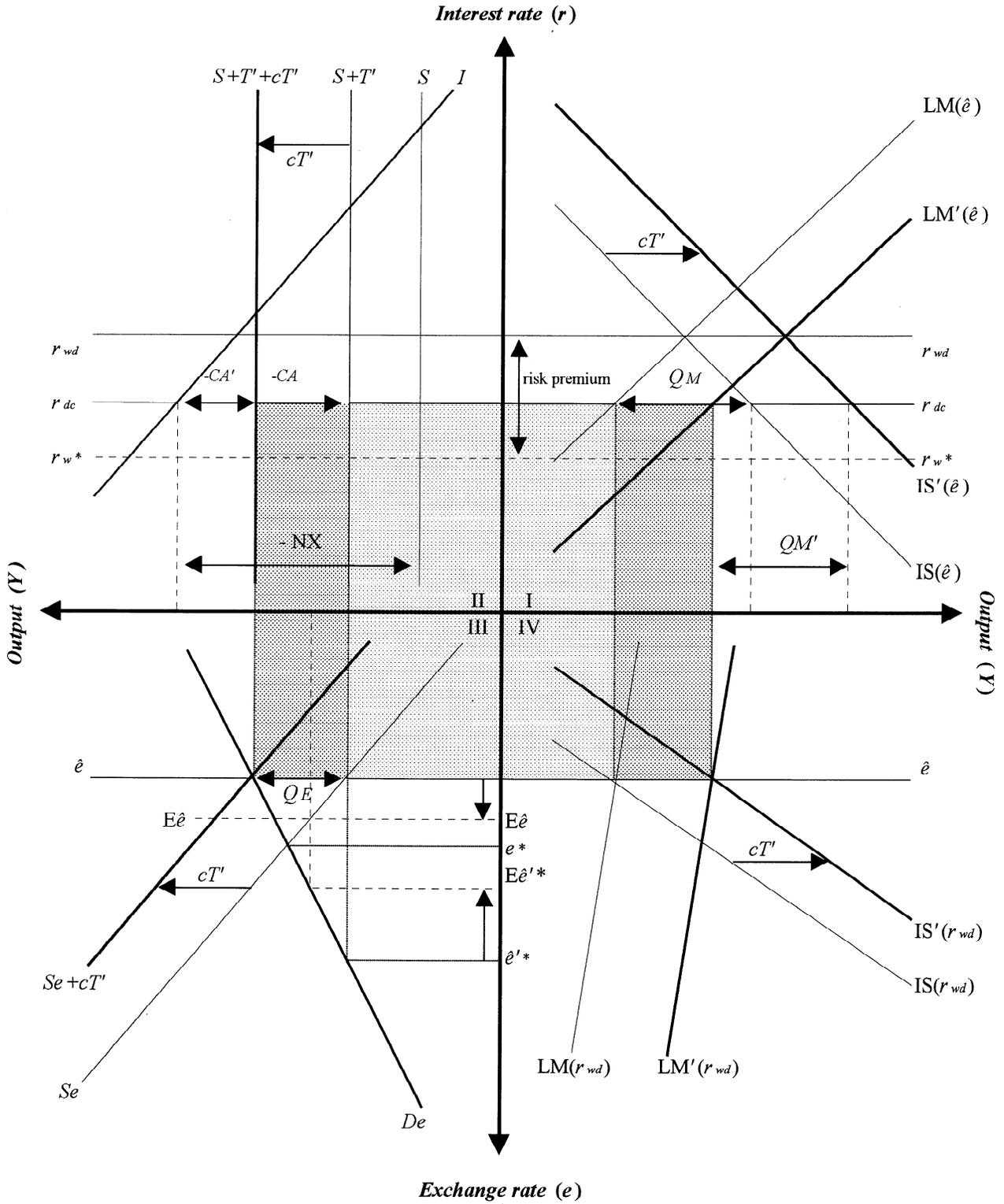
B. The Model's Key Predictions

18.   As formally derived in the Appendix, the integration of the emigrants' decisions regarding the optimal method of transferring an exogenous amount of remittances to their families yields the following insights: (*i*) the risk of an imminent devaluation increases with decreasing foreign exchange reserves at the central bank and/or changes to other relevant policy parameters; (*ii*) the expectation of the increased likelihood of the parity's realignment leads to increasing cash transfers of foreign currencies and to a corresponding deterioration of the "workers' remittances" figure recorded in the balance of payments; and (*iii*) the inflow of private transfers, channelled into the informal market, offsets the excess demand observed in the official market. Figure 2, as explained below, depicts the macroeconomic effects of these unrecorded cash transfers on the economy.

C. The Effects of Cash Transfers on the Capital Market

19.   The Cape Verdean economy, as indicated in the model's specifications, has to adjust to two nominal constraints, viz., the interest and exchange rate ceilings depicted in quadrants I/II and III/IV, respectively. Relevant for the two top quadrants is $r_w{}^*$, which denotes the world interest rate. In the absence of country-specific risk premiums, this rate represents the small, open economy's level, to which its economy has to adjust. With positive premiums being demanded for reasons of inherent devaluation and default risks (i.e., $\rho_{DR} > 0$ and $\rho_{PD} > 0$), the observed interest differential is, as described in equation (5) (see Appendix), an increasing function of the country's overall risks, resulting in the world interest rate's "domestic equivalent," r_{wd}, with $r_{wd} > r_w{}^*$. If, as was the case in Cape Verde, there is a domestically binding interest rate ceiling (r_{dc}), above which the price for credit cannot rise, this situation will create disequilibria in the goods and capital markets, resulting in excess demand for loanable funds (Q_M) and an output level beneath its potential.[12] The fixed nominal exchange rate, to which defense the monetary authorities have committed themselves, is represented by $\hat{e}$ in quadrants III and IV.

Quadrants I and IV

20.   Both quadrants represent the traditional Mundell-Fleming relationships—in the *Y/r*- and *Y/e*-spaces, respectively—characterizing a small, open economy with fixed exchange rates. The country-specific modifications are (*i*) the domestic interest rate ceiling in quadrant I and (*ii*) the nonvertical nature of the LM(r_{wd})-curve in quadrant IV; see equation (2). The joint equilibrium in both the goods and money markets—as perceived by the economic agents when unaware of the size of cash transfers (or even their existence)—is characterized, in quadrant I, by the intersection of the IS($\hat{e}$)- and LM($\hat{e}$)-curves at the domestic equivalent of the world

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[12] The government could, however make this constraint nonbinding—if it pursued policies that would lower the risk premium by increasing foreign exchange reserves and decreasing public debt. With sound macroeconomic policies, the corresponding risk premium would decline, bringing r_{wd} below r_{dc}.

interest rate, r_{wd}, and, in quadrant IV, by the corresponding equilibrium of IS(r_{wd}) and LM(r_{wd}).

21.   The output level that corresponds to the goods and money market equilibria described above excludes the effects of the domestic currency-denominated cash transfers, $\hat{e}*cT$ (in the graph, cT'). However, if $\hat{e}*cT > 0$ is added to the left-hand side of equation (1), aggregate demand and output will have to expand accordingly, thus positioning the IS($\hat{e}$)-curve to the right of its "perceived" position. In the basic textbook case, an exogenous increase in aggregate demand creates the pressure for the domestic equilibrium rate to increase beyond the world rate, effecting a capital inflow and a pressure for the domestic currency to appreciate vis-à-vis the foreign ones. This result obliges the central bank to sell domestic money, thus increasing M and R^{CB}. The latter effect causes ρ_{DR} to fall. In this particular Cape Verdean case, the central bank's "actual" reserve position has been known all along, because the economic agents did not need to estimate the probable value of $\hat{e}*cT$ to be able to observe R^{CB}. Consequently, the r_{wd}-level corresponds to the "actual" as well as to the "perceived" scenario.

22.   A second point has to be made. As outlined above, Cape Verde's transmission mechanism on the money market side is directly linked through imports: according to (2), higher aggregate demand in the goods market means an almost proportional rise in the demand for imports, which, in turn, results in an increase in the demand for credits used to apply for foreign currencies.[13] To the degree that aggregate demand is correlated with imports, and imports to credit, and to the extent that commercial banks are allowed—or able to find ways—to create money, this mechanism operates through the creation of book (rather than central bank) money.[14] It thereby reduces the central bank's necessity to intervene in the

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[13] This relationship explains the LM(r)-curve's negative slope in the Y/e-space: higher exchange rates (or a depreciation) increase import prices, leading to a reduced demand for domestic credits (following the argument laid out in footnote 14).

[14] The reason behind the banks' ability to create book money stems from Cape Verde's being a highly import-dependent economy, in which its importers were able to arrange the purchases of import goods in such a way that little or few payments needed to be made *before* the commodities were actually sold in the market place. In a somewhat stylized form, the mechanism functioned as follows. Unable to access the international capital market, firms could apply for CVEsc-denominated loans, which they used as domestic counterpart for foreign currency requests, usually at the very same commercial bank. They forwarded the request for foreign exchange to the central bank. While awaiting the delivery of the requested foreign exchange, the banks' clients imported goods and services that were destined for resale in the Cape Verdean economy. The CVEsc-denominated loans would thus eventually pay the foreign exporters. As, since about 1995, there had been a queue for foreign exchange, foreign exporters, who did not want to lose their clients, started to issue Cape Verdean importers

(continued...)

foreign exchange market in its effort to secure the prespecified exchange rate level $\hat{e}$. Nevertheless, the fundamental adjustment process underlying the Mundell-Fleming approach remains intact—with the result that the LM($\hat{e}$)-curve shifts outward towards its equilibrium position, at which the world interest rate's domestic equivalent has been derived on the basis of the observed position of the central bank's foreign exchange reserves with $\hat{e}^*cT > 0$. The resultant "actual" (dis-)equilibrium in the goods market is thus described by the interaction of the IS'($\hat{e}$)- and LM'($\hat{e}$)-curves at r_{dc}, with Q_M remaining unchanged in size. Quadrant IV is identical to quadrant I, except that the exchange rate constraint is explicitly modelled.

Quadrant II

23. This graph reflects the standard description of the goods market in a small, open economy, where the interest rate cannot adjust to guarantee the equality of investment and where net foreign investment, $S - I$, equals the trade deficit, $-NX$.[15] The large trade deficit that has been the trademark of Cape Verde's balance of payments is reflected in the gap between savings and investment at r_{dc}. This deficit would be equal to the current account, were it not for the substantial unrequited inflows of capital, which help, at least partially, to bridge this resource gap. The amount of (recorded) transfers, $\hat{e}T$ (in the graph, T'), sent by the expatriates, shifts the "savings" curve outward from S to $S + \hat{e}T$, thus narrowing the current account deficit to the horizontal distance between $S + \hat{e}T$ and I at the same interest rate level. The "invisible" cash transfers, $\hat{e}^*cT$, move the "savings" curve even further to the right, from $S + \hat{e}T$ to $S + \hat{e}T + \hat{e}^*cT$, thereby narrowing the "actual" current account deficit to the

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[14](...continued)
suppliers' credits that covered the time span between the approval of the foreign currency application at the commercial bank and its final disbursement. As a result, the banks were able to (at least, partially) transfer credit risk abroad, while the imported goods and services were sold in the domestic economy against Cape Verdean escudos. The loan, paying for the foreign exchange, was, once disbursed, earmarked to pay the foreign exporter, while the revenues from the sales were used to pay the bank its principal and interest rates—with the residual being the importer's profit. This process worked smoothly, without undue risk for any domestic participant, until an unexpected devaluation would invalidate all the above calculations: should a currency realignment occur while the importer was caught inside the foreign exchange queue, the bank loan would turn out to be insufficient to fully pay the foreign exporter, meaning that a certain fraction of the sales revenues would have to be used to apply for additional foreign exchange—which, in turn, would increase the risk for the commercial bank that the importer would be unable to meet his or her commitments. The increased likelihood of a devaluation was thus being reflected in the interest rate structure—even for domestic loans: with an increased devaluation risk, the real rate of interest increases.

[15] Only for reasons of simplicity has it been supposed that saving is unresponsive to interest rate changes, but this assumption does not crucially affect the results.

remaining gap between the latter curve and I, at r_{dc}.[16] Analogous to the r_{wd}-argument above, the current account deficit, as depicted by $-CA'$, is also observed by the economy's agents.

Quadrant III

24.   Quadrant III depicts the even more basic supply-and-demand schedule for the foreign exchange market. Given the government's decision to peg its currency at a fixed rate $\hat{e}$, foreign currency is supplied from the sources described in (7) and demanded for the purposes mentioned in (6). If, at the official rate, demand exceeds supply and the central bank behaves as depicted in (10), a backlog of unmet foreign currency demands, denoted Q_E, will develop, equal to the horizontal distance between the supply of foreign exchange, Se, and its demand, De, at $\hat{e}$. In this case, those economic agents that had managed to buy foreign exchange at the rate $\hat{e}$ would have the opportunity to exploit an instantaneous arbitrage opportunity by selling their foreign banknotes at $\hat{e}'*$ (the black market rate that prevailed with $\hat{e}*cT = 0$), with the corresponding total black market's profit being equal to the product of $Se(\hat{e})$ and $(\hat{e}'* - \hat{e})$.

25.   Yet, in the Cape Verdean case, $\hat{e}* \approx \hat{e}$. This outcome, if explained by the additional availability of foreign exchange, would be depicted by the outward shift of Se to $Se + \hat{e}*cT$. Subsequently, the extra source of supply would imply that everyone held up in the queue for foreign currency and in need of foreign money before the time of official disbursement by the commercial banks has an opportunity to satisfy his or her demand for exchange at the parallel market, at essentially the official rate.

D.   Reexamining Cape Verde's Balance of Payments

26.   To substantiate the supposition that cash transfers do indeed hold the key to the understanding of Cape Verde's puzzling foreign exchange market, one would need to assess whether it is possible to at least indirectly deduce the likely size of these otherwise "invisible" payments. Evidently, they are not recorded in the balance of payments' "transfer" row. Given their impact, for instance, on current account transactions, cash transfers might be reflected in the "net errors and omissions" item. Alternative strategies of deduction would include a derivation on the basis of the predictions made in quadrants I and IV, which suggest that the output level increases together with the cash transfers. The scope for measurement errors in the compilation of national accounts is relatively large, and it would appear that a potentially more promising strategy would include the analysis of the balance of payments relationship among transfers, the trade balance, and the current account represented in Figure 2, quadrant II. More in-depth econometric analyses are impeded by insufficient or unavailable data. In the following, it will nevertheless be attempted to derive first "guesstimates" of cT's likely order of magnitude.

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[16] This amount has to be financed by either external loans or a reduction in net foreign assets.

27.   The proposed model entails several key predictions that ought to be reflected in Cape Verde's balance of payments, if this approach is to serve as a preliminary step towards the full understanding of the island republic's capital market relations:

(1) $\Delta R^{CB} \approx 0$. For there not to be a differential between the official and black market rates, it has been conjectured that the total supply of foreign exchange, traded in the banks and on the streets, is approximately equal to total demand at the official rate. Therefore, there should not be any drastic movements in the central bank's reserve position despite the growing foreign exchange queue. However, given the excess demand in the *official* market, the central bank can be expected to sell more foreign currencies to the commercial banks than it buys from them, in which case the deterioration in official reserves would be observed as a controlled, *modest* reduction.

(2) $\uparrow E\hat{e} \rightarrow \downarrow \hat{e}T \rightarrow \uparrow \hat{e}^*cT$. The black market supply of foreign currencies is thought to stem from rising cash payments from abroad, likely at the expense of transfers sent through the banking system. The main motive for this change in behavior is believed to be the increased fears of imminent currency devaluations—following the recognition that a downward change in the parity would signify a reduction in the beneficiaries' purchasing power of their received remittances. A deterioration in the official reserve position, even a small one, sparks these fears. In addition, the announced change in the exchange rate regime—the switch from the basket to a single currency peg—could intensify the uncertainty among Cape Verdeans at home and abroad.

(3) $\uparrow \hat{e}^*cT \rightarrow \uparrow$ **net errors and omissions**. Workers' cash remittances are not officially recorded in the balance of payments, at least not under the "transfers" item. The influx of additional liquidity should therefore be reflected in the changes of the "net errors and omissions" line. Decreasingly negative, or increasingly positive, error values would be consistent with the idea of increasing, unrecorded capital inflows.

(4) $Q_E \nleq \hat{e}^*cT$. Cash transfers and the nonanticipatory, nonfictitious part of the foreign exchange queue should be approximately equal in volume—or, inversely, the actually recorded foreign exchange queue is, for these reasons, expected to be larger than the cash transfers.

(5) $\Delta M > \Delta EM$. Consistent with the rightward shift of the LM-curve in quadrants I and IV, monetary policies during the period in which the cash transfers are suspected should should have been more expansionary than initially expected, with interest rates, however, remaining approximately constant at their high levels.

28.   Given data compilation problems and the resulting impossibility of conducting serious econometric studies, preliminary support for the above explanation can be derived from a situation in which all five relationships described above are indeed reflected in the previous years' balance of payments statistics. An affirmative response would thus justify a more

thorough analysis of the transfer behavior of émigré Cape Verdeans and, implicitly, put the entire devaluation discussion in a completely different light.

The central bank's foreign exchange reserves

29.   Before the end-March 1998 devaluation of 6 percent, which had been announced together with the switch of the nominal anchor a quarter of a year hence, the central bank's foreign exchange reserves did indeed decrease—albeit modestly. As shown in the accompanying Table 2, they remained broadly constant, in Cape Verde escudo terms, from 1996 to mid-1998. Expressed relative to imports of goods and services, reserves fell from 2.7 months in 1995 to 2.4 in 1996 and 2.0 in 1997. Following the currency realignment, reserves increased, as would be expected, and by end-June 1998, they stood at about 2.3 months of imports of goods and services.

30.   The widely perceived devaluation risk, which had been steadily building until then, did not fully subside with the actual March 1998 change in the Cape Verde escudo's parity—it was suspected that the switch of the currency peg from a basket to the Portuguese escudo on July 1, 1998 would result in another downward correction.[17] Portugal's announcement, however, that it would support the fixed exchange rate with a substantial credit line, jointly managed by both governments, appears to have helped to subdue those fears in the latter half of 1998. Between July and December 1998, the commercial banks—mainly with foreign exchange transferred to them by the central bank—paid off a large part of the queue. Net of cancellations, they used about US$18 million, considerably more than the decrease in reserves of approximately US$10 million; see also Figures 1 (top panel) and 3.

Devaluation fears

31.   During the period between end-1995 and mid-1998, two factors provoked Cape Verdeans' devaluation fears. While the real effective exchange rate appreciated considerably, particularly in 1997, the central bank's reserves decreased, thus increasing the risk of a currency realignment; cf. equations (9) and (10). In early 1998, the authorities began to discuss plans aimed at replacing the peg to a basket of mainly European currencies with one to the Portuguese escudo. This was announced, together with the 6 percent adjustment, at end-March 1998 (with an implementation target of early July). During the three-month period leading up to the ultimate switch, widespread rumors, most visibly expressed in the *A Semana* article mentioned in footnote 17 continued to claim that the policy change would be used for another, even more substantial change in the parity vis-à-vis the Portuguese currency. As it turned out, the parity was kept, in line with the government's previous policy announcements. Therefore, in line with the logic of this paper's model, cash transfers in 1996, 1997, and early 1998 should have been larger than in 1994, 1995, or late 1998. Inversely, the model predicts

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[17] On June 5, 1998, the weekly Cape Verdean newspaper *A Semana*, for instance, fuelled devaluation fears by suggesting that the IMF favored a large devaluation of the Cape Verde escudo: "*FMI quer desvalorização do escudo.*"

Table 2. Cape Verde: Balance of Payments, 1994-98

	1994	1995	1996	1997	1998 Jan.-Jun.	Jan.-Dec.
			(In billions of Cape Verde escudos)			
Current account 1/	-3.1	-6.4	-5.2	-6.4	-3.5	-7.6
Excluding official current transfers	-6.3	-7.8	-6.0	-7.9	-3.8	-8.1
Trade balance	-14.0	-16.0	-14.5	-15.9	-7.3	-17.3
Exports, f.o.b.	1.7	1.9	2.4	3.7	1.5	2.7
Imports, f.o.b.	-15.7	-17.9	-17.0	-19.7	-8.8	-20.0
Services (net)	1.3	0.9	1.2	2.1	1.0	1.7
Factor income (net)	-0.3	-0.4	-0.6	-0.6	-0.3	-0.6
Current transfers (net)	9.9	9.1	8.7	8.1	3.1	8.6
Official (net) 2/	3.3	1.5	0.7	1.5	0.3	0.5
Private (net)	6.6	7.7	7.9	6.6	2.8	8.1
Capital and financial account	4.2	6.8	7.9	6.7	0.9	8.2
Net errors and omissions	-1.6	-1.5	-1.1	0.6	2.9	-0.7
Overall balance	-0.5	-1.1	1.5	0.9	0.3	0.0
Financing	0.5	1.1	-1.5	-0.9	-0.3	0.0
			(In millions of U.S. dollars)			
Current account 1/	-38	-83	-63	-69	-35	-77
Excluding official current transfers	-77	-102	-72	-85	-38	-82
Trade balance	-171	-208	-176	-171	-74	-176
Exports, f.o.b.	20	25	30	40	15	28
Imports, f.o.b.	-191	-234	-206	-211	-89	-204
Services (net)	16	12	15	22	10	18
Factor income (net)	-4	-5	-7	-7	-3	-6
Current transfers (net)	121	119	105	87	32	87
Official (net)	40	19	9	16	3	5
Private (net)	81	100	96	71	29	82
Capital and financial account	51	88	95	72	9	84
Net errors and omissions	-20	-19	-13	6	29	-7
			(In units as indicated)			
Memorandum items:						
Central bank's net reserves (in billions of CVEsc)	3.4	5.1	4.5	4.3	4.5	3.5
Central bank's net reserves (in millions of US$)	42	66	55	46	45	36
In months of imports of goods and services	2.3	2.7	2.4	2.0	2.3	1.5
Export of goods and services (in billions of CVEsc)	5.6	7.2	9.2	12.3	5.2	12.1
Export of goods and services (in millions of US$)	69	94	112	132	52	124
In percent of GDP	16.8	19.1	22.7	27.2	21.2	24.9
Imports of goods and services (in billions of CVEsc)	-18.3	-22.3	-22.6	-26.1	-11.5	-27.7
Imports of goods and services (in millions of US$)	-224	-290	-273	-280	-116	-282
In percent of GDP	54.4	58.9	55.5	57.9	47.3	56.9
Private transfers (percent of GDP)	19.7	20.2	19.5	14.6	11.6	16.6
Current account, excl. official transfers (percent of GDP)	-18.9	-20.7	-14.7	-17.5	-15.6	-16.6
Cape Verde escudos per U.S. dollar (period average)	81.9	76.9	82.6	93.2	99.4	98.2
Nominal GDP (in billions of CVEsc)	33.6	37.9	40.6	45.1	24.3	48.7
Nominal GDP (in millions of US$)	411	493	492	484	245	496

Sources: Bank of Cape Verde; and staff estimates.

1/ In 1997, the Cape Verdean authorities began to record sales of fuel to ships in full; previously they had been recorded only partially. The staff has attempted to replicate this new, more accurate presentation for the years 1997-98. The staff has also moved the item to "Exports," rather than "Services," to comply with the stipulations of the *Balance of Payments Manual* (5th edition).

that the officially recorded transfers should fall during the periods of rising cash transfers (and vice versa).

32.   Table 2 reveals that (officially recorded) private transfers comply with these predictions. They increased—when expressed in terms of GDP—between 1994 and 1995. However, during 1996, 1997, and early 1998, they decreased considerably, before recovering in end-1998 (see also Figure 1).

Net errors and omissions

33.   The possibly offsetting influx of cash transfers could be seen in the "net errors and omissions" row. Between 1994 and mid-1998, the first differences in the "net errors and omissions" line in Cape Verde's balance of payments showed a clear upward trend. They increased by US$1 million between 1994 and 1995—and by US$5 million, US$19 million, and US$23 million during 1995–96, 1996–97, and 1997–mid-1998, respectively. These values represent—assuming that other factors affecting this item remained relatively constant—an increase in unrecorded liquidity. During the first six months of 1998, the conjectured influx of extra capital would thus have been equivalent to approximately US$50 per person.

The size of the queue versus the conjectured amount of cash transfers

34.   Contrasting the officially recorded foreign exchange queue—that is, the sum of "real" and anticipatory plus fictitious demand for foreign currencies—with the figures above, one finds a relationship that would allow for an interpretation of the foreign exchange market along the lines of Figure 2, quadrant III. At end-June 1998, the queue consisted of a backlog of approximately US$38 million. If the conjectured cash transfer figure is approximately correct, about 60 percent of the applications for foreign currency—if they were effective demand—could be fully serviced through the informal market.

35.   Until mid-1998, the applications for foreign exchange were costless. Only at the end of the third quarter did the government introduce temporary measures that required importers to leave a considerable deposit at the time of application for foreign exchange and to pay the remainder during a limited period of time in order to maintain their positions in the queue. This would suggest that the queue had consisted, until then, to a considerable degree of fictitious and/or anticipatory demand. The relationship between conjectured cash transfers and the size of the queue would be consistent with the representation of the—official and parallel—foreign exchange markets in Figure 2, Quadrant III. That, then, would indeed explain why the informal traders were unable to demand any significant premiums on their sales of foreign currencies.

Broad money and interest rates

36.   Credit to the economy grew by almost 9 percent during the last quarter of 1997 and by an annualized 13 percent in the first half of 1998 (see Sacerdoti et al., 1999), thereby exceeding official targets. Generally, increasing real rates of interest rates are inconsistent with an expansionary credit policy. This result is, however, congruent with the model predictions as

depicted in the first and fourth quadrants of Figure 2. Income, aggregate demand, and, therefore, money demand had been implicitly underestimated. If cash transfers had shifted the IS (e)- and IS (r)-curves outward, monetary policy could be expansionary without being inflationary, while the aggregate demand and risk variables prevented the actually observed interest rates from falling.

37.   Clearly, the above findings cannot prove the existence of additional liquidity. But they provide a plausible framework within which it is possible to explain the policy outcomes consistently, both in terms of theory and data. No policy parameter is significantly different from the prediction inherent in the model's specifications. As described in Section II, the government started during the summer months of 1998 to implement policy changes that were compatible with the above interpretation of relationships at work in the country's foreign exchange market. They tried to formalize the black market, separate anticipatory from actual demand, and increase the confidence in the exchange regime. After March 1998, the authorities did not alter the Cape Verdean currency's peg with the Portuguese escudo.

V. RECENT POLICY RESPONSES AND CONCLUDING REMARKS

38.   In the summer and autumn of 1998, the Cape Verdean authorities implemented reforms aimed at liberalizing current account transactions. The main changes included (*i*) the adoption of a new foreign exchange law, (*ii*) the switch of the escudo's nominal anchor, (*iii*) the temporary requirement that importers pay a deposit when applying for foreign exchange, (*iv*) the obligation imposed on importers to produce the remaining domestic counterpart within five business days after the foreign currencies have been made available, (*v*) the ability of Cape Verdean residents to open foreign currency-denominated accounts at the country's commercial banks, (*vi*) a substantial increase in the amount of foreign currency that travellers can demand at the commercial banks, and (*vii*) the monitoring of the changes in the foreign exchange queue on a daily basis.

39.   The two reforms subsumed under (*iii*) and (*iv*) were implemented with the aim of separating the "actual" demand from the anticipatory and fictitious requests. The fifth policy change was driven by the conviction that the informal market, protected by the security net of an internationally supported currency peg, could be drawn into the formal market—with positive repercussions on Cape Verde's foreign reserve position. The sixth pillar of this government's reform concept appeals to broad segments of the Cape Verdean population, aimed—together with (*i*) and (*ii*)—at demonstrating confidence in this new phase of liberalized international transactions. With the majority of families receiving remittances from abroad, the attainment this goal is crucial, if the foreign cash is to find its way back into the formal banking sector.

40.   By requiring applicants to leave a sizeable deposit, requests for foreign currencies have ceased to be costless—thereby allowing the authorities to separate actual from anticipatory or fictitious demand. Moreover, importers cannot retain their position in the queue once they

Figure 3.   Cape Verde: The Foreign Exchange Queue, June 30, August 20 - December 31, 1998
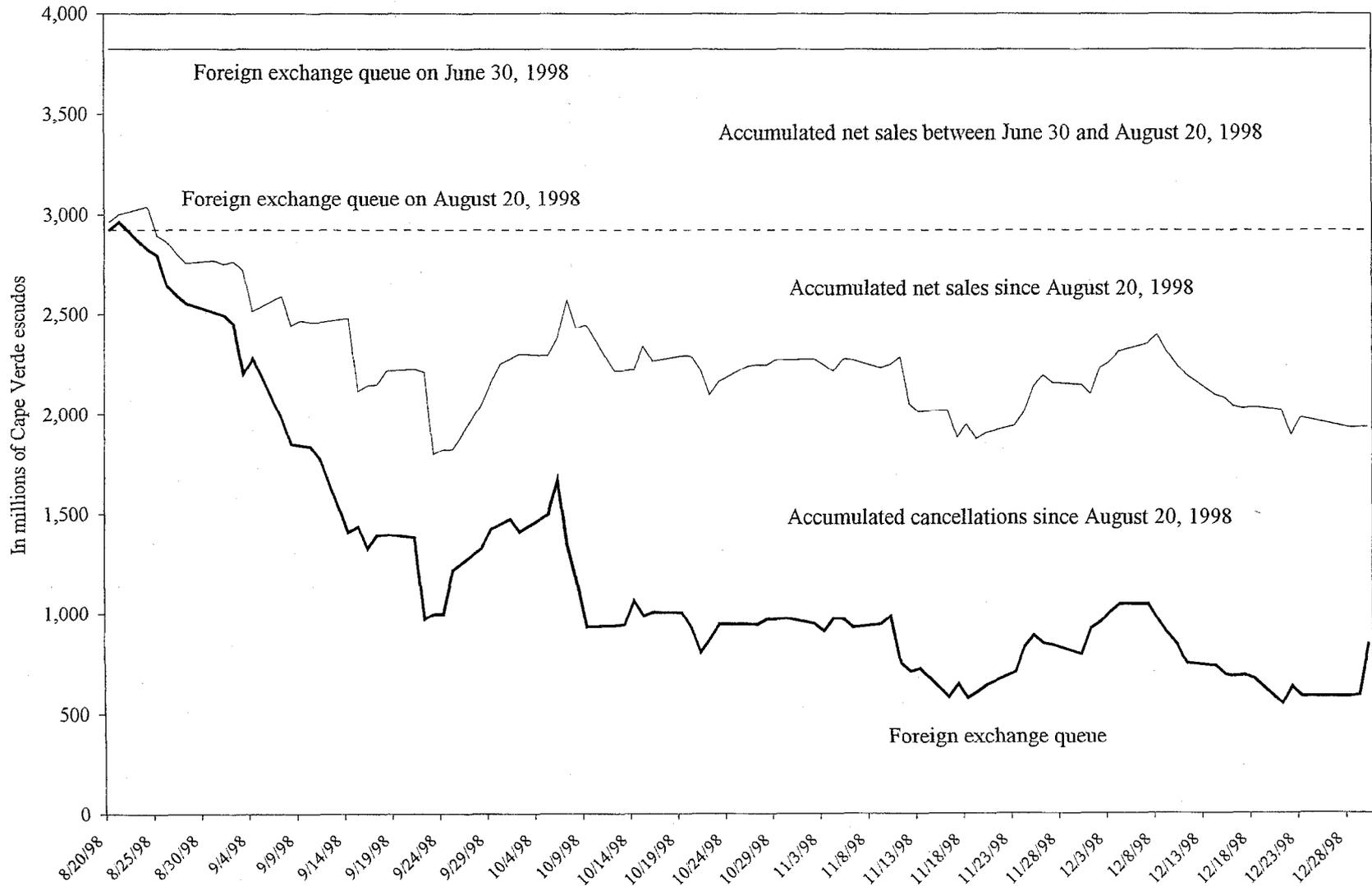
have proven incapable of producing the domestic counterpart within five business days. Consequently, foreign currencies are made available only to those applicants who have a legitimate and credible business interest. At end-December 1998, the queue[18] stood at about US$8 million, that is, of the total reduction of the queue (US$30 million) during that period, US$12 million (or 40 percent) stemmed from cancellations; see Figure 3. With a similar ratio of actual and anticipatory demand for the remainder of the queue, the implicit capital inflow derived from the "errors and omissions" line, as conjectured in paragraphs 33 and 34, and the nonfictious demand for foreign exchange appear to be congruent. That congruency, in turn, would imply that the effective demand for foreign exchange was indeed approximately equal to its total supply, thereby rendering the devaluation option unnecessary.

41.   Supported by the available balance of payments data, the approach presented in this paper seems to explain the interplay of the various macroeconomic variables in a consistent manner, culminating in the view that the total supply of foreign exchange has indeed been sufficient to satisfy demand. The alternative interpretation of the zero premium in the parallel market would be highly *un*-economic in nature—that is, simply supposing that the traders are not reacting to changes in the quantities being supplied and demanded in the market. If there were excess demand, it appears quite unlikely that not *one* single trader should have realized that he or she could earn a significantly higher income. With a fully liberalized foreign exchange market now imminent, the expatriates' transfers will be fully recorded, and it should become evident that this episode was one in which the increased uncertainty caused by the transitory measures resulted in behavioral responses that, at first sight, appeared to indicate serious imbalances in the foreign exchange market but, ultimately, were consistent with an overall equilibrium.

42.   This paper's result—suggesting a causation between increasing devaluation risks and the readjustment in the method of transferring workers' remittances—transcends the Cape Verdean example since there is no *a priori* reason why the "macroeconomic insurance function" of a large émigré community should not apply to other countries as well. However, the Cape Verdean case has proven particularly insightful, as size of private transfers in relation to the economy as a whole is unusually large and significant. Further research based upon this paper's findings could be directed towards establishing the empirical existence of a more general link between devaluation risks and the supply of foreign exchange made available to the parellel markets.

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[18] The queue was fully eliminated by mid-April 1999.

OPTIMAL CASH TRANSFERS

43.   This Appendix, using a simple Mundell–Fleming-type model, provides the theoretic justification for the capital market relationships depicted in Figure 2. Within this framework, emigrants will seek the optimal combination of bank transfers and (unrecorded) cash transfers.

1. The Domestic Credit Market

44.   Given the economy's open character, the situation in the domestic capital market is dependent on the exogenously determined interest rate, formally represented as the open economy balance between the supply of and the demand for loanable funds:

$$(1) \qquad\qquad S + \hat{e}T + NX(e, T) = I(r), \text{ with } \partial NX/\partial e > 0, \ \partial NX/\partial T < 0, \ \partial I/\partial r < 0,$$

where S stands for aggregate savings, $\hat{e}T$ for the domestic currency equivalent of private transfers from abroad, NX for net exports of goods and nonfactor services, and I for aggregate investment. Increasing exchange rates, e, transfers, T, and interest rates, r, affect NX and I, respectively, as indicated by their first derivatives. The $\partial T/\partial e$ relationship will be derived in the following. Using the standard textbook representation, S is understood to be output, Y, net of private sector consumption, C, and government expenditure, G. Equation (1) can hence be rewritten to describe the standard IS relationship (see Figure 2, quadrant I)—where IS(e) is represented by the equation $r = I^{-1}(C, \hat{e}, G, NX, T, Y)$.[19] As interest rates increase, investment projects become more expensive, leading—*ceteris paribus*—to a decrease in aggregate demand. This would explain the negative slope of the standard IS-curve.

45.   Alternatively, equation (1) can be expressed in terms of the exchange rate (see Figure 2, quadrant IV). The IS(r)-curve summarizes the relationship $e = NX^{-1}(C, G, I, r, T, Y)$. Defining e to be the domestic currency per one unit of a foreign currency, a devaluation—that is, an increase in e—will result in an improvement in the trade balance and, consequently, stimulate aggregate demand and output. Therefore, the IS(r)-curve is positively sloped in the Y/e-space. In either case, an exogenous increase in transfers will lead to a rise in aggregate demand and, subsequently, an outward shift of the IS-curve.

46.   While the central bank adjusts money supply, $M(\hat{e})$, solely for the purpose of defending the fixed exchange rate $\hat{e}$, money demand, M^D, reacts to changes in imports and the interest rate: $M^D = M^D(IM, r)$. Imports, in turn, depend on the exchange rate and the amount of transfers received: $IM = IM(e, T)$. Abstracting, for a moment, from the open economy assumption, this economy's money market can by described as follows. Given the existence of

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[19] Throughout this paper, the superscript "-1" will denote an inverse function indicating that, if $y = f(x)$, it follows that $x = f^{-1}(y)$.

an effective nominal interest rate ceiling,[20] denoted $\check{r}_{dc}$, money demand may, at times, exceed money supply, in which case the interest rigidity will lead to a credit rationing, denoted Q_M:

(2.1) $M^D\,(IM(e,\,T),\,r) = M(\hat{e})$,   if $r_d^* \le (\check{r}_{dc} - \pi)$,

(2.2) $M^D\,(IM(e,\,T),\,r) = M(\hat{e}) + Q_M$,   if $r_d^* > (\check{r}_{dc} - \pi)$,

where $Q_M = I(\check{r}_{dc} - \pi) - S - \hat{e}T + NX(e,\,T)$ if $(\check{r}_{dc} - \pi) < r_d^*$, i.e., if the interest rate is prevented from balancing demand and supply in the money market. Given (2) and ignoring the existence of an interest rate ceiling, the equilibrium interest rate, r_d^*, at which level the money market clears, can be calculated as follows:

(3) $r_d^* = M^{D-1}(IM(e,\,T),\,M(\hat{e}))$.

47.   Note that equation (3) describes the closed-economy LM-curve relationship, depicted in Figure 2, quadrant I, with an import-dependent money demand function. Analogously, the representation used of LM(r) in Figure 1, quadrant IV, is $e = M^{D-1}(IM^{-1}(M(\hat{e}),\,r,\,T))$. However, given the existence of the capital market imperfections, such as the effective credit ceiling described above, the interest rate will only adjust to balance supply and demand, if it remains beneath the threshold r_{dc}. Therefore, the interest rate that is actually observed in a closed economy equals[21]

(4.1) $\tilde{r}_d = \min\,\{r_d^*,\,r_{dc}\}$.

48.   In a small open economy, the relevant interest rate is determined exogenously, by the equilibrium prevailing in the world capital market, r_w^*. The domestic equivalent of the global equilibrium interest rate level, r_{wd}, is expected remain above the level described by r_w^* as

(5) $r_{wd} = r_{wd}(\rho_{PD},\,\rho_{DR},\,r_w^*)$,

where the variable ρ_{PD} is a risk premium capturing the country's default risk (it increases with an increasing ratio of public debt to GDP) and ρ_{DR} representing the threats that are associated with possible future devaluations.

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[20] See, for instance, Stiglitz and Weiss' (1981) seminal paper on credit rationing, in which they demonstrate the existence of a loan market outcome with optimal price ceilings. Imperfectly informed banks, according to their model, maximize expected profits over interest rates and the loans' default risk. There is a "bank-optimal" rate, above which the adverse selection and incentive effects suppress the banks' profitability, that is, either the riskiness of the pool of loans increases or the borrowers of high-interest loans are induced to engage in high-risk activities. Consequently, the rigid interest rate ceilings represent an equilibrium.

[21] The real equivalent of the nominal interest rate ceiling is $r_{dc} = \check{r}_{dc} - \pi$.

49.   Whether the domestic money market will actually clear is dependent on the relationship among these different interest rate levels. Several scenarios need to be distinguished:

- First, if, by pure coincidence, $r_{wd} = \tilde{r}_d$, the money market will clear and, given the congruence between international and domestic rates, the net flow of capital across borders is zero.

- Second, if $r_{wd} < \tilde{r}_d$, the country will adjust to the interest rate level $\tilde{r}_d$ and, consequently, observe a net inflow of capital, which will result in a trade surplus.

- And finally, if $r_{wd} > \tilde{r}_d$, there will be a net outflow of capital, causing a trade deficit, leading to excess demand in the market for loanable funds. As shown in Figure 2, quadrant I, this will create a queue in the capital market, equal to $Q_M = I(r_d) - S - \hat{e}T + NX(e, T)$.

Thus, the actually observed interest rate of an open economy with country-specific risk premiums and an interest rate ceiling can formally be expressed as

$$(4.2) \qquad r_d = \min\left\{\min\left\{r_{wd}, \tilde{r}_d\right\}, r_{dc}\right\}.$$

50.   In view of the facts that (*i*) the inflation rate differential between Cape Verde and its trading partners is declining, (*ii*) the real interest rate increased considerably, and (*iii*) the credit-market queue still failed to diminish, it seems likely that the risk premiums associated with public debt and devaluation risks hold the key to a full understanding of the unusual phenomena observed in both the credit and exchange markets—but asymmetrically so. Of those two risk variables, the former one appears to be less important, partly because the Cape Verdean authorities have embarked on a credible, comprehensive, donor-supported domestic debt-reduction operation.[22] For reasons of simplicity, it will thus be assumed that the associated risk premium, ρ_{PD}, remains constant. That, however, would mean that large changes in the ρ_{DR} variable had occurred, and these demand a plausible explanation.

51.   In light of Cape Verde's still limited production base, firms, to a large degree, demand loans for import rather than investment purposes, which results in the unusual situation that domestic credits possess a direct exchange rate risk, which is negatively correlated to the domestic currency's external value (see footnote 14). Market participants use signals to evaluate and quantify the risk of an imminent devaluation. The most important one is the change in central bank reserves, ΔR^{CB}. In a fixed exchange rate system, central bank reserves

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[22] External debt continued to increase, albeit at a moderate rate.

are accumulated—or depleted—as a result of interventions aimed at guaranteeing the pre-specified exchange rate. If foreign exchange reserves cannot be replenished at the same speed, at which they are demanded, the central bank will eventually run out of reserves, even in the absence of speculative attacks and thus be unable to fulfil its commitment of maintaining the given peg.

52.   In any given period, the demand for foreign reserve, De, is equal to imported goods and services, while the corresponding supply, Se, consists of exports and transfers:

(6) $De = IM(e, T)$,

(7) $Se = EX(e) + êT$.

The central bank's reserve position, in domestic currency terms, at the end of period t can therefore described be as a function of the demand for, and supply of, foreign exchange:

(8) $\Delta R^{CB} = Se - De$, or

(8') $R^{CB} = R^{CB}_{t-1} + NX(e, T) + êT$.

53.   The probability of an imminent devaluation approaches unity, if reserves are zero. Inversely, if reserves are "very large," the likelihood of an upward adjustment of the exchange rate will be almost zero. The devaluation-related risk premium is thus the product of the event's likelihood risk and its anticipated size:

(9) $\rho_{DR} = \gamma(\Psi) \exp(R^{CB})$,

where $0 < \gamma(\Psi) < 1$. The expression $\gamma(\Psi) \exp(R^{CB})$ symbolizes the devaluation risk and Ψ the set of relevant policy parameters (such as the changes in the budget deficits, money growth rates, inflation rate differentials, public speculations about future exchange rate realignments, and other changes planned to the foreign exchange regime). The expected exchange rate relevant for the immediate future thus is

(10) $Eê = ê + \rho_{DR}(\Delta ê)$,

where $\Delta ê$ represents the expected size of a possible future currency devaluation.

54.   Equations (4.2), (5), and (9) therefore determine r and, utilizing the definition of Q_M, the queue in the credit market. The two variables "imports" and the central bank's "foreign exchange reserve" in particular, will, in the following, link the domestic credit market with the country's external position, thereby allowing the model to close.

2. The Foreign Exchange Market

55.   In a fixed exchange rate system, the equilibrating market forces are replaced by central bank interventions. However, solving $\partial R^{CB}/\partial e = \partial NX/\partial e + \partial T/\partial e \equiv 0$ for e yields the shadow equilibrium exchange rate; see equation (8'). Should the central bank of a country with a non-convertible currency decide not to exhaust all its foreign currency reserves, it could decline to honor every request for foreign currencies *immediately*, thereby allowing a foreign exchange

queue, Q_E, (and an informal market) to develop. Consequently, for periods, in which $R^{CB}_t - R^{CB}_{t-1} < 0$, a simple, myopic decision rule, according to which the decline in reserves is partly offset by an accumulating foreign exchange queue, can be represented as follows:

$$(11.1) \qquad \Delta Q_E = -\lambda(NX(\hat{e}, T) + \hat{e}T),$$

if $(NX(e) + \hat{e}T) < 0$, and where $0 < \lambda < 1$. Thus, the foreign exchange queue at t equals

$$(11.2) \qquad Q_{E(t)} = -\lambda \sum_{s=0}^{t} \{-\Xi_s \, (NX_s(\hat{e}_s, T_s) + \hat{e}_s T_s)\},$$

where $\Xi_s = \Xi_s(\Psi^{CB})$, if $NX_s + \hat{e}_s T_s \geq 0$, with $\Xi_s(\Psi^{CB})$ being the central bank's policy rule on repaying the foreign exchange queue in periods with excess supply of foreign exchange, and $\Xi_s = 1$ otherwise.

56.   The existence of a foreign exchange queue implies the existence of an informal market, as a considerable amount of profit could be made in such a situation.[23] The corresponding black market rate, $\hat{e}^*$, at which traders are willing to sell foreign currencies, can be simply calculated as the solution, in terms of $\hat{e}^*$, of $De(\hat{e}^*, T) \equiv Se(\hat{e})$, that is

$$(12) \qquad \hat{e}^* \equiv De^{-1}(T, Se(\hat{e})).$$

57.   However, with $Q_E > 0$, the outcome $\hat{e}^* = \hat{e}$ is impossible—unless, of course, Se is misspecified and does not accurately reflect the total supply of foreign exchange. Consequently, there needs to be an offsetting source from which importers are able to (at least, temporarily) satisfy their demand for foreign currency. Direct transfers, by mail or in person, of expatriates' foreign currency amounts might just be that source—called "cash transfers" and, in foreign currency terms, denoted cT.

58.   The traditionally high unemployment rates characterizing the Cape Verdean economy imply that the marginal value of time of at least some members of each family is low. As day-to-day payments are made in the local currency, these funds can be expected to be exchanged

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[23] The aggregate black market profit is simply the product of foreign currency sold at the rate $\hat{e}$ and the difference between the official and black market rates.

in the parallel market. No forms need to be filled in, no income is officially recorded, and little police intervention deters people from pursuing this informal occupation. The correct shadow equilibrium rate in the foreign exchange market is thus equal to the black market's implicit equilibrium value derived from the balance of demand and "actual" total supply:

$$(13) \qquad De(\hat{e}^*, \hat{e}T) = Se(\hat{e}) + \hat{e}^* \, cT.$$

Assuming the import and export relations of (6) and (7) to be linear, significant, and stable,[24] the black market rate is equal to

$$(14.1) \qquad \hat{e}^* = ((\beta_0^{EX} - \beta_0^{IM}) + (\beta_1^{EX} - \beta_2^{IM}T)\hat{e})(\beta_1^{IM} - cT)^{-1}.$$

With the numerator being negative, and with $\beta_2^{IM}T > \beta_1^{EX}$ (for sizeable amounts of T, at least), it follows that increases in $\hat{e}$—i.e., devaluations—will lead to decreases in $\hat{e}^*$. With a nonzero devaluation risk ρ_{DR}, the increase in the expected immediate official rate, $E\hat{e}$, will lead to a corresponding decrease in the expected black market rate (see also Figure 2, quadrant III):

$$(14.2) \qquad E\hat{e}^* = ((\beta_0^{EX} - \beta_0^{IM}) + (\beta_1^{EX} - \beta_2^{IM}T)E\hat{e})(\beta_1^{IM} - cT)^{-1}.$$

Given that $\partial E\hat{e}^*/\partial cT = ((\beta_0^{EX} - \beta_0^{IM}) + (\beta_1^{EX} - \beta_2^{IM}T)E\hat{e})(\beta_1^{IM} - cT)^{-2} < 0$, it follows that the expected black market rate decreases (i.e., the local currency appreciates) with increasing cash transfers.

3. The Expatriates' Transfer Decisions

59.   Cape Verde has traditionally managed to maintain close ties with its extended expatriate community. This close connection is, for instance, symbolized by the political representation in parliament of constituencies abroad. In turn, émigré Cape Verdeans have not only closely followed the politico-economic developments in their home country but also, to the extent possible, supported their families financially. If it is assumed that overall remittances, in foreign currency terms, are exogenously determined by the particular situations faced in the respective host countries, the underlying economic decision-making problem simply relates to the payment method through which the family members on the islands are being supported by their relatives abroad.

60.   At the core, the emigrants' economic decisions relate to the transfer methods (rather than their sizes). The money can either be transferred through the banking system into the respective recipients' local currency accounts (in which case the transfers are exchanged at the day of payment) or be sent in foreign cash to allow the recipients to exchange the funds in the

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[24] That is, $IM(e, T) = \beta_0^{IM} + \beta_1^{IM} e + \beta_2^{IM} T$ and $EX(e) = \beta_0^{EX} + \beta_1^{EX} e$. Standard economic reasoning would suggest that $\beta_0^{IM} > 0$, $\beta_1^{IM} < 0$, $\beta_2^{IM} > 0$, $\beta_0^{EX} > 0$, $\beta_1^{EX} > 0$, and, especially in Cape Verde, $\beta_0^{IM} > \beta_0^{EX}$.

parallel market at any time before their purchases.[25] Consequently, the expected purchasing power of the money, which has been transferred through the banking system, is equal to the product of the transfers (denominated in the foreign currency) and the likely exchange rate at the time of consumption, $E\hat{e}T$. The purchasing power of foreign cash, by contrast, is a function of the likely rate prevailing at the informal market, $E\hat{e}^*cT$.

61.   This implies that, if a devaluation had occurred between the time of payment and consumption, it would have been more beneficial for the recipient had he or she received the transfers in foreign cash, as the foreign money would have preserved his or her purchasing power. In short, expatriate Cape Verdeans can, in the absence of additional transaction costs, be thought to maximize their families' local currency purchasing power of a given amount of total foreign currency transfers, $PP(\check{T})$:

(15.1) $PP(\check{T}) = E\hat{e}T + E\hat{e}^*cT.$

Thus, the emigrants' economic problem simply is

(16) $\max PP(\check{T})$, s.t. $T + cT = \check{T}$, where $\check{T}$ is constant.

Given the constraint in equation (16) and the definitions of $\varphi_1 \equiv \beta_0^{EX} - \beta_0^{IM} < 0$ (see footnote 24) and $\varphi_2 \equiv \beta_1^{EX} - \beta_2^{IM}\check{T} < 0$ (for reasonable values), equation (14.2) becomes

(14.3) $E\hat{e}^* = (\varphi_1 + (\varphi_2 + \beta_2^{IM}cT)E\hat{e})(\beta_1^{IM} - cT)^{-1}.$

Since $\check{T} > cT$, it follows that $(\varphi_2 + \beta_2^{IM}cT) < 0$ and $E\hat{e}^* > 0$. Consequently, equation (15.1) can be rewritten as

(15.2) $PP(\check{T}) = E\hat{e}\check{T} + ((\varphi_1 + (\varphi_3 + \varphi_4 cT)E\hat{e})cT)(\beta_1^{IM} - cT)^{-1},$

where $\varphi_3 = \varphi_2 - \beta_1^{IM} = \beta_1^{EX} - \beta_1^{IM} - \beta_2^{IM}\check{T} < 0$ iff $\beta_2^{IM}\check{T} > (\beta_1^{EX} - \beta_1^{IM})$ and $\varphi_4 = \beta_2^{IM} + 1 > 0$.

62.   The corresponding first-order condition is

(17) $\partial PP(\check{T})/\partial cT$: $cT^2 + \varphi_5 cT + \varphi_6 \equiv 0,$
                where $\varphi_5 = -2\beta_1^{IM} > 0$ and
                $\varphi_6 = (-\beta_1^{IM}(\varphi_1 + \varphi_3 E\hat{e}))(\varphi_4 E\hat{e})^{-1} < 0,$

given that the above conditions hold. Thus, the optimal amount of cash transfers, cT^* is

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[25] Recall that Cape Verdean residents were permitted only in mid-1998 to open accounts denominated in foreign currencies.

(18) $cT^* = -\varphi_5 \pm \left(\varphi_5^2/4 - \varphi_6\right)^{1/2}.$

As, for logical reasons, cash transfers cannot be negative, it follows that the unique solution has to be $cT^* = -\varphi_5 + \left(\varphi_5^2/4 - \varphi_6\right)^{1/2}$. The expectation of an imminent devaluation ($\uparrow E\hat{e}$) would affect optimal cash transfers in the following manner:

(19) $\partial cT^*/\partial E\hat{e} = 0.5\left(\varphi_5^2/4 - \varphi_6\right)^{-1/2}\left(-\partial\varphi_6/\partial E\hat{e}\right),$

where $-\partial\varphi_6/\partial E\hat{e} = \varphi_1\,\varphi_4^{-1}\,\beta_1^{IM}\,E\hat{e}^{-2} > 0$. Therefore, $\partial cT^*/\partial E\hat{e} > 0$, implying that an increase in the expected exchange rate—i.e. an expected devaluation—leads to increasing (unrecorded) cash transfers and, by implication, decreasing remittances channelled through the banking system. With the "correct" specification of (14.1), which includes transfers brought into the country either through the banking system or directly in cash, it follows that

(20) $\partial\hat{e}^*/\partial cT^* = \beta_1^{IM}\,\beta_2^{IM} < 0,$

i.e., an increase in cash transfers will lead to an appreciation in the local currency's black market rate.

4. Model Implications

63.   The combination of equation (20) with equations (10) and (18) therefore describes the transmission mechanism towards increasing cash transfers and subsequently falling black market rates. Two possible triggers are explicitly considered: either a deterioration in the trade balance causes foreign reserves to decline—see (8') and (9)—or other politico-economic factors instilling uncertainty—i.e., Ψ in equation (9)—increase the exchange rate premium:

$$\left\{\begin{array}{c} \downarrow NX \rightarrow \downarrow R^{CB} \\ \\ \uparrow \Psi \end{array}\right\} \rightarrow \uparrow \rho_{DR} \rightarrow \uparrow E\hat{e} \rightarrow \uparrow cT \rightarrow \downarrow \hat{e}*.$$

64.   The model emphasises that devaluation fears, aroused by either current account problems or some other exogenous politico-economic factors, play a pivotal role in the ultimate composition of workers' remittances. With decreasing confidence into the sustainability of an exchange rate peg, transfers are less likely to be sent through the banking system. Alternative methods will be sought by the emigrants to forward foreign cash in order to maximize the recipients' expected purchasing power of a given amount of foreign funds. Given the "informal" nature of these cash transactions, the analysis of the macroeconomic situation becomes more difficult. If these cash remittances, in relation to the entire economy, are sufficiently important, the gap between the "perceived" and "actual" outcomes might, as depicted in Figure 2, indeed be considerable.

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