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RWANDA

Selected Issues and Statistical Appendix

Prepared by Kenneth Meyers (head), Krzysztof Bledowski, Jakob Christensen,
David Hauner (all AFR), Gabriel Di Bella, Bjorn Rother (both PDR)

Approved by the African Department

September 21, 2004

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Rwanda: Basic Data

I. Social and Demographic Indicators
(2003, unless otherwise indicated)

Area	26,338 square kilometers
Population	
Total	8.5 million
Growth rate	2.9 percent
GDP per capita	US$200
Infant mortality rate (per 1,000 births; < 1 year)	99.0
Percentage of children completely immunized < 5 years	55.0
Life expectancy at birth (years)	40.0
Adult literacy rate (percent of aged 15+)	67.0
Men	74.0
Women	60.0
Net school enrollment ratio (in percent of relevant age group)	
Primary	97.3
Secondary	10.0
Tertiary	2.0
Access to safe water (percent)	44.0

II. Economic Indicators, 1999-2003

	1999	2000	2001	2002	2003
Gross domestic product					
GDP at constant 1995 prices 1/	509.8	540.3	576.6	630.7	636.7
Primary sector	223.6	243.9	264.2	302.5	293.0
Secondary sector	86.8	89.7	96.6	104.3	108.9
Tertiary sector	199.5	206.6	215.8	223.9	234.7
GDP at current market prices	644.9	705.7	754.3	825.0	905.3
Private consumption	574.0	622.4	646.9	727.1	775.7
Public consumption	71.2	74.3	87.9	97.7	137.1
Gross investment	111.1	123.7	138.9	139.6	166.8
Exports 2/	38.2	58.9	69.6	63.2	75.0
Imports 2/	149.6	173.5	189.0	202.5	249.4
(Annual percent change)					
Price indices					
GDP deflator	-3.5	3.3	0.2	0.0	8.7
Consumer price index (period average)	-2.4	3.9	3.4	2.0	7.4
Export price index (in U.S. dollars)	-14.2	20.9	-23.8	-13.2	7.9
Import price index (in U.S. dollars)	2.9	12.7	-3.0	5.4	3.5

Rwanda: Basic Data (concluded)

	1999	2000	2001	2002	2003
	(In billions of Rwanda francs)				
Government finance					
Total revenue and grants	100.7	136.9	148.2	160.3	195.5
Revenue	63.6	68.7	86.2	101.2	122.3
Grants	37.1	68.2	62.0	59.1	73.1
Total expenditure and net lending 3/	126.5	131.7	158.1	175.9	217.8
Current	86.0	89.2	107.4	134.6	162.7
Capital	40.8	42.0	50.0	40.7	51.1
Domestically financed	5.3	1.5	3.5	6.9	13.2
Externally financed	35.5	40.5	46.5	33.8	37.9
Net lending	-0.4	0.5	0.6	0.6	4.0
Overall deficit, including grants 3/	-25.8	5.1	-9.9	-15.6	-22.3
Domestic financing	6.2	-12.2	1.7	0.4	5.2
Of which : banking system	7.1	-9.2	-0.4	2.8	5.3
External financing (net)	21.5	11.4	40.9	30.5	22.0
Money and credit (end of period) 4/					
Foreign assets (net)	44.9	66.9	81.0	103.7	104.0
Domestic credit	94.0	94.8	95.1	90.0	118.6
Claims on government (net)	34.2	24.2	18.1	1.9	17.5
Claims on the economy (including public enterprises)	59.8	70.6	77.0	88.0	101.1
Other items (net)	-34.6	-42.4	-45.9	-48.6	-55.7
	(In millions of U.S. dollars, unless otherwise indicated)				
Balance of payments					
Exports, f.o.b.	62.0	89.8	93.5	67.3	63.0
Of which : coffee	26.5	22.5	19.4	14.6	15.0
Imports, f.o.b.	248.8	239.8	237.9	234.7	244.0
Trade balance	-186.7	-150.1	-144.4	-167.4	-181.0
Services (net)	-143.0	-141.4	-125.3	-125.1	-143.4
Private current transfers (net)	18.2	11.0	21.7	24.5	31.3
Official current transfers (net)	175.5	205.6	170.1	170.3	192.5
Current account balance (including official transfers)	-147.5	-90.2	-100.3	-116.7	-131.1
Gross official reserves (end of period)	174.2	190.6	212.1	243.6	214.2
Nominal trade-weighted effective exchange rate (1990 = 100)	43.1	37.5	36.8	31.1	29.9
Real trade-weighted effective exchange rate (1990 = 100)	93.1	83.2	80.2	70.2	67.6

Sources: Rwandese authorities; World Bank; and Fund staff estimates.

1/ Including net indirect taxes (not included in the three sectors shown below).
2/ Goods and nonfactor services.
3/ Payment order basis.
4/ Actual figures are based on current exchange rates.

I. AGRICULTURAL STRATEGY AS PART OF A POVERTY REDUCTION PROGRAM[1]

A. Introduction and Summary

1.   This paper analyzes the growth strategy as described in Rwanda's Poverty Reduction Strategy Paper (PRSP). The PRSP constitutes a critical (ongoing) effort aimed at generating poverty-reducing economic growth. Given the many aspects of the overall strategy presented, this paper will focus on the elements of the strategy with a substantial macroeconomic significance.

2.   Poverty in Rwanda is mainly a rural phenomenon, as rural population constitutes about 90 percent of the total, and agricultural productivity in Rwanda is relatively low, even by sub-Saharan African standards. As extreme poverty occurs largely among the rural landless, the PRSP targets high and sustained rates of agricultural growth, to be achieved through agricultural intensification and, in particular, through the use of improved seeds and the increased use of chemical fertilizers.

3.   This paper focuses on the analysis of this strategy, assessing its coherence, and developing policy issues that will need to be taken into consideration in the formulation of appropriate sectoral strategies.

4.   The remainder of the paper is organized as follows: Section B describes the main elements of the growth strategy included in Rwanda's PRSP. Section C focuses on the market for fertilizer, describing its current workings and analyzing possible problems that prevent high volumes of effective demand to materialize. Section D draws the conclusions. Appendices provide supplementary information on issues addressed in the main text.

B. Poverty Reduction Strategy Paper and Growth Targets

5.   Poverty in Rwanda is severe. With an average GDP per capita in current US$ terms of US$200, 60 percent of the population was living in poverty in 2002. Thus, in order to achieve a meaningful improvement in living conditions, overall annual real GDP growth targets under the PRSP are set at 6 percent, compared to the estimated annual population growth rate of 2.5-2.9 percent.

6.   Rwanda's PRSP strategy targets poverty reduction through productivity growth in the primary sector, especially agriculture.[2] The strategy draws on a series of papers written under the Agricultural Policy Development Project (APDP).[3]

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[1] Prepared by Gabriel di Bella and Krzysztof Bledowski. Based on a draft Working Paper by Gabriel di Bella.

[2] See the PRSP (GoR (2002c)), Chapter 3, page 30.

[3] Key papers underpinning the strategy were written by Mellor (2002a,b) and Mellor and Ranade (2002a). Other contributions under the APDP include those by Crissman (2002), Goosens (2002) and De Rosa and

(continued)

Under this strategy:

- Sustained growth in the primary sector (5.3 percent per year for a period of five to seven years) serves as an engine of growth in the rural non-tradable sector. The consequent rural employment generation provides income to the rural landless—the poorest among the rural poor (as is the case for most sub-Saharan African countries, see Khan (2000)).

- In generating an annual rural non-farm growth rate of 6.7 percent, the PRSP assumes an elasticity of rural non-farm activities with respect to farm growth.

- To complete the strategy, the PRSP assumes that the rate of growth of the urban formal sector also reacts to the growth of the primary sector. The posited elasticity results in an annual rate of growth of 7 percent for the urban formal sector.

- Finally, the PRSP argues for an elasticity of urban informal sector growth with respect to urban formal sector growth that leads to a growth rate of 9.2 percent per year for the urban informal sector.[4]

7.   In short, reduced to its bare frame, the PRSP posits that achieving sustained agricultural productivity growth will generate substantially larger productivity increases in other economic sectors. Strong growth in the primary sector is driven by an assumed robust response of (rural) employment to increases in demand for rural non-farm products. Increases in farm income generate both direct effects through the improvement in the situation of farmers, and indirect effects through the generation of non-farm rural activities that, in turn, decrease (the posited high) rate of rural unemployment, and decrease extreme poverty.[5] Mellor (2002a) argues that, given the substantial share of agriculture in GDP, it would be

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others (2002). The target growth rate for the primary sector under PRSP, as well as its rationale, are taken from Mellor (2002a).The Primary Sector growth strategy in Mellor (2002a) is complemented by a Rural Works Program that targets the rural non-farm poor (Mellor (2002b)). The latter three papers set out a strategy for a crop strongly responsive to fertilizer (Irish potato) and analyzes the possible economic impact of trade liberalization in Rwanda.

[4] These figures are identical to those in Mellor (2002a); however, there are some differences in wording: while the PRSP states that the 7 percent growth in the formal urban sector results from the growth in the primary sector, Mellor (2002a) states that this growth is arbitrarily assumed. (See page 30, PRSP and Mellor (2002a) page 28). The 6.7 percent growth in the non-farm rural sector results from an elasticity of 1.5 in excess of the population growth, i.e. $6.7=(5.3-2.5)*1.5+2.5$, where 2.5 is the rate of population growth. The same rationale lies behind the 9.2 percent growth rate in the informal urban sector $(9.2=(7.0-2.5)*1.5+2.5)$. Finally, note that the PRSP does not link these assumptions to the description of the expected sources of growth in the secondary sector based on the expansion of specific manufacturing capacity, including tobacco and brewing (see page 75, PRSP)

[5] Mellor (2002a,b) assumes that the rate of rural unemployment is around 14 percent; however, there are no official estimates for this figure.

difficult to find an alternative engine of both effective demand and employment, taking into consideration the relative unimportance of other economic sectors.

8.   Given the centrality of this growth strategy to the achievement of Rwanda's long-term objectives, it is worth reviewing the soundness of the growth model and the supporting analysis.

Are PRSP target growth rates consistent with existing data?

9.   While agricultural growth constitutes the core of the overall growth strategy described in the PRSP, the coherence of the data set comprising agricultural production in Rwanda is questionable. As will be set out below, these uncertainties call into question the target growth rates for the agricultural sector.[6]

10.   According to national accounts statistics, Rwanda's Primary Sector is composed of food crops, export crops, livestock and other. Table 1 shows average prices for food crops and export crops in 2000, and also, volumes of production for these crops according to the figures published in GoR (2002a).[7] These figures constitute the basis for the calculation of Rwandan national accounts (and are consistent with the figures reported in IMF's Staff Report (IMF (2002a)) and Statistical Appendix (IMF (2002b)). Table 1 also shows production volumes for selected food crops according to a survey conducted by the Food Security Research Project (FSRP) jointly with the Rwandan Ministry of Agriculture (MINAGRI/FSRP (2001)) during the agricultural seasons A and B of 2000 (2002a).[8] In addition, Table 1 displays the target growth rates for each food crop specified in the PRSP.

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[6] This paper follows the recommendations expressed in the PRSP's Joint Staff Assessment, which emphasizes the need for further analytical work regarding the growth strategy.

[7] The figures in GoR(2002a) are also referred to as "National Accounts" in the tables that will follow.

[8] The FSRP is managed by Michigan State University and is also funded by USAID. For a complete list of references, go to http://www.aec.msu.edu/agecon/fs2/rwanda/index.htm.

Table I.1. PRSP's Target Growth Rate for Primary Sector's GDP

	Average Prices for Selected Crops (2000) (RWF/Kg.)	PRSP's Target Growth Rate	2000 Nat. Acc. Figures	2000 FSRP Figures	2001 Nat. Acc. Figures	2001 FSRP Figures
Volumes (In thousand tonnes)						
Food crops			5722.8	3527.5	6068.2	3701.2
Selected food crops			5391.2	3196.0	5717.9	3350.9
Sorghum	82.3	5.0	155.1	129.5	162.9	136.0
Maize	83.7	5.0	62.5	59.1	65.6	62.0
Other cereals			17.8	17.8	18.7	18.7
Wheat	149.5	5.0	6.4	6.4	*6.8*	*6.8*
Rice	229.5	5.0	11.4	11.4	*11.9*	*11.9*
Beans	98.6	5.0	215.3	151.3	226.1	158.9
Peas	137.9	3.0	15.3	7.3	15.8	7.5
Groundnuts/Soya			20.9	20.9	21.5	21.5
Groundnuts	328.6	3.0	7.0	7.0	*7.2*	*7.2*
Soya	155.8	3.0	13.8	13.8	14.3	14.3
Bananas	58.5	3.0	2150.5	1080.9	2215.0	1113.4
Potatoes	36.8	20.0	954.4	320.1	1145.3	384.2
Sweet potatoes	28.7	4.0	1025.6	890.4	1066.6	926.0
Taro	*47.0*	1.0	88.2	88.2	89.1	89.1
Cassava	75.6	1.0	812.4	557.4	820.6	563.0
Vegetables/Fruits	70.3	8.0	204.6	204.6	221.0	221.0
Export crops						
Coffee		15.0				
Tea		15.0				
Livestock		8.0				
Other		3.0				
Gross value (in billions of 2000 RF)						
Food crops			319.6	200.7	335.7	209.5
Selected food crops			293.0	174.2	307.6	181.4
Primary sector GDP (in billions of 2000 RF)			292.2	199.7	307.7	209.3
Food Crops			248.7	156.2	261.2	163.0
Export Crops			7.1	7.1	8.2	8.2
Livestock			24.9	24.9	26.2	26.1
Other			11.5	11.5	12.1	12.1
Changes in primary sector GDP						
Absolute change					15.5	9.6
In percent of 2000 GDP					2.20	1.57
In percent of 2000 Primary GDP					5.32	4.82
PRSP primary sector growth target					5.30	5.30

Source: FSRP, PRSP, Rwandan authorities and authors' calculations

11. Using this information, estimations of gross value, input cost and value added for the primary sector are calculated in order to check whether or not the target growth rate of 5.3 percent for the primary sector is internally consistent, i.e., if it can be derived by using the particular target growth rates assumed on the 2000 values of each component of the primary sector GDP according to the National Account statistics. While this target rate is, in effect, internally consistent, when calculations are performed using the information contained in national accounts (GoR (2002a)), it is not when FSRP figures are used instead.[9,10,11]

12. The reason behind this difference is that production figures in MINAGRI/FSRP (2001) are substantially smaller than those published in GoR (2002a), and so is the relative composition among subsectors (and food crops). Therefore, when applying the target growth rates for the specific subsectors (and crops) assumed in the PRSP, the primary sector rate of growth in 2001 is reduced to 4.8 percent, i.e., 0.5 percentage points lower than targeted.[12,13]

13. Which of the data sets is most reliable? Which data should be used in reviewing the viability of the growth strategy and its projected poverty impact? Insufficient resources and a difficult political situation motivated the disruption of the agricultural surveys in 1991, as mentioned above. In the absence of better ways (or to avoid a painful downward revision of GDP figures), the Ministry of Agriculture based (and continues to base) its estimations of

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[9] If, however, the target growth rates are assumed to last for more than a year, the increase in the importance of those crops for which higher rates of growth are assumed, most notably Irish potatoes, begin to dominate and push the rate of growth of agricultural –and primary- GDP up to 9.5 and 8.3 percent in 2006, if GoR(2002a) or MINAGRI/FSRP figures are used, respectively.

[10] The PRSP and its supporting documents use the year 2000 as their base; to preserve analytical clarity, the paper will use the same base. This will be useful later on to compare actual with forecast figures in the PRSP.

[11] The difficulties encountered in arriving at a consistent time series estimate for Rwanda's agriculture output are extraordinary: "... MINAGRI ..., did not reinstate an agricultural census based on a nationally representative random sample of farmers until the beginning of the 2000A season" (Kelly et al (2001a)). The previous survey conducted by MINAGRI, during 1991, i.e., MINAGRI /FSRP (2001) was, actually, the first survey of agricultural production in ten years.

[12] This difference is mostly the consequence of different production figures for Irish potatoes (950 thousand tones according to GoR (2002a) and only 320 thousand tones according to MINAGRI/FSRP (2001). Goosens (2002) is aware of the differences in figures for the production of Irish potatoes. He also mentions a third source of information, also inconsistent with the first two. Mellor (2002a) explicitly uses official national accounts statistics to obtain its target growth rate for the primary sector and also, for his estimation of the composition of GDP between tradable and not tradable goods production (both in the rural and non-rural sectors). However, when analyzing the regional market for Irish potatoes, he uses FAO figures, which are inconsistent with national account statistics and seem to be in line with the figures reported in MINAGRI/FSRP (2001).

[13] MINAGRI/FSRP (2001) does not include information for the production of groundnuts, soya, taro and vegetables and fruits. Given their limited importance for total agricultural production, their levels were assumed to be equal to those reported in GoR (2002a). Additionally, MINAGRI/FSRP (2001) does not report production figures for export crops; however, production figures for these crops can be assessed from external trade accounts and also from information by OCIR-Café and OCIR-Thé (the public entities involved in coffee and tea distribution). We assumed that the figures reported in GoR (2002a) were accurate.

agricultural production on informal surveys of surfaces planted per crop, per province. However, the Ministry of Agriculture does not run ex-post checks on how accurate these ex-ante estimations were. The FSRP surveys did exactly that, providing production figures based on a nationally representative random sample, not just ex-ante estimations. Given this, the FSRP data would seem to be the most appropriate basis for measuring agricultural production.

14.   Basing the analysis of the growth strategy on the FRSP data leads to three important changes. First, since agricultural production is lower than that included in national account statistics, the growth base will differ from that used in the PRSP. Second, FSRP surveys were conducted only for the period 2000–02 whereas the national accounts continuously overstated estimations of agricultural Third, the overall assessment of poverty in Rwanda, including food security, could be worse than has been actually assessed in the PRSP.[14]

Data inconsistencies: GoR vs. FSRP/Ministry of Agriculture

15.   Table 2 compares selected food crop production for 2000-02 (and gross value of production for 2000) contained in the national account statistics with the surveys conducted by the Ministry of Agriculture. In volume terms, 2000 Ministry of Agriculture totals represent just over 59 percent of those published by the GoR (2002a). For 2001 this ratio falls to 57 percent and jumps to around 70 percent for 2002.[15] Obviously, these differences are substantial enough to influence the assessment of food security in Rwanda.

16.   Finally, as already emphasized (see Table 1), these differences affect the gross value of production for the selected crops included in the Ministry of Agriculture survey. For example, in 2000 the value of production according to the Ministry of Agriculture survey would be over 59 percent of the gross value of production reported by the national accounts.

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[14] A recent technical assistance mission from East AFRITAC confirmed this methodological problem.

[15] The largest differences were found for Irish potatoes and bananas.

Table I.2. Differences in Agricultural Production Data
(In thousand tonnes)

	2000		2001		2002		2000	2001	2002
	National Accounts (A)	FSRP Figures (B)	National Accounts (C)	FSRP (D)	National Accounts (E)	FSRP (F)	(B)/(A) (%)	(D)/(C) (%)	(F)/(E) (%)
Selected food crop production	5391.2	3196.0	4958.8	2832.5	6685.4	4845.1	59.3	57.1	72.5
(In percent of total food crop production)	94.2		93.6		94.2				
Sorghum	155.1	129.5	174.9	108.7	184.3	148.0	83.5	62.1	80.3
Maize	62.5	59.1	92.1	92.5	91.7	113.4	94.5	100.4	123.7
Beans	215.3	151.3	290.0	194.7	246.8	218.8	70.3	67.1	88.6
Peas	15.3	7.3	15.5	8.8	16.0	12.8	47.6	56.8	79.9
Bananas	2150.5	1080.9	1572.7	858.0	2784.9	2024.6	50.3	54.6	72.7
Potatoes	954.4	320.1	971.3	400.3	1038.9	432.3	33.5	41.2	41.6
Sweet potatoes	1025.6	890.4	1154.3	725.3	1291.8	1201.1	86.8	62.8	93.0
Cassava	812.4	557.4	688.0	444.2	1031.1	694.1	68.6	64.6	67.3

Source: FSRP, Rwandan Authorities and authors' calculations

Table 3 shows yields per hectare for selected crops for 2000-02. As expected, yields per hectare according to the Ministry of Agriculture are substantially lower than those reported by the national accounts.[16] As we show later, the differences in yields arise mainly from differences in the volumes produced, although variations in land under cultivation for individual crops also played a role. The total area cultivated as, reported by both sources, was fairly similar, however.

Table I.3. Yields per Type of Crop
(In tonnes)

	2000		2001		2002		2000	2001	2002
	National Accounts (A)	FSRP (B)	National Accounts (C)	FSRP (D)	National Accounts (E)	FSRP (F)	(B)/(A) (%)	(D)/(C) (%)	(F)/(E) (%)
Sorghum	0.89	0.68	1.07	0.71	1.12	0.90	76.8	66.5	79.7
Maize	0.70	0.66	0.82	0.73	0.81	0.92	94.5	88.8	112.8
Beans	0.65	0.49	0.76	0.56	0.64	0.68	75.1	73.4	105.4
Peas	0.51	0.30	0.49	0.28	0.51	0.38	58.7	56.5	75.1
Bananas	5.97	2.94	4.40	2.60	7.76	5.61	49.3	59.1	72.3
Potatoes	8.76	4.09	8.16	3.49	8.68	4.50	46.8	42.8	51.8
Sweet Potatoes	5.87	4.93	6.00	4.02	6.69	6.06	83.9	67.0	90.6
Cassava	6.74	2.35	5.41	1.88	8.07	2.68	34.8	34.8	33.2

Source: FSRP, Rwandan authorities and authors' calculations

In Table 4 we estimate (from Tables 2 and 3) how national accounts would have been affected in 2000 if actual production figures had been used. Such estimation is based on a calculation of gross value of production using average market prices for food crops and an assessment of the input cost ratio, using gross value and value added as reported in GoR

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[16] This is especially the case for cassava, Irish potatoes, bananas and peas.

(2002a).[17] Combining this ratio with the gross value of selected crops contained in MINAGRI/FSRP (2001), we estimated a new value of GDP for food crops. Throughout, the value added for the food crops not included in the MINAGRI/FSRP survey was assumed to be equal to that reported in the national accounts.

Table I.4. Rwanda: National Accounts According to Different Official Sources
(In billions of RF unless otherwise indicated)

	2000 National Accounts (A)	FSRP (B)	(B)-(A)	(B)/(A)
GDP (Factor cost)	658.9	566.4	-92.5	86.0
Primary sector	292.2	199.7	-92.5	68.3
of which food crops	248.7	156.2	-92.5	62.8
GDP (Market prices)	705.7	613.2	-92.5	86.9
Consumption	695.6	603.1	-92.5	86.7
of which private (residual)	621.3	528.8	-92.5	85.1
For memoradum				
RF/USD exchange rate (period average)	389.7	389.7		
GDP (millions current dollars)	1810.9	1573.6	-237.3	86.9
Population (millions)	8.5	8.5		
Per capita GDP (US dollars)	213.0	185.1	-27.9	86.9

Source: FSRP, Rwandan authorities and authors' calculations

17.   The results of these calculations indicate that if the production figures reported in MINAGRI/FSRP (2001) were used to compute the national accounts, the GDP at current prices for the year 2000 would be about 13 percent lower than that reported in the official national accounts. Primary sector GDP would be 32 percent and private consumption 15 percent lower than those reported in the national account statistics.[18] As a result, the primary sector would account for 35 percent of GDP compared to 44 percent of GDP under the official national accounts measure. It is worth noting that the size of the primary sector GDP is a key factor in the poverty reduction strategy as described in the PRSP. Non-farm

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[17] For bananas, a simple average of prices for *banana à cuire* and *banana fruit* was used; for vegetables, the average price was calculated as a simple average of vegetable prices as reported in PRSP.

[18] On the demand side, we assumed that all of the decrease in the value of GDP generated would depress private consumption.

economic growth is assumed to be driven by rural farm income. The smaller is the size of the primary sector, the larger must be the elasticity to obtain gains in rural non-farm income.[19]

Measuring potential increases in agricultural production: a simple methodology

18.   In order to estimate potential increases in agricultural production, the following methodology can be used. Yields y_{ij}^{ρ} per hectare of soil j, in province ρ, for crop i can be defined as

$$(1) \quad y_{ij}^{\rho} = f_{ij}\left(\phi, v \cdot l, \vartheta \cdot s, k; \Theta\right) \cdot \varepsilon,$$

where ϕ denotes the level of fertilization, l is labor input (v accounting for quality of labor), s denotes the seed input (ϑ accounting for quality of seeds), k is the level of physical capital, and Θ is a generic variable that accounts for elements difficult to measure, e.g., the influence of land tenure. ε is a random variable, with $E\varepsilon = 1$ and strictly positive variance, which captures the uncertainties associated with agricultural production, most notably weather developments.[20] In the economically relevant region, $f_{ij\phi}, f_{ijv\cdot l}, f_{ij\vartheta\cdot s}, f_{ijk} > 0$. The same production function holds for all provinces provided that the same type of crop and soil are being considered. Furthermore,

$$(2) \quad \phi = \min\left[\alpha_i \cdot x_1, \gamma_i \cdot x_2\right],$$

where ϕ is defined as a Leontief function (with $\alpha_i > 0$ and $\gamma_i > 0$), with inputs of inorganic (chemical) fertilizer x_1, and organic (manure) fertilizer, x_2. The Leontief technology captures the fixity with which the organic and inorganic fertilizers must be used in order to assure efficiency. For simplicity, the function includes only one (generic) type of inorganic fertilizer.

Production of crop i, in province ρ, is given by

$$(3) \quad Y_i^{\rho} = S^{\rho} \cdot \sum_{j=1}^{J} \theta_j^{\rho} \cdot \lambda_{ij}^{\rho} \cdot y_{ij}^{\rho},$$

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[19] Input costs are probably overestimated because they are measured by market prices instead of farm prices. In the case of export crops, farm (producer) prices were used. Finally, note that these figures imply a per capita GDP of US$185 per year compared to the official figure of US$213 for 2000.

[20] Clay (1996) and Clay and others (2001) are useful references on the determinants of agricultural production in Rwanda.

where S^ρ denotes total (arable) surface in use in hectares in province ρ, θ_j^ρ is the proportion of that surface accounted for by soil of type j in province ρ, and λ_{ij}^ρ denotes the proportion of soil j cultivated with crop i in province ρ. With J denoting the number of different types of soil, $\sum_{j=1}^{J} \theta_j^\rho = 1$. The total national production of crop i is given by

$$(4) \ Y_i = \sum_{\rho=1}^{P} Y_i^\rho,$$

where P denotes the number of provinces in the country.[21]

19.   If data on fertilizer response per type of crop and soil are available, and assuming other inputs can be replicated in real conditions, it is possible to obtain a measure of (total) potential agricultural production. Subsumed in this exercise are data on type of soil per province, and cultivated land per type of crop, soil and province.[22] The relationship allows for assessment of potential increases in agricultural production given changes in fertilizer intensification.

20.   Rwanda is divided into eighteen different agro bioclimatic (ABC) zones (which determine soil qualities) and twelve provinces. Land is cultivated in all provinces except Kigali-Ville (i.e. $J = 18$ and $P = 11$). Berdinger (1993), based on earlier work by J. Gasana on ABC zones, estimated a division of each province into these different zones, i.e., he provided the values of θ_j^ρ, $\forall j, \rho$.[23] In addition, Kelly and Murekezi (2000) provided information about fertilizer response for a number of food crops using NPK or combinations of Urea and DAP in the presence of appropriate amounts of organic fertilizer.[24] The trials are

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[21] Note that in (3), S^ρ could be lower than the total arable surface. In Rwanda, total arable land is estimated at 1,114 thousand hectares. According to 2002 figures from the MINAGRI/FSRP survey, approximately 900 thousand hectares were cultivated in each of Season A and B (slightly more than 80 percent of the total).

[22] These are strong assumptions. If anything, they introduce an upside bias to the results. The measure of potential output as described above is not necessarily associated with any optimal behavior of agents. It just reflects a technical relationship.

[23] Note that we have implicitly assumed the composition of land under cultivation per type of soil to be uniform across the country.

[24] The crops covered in Kelly and Murekezi (2000) are climbing beans, maize, rice, sorghum, Irish potatoes, soybeans, sweet potatoes and cabbage. Additionally, they reported that for the ABC zones where fertilizer trials had been conducted for cassava, wheat and peas, profitability was not assured. To the best of our knowledge no fertilizer trials have been carried out for bananas, coffee and tea. This gap is significant since bananas are the single most important crop while coffee and tea make up most of Rwanda's exports. Desai (2002) reports that OCIR-Café and OCIR-Thé have estimated potential demand for inorganic fertilizer but does not explain the methodology. Murekezi in Abt associates (2002) mentions some estimates for yields associated with fertilizer utilization for tea cultivation but not for coffee.

relevant because they provide information about $f_{ij}(\cdot)$, α_i and γ_i. An assumption of their replicability is key to estimating potential agricultural production. Finally, the allocation of land per type of crop for each province may be obtained from either GoR (2002a) or MINAGRI/FSRP (2001). We will use both for comparability purposes.

21.   Note that the existing information is insufficient to determine the values of λ_{ij}^{ρ}, $\forall\, i, j, \rho$. To fill this gap, we assumed that each crop is cultivated in different types of soil in proportions that are identical to proportions of different ABC zones for the entire province.

22.   It is possible now to extend this simple methodology to the entire agricultural sector. Table 5 provides data on total potential additional production for selected food crops. Given cultivated land per crop, soil and province, we applied the recommended profitable doses of both organic and inorganic fertilizer as reported in Kelly and Murekezi (2000).[25]

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[25] Fertilizer profitability is analyzed in Kelly and Murekezi (2000) using V/C ratios for 1999. A V/C ratio greater than one is considered to be profitable from an economic perspective. This introduces an efficiency measure into an otherwise technical calculation. We have no knowledge of these V/C ratios being extended beyond 1999. Also, many of the fertilizer trials include both NPK and combinations of DAP and Urea. Since the combinations of DAP and Urea are usually more effective, we have computed potential production and fertilizer response using this combination. However, in reality NPK application continues to predominate, as pointed out by Murekezi in Abt associates (2002).

Table I.5. Rwanda: Estimation of Potential Additional Production Derived
from Optimal Fertilizer Utlization

Figures According to National Accounts

	Production in 2000 (A)	Potential Additional Production with Fertilizer (In thousand Tonnes) (B)	(B)/(A)	Gross Value Production in 2000 (C)	Additional Production with Fertilizer (in billions of RF) (D)	(D)/(C)
Selected food crops	1161.9	1308.0	112.6	51.5	60.1	116.7
Sorghum	63.4	88.2	139.1	5.2	7.3	
Maize	25.5	58.7	229.9	2.1	4.9	
Rice	2.6	1.1	42.6	0.6	0.3	
Beans	90.8	63.2	69.7	8.9	6.2	
Soya	5.8	8.4	144.5	0.9	1.3	
Potatoes	657.8	690.0	104.9	24.2	25.4	
Sweet potatoes	304.0	317.0	104.3	8.7	9.1	
Vegetables/Fruits	12.0	81.3	675.3	0.8	5.7	
Gross value of selected food crops				51.5	60.1	
Estimated value added of selected crops				40.1	46.8	
Primary sector (PS) GDP (2000)				292.2		
Value added of selected crops as percent of PS GDP				13.7	20.6	

Figures According to FSRP

	Production in 2000 (A)	Potential Additional Production with Fertilizer (In thousand tonnes) (B)	(B)/(A)	Gross Value Production in 2000 (C)	Additional Production with Fertilizer (in billions of RF) (D)	(D)/(C)
Selected food crops	578.2	1023.3	177.0	26.4	47.3	179.0
Sorghum	44.4	101.6	228.9	3.7	8.4	
Maize	19.1	50.0	261.4	1.6	4.2	
Rice				0.0	0.0	
Beans	65.8	79.9	121.5	6.5	7.9	
Soya				0.0	0.0	
Potatoes	223.0	512.5	229.8	8.2	18.8	
Sweet potatoes	225.9	279.2	123.6	6.5	8.0	
Vegetables/Fruits	*12.0*	*28.3*	235.2	0.8	2.0	
Gross value of selected food crops				26.4	47.3	
Estimated value added of selected crops				20.6	36.8	
Estimated primary sector GDP (2000)				199.7		
Value added of selected crops as percent of PS GDP				10.3	23.7	

Source: FSRP, Rwandan authorities and authors' calculations

23.   Although the same yield responses are applied, the potential increases in crop output will differ depending on which data on cultivated land per type of crop and province are applied (GoR (2002a) vs. MINAGRI/FSRP (2001). The two sources simply supply inconsistent information about cultivated land per crop per province.

24.   Despite its simplicity this methodology is flexible. It has the added relevance of being singled out in the PRSP as the engine of agricultural development in Rwanda. Indeed, Mellor (2002a) assumed that 75 percent of growth of the primary sector GDP can be explained by increases in fertilizer utilization.[26]

25.   The upper part of Table 5 reports the results for potential production gains using the cultivated land per crop as reported in GoR (2002a). Based on these figures, output of selected food crops could be approximately doubled if recommended doses of fertilizer are used. The lower part of Table 5 shows the respective results when applying the data from MINAGRI/FSRP (2001). Following to this latter approach, production of selected food crops could be almost tripled.

26.   Although fertilizer intensification would add to the volume of crops it would add less to the value of primary sector GDP. Given the PRSP's long-term horizon (and the document's consistency with Vision 2020), it is relevant to estimate how sustainable is the 5.3 per cent target growth rate for the primary sector. Regardless of sources of data, such a rate of growth could not be maintained beyond three to four years.

27.   Finally, it is important to stress that this analysis is static in nature, i.e., it does not take into consideration the effects of additional production on prices. Changes in relative supplies could affect relative prices, V/C ratios, and incentives for fertilizer utilization as well as allocation of land for agricultural and non-agricultural purposes.[27]

The agroeconomic potential

28.   For clarity purposes it is important to introduce a concept of agroeconomic potential as specified by theoretical demand for fertilizer. It is defined as the amount of fertilizer consumed which maximizes profits. Basic economic theory teaches us that fertilizer is profitably demanded when its additional cost is more than compensated by the incremental value it generates. This holds for V/C ratios greater than one. At any given time the agroeconomic potential is derived by multiplying the land used (in ha) by the recommended

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[26] See Mellor (2002a) page 7, and PRSP page 30. It is not clear if the reference is to the primary sector as a whole, to food crops only, or to a combination of food and export crops.

[27] In other words, in a fully specified model, $x_1, x_2, s, l, k, \lambda_{ij}^{\rho}$ and prices of each crop i are endogenous and so are V/C ratios per crop. Static exercises, such the ones performed in this paper and in the PRSP, are useful for short-term analysis. Their utility is drastically reduced for longer horizons, where marketing constraints bind. Given current restrictions and uncertainties associated with the Rwandan data sets, such models would be difficult to design and test.

fertilizer doses per crop for V/C ratios greater than one.[28] The estimates of the potential are computed in Table 6 using information from Kelly and Murekezi (2000) for both the GoR (2002a) and the MINAGRI/FSRP (2001) data sets. The first set of columns reports the estimates for selected crops using the sources already mentioned.

29.   The second set of columns shows the additional demand for inorganic fertilizer per crop that could be justified on efficiency grounds. These calculations depict the demand for inorganic fertilizer for V/C ratios greater than two, as reported in Kelly and Murekezi (2000).[29]

30.   It also includes the average recommended doses of organic fertilizer that are needed for inorganic fertilizer to be effective. The third set of columns contains an estimation of the current level of fertilizer use per type of food crop. Note the very low level of utilization compared with the ex-ante potential demand. The fourth set of columns approximates the cultivated area for which economically profitable fertilizer trials were in place. This figure, at 25 percent, indicates that more fertilizer trials could be applied for the main ABC zones and crops, as pointed out in Kelly and Murekezi (2000) and Kelly et al (2001b). The fifth set of columns documents fertilizer productivity indicators per type of food crop, measured by marginal physical product.[30] Finally, the sixth set of columns shows the current composition of fertilizer utilization.[31]

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[28] Kelly et al (2001b) estimated the agro-economic potential for fertilizer using a similar methodology, but took into consideration only those crops for which V/C>3.

[29] A ratio of VC>2 was chosen as a threshold for two reasons. First, it allows us to analyze the proposed schedule of fertilizer increases using those combinations of crop/ABC zone/province for which the response is known to be important. Second, due to doubtful quality of data, we want to constrain the V/C ratio to be greater than one.

[30] As can be seen, the crops most responsive to inorganic fertilizer are Irish potatoes and vegetables. Consequently, Irish potatoes command most of the inorganic fertilizer application.

[31] See Mellor (2002a) page 11. Mellor also estimates potential production gains for coffee and tea resulting from increases in hypothetical application of inorganic fertilizer. He points out, based on a personal observation, that despite production reaching by 1999 a third of its pre-war level, "... in Butare and elsewhere new plantings are going in at a rapid rate." Loveridge (2002) has an alternative view. Consistent with Mellor (2002a), he points out that "substantial percentages of producers have stopped growing coffee in recent years" *but* "[m]ore are considering changes that will place emphasis on alternative crops, notably bananas and beans. A small price decrease from 2001 prices will bring even more coffee growers to the (point) where they stop tending their coffee."

Table I.6. Rwanda: Agroeconomic Potential and Marginal Physical Product of Fertilizer for Selected Crops Using 2000 as Base Year

	2000 Agroeconomic Potential (V/C>1, 1999) (,000 tonnes)		2000 Agroeconomic Potential (V/C>2, 1999) (,000 tonnes)		2000 Current Utilization (,000 tonnes)		2000 % of Cultivated Area Included in Calculation		2000 Estimated MPP of Fertilizer Extra Tonnes per ,000 extra Fertilizer Utilization		2000 Estimated MPP of Fertilizer Extra Tonnes per ,000 extra Fertilizer utilization	
	(A)	(B)	(A)	(B)	(A)	(B)	(A)	(B)	(A)	(B)	(A)	(B)
Total fertilizer												
Inorganic	80.91	75.11	79.33	73.44	1.59	1.68	26.2	24.0				
Organic			1416.80	1352.25								
Sorghum												
Inorganic	12.29	14.44	12.04	14.39	0.25	0.05	42.2	46.5	7.3	7.1	15.6	2.8
Organic			294.21	355.54								
Maize												
Inorganic	7.19	7.36	7.18	7.36	0.01	0.00	42.9	34.3	8.2	6.8	0.3	0.3
Organic			153.89	145.77								
Rice												
Inorganic	0.16	0.03	0.11	0.02	0.05	0.01	17.9	3.1	10.2		3.1	0.5
Organic			3.06	0.68								
Beans												
Inorganic	17.30	16.46	17.23	16.39	0.07	0.07	45.8	47.3	3.7	4.9	4.4	4.2
Organic			533.90	516.11								
Soya												
Inorganic	1.62	0.49	1.61	0.48	0.00	0.01	39.2	32.2	5.2		0.3	0.3
Organic			28.99	13.95								
Potatoes												
Inorganic	18.40	14.56	17.24	13.07	1.16	1.49	65.8	67.0	40.0	39.2	73.3	88.9
Organic			179.37	130.90								
Sweet potatoes												
Inorganic	23.11	21.46	23.08	21.43	0.03	0.03	29.7	25.9	13.7	13.0	1.9	1.5
Organic			201.84	181.78								
Vegetables/Fruits												
Inorganic	0.85	0.32	0.83	0.29	0.02	0.03	6.9	8.0	97.6	97.6	1.0	1.5
Organic			21.55	7.51								

Source: FSRP, Rwandan authorities and authors' calculations
Notes: (A) National Accounts; (B) FSRP

Proposed fertilizer intensification and growth targets

31.   It is possible now to make an assessment of the consistency between the target growth rates and fertilizer intensification proposed in the PRSP and its supporting documents. To assess such consistency, the target increases in fertilizer included in the PRSP are combined with the data reported in Table 6. The results are reported in Tables 7 and 9 for GoR (2002a) data sets and in Tables 8 and 10 for MINAGRI/FSRP (2001) data sets.

32.   Since the PRSP does not specify how increases in fertilizer utilization are to be allocated among different crops, Tables 7 and 8 approximate this allocation to that reported by Mellor (2002a). Mellor assumes that coffee and tea are strongly fertilized (relative to other crops). This is backed by data regarding current fertilizer consumption. However, it is important to point out that no published results are available with respect to yield response of these crops to inorganic fertilizer.

33.   Tables 9 and 10 calculate increases in hypothetical agricultural production, both in volume and in 2000 Rwandan francs (RWF), if fertilizer had been applied as reported in Tables 7 and 8. Again, the estimates depend on the choice of official sources. The first part of the tables shows increases in volumes and the second part increases in value.

Table I.7. Rwanda: Proposed Schedule for Fertilizer Intensification and Associated Production Increases
(For selected Crops. Figures According with National Accounts Figures)

	2000	2001	2002	2003	2004	2005	2006	Agroeconomic Potential
Food and Export Crops	2.94	4.94	7.94	12.94	17.95	22.94	27.94	
annual changes		*2.00*	*3.00*	*5.00*	*5.00*	*5.00*	*5.00*	
		2.00	*3.00*	*5.00*	*5.00*	*5.00*	*5.00*	
Sorghum	0.25	0.27	0.46	0.84	1.39	1.86	2.29	12.29
annual changes		*0.03*	*0.18*	*0.38*	*0.55*	*0.47*	*0.44*	
Maize	0.01	0.06	0.24	0.62	1.17	1.63	2.16	7.19
annual changes		*0.05*	*0.18*	*0.38*	*0.55*	*0.46*	*0.53*	
Rice	0.05	0.16	0.16	0.16	0.16	0.16	0.16	0.16
annual changes		*0.11*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	
Beans	0.07	0.12	0.30	0.68	1.23	1.69	2.13	17.30
annual changes		*0.05*	*0.18*	*0.38*	*0.55*	*0.46*	*0.44*	
Soya	0.00	0.06	0.24	0.62	1.17	1.62	1.62	1.62
annual changes		*0.05*	*0.18*	*0.38*	*0.55*	*0.45*	*0.00*	
Potatoes	1.16	1.96	3.06	5.06	6.06	7.31	8.81	18.40
annual changes		*0.80*	*1.10*	*2.00*	*1.00*	*1.25*	*1.50*	
Sweet Potatoes	0.03	0.08	0.26	0.64	1.19	1.65	2.09	23.11
annual changes		*0.05*	*0.18*	*0.38*	*0.55*	*0.46*	*0.44*	
Vegetables/Fruits	0.02	0.07	0.12	0.17	0.22	0.27	0.32	0.85
annual changes		*0.05*	*0.05*	*0.05*	*0.05*	*0.05*	*0.05*	
Coffee and Tea	1.36	2.17	3.11	4.16	5.36	6.76	8.36	
annual changes		*0.81*	*0.94*	*1.05*	*1.20*	*1.40*	*1.60*	
Coffee	1.20	1.91	2.74	3.67	4.73	5.97	7.38	
annual changes		*0.72*	*0.83*	*0.93*	*1.06*	*1.24*	*1.41*	
Tea	0.16	0.25	0.36	0.49	0.63	0.79	0.98	
annual changes		*0.09*	*0.11*	*0.12*	*0.14*	*0.16*	*0.19*	

Source: FSRP, Rwandan authorities and authors' calculations

Table I.8. Rwanda: Proposed Schedule for Fertilizer Intensification and Associated Production Increases
(For Selected Crops. Figures According with FSRP Survey)

	2000	2001	2002	2003	2004	2005	2006	Agroeconomic Potential
Food and export crops	1.68	*3.68*	*6.68*	*11.68*	*16.67*	*21.67*	*26.68*	
annual changes		*2.00*	*3.00*	*5.00*	*5.00*	*5.00*	*5.00*	
		2.00	*3.00*	*5.00*	*5.00*	*5.00*	*5.00*	
Sorghum	0.05	*0.23*	*0.53*	*1.06*	*1.87*	*2.60*	*3.19*	14.44
annual changes		*0.18*	*0.30*	*0.53*	*0.81*	*0.73*	*0.59*	
Maize	0.00	*0.19*	*0.51*	*1.06*	*1.89*	*2.61*	*3.31*	7.36
annual changes		*0.19*	*0.32*	*0.55*	*0.83*	*0.72*	*0.70*	
Rice	0.01	*0.01*	*0.01*	*0.01*	*0.01*	*0.01*	*0.01*	0.03
annual changes		*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	
Beans	0.07	*0.27*	*0.59*	*1.14*	*1.95*	*2.65*	*3.25*	16.46
annual changes		*0.20*	*0.32*	*0.55*	*0.81*	*0.70*	*0.60*	
Soya	0.01	*0.01*	*0.01*	*0.01*	*0.01*	*0.01*	*0.01*	0.49
annual changes		*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	
Potatoes	1.49	*2.41*	*3.74*	*6.02*	*7.07*	*8.37*	*9.87*	14.56
annual changes		*0.92*	*1.33*	*2.28*	*1.05*	*1.30*	*1.50*	
Sweet potatoes	0.03	*0.23*	*0.55*	*1.10*	*1.92*	*2.63*	*3.23*	21.46
annual changes		*0.21*	*0.32*	*0.55*	*0.82*	*0.71*	*0.60*	
Vegetables/Fruits	*0.03*	*0.08*	*0.13*	*0.18*	*0.23*	*0.28*	*0.32*	0.32
annual changes		*0.05*	*0.05*	*0.05*	*0.05*	*0.05*	*0.04*	
Coffee and Tea	1.36	2.17	3.11	4.16	5.36	6.76	8.36	
annual changes		*0.81*	*0.94*	*1.05*	*1.20*	*1.40*	*1.60*	
Coffee	1.20	1.91	2.74	3.67	4.73	5.97	7.38	
annual changes		*0.72*	*0.83*	*0.93*	*1.06*	*1.24*	*1.41*	
Tea	0.16	0.25	0.36	0.49	0.63	0.79	0.98	
annual changes		*0.09*	*0.11*	*0.12*	*0.14*	*0.16*	*0.19*	

Source: FSRP, Rwandan authorities and authors' calculations

34.   Assuming the GoR (2002a) data set, Table 9 shows that 0.51 percentage points of primary sector GDP growth in 2000 can be ascribed to fertilizer intensification and 1.61 percentage points to other sources.

Table I.9. Rwanda: Analysis of the PRSP Target Growth Rate for the Primary Sector
(Figures Consistent with National Accounts Figures)

	2001	2002	2003	2004	2005	2006	Simple Avg.
	(In Thousand Tonnes)						
Food Crops	114.16	132.26	177.97	146.59	155.39	165.37	148.62
	Extra production estimated from National Account figures						
Selected food crops	39.78	55.82	99.42	65.87	72.43	80.11	68.91
Sorghum	0.19	1.33	2.79	4.03	3.44	3.21	2.50
Maize	0.42	1.49	3.11	4.50	3.75	4.36	2.94
Rice	1.10	0.00	0.00	0.00	0.00	0.00	0.18
Beans	0.19	0.67	1.40	2.02	1.69	1.61	1.26
Soya	0.27	0.94	1.97	2.86	2.34	0.00	1.40
Potatoes	32.02	44.02	80.04	40.02	50.03	60.03	51.03
Sweet potatoes	0.71	2.49	5.23	7.56	6.31	6.02	4.72
Vegetables/Fruits	4.88	4.88	4.88	4.88	4.88	4.88	4.88
	Extra production assumed equal to that in the PRSP						
Bananas	64.52	66.45	68.44	70.50	72.61	74.79	69.55
Other roots and tubers	9.01	9.10	9.19	9.28	9.37	9.47	9.23
Cassava	8.12	8.21	8.29	8.37	8.45	8.54	8.33
Taro	0.88	0.89	0.90	0.91	0.92	0.93	0.90
Other	0.86	0.89	0.92	0.94	0.97	1.00	0.93
Wheat	0.19	0.20	0.21	0.21	0.22	0.22	0.21
Peas	0.46	0.47	0.49	0.50	0.52	0.53	0.50
Groundnuts	0.21	0.22	0.22	0.23	0.24	0.24	0.23
Export crops							
Coffee							
Parchment	3.60	4.14	4.76	5.48	6.30	7.24	5.25
Green	2.42	2.78	3.19	3.67	4.22	4.86	3.52
Tea							
Green leaves	9.44	10.85	12.48	14.35	16.50	18.98	13.77
The Noir	2.16	2.48	2.86	3.29	3.78	4.34	3.15
	Primary sector GDP forecast using PRSP's assumptions regarding fertilizer utilization (in billions of 2000 RF)						
Food crops	6.20	4.56	6.43	6.12	6.72	7.34	6.23
In percent of 2000 PS GDP	2.12	1.56	2.20	2.09	2.30	2.51	2.13
Selected food crops	1.48	1.93	3.40	2.63	2.72	2.73	2.48
In percent of 2000 PS GDP	0.51	0.66	1.16	0.90	0.93	0.93	0.85
Export crops	1.07	1.22	1.41	1.62	1.86	2.14	1.55
In percent of 2000 PS GDP	0.36	0.42	0.48	0.55	0.64	0.73	0.53
Food and export crops	7.26	5.79	7.84	7.74	8.58	9.48	7.78
In percent of 2000 PS GDP	2.49	1.98	2.68	2.65	2.94	3.24	2.66
Livestock and other	1.51	1.20	1.63	1.61	1.78	1.97	1.62
In percent of 2000 PS GDP	0.52	0.41	0.56	0.55	0.61	0.67	0.55
Total primary sector GDP	8.77	6.99	9.47	9.34	10.37	11.45	9.40
In percent of 2000 GDP	1.24	0.99	1.34	1.32	1.47	1.62	1.33
In percent of 2000 PS GDP	3.00	2.39	3.24	3.20	3.55	3.92	3.22
In percent of PRSP target	5.30	5.30	5.30	5.30	5.30	5.30	5.30

Source: FSRP, Rwandan authorities authors' calculations

Table I.10. Rwanda: Analysis of the PRSP Target Growth Rate for the Primary Sector
(Figures Consistent with the MINAGRI/FSRP Survey)

	2001	2002	2003	2004	2005	2006	Simple Avg.
			(In Thousand Tonnes)				
Food crops	86.70	107.63	153.30	114.84	122.48	127.49	118.74
		Extra production estimated from National Account figures					
Selected food crops	47.19	67.06	111.65	72.07	78.56	82.39	76.49
Sorghum	1.28	2.13	3.75	5.72	5.15	4.16	3.70
Maize	1.30	2.15	3.74	5.64	4.89	4.76	3.75
Rice							
Beans	0.98	1.54	2.69	3.95	3.41	2.92	2.58
Soya							
Potatoes	36.08	52.16	89.42	41.18	50.99	58.83	54.78
Sweet potatoes	2.68	4.19	7.18	10.69	9.24	7.80	6.96
Vegetables/Fruits	4.88	4.88	4.88	4.88	4.88	3.93	4.72
		Extra production assumed equal to that in the PRSP					
Bananas	32.43	33.40	34.40	35.43	36.50	37.59	34.96
Other roots and tubers	6.46	6.52	6.59	6.65	6.72	6.79	6.62
Cassava	5.57	5.63	5.69	5.74	5.80	5.86	5.72
Taro	*0.88*	*0.89*	*0.90*	*0.91*	*0.92*	*0.93*	0.90
Other	0.62	0.64	0.66	0.68	0.70	0.72	0.67
Wheat	*0.19*	*0.20*	*0.21*	*0.21*	*0.22*	*0.22*	0.21
Peas	0.22	0.23	0.23	0.24	0.25	0.25	0.24
Groundnuts	*0.21*	*0.22*	*0.22*	*0.23*	*0.24*	*0.24*	0.23
Export crops							
Coffee							
Parchment	3.60	4.14	4.76	5.48	6.30	7.24	5.25
Green	2.42	2.78	3.19	3.67	4.22	4.86	3.52
Tea							
Green leaves	9.44	10.85	12.48	14.35	16.50	18.98	13.77
The Noir	2.16	2.48	2.86	3.29	3.78	4.34	3.15
	Primary sector GDP forecast using PRSP's assumptions regarding fertilizer utilization						
			(In billions of 2000 RF)				
Food crops	3.54	4.23	5.71	4.81	4.99	5.08	4.73
In percent of 2000 PS GDP	1.77	2.12	2.86	2.41	2.50	2.54	2.37
Selected food crops	1.60	2.25	3.67	2.72	2.84	2.87	2.66
In percent of 2000 PS GDP	0.80	1.13	1.84	1.36	1.42	1.44	1.33
Export crops	1.07	1.22	1.41.	1.62	1.86	2.14	1.55
In percent of 2000 PS GDP	0.53	0.61	0.71	0.81	0.93	1.07	0.78
Food and export crops	4.60	5.46	7.12	6.43	6.85	7.22	6.28
In percent of 2000 PS GDP	2.30	2.73	3.57	3.22	3.43	3.61	3.15
Livestock and other	0.96	1.13	1.48	1.34	1.42	1.50	1.30
In percent of 2000 PS GDP	0.48	0.57	0.74	0.67	0.71	0.75	0.65
Total primary sector GDP	5.56	6.59	8.60	7.77	8.28	8.72	7.59
In percent of 2000 GDP	0.91	1.08	1.40	1.27	.135	1.42	1.24
In percent of 2000 PS GDP	2.78	3.30	4.31	3.89	4.14	4.37	3.80
In percent PRSP target	5.30	5.30	5.30	5.30	5.30	5.30	5.30

Source: FSRP, Rwandan authorities and authors' calculations

35.   For export crops we replicate the growth rates of Mellor (2002a), which results in a 0.36 percentage points increase of 2000 primary sector GDP, due mainly to fertilizer intensification. Finally, the remaining categories (including livestock) are assumed to grow at a rate which explains 17.2 percent of total primary sector growth and generates a growth equivalent of 0.52 percentage points of the sectoral GDP.[32]

36.   Adding up all component growth rates of the primary sector gives us the constant 2000 prices growth rate of 3 percent. This rate should be compared to the target rate of 5.3 percent. Additionally, of the 3 percent increase, only 0.87 percentage points could be ascribed purely to fertilizer intensification Therefore, less than a third of the increase in sectoral GDP growth could be explained by fertilizer intensification. This is below the assumed 75 percent.

37.   Assuming the MINAGRI/FSRP (2001) data set, Table 10 shows that 0.8 percentage points of primary sector GDP growth in 2000 can be ascribed to fertilizer intensification and 0.97 percentage points to other sources. Export crops explain a higher percentage of the growth rate compared to the previous data set due to a lower production base (0.53 percentage points of growth for 2001). Finally, other subsectors are assumed to grow at a rate which explains 17.2 percent of total primary sector growth.

38.   Adding up all component growth rates of the primary sector gives us the growth rate of 2.8 percent. Of the 2.8 percent increase, 1.3 percentage points can be ascribed purely to fertilizer intensification. This implies that using MINAGRI/FSRP (2001) as a base, approximately half of the increase in the sectoral GDP growth could be explained by fertilizer intensification. Again, this figure is well below the hypothesized 75 percent.

39.   The above analysis has focused on the year 2001. Its extension to later periods reveals that the projected primary sector GDP increases are never close to the 5.3 percent target. The estimated (simple) average of primary sector growth for 2001–2006 is 3.2 percent for GoR (2002a) data, and 3.8 percent for MINAGRI/FSRP (2001) data.

40.   These results should not surprise if current utilization of land per crop (see Table 5) is considered. Higher ex-ante growth rates of primary sector GDP might be possible if a significant redistribution of land takes place in favor of those crop plantings which are most fertilizer-responsive. Finally, we should emphasize a salient assumption of adequate supply of manure, labor and capital which are forthcoming at all levels of output.

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[32] Since there are no fertilizer response trials for bananas, other roots and tubers, wheat, peas, groundnuts and export crops, production increases of these crops followed those of Mellor (2002a) If anything, the estimates are upward biased.

Upshots for the overall growth strategy

41.   The primary sector has been assumed throughout to be the engine of growth strategy. The key rationale is the large share of this sector in GDP and the large proportion of agricultural employment in total employment.

42.   However, the following factors introduce uncertainty into our model:

•   Assumptions about primary sector shares in GDP;

•   internal consistency of sector target growth rates based on available information;

•   sustainability of primary sector growth rates given resource endowments and fertilizer response;

•   assumptions about crop gains for which there are no known fertilizer response trials;

•   assumptions about fertilizer effectiveness and proportions of its application

•   assumptions about land conservation investments and labor/capital supply elasticities;

•   assumptions about size of rural non-farm output potential, rural unemployment, elasticity of non-farm growth with respect to farm growth, and shares of formal and informal sectors in GDP.

43.   If for any of these reasons the primary sector expands at a lower rate the overall GDP and employment will lag accordingly. The difference between the GoR and MINAGRI/FSRP statistics alone accounts for 10 percentage points gap in the size of the primary sector. More research on fertilizer response should be conducted for different combinations of crops/ABC zones, as well as on conditions in which inorganic fertilizer is used. Inadequate combinations of organic and inorganic fertilizer could render disappointing results as emphasized in Kelly and Murekezi (2000) and Kelly et al (2001b). Finally, it is important to consider a market for fertilizer which could be a constraining factor. This is specially relevant given the uncertainty associated with land tenure and land tenure institutions.

C. The Market for Fertilizer

44.   At this point, it is clear that fertilizer intensification is the main factor behind high targeted growth rates of agriculture. We will therefore examine the current trends in Rwanda's market for fertilizer. Kelly and Murekezi (2000), Kelly et al (2001a) and Kelly et al (2001b) analyzed this market as part of Rwanda's FSRP while Abt Associates (2002) and

Desai (2002) did the same within the APDP). This section summarizes their findings, with special emphasis on those elements which could hamper effective fertilizer demand.[33]

The supply of fertilizer

45.   The (chemical) fertilizer used in Rwanda is imported from external sources: no domestic production base exist. Fertilizer is imported by a few private traders, mainly through Dar-es-Salaam, which replaced Mombassa as the main port of entry. Some NGOs have also added to the supply in recent years. In 1995–98 the EU supported exports of fertilizer to Rwanda under a sliding scale of subsidy which decreased from 50 percent in 1995 to 20 percent in 1998. From 1999 on the market for fertilizer has become fully liberalized. A Ministry of Agriculture decree, which banned distribution of free or subsidized farm inputs, was followed by two laws (05/2000 and 06/2000) which regulate imports of agricultural products, and which exempted fertilizer from duties and sales taxes for a period of three years.[34] These measures support the development of the private sector free from institutional distortions. It appears that the supply response has been good (see Cook in Abt Associates (2002) and Desai in Abt Associates (2002) and Desai (2002)).

46.   Mauritius is Rwanda's largest fertilizer trading partner. This points to unfulfilled potential economies of scale in transportation which could lower prices in the future. The actual supply could be higher than total imports as reported by the National Bank of Rwanda (NBR). The unclassified imports through the Cyanika border post (Cook in Abt Associates, 2000) might explain the difference.

47.   There seem to be two main regional markets. The one in the Northwest has a center in Ruhengeri, while the rest of the country is supplied from Kigali-Ville. Informal traders are more common in Ruhengeri and formal traders more common in Kigali-Ville (Cook, in Abt Associates, 2002). Some supply inadequacies prevail (Desai, 2002), Kelly et al (2001a)).

48.   Distribution to farmers takes place through cooperatives and wholesale traders who buy fertilizer from importers and sell it on by the sack (50 kgs. per sack). Retailers and producers' associations sell by the sack or less-than-sack. Wholesalers may grant credit to retailers or buyer by-the-sack, with allocation on a case-by-case basis. In turn, Cooperatives may sell fertilizer to non-members if the latter pay in cash (Cook in Abt Associates, 2000). Sixty percent of fertilizer operations are cash-based (Kelly et al, 2001a).

49.   The Agriculture and Rural Market Development Project (ARMDP), managed by the World Bank, attempted to promote a virtuous circle of fertilizer utilization through extension of credit. However, he project met limited success (Desai, 2002).

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[33] See Appendix 2 for a more detailed description of fertilizer utilization during 2000.

[34] These exemptions may be extended for additional three years by a presidential decree.

The demand for fertilizer

50.   The main users of inorganic fertilizer are OCIR-Thé and OCIR-Café (Desai in Abt Associates (2002) and Cook in Abt Associates (2002)). Outside of coffee and tea, fertilizer in mostly applied in the Ruhengeri and Gisenyi provinces and for growing Irish potatoes.

51.   Individual private demand is feeble and quantities demanded relatively small. According to FSRP figures for 2001, from a sample of 1500 households only 72 bought fertilizer. They purchased altogether 1.59 tones, with a mean of 22 kgs, a median of 10 kgs, and a mode of 1 kg per household (Cook in Abt Associates, 2002). According to Kelly et al (2001b) there exist crop/ABC combinations that could be profitably exploited through fertilizer intensification.

52.   A growing number of farmers' associations seem to benefit from preferential treatment accorded by NGO (Murekezi in Abt Associates, 2002). Farmers' associations join larger cooperatives, which in turn, grant them credit. Some cooperatives, however, are unwilling to take on new members because of debt collection problems (Cook in Abt Associates, 2002).

Some corollaries

53.   Higher import volumes could bring about substantial decreases in the cost of fertilizer, benefiting from economies of scale in transportation. Prices are relatively high due to low import volumes and inefficiencies in the supply chain (Desai in Abt Associates, 2002) and Desai (2002).

54.   Low fertilizer demand, which impedes exploitation of profitable opportunities, stems from farmers' knowledge gaps, cash constraints, and an unregulated land tenure system. Kelly et al (2001a) points at some contradictions of farmers' knowledge about complementarity of organic and inorganic fertilizer, fertilizer and pesticides application, and the importance of seed quality. It seems that many opportunities are, indeed, already known to farmers. Cash constraints do appear to depress effective demand as agricultural production in Rwanda is mostly of the subsistence type. Many farmers cite high prices as a reason for not using fertilizer (Kelly et al, 2001a). The decreasing average farm size combined with rapid population growth hamper the design of programs addressing this constraint. However, the smaller the average farm, the larger the gains made possible through farmers' associations. A program like the World Bank's ARMDP contains many elements needed to solve the cash dilemma. Rwanda's fertilizer market seems to suffer not from lack of suppliers' working capital but from lack of effective demand.[35] For this strategy to succeed,

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[35] At 2000 prices and exchange rates the market was estimated at 5,000 tones of inorganic fertilizer or barely more than US$3 million. The ARMDP program boasted resources of US$5 million financed by a concessional IDA loan.

loan collection rates should increase.[36] Fertilizer utilization may not be directed towards the most responsive crops due to poor education. *The ubudehe mu kurwanya ubukene* decentralization mechanism, as described in the PRSP, could be deployed to correct for this shortcoming.[37]

55.   Low levels of fertilizer demand could also stem from land tenure deficiencies. As Khan (2000) emphasizes, property rights are neither well-defined nor well enforced.[38]

D. Conclusions

56.   The analysis of the agricultural strategy for Rwanda has shown that sustainable economic growth is achievable under the right policy mix. However, poverty reduction consistent with the Vision 2020 targets will be difficult to attain even under the most favorable fertilizer intensification. Notwithstanding the appropriateness of the theoretical approach undertaken here, we feel that the development of the primary sector should remain a cornerstone of any strategy. Agriculture makes up the largest part of GDP and so has the greatest potential to reduce poverty

57.   Although the original PRSP considered various sectoral strategies, including one for agriculture, the recent Progress Report recognizes difficulties in drafting a coherent approach. The authorities explain away the delays through lack of resources, although inadequate prioritization plays a role, too. Our findings may serve as guideposts to devise a lucid strategy for the agricultural sector.

58.   **First**, there is an urgent need to improve the methodology of estimating the GDP in general, and the primary sector in particular. The extension of FSRP surveys within the framework of national accounts is a step in the right direction.

59.   **Second**, it would be advisable to conduct fertilizer response trials for those crops and ABC zone combinations which are currently not included in the Ministry of Agriculture/FSRP database. With the current composition of crops fertilizer responses, potential GDP growth rates of around 5 percent are sustainable only for four years at most. Fertilizer utilization surveys should be conducted regularly to estimate marginal physical

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[36] Kelly et al (2001b) actually discourage use of credit-based schemes. Kelly believes that free distribution of fertilizer could trigger a virtuous circle of productivity and income growth. She cites failed experience with credit-based schemes in other African countries where repayment rates were very low (Kelly, personal communication).

[37] See Appendix A of the PRSP.

[38] As of this writing, the government of Rwanda is preparing a land tenure reform law which would grant deeds of ownership to all farmers tilling or occupying land. The deeds would be fully transferable and an open market for them upheld and encouraged. If implemented and enforced, this change could contribute to concentration of holdings and growth in income, which in turn, could alleviate the cash shortages mentioned above.

products for different crops and ABC combinations. This would help identify areas in which lack of organic fertilizer application or soil conservation act as constraints for growth.

60.   **Third**, target growth rates for the primary sector can be achieved only if stronger fertilization than that assumed in the PRSP is in place. More attention should be paid to improvements of other inputs, such as seeds, labor or soil (through conservation investments).

61.   **Fourth**, while the approach taken in this study was static, the problems which Rwanda face are dynamic in nature. In the medium term, most economic variables are endogenous. For example, increases relative supply of some products will affect V/C ratios. An adequate growth strategy should take into account changes in behavior and incentives.

62.   **Fifth**, the development of a well-functioning market for fertilizer is key to achieving the growth objectives specified in the PRSP. Of paramount importance are policies to stimulate effective fertilizer demand. Among barriers we have identified are lack of knowledge, cash constraints, marketing problems and inadequate land-tenure laws. Of those, the former three seem to be the most important.

Two additional points should be made here:

63.   Various support programs (public and private) ought to be integrated under one sectoral strategy. This will economize resources, avoid duplication and provide for a coherent effort to fight poverty.

64.   Finally, key priority expenditure programs would benefit from an estimation of expected rates of return. This would improve the monitoring process by establishing benchmarks against which results could be compared.

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II. RWANDA'S COFFEE EXPORTS: PAST EXPERIENCE AND LESSONS FOR THE FUTURE[39]

A. Introduction

65.   **The Rwandese authorities adopted an ambitious growth strategy for the country's coffee sector, which accounted for nearly a quarter of total merchandize exports in 2003.** Given its importance for export performance, the Rwandese authorities targeted improving the performance of the coffee sector, along with tea and tourism, as a critical element in their export promotion strategy (EPS). Under the EPS, coffee exports are programmed to more than double under a seven year plan that was initially expected to begin in 2003. In a move to improve the quality of coffee exports, the strategy targets an increase in the share of higher quality, fully-washed coffee from 3 percent of total coffee exports (in volume terms) in 2003 to 60 percent by 2010. Overall, annual export earnings would increase to a range of US$52 million to US$62 million by 2010, from US$15 million in 2003 (see OCIR-Café, Action Plan 2003-2010, September 2003).

66.   **The strategy's implementation represents a considerable challenge, given that the coffee sector's performance has been continuously declining over the past twenty years.** Exports, which account for almost all of domestic production, have experienced substantial fluctuations, peaking at 46,000 tons in 1986 and declining to a low of 14,700 tons in 2003 (Figure II-1). Within this variation, the genocide in

Figure II-1. Rwanda: Coffee Export Volume and Producer Prices

Export volume ('000 metric tons, left scale) — Producer prices (US$/lb., right scale)

Sources: 1984-2003, Rwandese authorities; 2004, Fund staff projection.

1994 marks a clear turning point, after which volumes experienced a sharp and persistent drop relative to their pre-war levels: in 2003, nine years after the event, coffee exports were still at about only 50 percent of the 1993 level.
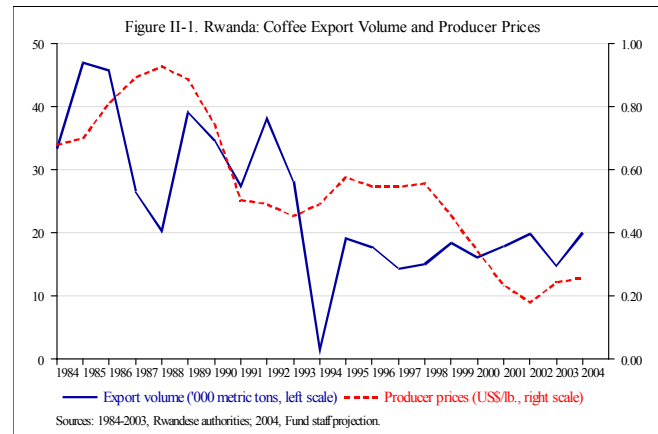
67.   **A combination of several domestic factors impeded export volumes to recover more fully in the post-genocide era:**

- Efforts to *replace aging coffee trees* had been significantly scaled down and led to lower productivity and poorer bean quality;[40]

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[39] Prepared by B. Rother (PDR).

[40] Significant efforts to renew the stock of trees only started recently: OCIR-Café targets the replacement of 40 million out of an estimated total of 60 million trees throughout the next years. However, in 2004, the first year of the program, only some estimated 4 million have been replaced. For 2005, OCIR-Café intends to rejuvenile another 6 million.

- the change in the *responsibilities of OCIR-Café*, the government's sectoral support body, toward a role focused on promotional activities and quality assurance effectively eliminated an important channel of providing extension services to many small farmers and associations;

- the *use of input factors* decreased sharply, in part as a result of changes at OCIR-Café. Fertilizer consumption in 2002 was estimated at 128 tons compared to the 5,200 tons that had been targeted under the EPS (see Coffee action plan, p.2);

- the sector's *fragmented production structure*, which is dominated by individual farmers and farmer associations, suffers from poor access to capital and unsettled disputes over land titles;

- and finally, many small scale producers lack the necessary skill set.

68.   **Beyond this, export performance suffered from an almost continuous decline in unit prices,** with Rwandese producer prices falling from levels around US$0.90 per pound. in the late 1980s to US$0.26 in 2002. While prices rose modestly over the past year, partially driven by a bad harvest in Brazil, the outlook for the medium-term is uncertain.

69.   **The remainder of the paper contains a comparative analysis of Rwanda's recent experience relative to other Arabica producing countries, with the aim of assessing the authorities' EPS in a broader perspective.** In Section B, we examine whether price and volume trends observed in Rwanda's coffee export sector between 1997 and 2003 had been shared by its main competitors or were, alternatively, country-specific phenomena. The section also contains a cross-country analysis which seeks to identify key drivers of export volume growth—with the objective of better understanding whether Rwanda is exposed to some severe structural disadvantages vis-à-vis other producer countries. In Section C, the discussion then relates the empirical results to Rwanda's coffee strategy, focusing on whether the findings are broadly consistent with the main thrust of the document.

B. Comparative Performance of Rwanda's Coffee Sector

70.   **Is Rwanda's experience of declining export volumes and producer prices unique or is it a trend widely shared among Arabica exporting countries?** The exercise to put Rwanda's performance in perspective is guided by the following set of questions:

- How did *producer prices* evolve for Rwanda relative to its competitors, both in terms of level and volatility?

- How did Rwandese *export volumes* change compared to those of other Arabica producing countries over the last six years?

- And finally, do specific *structural conditions* help explaining cross-country variability in export performance? As data limitations only allow a quantitative study of the main Arabica market rather than smaller niche segments, the focus in this part

of the study lies on the explanation of export volume growth, with producer prices being assumed to be largely beyond the control of the individual exporting country.

The data set covers 21 Arabica producing countries over the period 1997-2003 and was constructed from published data of the International Coffee Organization (ICO).[41] It is accessible under www.ico.org and was completed, for macroeconomic concepts, by data drawn from the IMF's World Economic Outlook database.

C. Price Developments, 1997–2003

71. **The decline in producer prices had been a global phenomenon, but African countries were particularly exposed to negative world market trends:**

- While a substantial gap can be observed between wholesale (proxied by the ICO indicator, which is a weighed average of New York and German market prices) and average producer prices, the mark-up was not stable over time: for the average producer country, the price gap narrowed in 2000-01 and remained roughly unchanged thereafter (Figure II-2a). In Rwanda, however, producer prices continued to fall in 2002-03, and producers faced a discount of about US$0.20 per pound. relative to the average competitor.

Figure II-2a. Arabica Coffee: Price Developments, 1997-2003
Wholesale and Producer Prices
(annual percentage change)

Source: International Coffee Organization; and Fund staff estimates.

Figure II-2b. Arabica Coffee: Price Developments, 1997-2003
Comparison of Producer Prices in Rwanda and Other Regions
(annual percentage change)

Source: International Coffee Organization; and Fund staff estimates.

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[41] The country sample includes Bolivia, Burundi, Costa Rica, Dominican Republic, El Salvador, Ethiopia, Guatemala, Haiti, Honduras, Jamaica, Kenya, Malawi, Mexico, Nicaragua, Panama, Paraguay, Peru, Rwanda, Venezuela, Zambia, and Zimbabwe. Robusta producers and countries producing both Arabica and Robusta species are left unconsidered. Cuba is excluded due to lack of data, as are Brazil and Columbia based on the fact that these countries produce particular species of the Arabica coffee. For Zimbabwe, 1997 producer prices were excluded from the data set, as the statistics report an improbable 613 percent increase, which risks distorting the overall picture. However, a 640 percent growth rate for Venezuelan coffee exports in 2002 has been kept in the sample, given the substantial degree of variation in export volumes for this country over the entire sample period. The qualitative regression results do not change when excluding this observation.

- Lower-than-average and declining producer prices are not unique to Rwanda, but are largely shared by other African countries (Figure II-2b). In contrast, prices in Latin America increased in 2002-03, which—given stagnant wholesale prices—in their cases led to a substantial reduction in the wholesale margin.

72.   **While the price volatility experienced by African countries has not, in general, been greater than that faced by their Latin American peers, the price fluctuations faced by Rwandan producers were relatively high (Table II-1).** To the extent that a high degree of price volatility makes longer-term price trends more difficult to observe, it could be detrimental to producers' decision making. On the other hand, if domestic stabilization schemes to smooth producer prices were not closely linked to world market conditions, they risk

Table II-1. Variation of Price Changes Around Mean, 1997-2003 (Standard deviation)	
El Salvador	0.40
Ethiopia	0.26
Guatemala	0.17
Honduras	0.35
Kenya	0.35
Malawi	0.12
Peru	0.23
Rwanda	0.29
Wholesale prices	*0.27*

representing a significant burden on public finances and might distort production decisions.[42]

D. Export Volumes, 1997–2003

73.   **In terms of export volumes, Rwanda underperformed relative to its competitors,** particularly given the expectation of temporarily overshooting growth rates as a reaction to the genocide-induced break-down of exports in 1994:

Figure II-3a. Arabica Coffee: Export Volume Growth Comparison of Rwanda and Sample Average (annual percentage change)

Source: International Coffee Organization; and Fund staff estimates.

- Rwanda's production performance varied substantially from that of other producers. In five out of the seven years, Rwanda's coffee exports underperformed average cross-country growth rates. 1997 and 2003 were two particularly bad years for the country, with export volumes dropping by 31 percent and 23 percent respectively

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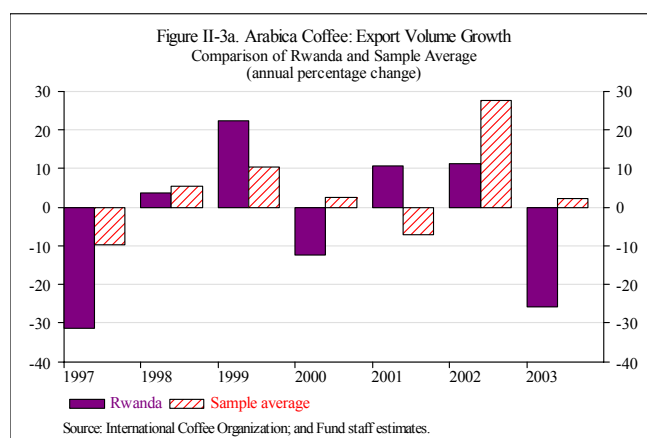
[42] (Temporarily) higher price volatility, as in the case of Kenya, could be the consequence of a regime shift from a marketing system based on a stabilization scheme to an auction-based one, which might involve a substantial degree of learning from market participants.

(Figure II-3a). On the other hand, 2001 was an unusually strong year for Rwandese coffee exports, when most competitors recorded a decline in volumes.

- Interestingly, the other African producers including Burundi, which is geographically close to Rwanda and should therefore be exposed to similar climatic conditions, did not share the poor growth in 1997 and 2003 (Figure II-3b).

Figure II-3b. Arabica Coffee: Export Volume Growth
Comparison of Rwanda, Burundi and African Average
(annual percentage change)

Sources: International Coffee Organization; and Fund staff estimates.

- One issue which is not unique to Rwanda but shared among all producers is a relatively high degree of volatility in export growth.
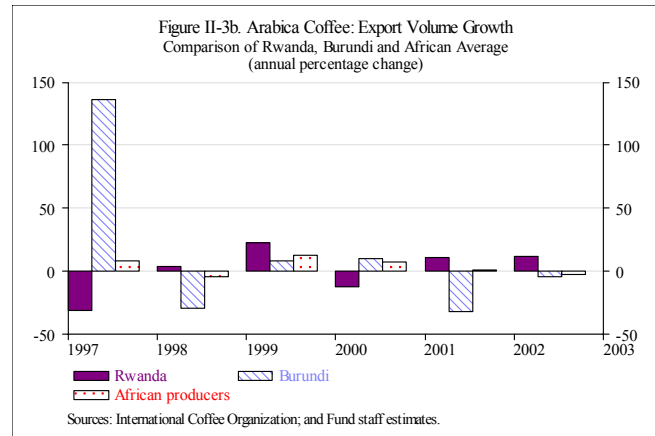
E. Explaining Export Volume Growth: A Cross-country Panel

74.   **As small countries are typically price takers in commodity markets like coffee, efforts to strengthen export performance generally focus on volume growth.** This section will therefore examine statistical relationships between a (necessarily incomplete) list of plausible explanatory factors and coffee export volumes. In particular, the exercise focuses on whether there are any structural conditions bearing on Rwanda that constitute a systematical obstacle for the sector's future performance—and which therefore would need to be explicitly addressed by appropriate action in the context of the authorities' EPS. The variables included in the analysis (variable names in brackets) and the hypotheses on their expected relationship to volume growth are as follows:

- *The lagged change in producer prices relative to wholesale prices* (lagged price change).[43] Given the delay of roughly one year between the production decision and the actual sale of the coffee harvest[44], strong price increases in year t-1 should stimulate year t production levels. While this reaction function is backward-looking and not fully consistent with the axiom of rational behavior, it might still be a plausible assumption as it takes account of the fact that reliable information on future price trends is generally unavailable to small farmers. The observed high degree of

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[43] The variable measures the change in producer prices relative to the change of wholesale prices as proxied by the ICO Indicator prices for other mild Arabicas, which is a weighed average of the New York and German markets. Reported regression results do not change substantively when using simple producer price changes instead.

[44] Almost the entire Rwandese coffee production is sold on the Kigali spot market.

cyclicality in coffee prices further supports such a view, with high prices in one period driving higher production levels for the next year, which, in turn, create an excess supply on the market and consequently drive down prices again.

- *The country's share in the global Arabica market* (size 1).[45] The higher the share in total world production, the more selling power should the country's exporters enjoy, supported by a high degree of brand recognition and well-established marketing/ distribution networks. In such circumstances, production increases should be easy to sell.

- *The share of coffee exports in total merchandise exports* (size 2). Whereas size 1 could be interpreted as a pull-variable, driven by international demand for a country's Arabica exports, size 2 is a push-variable: the higher the importance of the coffee sector for earning foreign exchange, the more a country might be forced to rely on its continued performance to cover the Balance-of-Payment's financing gap. One should thus expect a high level of commitment to increase export volumes in situations where foreign exchange remains scarce. On the other hand, good prices should be harder to achieve given the pressure to sell.

- *Domestic GDP growth* (GDP growth). Stronger domestic growth performance could lead to lower coffee export volumes. First, a reallocation of production factors out of the (typically) traditional coffee sector toward higher value-added activities, especially in countries facing severe capital constraints, could lead to a drain on resources. In addition, higher domestic growth might lead to higher domestic coffee consumption at the expense of exports.

- *Industrialized countries' GDP growth* (GDP/OECD). The higher world demand for coffee, which is proxied by real GDP growth in industrialized economies, the higher should be export volume growth.

- *Transportation costs* (landlocked). Landlocked countries should face higher transportation costs compared to countries with port access, and should therefore be at a disadvantage to market their coffee production.[46]

- *Production technology* (per capita income). More advanced technology, including public infrastructure, should help to boost coffee production. Lacking a better variable to pick-up this effect, per capita income is used as an approximation.

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[45] 2003 export data is used to determine both size variables. Note that these do not change over time.

[46] As there is no railway system in Rwanda, coffee exports by truck travel between 5 and 20 days to reach Mombassa.

- *Geographical region* (Latin). Systematical differences between Latin American and African Arabica producers including with regard to climatic conditions, the protection of property rights, or ownership structures, could translate into divergences in outcomes.

The data suggest that export volume growth is strongly correlated with producer price changes, the share of coffee in total merchandise exports, and GDP growth. In all these cases, the sign of the correlation coefficient points into the expected direction (Table II-2): price increases, a high dependence of the country on the coffee sector for foreign exchange earnings, and high industrialized countries' GDP growth are positively associated with export volumes, whereas higher domestic GDP growth seems to be paralleled by a decline in coffee exports. On the other hand, size 1, transportation costs, production technology, as well as geographical region do not seem to be linked, to a meaningful extent, to export growth performance.[47]

Table II-2. Correlation Coefficients with volume change	
Lagged price change	0.21
Size 1	0.04
Size 2	0.18
Latin	-0.07
Landlocked	0.07
GDP growth	-0.21
GDP/OECD	0.12
Per capita income	-0.07

75. **These findings are broadly confirmed by a simple OLS regression of export volume on its various explanators.** A simple model without time and country dummies shows again that lagged price changes, size 2, and GDP/OECD are all positively correlated with export volume growth (Table II-3). In addition, all these relationships are significant at least at the 10 percent level. And as above, domestic GDP growth is shown to have a negative effect on export performance, a result which is significant even at the one percent level. However, the various coefficients' strength and therefore their relative effect on exports varies greatly: industrialized country GDP growth has the strongest impact, followed by domestic GDP growth, size 2, and lagged price changes. The coefficient for size 1 also shows a strong impact with the expected sign,

Table II.3. OLS Statistics				
Export Volume	Coef.	STD	t	P>|t|
Lagged price change	0.298	0.123	2.42	0.017
Size 1	0.495	0.560	0.88	0.379
Size 2	0.320	0.170	1.89	0.062
GDP	-2.450	0.962	-2.55	0.012
GDP/OECD	6.841	3.365	2.03	0.045
Latin	0.010	0.107	0.10	0.924
Landlocked	0.006	0.106	0.05	0.957
Per capita income	0.000	0.000	0.17	0.865
Constant	-0.120	0.136	-1.46	0.146
Adjusted R^2=0.095; 114 observations				

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[47] The correlation coefficients reported use only the subset of data with no missing values on any of the variables listed. A pairwise regression, which uses all of the observations available for each variable pair, indicates that only the correlations of volume change with lagged price change and domestic GDP growth are significant at least at the five percent level.

but it remains statistically insignificant.[48]

76.   **Interestingly, African Arabica exporters do not seem to suffer from systematically lower volume growth rates than their Latin American competitors.** However, the inability to establish a statistically significant difference in performance between the two regions in the regressions might partially be attributed to the fact that the size variables absorb some of the inter-regional variation:

- On average, African producers only represented 2.7 percent of the total Arabica market (size 1), whereas coffee exports totaled 23 percent of their merchandise exports (size 2).[49]

- The average world market share of Latin American countries is more than twice as high as that of their African peers, but coffee exports represented only 3.6 percent of their total exports.

F. Implications for Rwanda's Coffee Sector

77.   **The authorities' strategy to move to niche segments of the Arabica market could help raising Rwandan coffee export prices.** As the cross-country comparison revealed, Rwandese coffee producers faced a large discount relative to Arabica wholesale prices, which even grew in recent years. Partially, this gap might have been caused by lower or uneven quality related to the aging of the tree stock. But it might also reflect insufficient selling power on the international market due to the low share of Rwandese exports in the total Arabica market (about one percent of the sample countries' total Arabica exports). A shift of production toward niche markets could help overcoming this structural disadvantage: supported by the strategy's efforts to enhance bean quality, the differentiation of Rwandese coffee aiming at the creation of privileged marketing and distribution channels for the country's exports could increase its selling power over time and make Rwandese coffee a strong brand in exclusive segments.

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[48] The results remain broadly robust when controlling for country and time effects. But while many country dummies had been significant, pointing to substantial country-specific information, year dummies were never found to be relevant. More specifically, in a model with country dummies only, the size2 variable drops out of the estimation. In a specification with time dummies only, the GDP OECD variable falls out of the estimation, but none of the year dummies becomes significant. In a specification with both country and time dummies, the size 2 and the GDP OECD variables drop out of the equation; and eight country dummies are found to be significant at the 10 percent level.

[49] T-tests on the equality of means among Latin American and African Arabica producers reject the null hypothesis of equal means at the 10 percent level for both of the size variables, but not for average volume and price changes.

78.   **However, a shift merely toward fully-washed coffee might not be enough to create a significant competitive advantage for Rwanda.** Many countries are currently adjusting to the higher demand for fully-washed coffee, so that this particular product risks becoming a new market standard rather than a niche. In such a scenario, the high growth rates and price margins programmed in the current EPS might not be achievable.[50] Therefore, and looking forward, a further development of the authorities' strategy might be warranted, aiming at an intensified diversification of coffee production into segments such as certified organic, gourmet (selected big beans), or mountain coffee.

79.   **The regression results suggest that Rwanda's status as a poor and landlocked African country should not necessarily impede on coffee export growth.** The fact that none of these structural conditions was found to be significantly related to export growth warrants some cautious optimism for Rwanda's coffee strategy. This assessment is further supported by the strategic importance of the sector[51] for the country's foreign exchange earnings and debt sustainability, as well as the resulting strong commitment on the parts of the authorities to swiftly take action (the positive influence of the size 2 variables). However, the analysis also suggests that the coffee sector would continuously be exposed to a high degree of volatility, as export volumes strongly respond to changes in (lagged) producer prices relative to wholesale prices as well as demand conditions in OECD markets – two factors that are largely beyond the control of the producer countries.

80.   **Finally, the growth of export volumes might gradually decline in line with the development of the Rwandese economy.** Such a trend should primarily be driven by a reallocation of scarce production factors including capital, which would be expected to gradually shift out of coffee production toward other sectors of the economy. To the extent that such a shift in the production structure strengthens Rwanda's export base and leads to increased diversification, it should be welcomed by policymakers.

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[50] The current coffee strategy document assumes long-term unit prices for fully-washed coffee of US$1.74 per kilogram in a low scenario and of US$2.20 in a high scenario. This projection appears very optimistic when compared to the current level of US$1.10 for ordinary coffee. As a point of comparison, fully-washed coffee from Burundi sold for US$1.20 per kilogram in July 2004.

[51] It is only in Burundi and Ethiopia that coffee exports represent a higher share of total merchandise exports.

III. Modeling Rwanda's Money Multipliers and Money Demand[52]

A. Introduction and Summary

81.   **This paper investigates the potential usefulness of econometric analysis of the money multipliers and money demand for informing monetary policy in Rwanda.** We examine the reliability of the results generated by simplified versions of econometric models for the behavior of the money multipliers and of money demand commonly used by central banks in more advanced countries.

82.   **The findings are generally encouraging for the use of econometric models for monetary analysis in Rwanda.** Despite serious data limitations, common models yield results that are sufficiently reliable to usefully inform policymaking. Nevertheless, the judgment of policymakers will always remain the pivotal point of monetary policy implementation.

83.   **On the supply side, the multipliers can be forecast with reasonable reliability.** For all multipliers and component ratios, it is possible to construct simple time series models that reduce the residuals to white noise. The aggregate approach to forecasting the multiplier yields somewhat better results than the components approach. Examining the component ratios from the structural side, we can establish the relationships found in studies on industrial economies for the reserve ratio that reflects the behavior of the banks, but not for the ratios reflecting the behavior of the non-bank public.

84.   **On the demand side, the long-term money demand relationship can be characterized by a cointegrating vector, and for the short-term relationship, a Vector Error Correction Model (VECM) can be fitted well to the actual series (in levels).** The long-term relationship includes the price level, real output, and the exchange rate as a proxy of the opportunity cost of holding nominal balances of domestic currency. However, some variables frequently used in long-term money demand models cannot be included due to data problems. The periods of excess money demand or supply resulting from this cointegrating equation can be shown to be intimately associated with discernable shocks. The short-term specification, in addition to the variables in the long-run specification, also includes structural and seasonal dummies.

B. Data

85.   **Monetary statistics in Rwanda are broadly adequate for econometric analysis.** The National Bank of Rwanda (NBR) publishes its balance sheet and data on its money and foreign exchange market operations, including exchange rates and interest rates, on a weekly, and the banking sector balance sheet on a monthly basis. Format and detail of the information provided conform mostly to generally accepted standards.

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[52] Prepared by D. Hauner and G. Di Bella, drawing on a draft Working Paper by the authors.

86.   **Nevertheless, some serious data limitations must be born in mind in the economic interpretation of the statistical results subsequently presented:** (a) Most series have several breaks, most importantly due to the war and genocide in 1994. (b) Some series important for our analysis (for example, borrowed reserves) are only available after 1995. (c) Interest rate and exchange rate controls during some periods limited not only the variance of some variables, but also their economic interpretation.[53] (d) With regard to national accounts, only annual GDP statistics are available and those only for the production side.[54] (e) For prices, the GDP deflator shares the problems just mentioned, while the consumer price index (CPI) is constrained by its technical implementation and uneven regional coverage.

87.   **While we will deal with more specific data issues in the money multiplier and money demand sections, respectively, we upfront define the monetary aggregates as:** The monetary base is currency in circulation outside banks plus bank reserves (including cash in banks) plus non-bank deposits in the NBR, as defined for the IMF program.[55] The adjusted monetary base is the monetary base excluding borrowed reserves. M1 is currency in circulation plus demand deposits with commercial banks. M2 is M1 plus time and savings deposits with commercial banks. M1 in real terms is M1 in nominal terms deflated by a measure of the price level (either the CPI or the GDP deflator). Currency outside banks in real terms is measured in a similar way.

88.   **Limitations on control over the monetary base by the central bank limit not only the effectiveness of monetary policy, but also the usefulness of monetary control models.** In principle, the central bank can control three sources of the monetary base: net foreign assets, net credit to government, and credit to the private sector. The fourth source, other items net, contains assets and liabilities that are mostly outside the direct control of the central bank, such as the counterpart to valuation changes in its net foreign assets. However, net foreign assets are also largely outside the control of the central bank when foreign exchange inflows are uncertain, as in the case of substantial grant flows. The same applies to net credit to government in the case of fiscal dominance, particularly when coordination between the treasury and the central bank is lacking.

89.   **The NBR has obtained increasing, albeit still limited, control over the monetary base in recent years.** Table III-1 shows the annual growth rates of the monetary base from 1995 to 2003, and the respective contributions of the four sources of the base. On the back of higher grant inflows, 2000–2002 permitted a lessening of fiscal dominance,

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[53] Unfortunately, collection of parallel exchange market data has started only recently.

[54] Agricultural production is estimated per season (approximately every six months) and the estimates published by the minister of agriculture. However, this series also present voids and some inconsistencies in the methodology used for its compilation.

[55] While non-bank deposits in the central bank do not, strictly speaking, constitute high-powered money, a large part of "non-bank deposits" are deposits by (money-creating) other non-bank financial institutions, most importantly the *Union des Banques Populaires Rwandaises* (UBPR).

although the year 2003 marked a backslash here. While net credit to the private sector was a minor contributing factor to the growth in the monetary base up to the year 2000, it has gained considerably in importance during recent years.

Table III-1. Sources of the Monetary Base

(Percentage change relative to the beginning-of-period monetary base)

Period	B	NFA	NCG	CPS	OIN
1995	39.4	89.1	-68.5	6.8	12.0
1996	23.7	19.8	11.8	-4.5	-3.4
1997	6.1	43.5	19.9	-7.6	-49.8
1998	-8.3	-26.6	-8.2	9.7	16.8
1999	15.8	-3.0	18.8	0.2	-0.2
2000	-9.0	27.3	-27.9	3.8	-12.1
2001	4.6	39.8	-11.2	-23.6	-0.5
2002	13.0	58.3	-56.8	16.9	-5.4
2003	15.2	-17.0	44.0	2.1	-13.8

Sources: National Bank of Rwanda; authors' calculations.
Notes: B…Monetary Base, NFA…Net Foreign Assets, NCG…Net Credit to Government (credit minus deposits, includes all public entities except for public enterprises), CPS…Credit to Private Sector (includes commercial banks, other financial institutions, and private and public enterprises), OIN...Other Items Net.

C. Modeling the Money Multipliers

90. **In this section, we examine the scope for modeling Rwanda's money multiplier and its components.** First, we introduce the money multipliers and component ratios, including descriptive statistics. Second, we examine whether ARIMA models can forecast the money multipliers with reasonable reliability. Third, we look at whether the component ratios obey the same well-established structural relationships in Rwanda as in many other countries.[56]

91. **While the money multiplier approach has come out of fashion in industrial countries, more interest has recently been devoted to it for developing countries.** According to classic monetarist theory (for example, Brunner, 1997), the multiplier reflects

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[56] We limit our analysis in this section to the period after the genocide, i.e., 1995 to 2003, for three reasons: First, we would have to omit the year 1994 due to the lack of data and the exceptional circumstances in this period. Second, many data series are available only for the time after the genocide. Third, substantial interest rate controls limit the usefulness of interest rate data for the time before 1995.

the behavior of the public and of the banks, while the monetary base reflects actions of the central bank. However, most well known studies of the multipliers in industrial countries date back to the 1970s and 1980s,[57] as central banks in industrial and middle-income countries have increasingly shifted from controlling the money stock through reserve aggregates to targeting credit market conditions through interest rates. But in low-income countries, where the estimated interest rate elasticity of money demand is more uncertain, targeting reserve aggregates remains prevalent,[58] and several papers have been devoted to the money multiplier in developing countries more recently, for example, Darbha (2002), Hasan (2001), and Zaki (1995).

Introducing the money multipliers and component ratios

92. **We use the following concepts:**[59] The monetary base (B) is currency held by non-banks (C) plus bank reserves (R). The adjusted monetary base (Ba) excludes borrowed reserves. Narrow money (M1) is currency held by nonbanks and demand deposits (D). Broad money (M2) is M1 plus time and savings deposits (T). Four multipliers relate the (adjusted) monetary base to narrow and broad money: m1, $m1_a$, m2, and $m2_a$. The components of the multipliers are the currency ratio (c = C/D), the deposit ratio (t = T/D), and the (adjusted) reserve ratio (r = R/[D+T] or $r_a = R_a/[D+T]$). The multipliers and their components are related as follows (replace r by r_a, m1 by $m1_a$, and m2 by $m2_a$ for the multipliers based on adjusted bank reserves):

$$M1 = \frac{1+c}{c + r(1+t)} B = m1 * B \qquad (1)$$

$$M2 = \frac{1+c+t}{c + r(1+t)} B = m2 * B \qquad (2)$$

93. **We do not adjust the monetary base for changes in the reserve requirement ratio.** This allows all the effect of changes in the reserve requirement to appear in the r-ratio and, hence, as fluctuations in the multipliers. The multipliers rise when the reserve

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[57] For example, Beenstock (1989), Frost (1977), Rasche and Johannes (1987), Garfinkel and Thornton (1991). Baghestani and Mott (1997) and Freeman and Kydland (2000) are more recent examples.

[58] Rasche and Johannes (1987) show that the expected utility loss from deviations of actual money around its targeted level in an interest rate regime versus a reserve aggregate regime mostly depends on the uncertainty of the estimated interest rate elasticity versus the variance of the multiplier forecasts.

[59] For the definitions of the monetary aggregates see the data section.

requirement ratio is lowered and fall when the reserve requirement ratio is raised.[60]

94. **We use monthly observations from 1/1995 to 12/2003.** Descriptive statistics of multipliers and components are in shown in Table III-2. During this period, the M2 multiplier rose by 83.7 percent, an increase entirely due to a 222.9 percent increase in the time deposit ratio. At the same time, the currency ratio declined by 9.3 percent and the reserve ratio declined by 65.4 percent. Obviously, adjusted multipliers that exclude borrowed reserves are more volatile than the unadjusted multipliers.

Table III-2. Descriptive Statistics of the Multipliers and Components

	M1	$M1_a$	m2	$m2_a$	c	t	r	r_a
Mean	1.58	1.62	2.74	2.82	0.66	1.19	0.19	0.18
Median	1.57	1.61	2.71	2.71	0.63	1.12	0.19	0.19
Maximum	1.90	2.17	3.66	4.24	0.99	1.83	0.34	0.34
Minimum	1.19	1.19	1.89	1.89	0.49	0.38	0.10	0.04
Std. Dev.	0.13	0.17	0.49	0.59	0.10	0.32	0.05	0.06

Source: Authors' calculations.

95. **Plots of the multipliers and their components are shown in Figure III-1.** Both m1 and m2 have been trending upwards for most of the sample period (Figures III-1a and III-1b).[61] The residuals of m1 and m2 after detrending and seasonal adjustment (with Census X-12) were smaller in 1999 to 2003 than in 1995 to 1998. The currency ratio has remained relatively stable since 2001, after a precipituous decline from 1995 to 2000 (Figure III-1c). The time deposit ratio trended upward during most of the sample period, but has stabilized somewhat since end-2001 (Figure III-1d). The reserve ratio and the adjusted reserve ratio have trended downward over the sample period, due to the decline in the excess reserve ratio that arguably reflects both the development of better investment opportunities for the commercial banks (government and central bank bills) and the deteriorating solvency of the banking system during the sample period (Figures III-1e and III-1f).

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[60] An alternative approach would have been to use the *reserve adjustment magnitude* (RAM) developed by Brunner and Meltzer (see, for example, in Burger and Rasche, 1977, and Frost, 1977). We regard RAM as overly sophisticated for the present context, because the NBR only very rarely changed the reserve requirement in past years, and our concern here is mostly the short-run predictability of the multipliers. Ex post, the ARIMA results below support this decision, as the longest lag in the preferred model for the r-ratio is only an MA(1) term.

[61] The downward spike at the beginning of 1997 reflects an extremely abrupt expansion in the monetary base (through NCG and NFA at a time) during that period.

Figure III-1. The Multipliers and their Components

(a) Multiplier m1 (detrended and seasonally adjusted)
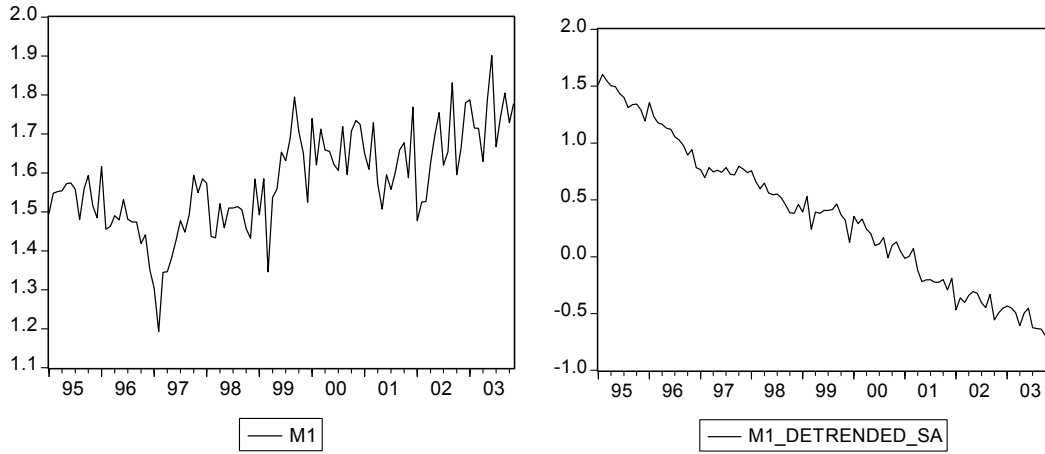
(b) Multiplier m2 (detrended and seasonally adjusted)
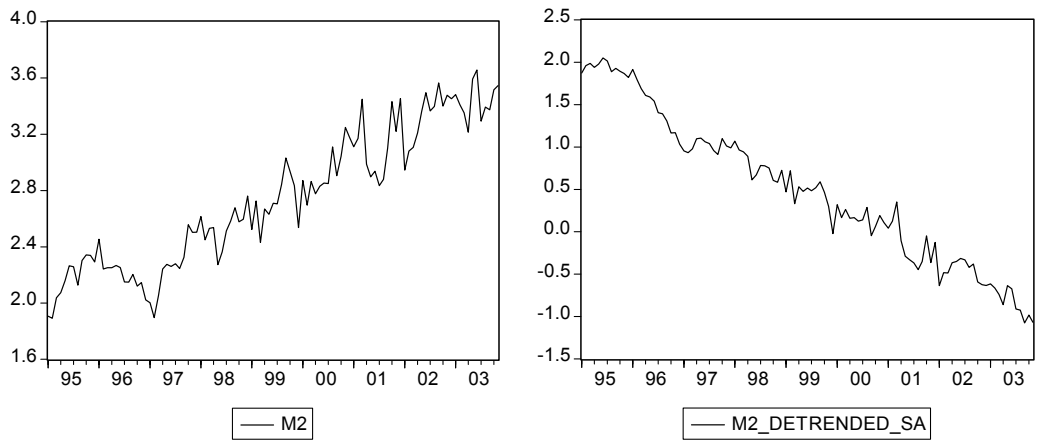
(c) Currency Ratio

(d) Time Deposit Ratio
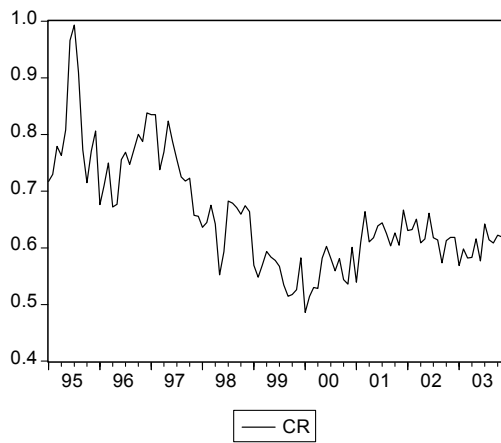
(f) Reserve Ratio

(g) Excess Reserve Ratio
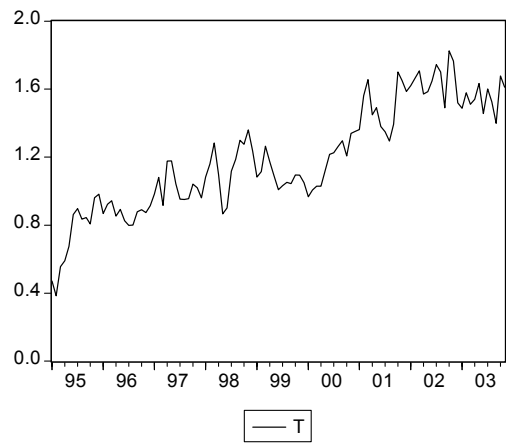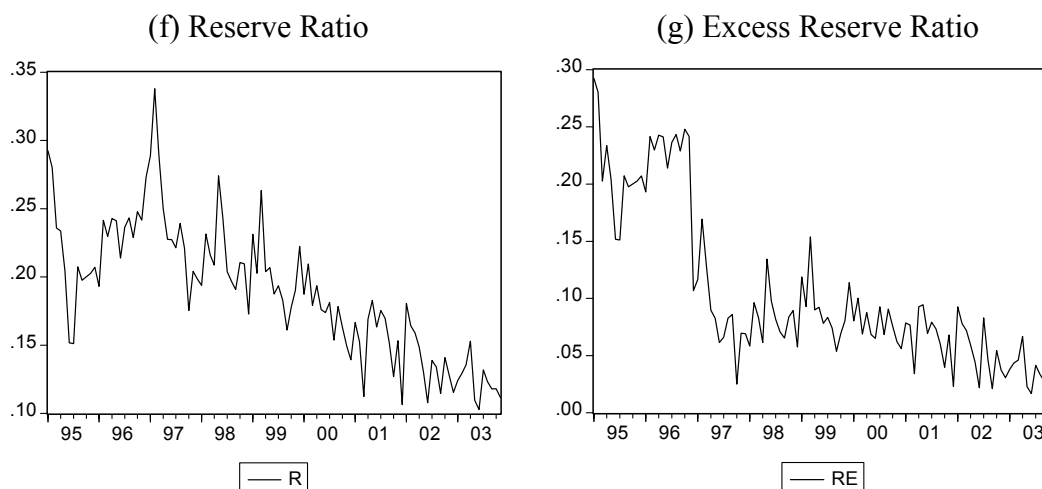
Sources: National Bank of Rwanda; authors' calculations.

96.   **Regressing the multipliers on their components (Table III-3) suggests that the reserve ratio causes most of the volatility in the multipliers.** This crude measure (serial correlation in the residuals is ignored) also shows that volatility in the deposit ratio t accounts for some of the volatility in the m1 multiplier, but is insignificant for the m2 multiplier. All significant coefficients have the expected signs.

Table III-3. Sources of Volatility in the Multipliers

	$\Delta m1$	$\Delta M1_a$	$\Delta m2$	$\Delta m2_a$
Δc	-0.35 [R^2=0.03]	-0.22 [R^2=0.00]	0.06 [R^2=0.01]	0.32 [R^2=0.00]
	(1.79)	(0.74)	(0.17)	(0.59)
Δt	-0.33 [R^2=0.15]	-0.36 [R^2=0.08]	0.21 [R^2=0.01]	0.20 [R^2=0.00]
	(4.40)	(2.98)	(1.53)	(0.88)
Δr	-2.83 [R^2=0.66]	-3.80 [R^2=0.53]	-5.11 [R^2=0.77]	-6.90 [R^2=0.54]
	(14.43)	(10.78)	(18.74)	(6.07)
Δr_a	-2.18 [R^2=0.61]	-3.66 [R^2=0.75]	-3.93 [R^2=0.70]	-6.74 [R^2=0.79]
	(12.87)	(17.95)	(15.86)	(19.93)

Source: Authors' calculations.
Note: Absolute values of t-statistics are in parentheses.

97.   **The high contribution of (excess) bank reserves to the volatility of the multiplier has important policy implications.** As excess reserves (required reserves are proportional to total deposits and thus rather stable) are at least partly determined by the central bank's policy stance through open market operations, the multipliers cannot be regarded as exogenous with respect to the NBR's policy stance. Thus, policymakers must also predict the effect of their actions on the multiplier when pursuing the multiplier

approach to money stock control.[62] Against this background, the central bank should (a) aim to predict the effects of their policy actions on excess reserves and thus on the multiplier, and (b) promote structural measures to reduce the volatility in excess reserves.[63]

ARIMA forecasts of the money multipliers

98.   **We asses the forecast power of ARIMA models of the multipliers and the component ratios** based on the aggregrate (forecast the multipliers directly) vs. the components approach (calculate the multipliers from the forecasts of the components). All the series we examine in this section are integrated of order I(1). As Rasche and Johannes (1984), we do not seasonally adjust the series in order to avoid the introduction of spurious autocorrelation from the standard seasonal adjustment techniques. As yearly seasonal patters in the multipliers can be observed, we followed Box and Jenkins (1976) by including 12-month seasonal autoregressive (AR) and moving average (MA) terms in all models; results, however, were inferior to those of other models.

Table III-4. Preferred Models for Multipliers and Components

y	p,d,q		$Q(24)$	S.E.
m1	9,1,1	$y_t = 0.2849\ y_{t-9} - 0.5313\ \varepsilon_{t-1} + \varepsilon_t$ (0.1041) (0.0864)	23.7	0.0814
m1$_a$	9,1,1	$y_t = 0.4345\ y_{t-9} - 0.5839\ \varepsilon_{t-1} + \varepsilon_t$ (0.1017) (0.0834)	25.3	0.1126
m2	0,1,1	$y_t = -0.4263\ \varepsilon_{t-1}\qquad\quad + \varepsilon_t$ (0.0884)	22.9	0.1469
m2$_a$	9,1,1	$y_t = 0.4817\ y_{t-9} - 0.5801\ \varepsilon_{t-1} + \varepsilon_t$ (0.1003) (0.0834)	18.4	0.2068
c	0,1,2	$y_t = -0.3611\ \varepsilon_{t-2}\qquad\quad + \varepsilon_t$ (0.0906)	20.4	0.0434
t	0,1,2	$y_t = -0.3782\ \varepsilon_{t-2}\qquad\quad + \varepsilon_t$ (0.0903)	20.3	0.1056
r	0,1,1	$y_t = -0.3932\ \varepsilon_{t-1}\qquad\quad + \varepsilon_t$ (0.0903)	21.6	0.0255
r$_a$	0,1,1	$y_t = -0.5001\ \varepsilon_{t-1}\qquad\quad + \varepsilon_t$ (0.0829)	21.9	0.0305

Source: Authors' calculations.
Notes: Standard errors of coefficients in parentheses. Q(24) is the Ljung-Box statistic at lag 24. S.E. is the standard error of the regression.

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[62] See Garfinkel and Thornton (1991).

[63] Potential measures include closing the commercial bank accounts at the central bank later in the day, and promoting the interbank market by reducing credit risk through more transparency (for example, an automated book-entry system).

99.   **For all the multipliers and components, it is possible to construct a simple ARIMA model that reduces the residuals to white noise.**[64] The preferred models are shown in III-Table 4. The models for m1, m1$_a$ and m2$_a$, in addition to the error, each consist of an AR(9) and an MA(1) term. The models for m2, r and r$_a$, each consist of only an MA(1) term. The models for c and t each consist of only an MA(2) term.

100.   **The aggregate approach yields somewhat better results than the components approach.**[65] Comparing their forecasting power in a static (one-step-ahead) forecasting framework,[66] all diagnostic indicators (III-Table 5) consistently support this finding for all four multipliers defined here. The only two indicators that are better for the components approach are the variance proportion of m1 and the bias proportion of m2.

Table III-5. Multipliers Forecast Diagnostics

	RMSE	MAE	MAPE	TIC	BP	VP	CP
Aggregate approach							
m1	0.0805	0.0672	4.2869	0.0254	0.0013	0.0305	0.9683
m1$_a$	0.1114	0.0885	5.4191	0.0341	0.0007	0.0299	0.9694
m2	0.1462	0.1121	4.0798	0.0264	0.0320	0.0034	0.9646
m2$_a$	0.2047	0.1556	5.3406	0.0348	0.0030	0.0110	0.9860
Components approach							
c	0.0431	0.0322	4.9412	0.0324	0.0014	0.0037	0.9949
t	0.1051	0.0821	7.0173	0.0428	0.0237	0.0012	0.9751
r	0.0254	0.0199	11.0202	0.0652	0.0112	0.0064	0.9824
r$_a$	0.0304	0.0234	16.6710	0.0806	0.0120	0.0123	0.9757
m1	0.0895	0.0729	4.6090	0.0282	0.0035	0.0176	0.9893
m1$_a$	0.1263	0.0924	5.5351	0.0387	0.0059	0.0389	0.9656
m2	0.1507	0.1160	4.1138	0.0266	0.0233	0.0083	0.9786
m2$_a$	0.3175	0.1974	6.2477	0.0551	0.1238	0.1075	0.7778

Source: Authors' calculations.
Notes: RMSE is the root mean squared error. MAE is the mean absolute error. MAPE is the mean absolute percent error. TIC is the Theil inequality coefficient. BP, VP and CP are the bias, variance and covariance proportions, respectively. Better forecasts have higher values.

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[64] We try several models and keep those (i) whose coefficients are all significant at the 1 percent level, and (ii) for which the LM and Ljung-Box tests do not reject the null hypothesis of no serial correlation in the residuals. Among the short-listed models, we use the Akaike and Schwarz criterions to guide us in the selection of the most parsimonous model.

[65] For the United States, Hafer and Hein (1984) came to the same conclusion.

[66] See Hafer and Hein (1984) and Rasche and Johannes (1987) for more elaborate discussions of this approach.

101.   **In sum, the aggregate approach permits to forecast the multipliers with considerable reliability, particularly for a relatively unsophisticated monetary system.** The diagnostic indicators for the aggregate approach (arguably with the exception of the variance proportion in the m1 and the bias proportion in the m2 forecasts[67]) are all at acceptable levels. However, the diagnostic indicators for the components approach are more mixed. Not surprisingly, the t ratio (which contains also the foreign-currency deposits) and the r and r_a ratios prove to be most difficult to forecast. The forecasts of the adjusted multipliers are consistently less robust than those of the unadjusted multipliers. This is not surprising, given the intrinsicly higher volatility of the adjusted multipliers (which exclude borrowed reserves).

102.   **Two additional factors make us relatively comfortable with our results.** First, the differences in the forecast diagnostics between the two approaches are small. This shows that the multipliers in Rwanda's case are no "black boxes" that could potentially hide large unexplainable variations in the multiplier components when analyzed with the aggregate approach. Second, the robustness of the forecasts for Rwanda compares favorably to those found in similar studies of the cases of other other low-income countries (for example, Zaki 1995).[68]

103.   **The forecast diagnostics of their respective multipliers are ambiguous on the question whether M1 or M2 can be controlled with greater precision.** While the mean absolute percent error points to M2, the other scale-invariable indicator, the Theil inequality coefficient, is about the same for M1 and M2. The covariance proportion is slightly lower for M1, where M1 suffers from a higher variation proportion and M2 from a higher bias proportion. However, as a higher bias proportion is arguably more problematic than a higher variance proportion, M1 would be preferred over M2 for monetary targeting.

Explaining the M2 component ratios by structural models

104.   **In this section, we broadly apply Beenstock's (1989) framework for the United Kingdom to the structural analysis of the M2 component ratios in Rwanda.** However, we are somewhat restricted by data availability. There is, for instance, no reliable measure of velocity to include as an independent variable, as we do not have quarterly, but only annual, observations for GDP.

105.   **The currency ratio and the time deposit ratio do not seem to behave in line with relationships well-established in other (more advanced) economies.** Usually, the currency ratio (time deposit ratio) can be shown to be decreasing (increasing) in income and in the deposit rate. However, for Rwanda we cannot establish this relationship in regressions

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[67] The variance proportion tells us how far the variation of the forecast is from the variation of the actual series, while the bias proportion tells us how far the mean of the forecast is from the mean of the actual series.

[68] Obviously, the robustness of money multiplier forecasts for a low-income country cannot favorably compare to those for industrial countries (for example, Rasche and Johannes, 1987).

of the currency ratio and the time deposit ratio on GDP and the 3-month deposit rate, which reflects the opportunity cost of holding currency vs. time deposit balances (demand deposits are typically unremunerated in Rwanda), and between demand deposits and time deposits, respectively. That is, economic agents seem to choose between currency vs. demand deposits and demand deposits vs. time deposits independently of income and of the opportunity cost of holding currency and (usually unremunerated) demand deposits vs. time deposits.

106.   **The reserve ratio behaves well in line with the results generally found for advanced economies.** The demand for excess reserves (only they are genuinely determined by the banks) is likely to increase with the mean and the variance of the frequency distribution of withdrawals. It is thus expected to vary inversely with the t-ratio, that is, with the share of time deposits in total deposits, because withdrawals from time deposits require advance notification (unless a penalty is paid), and the variance of time deposits is therefore usually lower. The tightness of the NBR's money market policy is likely to affect the demand for reserves. If the central bank assisted the market through its "front window", that is, at market rather than penalty rates, the banks' demand for reserves would tend to fall.[69] To capture this effect, we use Howard's (1982) variable PEN, defined by

$$ \text{PEN} = \text{discount rate} \bullet \frac{\text{outstanding discount window borrowing from the NBR}}{\text{cash reserves of the banking system}} . \quad (3) $$

However, as Howard, we do not find PEN to be significant. As an alternative (and arguably more parsimonious) indicator for the NBR's money market policy stance, we include the discount rate in the model and find it to be highly significant. Since r is naturally constrained between zero and unity, we estimate the model:

$$ \ln(r/(1\text{-}r))_t = -0.90 + 0.32\ln(r/(1\text{-}r))_{t\text{-}1} + 0.22\ln(r/(1\text{-}r))_{t\text{-}2} - 0.72t_t + 0.05R_{dis,t,} \quad (4) $$
$$ \quad (-2.26) \quad (2.40) \qquad\qquad (2.29) \qquad\qquad\qquad (-3.40) \quad (2.29) \quad R^2=0.70 $$

where t is the deposit ratio and R_{dis} is the discount rate; t-statistics are in parentheses. The reserve ratio behaves well in line with the results generally found for advanced economies. As expected, a higher t-ratio reduces demand for reserves, while a higher discount rate increases demand for reserves. All coefficients are significant at the 1 or 5 percent level.

107.   **In sum, structural models can characterize only the reserve ratio with reasonable reliability.** Forecasting the multiplier by structural equations is unlikely to yield reliable results given the apparent independence of the currency ratio and the time deposit ratio of variables suggested by theory and empirical studies on many other countries. However, there is a statistically sound basis for forecasting the reserve ratio r by a structural

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[69] For a more detailed exposition of the preceding argument, see Beenstock (1989).

model such as the one suggested by equation (4), combined with the model for t in Table III-4.

D. Modeling Money Demand

108.   **In this section, we examine the scope for modeling Rwanda's money demand both for the long and short terms.** For the long-run, we identify a money market equilibrium condition by a cointegrating vector of real money balances, output and the exchange rate. For the short run, money demand is estimated by a vector error correction model (VECM). We use quarterly data for the years 1980 to 2003. We limit the analysis in this section to M1, since M2 (a) is composed of assets reacting differently to changes in the interest rate, and (b) includes dollar-denominated deposits depending highly on foreign investment projects.

Theoretical framework and cointegration analysis

109.   **We assume a standard functional form for real money demand.** Thus, real money demand is assumed to be a function of output, y (as a proxy for expenditure), a vector including variables that proxy the opportunity cost of holding money balances, ψ, and a vector that includes other variables that influence the demand for real balances, ζ. In the long-run, the money market equilibrium condition can be expressed as

$$M1 / P = f(y, \psi; \zeta) \tag{5}$$

The sign of output is expected to be positive and the sign of the opportunity cost of holding money is expected to be negative.

110.   **We specify the following variables:** Real money balances are the difference between the logs of M1 in nominal terms, *lm1*, and either the GDP deflator (*lgdpdef)*, or the CPI (*lcpi)*, while expenditures are proxied by the log of real GDP (*lgdpr*). The vector ψ, which will be part of the more general VECM, is proxied by the inflation rate, measured either as the log first difference of the GDP deflator (*dlgdpdef*) or the CPI (*dlipc*) and the depreciation of the exchange rate (*dlerya*). In addition, we include structural dummies, one for the period of war and genocide (1993:4–1995:1), *dumg*, and another to reflect changes in the exchange rate peg or in the exchange rate system, *dumer* (1990:4–1991:1 and 1995:1–1995:3[70]). Dummy variables will also be included to account for seasonal factors (*dumq2*, *dumq3*, *dumq4*).

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[70] These are the only periods in which the quarterly depreciation rate (on average) was higher than 10 percent.

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Table III-6. Variable Specifications

Variable	Definition	Source
erya	Quarterly average of the official exchange rate	Rwandese authorities and IFS-IMF
erye	end-of period (quarterly) official exchange rate	Rwandese authorities and IFS-IMF
eryem	end-of period (quarterly) official exchange rate	Rwandese authorities and IFS-IMF
gdpr	quarterly real GDP, resulting from smoothing the annual series using a quadratic approximation	Rwandese authorities and Fund staff calculations
gdpn	quarterly nominal GDP, resulting from smoothing the annual series using a quadratic approximation	Rwandese authorities and Fund staff calculations
gdpdef	implicit quarterly deflator from *gdpr* and *gdpn*	Rwandese authorities and Fund staff calculations
ipc	end-of period (quarterly) consumer price index	Rwandese authorities and IFS-IMF
irate	three-month deposit rate in RF	Rwandese authorities and IFS-IMF
m1	M1 in nominal terms	Rwandese authorities and IFS-IMF
m1p	M1 in real terms deflated by the CPI	Rwandese authorities and IFS-IMF
ci1	Currency outside banks in nominal terms	Rwandese authorities and IFS-IMF
ci1p	Currency outside banks in real terms deflated by the CPI	Rwandese authorities and IFS-IMF

Figure III-2. The Main Variables of the Money Demand Function
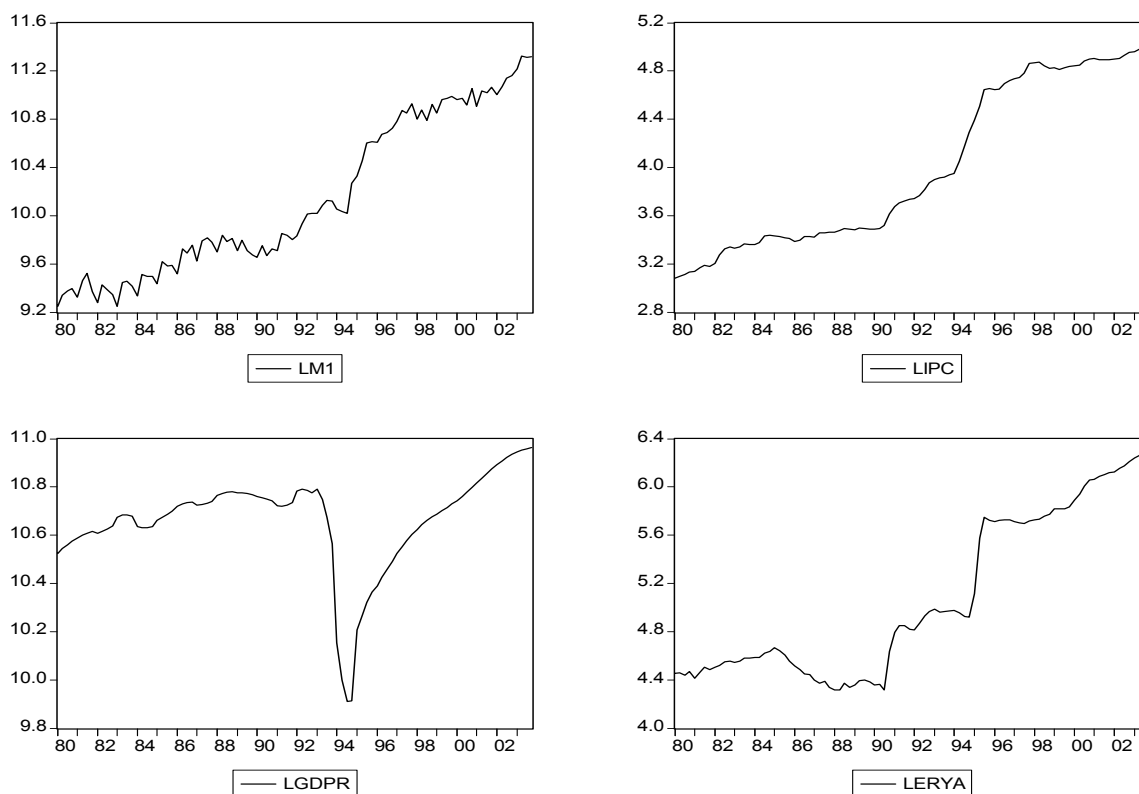
Source: Authors' calculations.

111.   **Figure III-2 shows the evolution (in natural logs) of the variables used in the estimation.** The discrete changes in output and exchange rates are apparent for the moments of political conflict or when there are changes in the policies implemented. Regarding nominal money balances, note how limited the response was during moments of political turmoil: This seems to hint that the adjustment to desired real money balances occurred through the functioning of other adjustment mechanisms, most possibly the inflation rate and exchange rate depreciations, the latter in particular during the second half of the sample.[71]

112.   **As we cannot use some variables common for long-run money demand, we estimate the disequilibrium in the market for real money balances in period *t* by**

$$E_t = lm1 - \beta_2\,lcpi - \beta_3\,lgdpr + \beta_4\,lerya, \tag{6}$$

where the coefficient on *lm1*, β_1, is normalized to unity. Some papers on money demand (Celasun and Goswami, 2002, among others), include the inflation rate and/or the depreciation of the exchange rate and the interest rate in their formulation of the long-run equilibrium. In the case of Rwanda, this is not possible as these variables are all I(1) in levels. This holds even considering different subsamples.[72] Furthermore, since the only interest rate (*irate*) available for most of the period studied, the three-month deposit rate, was under the control of the monetary authorities during an extended period of time, it cannot be used as a genuine measure of the opportunity cost of holding money.

113.   **Through the Johansen trace statistic, we find one cointegrating relationship of long-term money demand at the 1 percent significance level and with the expected signs,**

$$lm1 - 1.13\,lcpi = 6.06 + 1.27\,lgdpr - 0.38\,lerya.^{[73]} \tag{7}$$

The coefficient of the price level is not significantly different from unity, nor is the coefficient on output at usual confidence levels; this is consistent with a constant velocity in the long run. Note that there is a negative association in the long run between real money balances and the level of the exchange rate. There could be two mutually related reasons for

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[71] This also seems to indicate difficulties to convert domestic currency into foreign currency as a form to adjust to excesses in money supply; in these cases, the adjustment seemed to have been through exchange rate movements or capital controls.

[72] The null that the first log difference of the GDP deflator (*dlgdpdef*) has a unit root cannot be rejected at usual significance levels. Building on that, several models using *dlgdpdef* as a measure of opportunity cost in the cointegrating relationship were tested, some of them with positive results with regard to the economic significance of the coefficients found. However, the goodness of fit was less impressive, in particular for the period after 1998.

[73] Unit-root tests indicate that all the variables considered are I(1). Alternative models combined some of the variables included in (7) with various other variables, including end-of-period instead of quarterly average exchange rates, interest rates, a dummy to account for differences in interest rates regimes, and the consideration of the real money demand as a unique variable forcing the coefficient on the price level to unity.

this: (a) CPI seems to be a good proxy for the prices of non-tradable goods and the price of food staples; (b) the prices of some goods are fully dollarized, regardless whether they are quoted in domestic currency. As a consequence, it seems that the presence of the exchange rate in the cointegrating equation behaves like a shadow price index for tradable goods.

Figure III-3. The Disequilibrium in the Market for Nominal Money Balances
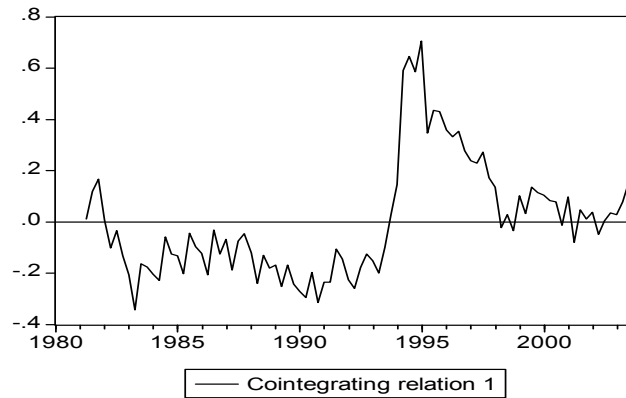
Source: Authors' calculations.

114.   **The disequilibrium in the market for nominal money balances, E_t, (Figure III-3) shows excess demand for most of the 1980s and a monetary overhang related to the genocide.** From (6) it is clear that if $E_t<0$, there is an excess demand for real money balances. Equilibrium could be restored either through the adjustment of endogenous variables (the price level, the exchange rate level or the level of real income), or through increases in the money supply. (Conversely, if $E_t >0$, there is an excess supply of real money balances.) Under deteriorating political and economic conditions, the market turned to excess supply during 1994–95 and returned to equilibrium only at the end of the 1990s, since when it has fluctuated around equilibrium. However, the figure shows some monetary overhang at the end of 2003, consistent with what the IMF program review noted at that time.

Short-term demand and VECM

115.   **There are different approaches to model and estimate the demand for real money balances in the short term.** One of these is to integrate the long-run equilibrium condition obtained from the Johansen methodology as one of the terms into a short-term demand in first differences. A more comprehensive approach is to recognize the mutual interaction of the variables included in the money demand specification, and integrate the short-term demand into a more general macroeconometric model such as

$$\Delta X_t = \Pi_0 + \Pi\, X_{t-1} + \Pi_1\, \Delta X_{t-1} + \Pi_2\, \Delta X_{t-2} + \ldots\ldots + \Pi_p\, \Delta X_{t-p} + \Gamma\, Z_t + \varepsilon_t. \tag{8}$$

Here, ΔX_t is a 4x1 vector of log first differences of the endogenous variables, Π_0 is a 4x1 vector of constants, Π is a 4x4 matrix including the coefficients (*betas*) and adjustment coefficient (*alphas*) of the cointegrating relation, X_{t-1} is a 4x1 vector of the endogenous variables in levels for the period *t-1,* while the rest is composed by lags of ΔX_t and their respective matrices of coefficients. Finally, Z_t is a vector of exogenous variables and ε_t is a 4x1 vector of disturbances that are such that ε_{it} may be correlated with ε_{jt}.

116. **We model a VECM in the first differences of the variables considered in the estimation of the cointegration equation, plus structural and seasonal dummies.** Based on the Akaike information criterion and Cholesky decomposition, we proceed to estimate a model with *lerya*, *lgdpr*, *lcpi*, *lm1* and four lags (reducing the sample to 91 observations from 1981:2 to 2003:4).[74] We use the log first difference of real GDP as the second equation in the VECM because it is often affected by weather-related shocks to the agricultural sector.

117. **The coefficients of the lagged portion of the short-term money demand are generally in line with economic theory (Table III-7).** Output is positively associated with money demand. Price increases precipitate an initial increase of the demand of nominal balances, but a subsequent decrease associated with the need to economize money balances to avoid the inflation tax. In addition, money demand is negatively associated with exchange rate depreciation, which also is the reflection of a higher opportunity cost of holding money.

Table III-7. Lagged Coefficients of Estimated (Short-Term) Money Demand

Lag	1	2	3	4
d(lerya)	-0.15	0.07	0.32	-0.14
std	-0.14	-0.15	-0.14	-0.12
t	-1.03	0.49	2.30	-1.14
d(lgdpr)	0.39	0.52	-0.46	-0.20
std	-0.16	-0.17	-0.17	-0.17
t	2.41	3.05	-2.76	-1.17
d(lipc)	0.60	-0.29	-0.60	0.25
std	-0.35	-0.38	-0.38	-0.32
t	1.71	-0.76	-1.57	0.80
d(lm1)	-0.30	-0.12	0.03	0.29
std	-0.12	-0.12	-0.12	-0.12
t	-2.47	-1.02	0.28	2.47

Source: Authors' calculations.

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[74] Structural innovations in *lerya* are assumed to simultaneously affect the innovations in the other variables, while structural innovations in *lm1*, do not. This ordering seems reasonable as the exchange rate remained fixed during a significant part of the sample period, and, even after exchange rate liberalization, the central bank continued intervening in the market.

118.   **The size and signs found for the seasonal and structural dummies (Table III-8) seem to adequately reflect Rwanda's seasonality and economic circumstances.** Money demand is stronger in the second quarter than in the third and fourth quarters (associated with the agricultural crop cycle), and decreases in the first quarter compared with the fourth. The structural dummies for episodes of rapid depreciation (DUMER) and the genocide period (DUMG) are both positive, reflecting discrete reductions in the demand for nominal money in response to these shocks.

Table III-8. Structural Coefficients of Estimated (Short-Term) Money Demand

	DUMER	DUMG	DUMQ2	DUMQ3	DUMQ4
Coefficient	0.02	0.08	0.11	0.05	0.05
std	-0.04	-0.06	-0.03	-0.02	-0.03
t	-0.60	1.38	4.19	2.91	1.90

Source: Author's calculations.

119.   **Regarding the long-term equilibrium condition, the associated adjustment coefficients (*alphas*, Table III-9) have signs consistent with economic intuition.** If $E_t > 0$, nominal money decreases, while the price level, the exchange rate and real GDP increase to restore equilibrium in the market for real money balances. The *alpha* for the equation concerning the log first difference of nominal money (the first equation of the VECM) implies that the demand for nominal money balances in the short run will be partially explained by the adjustment towards equilibrium, provided there was disequilibrium in the previous period. Obviously, the magnitude of this disequilibrium changes period to period in response to new innovations. Although this adjustment seems small, it was already hinted by observing the evolution of nominal money balances in Figure III-4.[75] The *alpha* for consumer prices implies that approximately 2 percent per year of the disequilibrium in the market for money is translated into changes in the price level, that is, into positive inflation rates provided there is excess supply in the market for real money balances. The *alpha* for the exchange rate implies that part of a depreciation occurring in a given year will be partially explained by the adjustment in the market for money (approximately 1 percent of the market's disequilibrium). Real output adjusts more to disequilibria in the money market is, with approximately 8 percent of the disequilibrium per year being transmitted to this variable.[76]

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[75] In the particular case of Rwanda, the failure of nominal money balances to adjust to disequilibrium in the market for real balances could also be the consequence the existence of dormant accounts in the wake of the genocide.

[76] It is possible that the *alphas* of the CPI, the exchange rate and M1 are underestimated, as the one of GDP may be overestimated for two reasons. First, a significant part of the variance observed in the GDP series is related to weather-related shocks affecting the agricultural GDP that are, initially, non-monetary in nature; second, the strong recovery in both real money balances and GDP after 1994 may have biased the results.

Table III-9. Long-Term Equilibrium Condition for Money

	d(lerya)	d(lgdpr)	d(lipc)	d(lm1)
Coefficient	0.003	0.018	0.004	-0.002
std	-0.004	-0.004	-0.002	-0.006
t	-0.721	5.045	2.295	-0.289

Source: Author's calculations.

120.   **It is possible to construct a VECM of money demand in levels that fits the actual series well (Figure III-4).** Table III-10 shows the nominal money demand in levels resulting from the reduced form of the VECM in levels, blending both short- and long-term estimated portions. The resulting series fits the actual series remarkably well, in particular up to 1997. The larger residuals for the later part of the sample could be, among others, due to a combination of (i) more frequent shocks; (ii) more alternatives to money offered by the banks.

Figure III-4. Actual and Fitted Money Demand
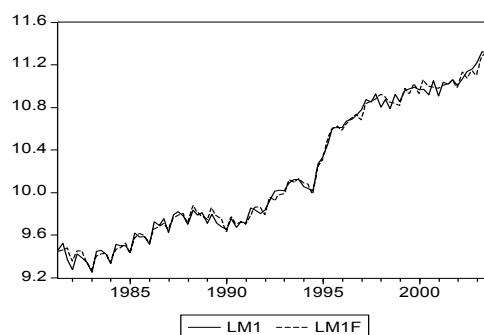
Source: Authors' calculations.

Table III-10. VECM of Money Demand

Lag		1	2	3	4	5
Constant	-0.11					
DUMER	0.03					
DUMG	0.08					
DUMQ2	0.11					
DUMQ3	0.05					
DUMQ4	0.05					
lerya		-0.15	0.22	0.25	-0.46	0.14
lgdpr		0.41	0.13	-0.98	0.26	0.20
lipc		0.61	-0.89	-0.31	0.85	-0.25
lm1		0.69	0.18	0.15	0.26	-0.29

Source: Authors' calculations.

121.   **A number of potential extensions could complement and improve the analysis of money demand presented here, in particular:**

- to distinguish between monetary and non-monetary GDP and to pursue further the effects of weather-related shocks to the agricultural sector;[77]

- to consider a "core CPI" in measuring real money balances, also because core inflation could be a unit root process;[78]

- to compile a series for exchange rate premia in parallel markets for the entire observation period, as black market premia have in the past often been significant;

- to use a structural VECM imposing theory-motivated identification conditions instead of the relatively simple Cholesky approach for the identification of the VECM.

E. Policy Recommendations

122.   **Amongst others, our findings suggest the following implications for the NBR's monetary control framework:** First, as excess reserves are the main source of volatility in the money multplier, the NBR should favor measures that could stabilize excess reserves. Such measures could include closing the commercial bank accounts at the central bank later in the day and promoting the interbank market by reducing credit risk through more transparency (for example, an automated book-entry system).

123.   **Second, The NBR's monetary programming could benefit from paying more attention to the specification of money demand.** The analysis presented here shows that, despite political and economic turmoil, and extensive controls, money demand, both in the short and long terms, reacts in a way consistent with economic fundamentals. Taking this into account when devising its program of interventions in the money market could help the NBR to avoid unwanted monetary overhangs, undesired exchange rate volatility, or bursts in core inflation.

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[77] Positive shocks could increase the share of the monetized sector (more households achieve a level of production beyond subsistence), and real money demand pressures could arise.

[78] Particularly through food, a significant part of the variance in the CPI is weather-related. Therefore, the cyclical variations observed in the index are mostly the consequence of cyclical changes in food prices generated by a stationary "weather process."

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IV. RWANDA'S BANKING SECTOR[79]

A. Introduction and Summary

124.   **This chapter discusses the structure, performance and problems of Rwanda's banking system.** The sector was severely damaged by the genocide of 1994 and its rebuilding has since then been in the particular focus of the activities of the Fund, the World Bank, and other institutions.[80] This report is to give an overview of the current state of affairs.

125.   **The growing banking sector in Rwanda is relatively limited in size and marked by significant government intervention.** This is despite the emergence of the private sector and the participation of foreign banks. With fast growth of credit to the economy, financial intermediation has developed rapidly, with Rwanda now reaching the average level of financial development in Sub-Saharan African countries of similar income levels.

126.   **Bank regulation has been strengthened although implementation is problematic**. New regulations have been issued at the end of 2003 but the institutional framework for bank supervision and prudential norms can be improved. Implementation of comprehensive bank regulations still faces a number of obstacles and compliance of banks remains uneven.

127.   **The health of the banking sector remains fragile.** Efficiency and profitability of the sector have shown encouraging signs in 2003. However, with a significant share of non performing loans and high risk concentration, asset quality is poor. Capitalization of the sector remains insufficient despite the recent capital injections of the government in two of the six commercial banks.

128.   **The problems of the banking sector are compounded by their direct links to macroeconomic policy:** High and volatile excess reserves render the money multiplier unstable; precarious liquidity situation of several banks impedes monetary policy implementation; and bank restructuring imposes a high quasi-fiscal burden on the economy.

129.   **The remainder of this chapter is organized as follows.** Sections B, C, and D discuss the structure of the sector, its development, efficiency, and profitability, respectively. Section E gives a brief account of regulation and supervision, while sections F and G examine issues of asset quality and capital.

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[79] Prepared by D. Hauner and J. Vacher (MFD).

[80] Current activities include two long term MFD experts at NBR and the conduct of a World Bank-funded Financial Sector Study completed in June 2004. The scheduling of an FSAP is being discussed with the authorities.

B. Structure of the Sector

130. **Rwanda's banking sector is of very limited size, and the state retains a significant stake, despite recent privatizations.** At the end of June 2004, Rwanda's banking system had total assets of RF 266 billion (US$460 million) and total deposits of RF 170 billion (US$293 million). Total employment in the sector is approximately 1,800, more than one third of which is accounted for by the association of credit unions (UBPR). Weighted by total assets, the government owned about 45 percent of the banking sector at end-2003. While this number is to fall significantly after the completion of the sale procedure of two state-owned banks, BCR and BACAR, scheduled for the second half of 2004, government involvement will remain significant. Rwandan or international private interests, which have played an increasing role due to the economic boom after the genocide, control most of the rest (Table IV-1).

131. **At end-June 2004, the banking sector consisted of the central bank, the Banque Nationale du Rwanda (Rwanda National Bank, NBR), six commercial banks, and three special-purpose banks.** The commercial banks are (in the order of total assets) Banque de Kigali (BK), Banque de Commerce de Developpement et d'Industrie (BCDI), Banque Commerciale du Rwanda (BCR), Banque à la Confiance d'Or (BANCOR), Banque Continentale Africaine du Rwanda (BACAR), and Compagnie Generale de Banque (COGEBANQUE). BANCOR, BCDI, and COGEBANQUE were established during the economic boom after the 1994 genocide. The sector is dominated by the three largest commercial banks, which account for two thirds of deposits and nearly two thirds of outstanding loans.

132. **The three special-purpose banks are de jure, but not all de facto, delineated from the commercial banks mainly by their source of funding.** In principle, special-purpose banks do not offer demand deposits. They fund their activities by savings and term deposits of a maturity of at least one year, through own funds and via refinancing facilities for priority sectors managed by the NBR on behalf of the government. This group comprises a development bank (Banque Rwandaise de Developpement, BRD), a mortgage bank (Caisse Hypothecaire du Rwanda, CHR), and 148 cooperative banks that are united in the Union de Banques Populaires de Rwanda (UBPR). UBPR takes demand and time deposits from its members. It differs from other banks by its ownership structure and by a different set of prudential regulations which apply to micro finance activities.[81] The special-purpose banks play an important role: UBPR's market share, both in deposits and in loans, is larger than those of three of the six commercial banks, while BRD's market share is larger than the one of the smallest commercial banks. However, BRD has a stagnant activity and so far does not fulfill its assigned role of development bank, while CHR, which had been insolvent for many

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[81] The IMF has recommended on several occasions that the NBR clarify whether the UBPR is or is not a deposit-money bank.

years, received RF 500 million in capital from the government in 2003 and intends to grant housing loans to public servants.

Table IV-1. Overview of Financial Institutions

(End of 2003)

	Est.	Ownership	Branches	Staff	Market share 1/	
					Deposits	Loans
Commercial banks:						
BK	1966	50% foreign bank, 50% (para-)statal	8	300	26.2%	22.6%
BCDI	1995	100% private	11	245	22.2%	19.6%
BCR	1983	100% (para-)statal 2/	7	185	17.2%	15.0%
BANCOR	1995	100% private	2	50	7.3%	8.6%
BACAR	1983	66% (para-)statal, 34% private 2/	4	160	8.3%	9.1%
COGEBANQUE	1999	100% private	3	63	3.4%	5.1%
Special purpose banks:						
UBPR	1975	100% private	149	700	9.7%	12.8%
BRD	1967	33% int'l aid agencies, 11% private,				
		56% (para-)statal	1	51	5.3%	7.1%
CHR	1975	17% private, 83% (para-)statal	1	24	0.5%	0.0%

1/ Balances with non-banks.
2/ After government take-over in 2004, but before the transferral of ownership after privatization.
Sources: Rwandese authorities; BBA(2003).

C. Development of the Sector

133.   **The state of development of the banking sector is broadly in line with that of other Sub-Saharan African countries at similar income levels.** The 2003 average ratio of broad money to GDP in the countries shown in Table IV-2 was 19.7 percent, compared to 18.5 percent in Rwanda. However, variation in the peer group is very high and the definition of broad money may varie between countries.[82]

134.   **A trend of financial deepening could be observed in recent years, accompanied by rising dollarization.** The M2/GDP ratio was highly volatile during 1994–97 due to the genocide and the subsequent strong presence of NGOs and aid agencies. However, it has been trending upward steadily since 1998. More than half of the increase in monetization since 1998 was due to growth in foreign currency deposits (Figure IV-1). These amounted to 4.6 percent of GDP or 31 percent of total deposits at the end of 2003, which is in line with the average for African countries.

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[82] Rwanda's definition of broad money is very restrictive, that is, its financial depth figure is probably under- rather than overstated.

Table IV-2. Ratio of Broad Money to GDP in Selected Countries
(in percent)

	GDP p.c., USD at PPP, 2003	Broad Money in Percent of GDP		
		2001	2002	2003
Chad	1394.2	12.9	13.7	13.3
Kenya	1310.1	36.0	36.2	34.9
Burkina Faso	1200.9	20.8	19.6	19.7
Zambia	1073.3	21.0	22.3	20.4
Rwanda	988.1	17.3	17.6	18.5
Niger	982.1	9.6	9.0	9.6
Malawi	850.2	15.3	13.7	14.1
Mozambique	850.2	30.6	30.5	30.0
Tanzania	726.9	13.4	14.7	16.0

Source: IMF, World Economic Outlook Database.

135. **An extremely concentrated customer base has lead to fierce competition among banks.** Only seven percent of the population have bank accounts, most of them with UBPR which has around 350,000 members (BBA 2003).The customer base of commercial banks comprises around 10,000 commercial and 100,000 individual clients. All commercial banks compete both on the deposit and the loan side for a core group of only approximately 50 corporate customers. In addition to a couple of private firms and large public sector entities, this group comprises NGOs, consulates, embassies, and international organizations, which make both foreign exchange deposits and engage in numerous exchange transactions. The fact that only large deposits are remunerated contributes to the banks' dependency on a small group of major depositors.

Figure VI-1. Indicators of Financial Depth

(in percent of GDP at year-end)
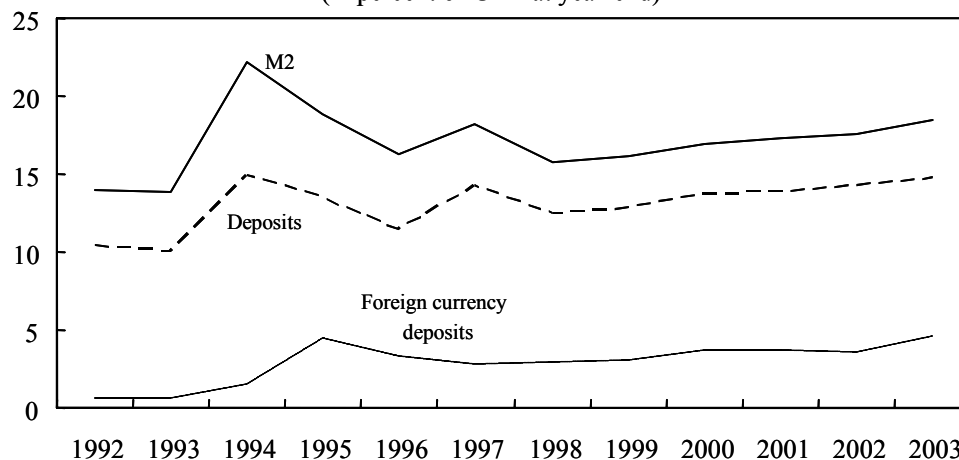
Source: Rwandese authorities; and Fund staff estimates.

136.   **Loan-to-deposit ratios are relatively high in Rwanda. At 76 percent in 2003, the overall loan to deposit ratio is close to Kenya's figure of 80 percent.** Also, banks in Rwanda hold less government bills than in other countries. While holdings of government paper have been growing rapidly since 2001, they represent only 10 percent of assets (compared with 25 percent in Kenya, 27 percent in Tanzania and 35 percent in Uganda). However, loan to deposit ratios tended to decrease in past years with a rebound in 2003.

137.   **While credit to the economy has grown rapidly in recent years, provision of credit to the private sector remains narrowly concentrated to Kigali and to specific sectors.** A declining government domestic financing requirement permitted credit to the economy to grow twice as fast as nominal GDP since 1994 (Figure IV-2). However, regions and sectors have benefited very unevenly. As much as 80 to 90 percent of banking transactions take place in Kigali. Only UBPR is represented in all of the eleven prefectures.[83] In terms of sectors, loans go mainly into trade, tourism, property development, and manufacturing. Agriculture, by far the largest sector of the economy, received only 2.3 percent of bank credit in 2003 (compared with about 10 percent in Kenya and 14 percent in Tanzania), notwithstanding the existence of UBPR, which was explicitly charged with provision of credit to the rural areas.

Figure VI-2. Commercial Bank Credit and GDP

(end of year, 1994=100)
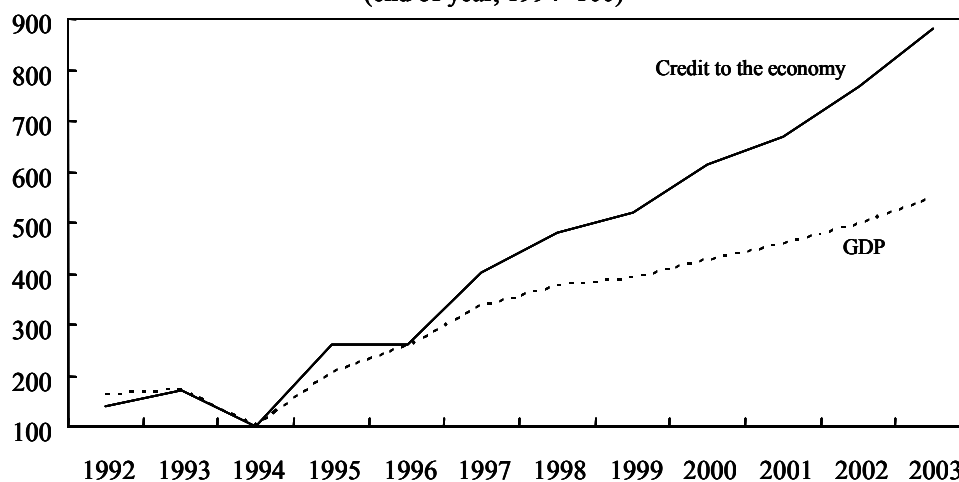
Source: Rwandese authorities; and Fund staff estimates.

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[83] BK and BCDI have each offices in seven prefectures, BCR in six, BACAR in four, and BANCOR in two prefectures. COGEBANQUE is only represented in Kigali.

138.   **Maturities are very short both for deposits and for loans, against the background of a highly risky environment.** Maturities generally do not exceed three months for deposits and one year for loans. There has been some shift away from demand and into fixed deposits in 2001 and 2002, but fixed term deposits came back to 29 percent of total deposits at the end of 2003.

139.   **Many banks habitually hold high and volatile excess reserves, mainly due to a tenuous money market, among other reasons.** More recently, the deterioration in the health of the banking sector reduced excess reserves of the overall system to low and often negative (end-month) levels (Figure IV-3). The overall figure, however, disguises continued high excess reserves of several healthier banks. The main factors accounting for the banks' propensity to keep high working balances appear to be: (a) volatile interbank market that is marked by the perception of high credit risks; (b) limited number of depositors and short maturity of deposits, which imply that management decisions of individual customers can give rise to significant liquidity risks for the banks; (c) closing of accounts with the NBR at the same time as the end of the clearing house session, which is at 12 noon; (d) very high penalties for shortfalls in required reserves that force banks to take strong precautions.

Figure IV-3. Commercial Bank Excess Reserves (RF bn)
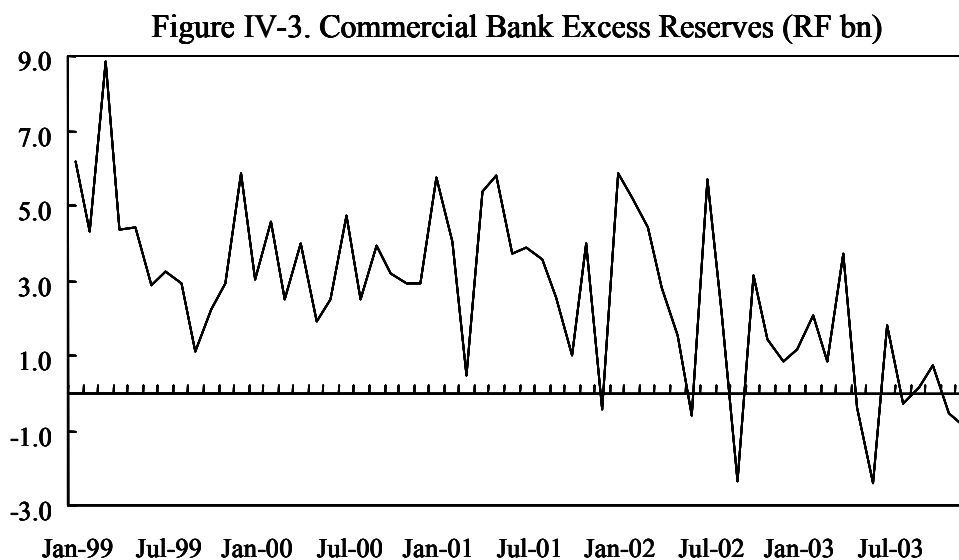
Source: Rwandese authorities; and Fund staff estimates.

D. Efficiency and Profitability

140. **Combined efficiency measures reflect encouraging improvements in 2003** (Table VI-3). Cost efficiency, which had deteriorated sharply in the preceding years due to high loan-loss provisions, reached its best level in five years. Strong credit growth and high domestic government financing raised revenue and consequently intermediation efficiency[84] as well as productive efficiency. Compared to other banking sectors of the region, productivity remains low, however (Table IV-4).

141. **Profitability improved substantially in 2003** (Table IV-3). After reaching record lows in 2002 due to high loan-loss provisioning, both return on assets (RoA) and return on equity (RoE) rose markedly in 2003. This was mainly due to lower provisioning and higher revenues, and partly due to a forceful attempt by some banks to increase loan recovery that will be difficult to repeat. A few caveats have to be mentioned: (a) the RoE measure would have to be adjusted downward by about 20 percent to account for the current capital shortfall relative to required capital in the system (see Table IV-7), (b) the average RoE still masks wide differences between banks. Low interest rate spreads (Table IV-5[85]) suggest relatively strong competition in the Rwandese market.

Table IV-3. Performance Ratios

(in percent)

	1999	2000	2001	2002	2003
Efficiency					
Cost efficiency (total expenses/total revenue)	88.4	88.4	92.0	143.1	77.2
Intermediation efficiency (interest expenses/interest revenue)	32.1	34.2	35.0	37.7	34.0
Productive efficiency (salaries/total revenue)	25.1	25.7	27.7	25.1	22.7
Profitability					
RoA (after tax)	0.6	0.6	0.3	-6.5	2.3
RoE (after tax)	5.5	4.5	2.7	-84.5	34.5

Sources: Rwandese authorities; Fund staff estimates.

Table IV-4. Bank Productivity

(2002, if not stated otherwise; in thousands of US$)

	Net Interest Per Employee	Assets Per Employee	Loans Per Employee	Deposits Per Employee
Kenya	36	581	295	458
Rwanda (2003)	17	318	170	224
Tanzania	25	509	208	279
Sub Saharan Africa	49	1073	505	742
Emerging Markets	60	2040	911	1620

Source: NBR, Staff calculations and Cihak, Podpiera (2004)
Note: excluding UBPR.

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[84] A low ratio of interest expenses to interest revenue is two-edged: it can indicate high intermediation efficiency of banks, or little competition in the banking market.

[85] Definition of maturities and weighting of loans might differ across countries.

Table IV-5. Interest Rates, Spreads, and Margins
(2002, unless specified otherwise)

	Real lending rate	Real deposit rate	Interest Spread	Interest margin
Kenya	16.5	3.5	13.0	9.2
Rwanda (2003)	7.5	0.7	6.8	...
Tanzania	12.0	-1.2	13.1	7.5
Uganda	19.4	5.9	13.5	12.7
Sub-Saharan Africa	9.9	-1.5	11.5	8.1
Low-income countries	10.8	-1.6	12.4	7.8
OECD countries	4.6	0.5	4.1	3.6

Sources: Cihak and Podpiera (2004), NBR, and Fund staff calculat ions

E. Regulation and Supervision

142.   **The current banking law came into force in 1999 and was markedly strengthened by new regulations issued at the end of 2003.** The sector was largely liberalized in 1995, including elimination of most restrictions on interest rates. The NBR is responsible for regulation and supervision of the banking system. At the end of 2003, it stepped up prudential regulations by raising the solvency ratio from 8 to 10 percent, lowering the permissible deduction of collateral from loan-loss provisions from 100 to 70 percent, and by strengthening rules on credit concentration, insider lending, and loan management.

143.   **The prudential regulations in principle conform to generally accepted standards, but important shortcomings remain, most importantly:**

- Loan classification is mostly based on past performance,[86] and allows banks to deduct 70 percent of estimated collateral values from required loan provisions. As deficiencies in the legal infrastructure often impede the sale of collateral, the regulation stipulates that the collateral cannot be deducted from the provisions if it has not been sold after a certain time.

- The NBR's ability to effectively intervene in banks' operations, though its foundations are laid in the banking law, could be strengthened in the following areas: (a) license revocation, (b) removal and/or fining of bank directors and officers, (c) takeover of a bank's management, and (d) liquidation of a bank.

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[86] Substandard – 90 days, doubtful – 180 days and loss – 360 days.

144.   **Several improvements in the institutional arrangements for banking supervision have been or are currently being implemented:**

- The coverage of supervision has been extended. While only three of six commercial banks were audited in 2002, that number was increased to four in 2003 and 2004 (in addition to BRD and CHR). Full annual audits of all six commercial banks are planned to begin in 2005. Two banks are currently under enhanced supervision.

- A Micro-Finance Supervision Unit was established in 2003.

- A new IAS-based accounting plan for banks took effect in 2004.

- A relaxation of the regulation on the limits on net foreign exchange exposure, that had taken effect in June 2003, was reversed in May 2004.

F. The Problem of Asset Quality

145.   **In spite of recent improvements, asset quality remains the main challenge for Rwanda's banking sector.** At the end of 2003, 30 percent of commercial bank gross loans were nonperforming, 8 percent net of provisions.[87] This was equivalent to 17 and 4.7 percent of total assets, respectively. Asset quality of some of the special purpose banks is even more problematic. In 2002 and 2003, the share of nonperforming loans (both in total loans and total assets, and both gross and net of provisions), has declined (Figure IV-4, Table IV-6). However, this is partly attributed to strong credit growth that could backfire if the financed projects do not yield the expected results.

146.   **While the genocide has contributed to a large volume of bad loans, it only explains about one fifth of its present-day total.** During the genocide, many borrowers were killed, fled the country, or disappeared. But according to NBR (2002), only 16 percent of total loans on the books at end-June 2002 were contracted before the war, 72 percent of which were nonperforming. Given that total loans at end-June 2002 amounted to 71 percent of total loans at end-2003, bad loans contracted before the genocide amounted to only 8 percent of end-2003 gross loans (0.16*0.71*0.72=0.08). These constituted about a quarter of bad loans at end-2003.

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[87] Nonperforming loans on a gross basis are overstated due to the widespread practice in francophone Africa of carrying them on the books instead of writing them off even when they have been fully provisioned for.

Table IV-6. Banking Sector Balance Sheet

	In Percent of Total Assets/Liabilities & Equity				
	1999	2000	2001	2002	2003
Cash and due from banks	39.7	37.8	40.4	39.0	37.7
Investments	7.5	4.9	4.5	8.9	11.2
Net loans	52.8	46.8	46.5	43.9	43.6
Gross loans	63.0	57.0	56.8	58.3	55.9
Performing loans	40.1	38.1	35.8	38.6	38.9
Non performing loans	22.8	18.9	21.0	19.6	17.0
Loan loss provisions	10.1	10.3	10.3	14.4	12.3
Other assets	13.3	9.3	9.0	8.9	11.9
Demand deposits	51.5	45.5	43.6	50.1	52.0
Time deposits	23.2	19.1	25.1	27.5	21.5
Other liabilities	24.0	21.9	19.9	19.1	21.8
Capital	14.6	12.3	11.9	4.0	9.1
Provisions	4.1	1.7	1.6	1.2	1.6
Reserves	5.4	3.4	3.2	3.0	2.6
Shareholder funds	4.5	7.0	7.5	7.2	9.8
Retained earnings	0.6	0.2	-0.4	-7.3	-5.0
Total off balance sheet items	124.5	105.6	85.4	88.2	77.9
Non-performing in percent of gross loans	36.3	33.1	36.9	33.7	30.3

Sources: Rwandese authorities; Fund staff estimates.

Figure IV-4. Bank Lending and Non-performing Loans
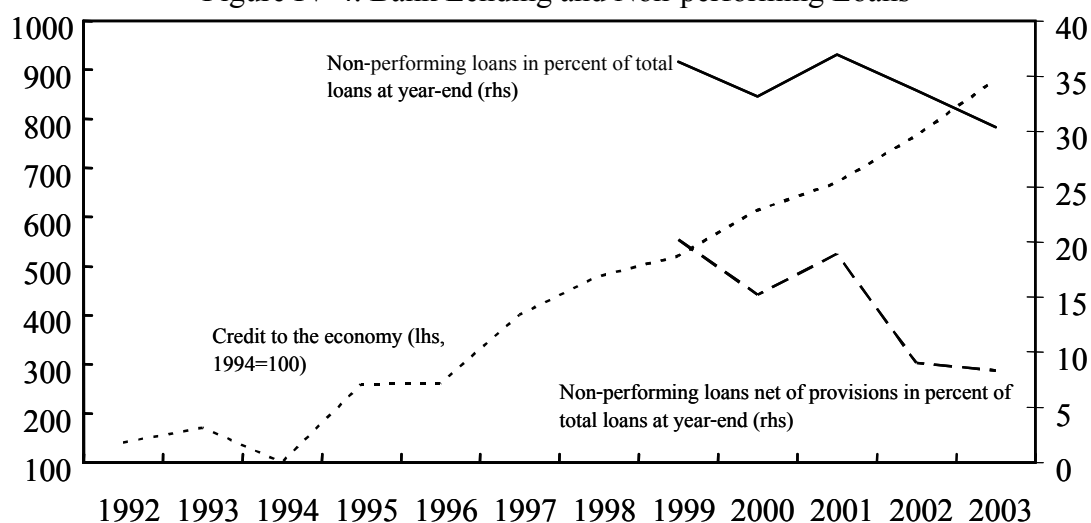
Source: Rwandese authorities; and Fund staff estimates.

147.   **Shortcomings of the judicial system and banks' poor management explain the accumulation of most new nonperforming loans.** Many debtors do not meet their obligations even though they are in a position to do so. For instance, NBR (2002) classified 48 percent of nonperforming loans as "capable, but unwilling to pay" at end-June 2002. With respect to banks' management, a study conducted by the Belgian Bankers Association (2003) highlighted the following as areas of particular weakness: strategy and general loan policies; functioning of organizational structure; information systems and management reports; controlling and internal audit; quality of human resources; style of management; and corporate governance.

148.   **In order to improve loan recovery procedures, measures recently implemented, measures currently being implemented, or measures planned to be introduced, include:**[88]

- The *voie parée* accelerated loan recovery procedure, although temporarily suspended by parliament due to alleged abuses, was reinstituted. Parties can agree on a potential voie parée in the loan agreement. Under such an agreement, the bank can seize the collateral automatically under certain circumstances and safeguards it for the borrower.

- The office of a public notary has been operational since 2001.

- The creation of financial and commercial courts is ongoing.

- An out-of-court arbitration center has been established and staffed.

- The municipal administration of Kigali has created a registrar of land deeds to facilitate mortgaging.

- The NBR has strengthened its Risks and Unpaid Debts Unit, which centralizes credit information related to delinquent borrowers.

- Since end-2003, banks have not been permitted to lend to borrowers that owe loans in categories three to five. In addition, lenders have to work out restructuring plans with delinquent borrowers, whose names would otherwise be published in newspapers "widely available in the country."

- An action plan for further improvement of credit information quality is to be implemented in 2004.

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[88] The creation of a "bad bank" for nonperforming loans was considered, but abandoned by the authorities due to concerns that it could give rise to additional moral hazard.

149.   **Risk concentration is a problem that is difficult to address given the structure of the economy and its lack of diversification.** In addition, seasonal derogations have been put in place to take into account the coffee season. Consequently, risk concentration is very likely to continue to impair asset quality. Risk concentration limits appear difficult to implement and are frequently breached by most banks. Overall, the limited development of the private sector, lack of sectoral diversification and limited access to banking services by a large share of population and businesses constitute serious difficulties for regulators.

150.   **The exposure to foreign-exchange risk is significant and has been growing.** At the end of 2003, about 30 percent of assets and liabilities were denominated in foreign currency. Deposits in foreign currency are allowed, with a rising trend in deposit dollarization having somehow stabilized more recently. As lending in foreign currency for domestic operations is not permitted, banks hold foreign assets in correspondent banks. Some of the banks frequently breach the regulatory limits on their net open foreign exchange positions.

G.   Capitalization and Restructuring

151.   **The sector barely reaches the required solvency ratio**. The sectoral capital adequacy ratio at the end of 2003 amounted to only 3 percent (0.5 percent at end-2002), while 8 percent would have been required. This shortfall was accounted for by two of the six commercial banks. With the implementation of the new regulation on the capital adequacy ratio, most banks fall short of the new regulatory requirement. The need for provisioning has consistently eroded the capital position of most banks.

152.   **Recent capital injections by the government, although potentially giving rise to additional moral hazard, have alleviated part of the capital shortfall in the system.** Recent capital injections by the government in two of the six commercial banks have increased the aggregate capital of the commercial banking system to RF 17.1 billion (Table VI-7). However, if capital is adjusted for nonperforming loans that have not yet been provisioned, the capital shortfall in the system remains significant. While down markedly from end-2002, it still was RF 3.5 billion, or 21 percent of actual capital, at end-2003.[89]

153.   **Past restructuring attempts could not achieve the sustained improvement of the health of the banking sector.** After the genocide, three-year (1996–99) restructuring plans resulted from an audit of the three commercial banks that had existed prior to the genocide and of BRD. While the implementation of these plans was generally satisfactory, many loans granted during the economic revival after the genocide became also nonperforming. A new audit of the financial sector commissioned in 1998 revealed the precarious situation of two banks, for which another restructuring plan (2000–02) was prepared.

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[89] The latest and provisional data from NBR as of end-June 2004, shows a capital shortfall of RF 5.5 billion. The data do not take into account the results of an inspection report expected to show the need for additional capital in one of the six commercial banks.

Table IV-7. Estimated Capital Shortfall in the Sector

(RWF Billion, Unless Specified Otherwise)

	1999	2000	2001	2002	2003
Actual (gross) capital	15.2	16.2	17.1	6.4	17.1
Unprovisioned nonperforming loans	13.2	11.4	15.4	8.3	8.7
Adjusted capital (Actual capital unprovisioned NPLs)	2.0	4.8	1.7	-1.9	8.3
Required capital (8 percent of risk weighted assets 1/)	2.6	4.8	4.0	-30.8	22.2
Capital shortfall (required adjusted)	0.6	0.0	2.3	-28.8	13.9
Capital shortfall in percent of actual capital	3.8	0.0	13.6	-451.5	81.4

Sources: Rwandese authorities; Fund staff estimates.

1/ End-2003 figure applies new requirement of 10 percent.

154.	**While the current restructuring process has been protracted, progress was made more recently.** The privatization of BCR and BACAR, planned for 2003, has entered its final phase in July 2004, with buyers selected for each of the banks. For the BRD, a 2003-2010 strategy was completed in 2002, giving it the mission to lead poverty reduction measures. A new strategy is being prepared covering 2004-2008. CHR was recapitalized in 2003, with a capital endowment consisting of government owned houses to be progressively auctioned. The bank is now ready to issue housing loans.

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Table 1. Rwanda: Gross Domestic Product by Origin at Current Prices, 1999-2003

	1999	2000	2001	2002	2003
	(In billions of Rwanda francs)				
GDP at market prices	644.9	705.7	754.3	825.0	905.3
GDP at factor cost	600.3	658.9	699.3	760.7	823.9
Primary sector	270.4	292.3	305.2	341.6	373.9
Food crops	228.5	248.7	258.5	293.1	323.6
Export crops	2.6	2.6	2.3	2.4	2.2
Livestock	24.4	24.9	28.3	29.7	31.4
Other	9.9	11.5	12.0	12.2	12.9
Secondary sector	124.9	144.4	163.0	175.9	192.7
Mining	1.3	11.5	14.5	9.1	5.7
Electricity, gas, and water	4.2	3.7	3.4	3.4	3.6
Manufacturing	67.8	68.6	73.9	80.5	80.3
Construction and public works	51.5	60.5	71.2	82.9	103.1
Tertiary sector	249.6	269.0	286.2	307.5	338.7
Commerce and tourism	68.7	71.0	75.2	82.0	91.7
Transport and communications	41.8	49.7	55.1	60.7	61.7
Public administration	47.2	52.8	54.2	55.8	64.8
Services	91.9	95.6	101.6	109.0	120.4
	(In percent of GDP)				
Primary sector	41.9	41.4	40.5	41.4	41.3
Of which: food crops	35.4	35.2	34.3	35.5	35.7
export crops	0.4	0.4	0.3	0.3	0.2
Secondary sector	19.4	20.5	21.6	21.3	21.3
Of which: manufacturing	10.5	9.7	9.8	9.8	8.9
Tertiary sector	38.7	38.1	37.9	37.3	37.4
Of which: public administration	7.3	7.5	7.2	6.8	7.2

Sources: Ministry of Finance and Economic Planning; and Fund staff estimates.

Table 2. Rwanda: Gross Domestic Product by Origin at Constant 1995 Prices, 1999-2003

	1999	2000	2001	2002	2003
	(In billions of Rwanda francs)				
GDP at market prices	509.8	540.3	576.6	630.7	636.7
GDP at factor cost	474.5	504.5	534.5	581.5	579.4
Indirect taxes	35.3	35.8	42.0	49.2	57.2
Primary sector	223.6	243.9	264.2	302.5	293.0
Food crops	185.3	204.5	222.4	259.3	249.9
Export crops	7.8	6.8	7.5	7.9	6.7
Livestock	21.5	22.9	24.3	25.0	25.7
Other	8.9	9.8	10.1	10.3	10.6
Secondary sector	86.8	89.7	96.6	104.3	108.9
Mining	1.1	1.2	1.2	1.1	0.8
Electricity, gas, and water	1.6	1.4	1.3	1.3	1.3
Manufacturing	48.1	46.1	49.7	52.2	49.6
Construction and public works	36.0	41.0	44.4	49.8	57.2
Tertiary sector	199.5	206.6	215.8	223.9	234.7
Commerce and tourism	48.1	47.4	49.7	52.2	55.9
Transport and communications	34.8	39.1	41.9	44.4	42.4
Public administration	42.8	44.1	44.6	45.0	49.5
Services	73.7	76.0	79.5	82.2	86.9
	(Annual percent change)				
GDP at market prices	7.6	6.0	6.7	9.4	0.9
Primary sector	8.6	9.1	8.3	14.5	-3.1
Of which: food crops	8.2	10.3	8.8	16.6	-3.6
export crops	24.7	-12.3	9.8	5.3	-15.4
Secondary sector	5.4	3.4	7.6	8.0	4.4
Of which: manufacturing	-3.4	-4.1	7.8	5.0	-5.0
Tertiary sector	7.4	3.6	4.4	3.8	4.8
Of which: public administration	6.5	3.0	1.0	1.0	10.0
	(In percent of GDP)				
Primary sector	43.9	45.1	45.8	48.0	46.0
Of which: food crops	36.4	37.8	38.6	41.1	39.3
export crops	1.5	1.3	1.3	1.3	1.1
Secondary sector	17.0	16.6	16.8	16.5	17.1
Of which: manufacturing	9.4	8.5	8.6	8.3	7.8
Tertiary sector	39.1	38.2	37.4	35.5	36.9
Of which: public administration	8.4	8.2	7.7	7.1	7.8

Sources: Ministry of Finance and Economic Planning; and Fund staff estimates.

Table 3. Rwanda: Supply and Use of Resources at Current Market Prices, 1999-2003

	1999	2000	2001	2002	2003
	(In billions of Rwanda francs)				
GDP	644.9	705.7	754.3	825.0	905.3
Consumption	645.2	696.6	734.9	824.8	912.9
Public	71.2	74.3	87.9	97.7	137.1
Private (residual)	574.0	622.4	646.9	727.1	775.7
Domestic investment	111.1	123.7	138.9	139.6	166.8
Government	40.8	42.0	50.0	40.7	51.1
Private	70.3	81.7	88.9	98.8	115.7
Resource gap	-111.4	-114.7	-119.4	-139.3	-174.4
Exports of goods and nonfactor services	38.2	58.9	69.6	63.2	75.0
Imports of goods and nonfactor services	149.6	173.5	189.0	202.5	249.4
	(In percent of GDP)				
GDP	100.0	100.0	100.0	100.0	100.0
Consumption	100.0	98.7	97.4	100.0	100.8
Public	11.0	10.5	11.7	11.8	15.1
Private (residual)	89.0	88.2	85.8	88.1	85.7
Domestic investment	17.2	17.5	18.4	16.9	18.4
Government	6.3	6.0	6.6	4.9	5.6
Private	10.9	11.6	11.8	12.0	12.8
Resource gap	-17.3	-16.3	-15.8	-16.9	-19.3
Exports of goods and nonfactor services	5.9	8.3	9.2	7.7	8.3
Imports of goods and nonfactor services	23.2	24.6	25.1	24.5	27.6

Sources: Ministry of Finance and Economic Planning; and Fund staff estimates.

Table 4. Rwanda: Supply and Use of Resources at Constant 1995 Prices, 1999-2003

	1999	2000	2001	2002	2003
			(In billions of Rwanda francs)		
GDP	509.8	540.3	576.6	630.7	636.7
Consumption	503.6	529.9	547.5	606.4	617.9
Public	56.3	56.9	67.2	74.7	96.4
Private (residual)	447.4	473.1	480.2	531.7	521.5
Domestic investment	95.2	80.7	83.0	73.6	75.3
Government	35.0	27.4	29.9	21.5	23.1
Private	60.2	53.3	53.1	52.1	52.2
Resource gap	-89.0	-70.4	-53.9	-49.3	-56.6
Exports of goods and nonfactor services	39.2	42.8	59.1	57.5	56.0
Imports of goods and nonfactor services	128.2	113.2	113.0	106.8	112.6
			(In percent of GDP)		
GDP	100.0	100.0	100.0	100.0	100.0
Consumption	98.8	98.1	95.0	96.1	97.1
Public	11.0	10.5	11.7	11.8	15.1
Private (residual)	87.7	87.6	83.3	84.3	81.9
Domestic investment	18.7	14.9	14.4	11.7	11.8
Government	6.9	5.1	5.2	3.4	3.6
Private	11.8	9.9	9.2	8.3	8.2
Resource gap	-17.5	-13.0	-9.4	-7.8	-8.9
Exports of goods and nonfactor services	7.7	7.9	10.2	9.1	8.8
Imports of goods and nonfactor services	25.1	21.0	19.6	16.9	17.7

Sources: Ministry of Finance and Economic Planning; and Fund staff estimates.

Table 5. Rwanda: Selected Food Crop Production, 1999-2003
(In thousands of metric tons)

	1999	2000	2001	2002	2003
Bananas	2897.4	2150.5	2103.1	3724.2	3223.6
Pulses	162.1	251.5	329.7	322.7	324.7
Beans and cowpeas	149.3	229.2	306.0	260.5	252.9
Soya beans and groundnuts	12.8	22.3	23.7	62.2	71.8
Cereals	175.0	235.4	292.9	304.3	294.0
Sorghum	107.6	155.1	174.9	184.3	170.1
Maize	54.9	62.5	92.1	91.7	80.5
Wheat	3.6	6.4	8.2	7.4	15.2
Rice	8.9	11.4	17.7	21.0	28.2
Roots and tubers	1445.6	2880.7	2914.9	3484.5	3111.4
Irish potatoes	175.9	954.4	988.9	1038.8	1100.0
Sweet potatoes	862.6	1025.6	1136.6	1291.8	864.8
Taro	90.2	88.2	101.4	122.8	138.9
Cassava	316.9	812.5	688.0	1031.1	1007.6
Total	4680.2	5518.1	5640.6	7835.6	6953.7

Source: Ministry of Finance and Economic Planning.

Table 6. Rwanda: Coffee and Tea Production, Prices, and Costs, 1999-2003

	1999	2000	2001	2002	2003
	(In thousands of metric tons, unless otherwise indicated)				
Coffee					
Production of parchment coffee					
Acreage (in thousands of hectares)	27.1	30.0	30.0	...	...
Yield (kilogram per hectare)	963.0	400.0	400.0	...	...
Production of green coffee					
Production	18.5	16.1	18.8	19.5	13.8
Exports	18.3	16.1	17.7	19.3	13.8
Changes in stocks	0.2	0.0	1.1	...	...
Stock level (year-end)	0.8	0.9	1.3	...	...
Production of tea					
Green leaves	56.7	62.9	77.8	50.5	11.6
Dried leaves	12.7	14.4	17.8	14.9	15.5
	(In Rwanda francs per kilogram, unless otherwise indicated)				
Prices and costs					
Coffee					
Minimum producer price (unprocessed) 1/	200.0	250.0	200.0	...	...
Average realized producer price (unprocessed)	260.0	250.0	200.0	...	...
Export prices (f.o.b. Mombasa)	705.0	551.0	479.0	347.0	548.7
Export prices (f.o.b. Mombasa, in U.S. dollars per kilogram)	1.4	1.4	1.1	0.7	1.0
Export tax (in millions of Rwanda francs) 2/	0.0	0.0	0.0	...	...
Tea					
Producer price (green tea)	37.0	37.0	37.0	...	...
Producer price (processed tea equivalent)	417.0	346.0	296.0	...	...
Export price	524.2	690.3	660.2	718.3	845.3
Export prices (in U.S. dollars per kilogram)	1.4	1.8	1.5	1.5	1.6

Source: Rwandese authorities.

1/ Since 1996, producer prices have been market determined; in 1997, estimated average producer price.
2/ Up to 1998, the export tax was proportional and based on the f.o.b. Mombasa export price; it was imposed only when the price
exceeded US$0.95 per kilogram. The export tax was abolished in 1999.

Table 7. Rwanda: Production of Principal Manufactured Goods and Minerals, 1999-2003
(In units indicated)

	1999	2000	2001	2002	2003
Manufactured goods					
Beer (millions of liters)	59.9	44.2	47.9	53.9	41.2
Sugar (metric tons)	2.1	1.1	6.3	6.6	5.3
Soap (tons)	6431.0	5867.0	7056.0	5571.0	4455.5
Corrugated iron sheets (thousands of tons)	4575.0	5435.0	4532.0	3993.0	3513.9
Cigarettes (millions)	217.0	327.0	278.0	391.0	401.8
Textile (millions of meters)	9.8	9.9	10.4	9.3	8.3
Cement (metric tons)	66,291.0	70,716.0	83,024.0	100,568.0	105,105.4
Minerals					
Cassiterite (metric tons)	359.0	365.0	555.0	672.1	692.2
Wolfram (metric tons)	84.0	144.0	161.0	324.7	344.5
Colombo-tantalite (metric tons)	330.0	360.0	296.0	277.0	285.3
Gold (kilograms)	10.0	...	...	...	...

Source: Rwandese authorities.

Table 8. Rwanda: Energy, Water, and Telephone Production, Consumption, and Prices, 1999-2003

	1999	2000	2001	2002	2003
	(In millions of kilowatt-hours, unless otherwise indicated)				
Electricity					
Available supply	197.1	204.9	210.8	262.5	244.3
Domestic production	127.3	110.8	89.3	98.2	117.6
Imports	69.9	94.1	121.5	164.3	126.7
Number of subscribers (thousands)	48.4	54.0	62.0	57.7	67.0
Electricity tariff (Rwanda francs per kilowatt-hour)					
Low-tension supply	42.0	42.0	42.0	42.0	42.0
Medium- and high-tension supply					
Up to 99 kilowatt-hours	42.0	42.0	42.0	42.0	42.0
Above 100 kilowatt-hours	42.0	42.0	42.0	42.0	42.0
Water	(In millions of cubic meters, unless otherwise indicated)				
Production	15.3	16.3	14.4	15.3	17.2
Consumption	7.7	9.5	7.4	8.4	9.0
Number of subscribers (thousands)	27.0	28.3	30.2	...	37.3
Consumption tariff (Rwanda francs per kilowatt-hour)					
0-25 kilowatt-hour	200.0	200.0	200.0	200.0	200.0
26-60 kilowatt-hour	300.0	300.0	300.0	300.0	300.0
Above 60 and below 100	350.0	350.0	350.0	350.0	350.0
Above 100 kilowatt-hour	375.0	375.0	375.0	375.0	375.0
Natural gas					
Production	1353.0	1373.0	828.0	103.0	314.3
Consumption	…	…	…	…	…
Telephone					
Turnover (in millions of Rwanda francs) 1/	5262.0	6416.0	8914.0	9535.1	10,599.2

Source: Rwandese authorities.

1/ Includes only Rwandatel, and the cellular phone company, RWANDACELL.

Table 9. Rwanda: Consumer Prices, 1999-2004
(March-June 1982=100)

	Weight (In percent)	Jun.	Dec.	Jun.	Dec.	Jun.	Dec.	Jun.	Dec.	Jun.	Dec.	2004 Jan.	Feb.	Apr.	May
Imported goods															
Food	9.8	470.5	461.5	460.4	456.3	485.7	481.4	473.3	514.7	554.0	614.0	698.4	691.0	719.6	714.1
Clothing	9.3	520.6	544.8	546.7	551.9	555.2	585.7	606.6	610.8	617.2	631.8	629.2	637.2	648.7	655.0
Household equipment	2.3	486.6	500.9	505.2	504.7	511.5	514.2	506.4	514.1	523.3	558.4	576.2	570.9	576.3	577.5
Health	1.3	707.2	727.3	755.7	721.2	756.5	782.5	843.9	854.9	854.9	878.9	914.5	920.6	928.6	927.7
Other health services	2.3	377.2	372.5	373.4	375.5	382.4	410.6	424.2	444.7	450.0	458.1	458.1	472.2	476.8	478.6
Housing	2.9	385.1	391.4	391.0	402.9	389.2	387.3	385.0	392.4	392.5	393.3	378.4	378.4	378.6	378.6
Transportation	7.2	824.3	840.7	860.0	886.3	886.8	890.0	890.9	905.9	921.6	934.6	939.1	938.4	938.8	943.5
Leisure, entertainment, and culture	0.9	203.7	212.2	221.5	220.7	227.9	241.5	262.4	267.5	265.9	259.3	258.7	259.7	269.8	269.8
Others	0.5	617.9	620.3	624.7	638.7	644.2	665.8	654.4	687.1	713.0	712.0	696.6	694.8	701.8	701.8
Group index	37.3	541.3	552.0	558.0	564.3	574.3	585.4	590.8	610.4	627.8	659.7	683.3	684.0	696.4	697.6
Mixed goods															
Food	1.3	698.6	761.4	842.6	875.7	912.7	966.0	943.6	811.5	811.8	864.9	865.3	876.1	875.8	876.5
Beverages and tobacco	7.2	400.9	403.0	410.8	419.6	431.1	424.6	407.2	407.2	482.5	486.7	489.3	536.9	539.5	539.5
Clothing	2.0	516.7	542.2	578.7	577.0	571.0	602.5	615.0	616.4	616.4	616.4	616.4	616.4	616.4	616.4
Household equipment	0.3	513.8	531.2	524.4	519.8	510.1	506.2	544.6	517.2	518.4	521.1	524.7	515.8	505.8	505.8
Health services	1.1	369.9	390.2	390.4	390.3	381.4	379.8	388.3	431.5	431.9	433.0	432.9	432.8	450.9	467.8
Housing	6.0	501.3	540.9	532.1	520.9	505.6	535.8	536.6	558.8	551.1	564.0	578.5	570.4	569.9	569.9
Leisure, entertainment, and culture	0.0	174.6	207.3	212.7	223.5	240.0	339.4	379.6	357.8	375.3	375.3	375.3	320.0	320.0	320.0
Others	0.0	400.0	400.0	400.0	400.0	400.0	400.0	400.0	400.0	400.0	400.0	400.0	400.0	400.0	400.0
Group index	17.9	468.5	491.5	501.6	503.5	504.3	519.1	513.3	513.6	541.4	551.3	557.3	574.3	576.2	577.2
Local goods															
Food	23.8	455.8	438.9	431.2	510.8	486.3	443.7	455.7	535.1	534.2	583.5	571.3	575.6	601.8	604.3
Beverages and tobacco	1.1	357.5	491.4	528.7	493.9	426.1	511.0	542.3	543.8	543.5	543.8	542.4	591.2	591.2	591.2
Household equipment	5.9	381.1	397.6	415.2	401.8	359.5	404.8	406.7	388.9	380.3	455.3	477.3	555.7	582.1	564.5
Health	0.4	544.7	666.4	672.5	666.4	671.1	671.1	671.1	666.4	666.4	666.4	666.4	666.4	666.4	666.4
Other health services	0.1	1190.8	1248.8	1,425.4	1,552.8	1,561.8	1,549.8	1563.9	1559.9	1559.9	1559.9	1559.9	1559.9	1559.9	1559.9
Housing	4.3	363.1	375.9	386.5	409.1	417.0	420.6	441.2	442.3	442.3	442.3	442.3	442.3	442.3	442.3
Transportation	3.1	320.3	361.2	394.0	410.7	447.9	468.7	468.7	468.7	470.5	492.9	492.9	492.9	492.9	492.9
Leisure, entertainment, and culture	0.3	482.3	703.8	864.4	1,004.9	1,004.5	1,147.4	1197.8	1186.6	1186.6	1186.6	1186.6	1186.6	1186.6	1186.6
Others	5.7	342.8	345.1	348.6	349.0	359.4	369.6	384.4	382.6	382.8	382.8	382.8	382.8	382.8	382.8
Group index	44.7	413.2	416.7	421.0	465.2	449.6	438.9	450.5	490.3	488.8	526.6	523.0	536.8	554.2	553.2
All goods															
Food	34.9	468.9	457.1	454.6	509.0	501.9	473.5	478.6	539.5	550.0	602.4	617.8	619.0	644.9	645.1
Beverages and tobacco	9.3	397.7	423.2	436.4	443.2	444.6	452.6	440.8	447.0	511.5	541.6	544.8	587.9	592.9	593.0
Clothing	11.3	519.9	544.3	552.5	556.4	558.0	588.7	608.1	611.8	617.1	629.0	626.9	633.4	642.9	648.0
Household equipment	8.4	413.9	429.8	443.1	433.4	405.4	437.5	438.2	426.9	423.3	485.1	505.4	558.4	577.9	565.9
Health	1.7	666.1	711.9	734.6	707.3	734.9	754.3	800.1	807.2	807.1	825.1	851.6	856.2	862.2	861.5
Other health services	3.5	394.0	398.7	403.4	407.8	409.7	427.6	439.7	466.7	470.3	476.0	476.0	485.3	494.0	500.5
Housing	13.2	430.7	454.2	453.6	458.5	451.0	465.5	472.1	484.1	480.6	486.7	490.0	486.3	486.1	486.1
Transportation	10.3	670.8	694.6	718.1	741.4	753.1	761.7	762.3	772.7	784.2	800.1	803.2	802.7	803.0	806.3
Leisure, entertainment, and culture	1.2	264.6	320.0	362.5	392.8	398.5	441.3	468.8	470.1	469.1	463.9	463.5	463.7	471.5	471.5
Others	6.1	363.7	366.1	369.6	371.0	381.0	392.1	404.8	405.7	407.8	407.7	406.5	406.4	406.9	406.9
Overall index	100.0	471.0	480.6	486.6	509.1	506.0	508.0	514.2	539.3	550.2	580.7	589.0	598.5	611.2	611.4

Source: National Bank of Rwanda (NBR).

Table 10. Rwanda: Budgetary Operations of the Central Government, 1999-2003
(In billions of Rwanda francs)

	1999	2000	2001	2002	2003
Revenue and grants	100.7	136.9	148.2	160.3	195.5
Tax revenue	60.4	65.3	79.5	94.6	114.6
Direct taxes	15.8	18.5	24.5	30.5	35.1
Taxes on goods and services	33.6	35.2	41.0	47.4	57.5
Taxes on international trade	11.0	11.6	14.0	16.7	22.1
Nontax revenue	3.2	3.3	6.7	6.6	7.7
Grants	37.1	68.2	62.0	59.1	73.1
Budgetary grants	13.4	39.9	33.9	39.3	51.0
Of which: HIPC Initiative assistance	0.0	0.0	10.6	12.2	11.5
Capital grants	23.7	28.3	28.1	19.8	22.1
Total expenditure and net lending	126.5	131.7	158.1	175.9	217.8
Current expenditure	86.0	89.2	107.4	134.6	162.7
Of which : priority	25.1	28.5	40.1	50.4	59.1
Wages and salaries	34.4	36.6	38.9	40.6	44.0
Civil	17.2	20.5	22.8	24.1	28.3
Defense	17.2	16.1	16.2	16.5	15.7
Purchases of goods and services	26.8	23.9	29.4	35.2	45.8
Civil	17.0	16.1	20.4	27.3	37.1
Defense	9.8	7.8	9.0	7.8	8.6
Interest payments	5.4	6.5	6.2	8.3	10.5
Domestic debt (due)	2.4	2.0	1.3	2.1	3.2
External debt(due)	3.0	4.5	5.0	6.2	7.3
Transfers (including Rwanda Revenue Authority)	11.5	11.0	15.1	20.4	22.2
Exceptional expenditure	7.9	11.3	17.7	30.2	40.2
Assistance to genocide victims	3.8	4.1	5.1	4.8	5.9
Demobilization/reintegration/reinsertion	1.9	1.8	3.4	3.4	7.3
Education assistance and governance	2.2	3.2	5.8	7.0	5.7
Other	...	2.1	3.3	14.9	21.3
Capital expenditure	40.8	42.0	50.0	40.7	51.1
Domestic	5.3	1.5	3.5	6.9	13.2
Foreign	35.5	40.5	46.5	33.8	37.9
Net lending	-0.4	0.5	0.6	0.6	4.0
Primary deficit (including exceptional expenditure)	-17.0	-14.1	-15.0	-25.2	-29.8
Primary deficit (excluding exceptional expenditure)	-14.4	-4.3	-0.8	-12.9	-2.8
Overall deficit (payment order)					
Including grants	-25.8	5.1	-9.9	-15.6	-22.3
Excluding grants	-62.8	-63.1	-71.9	-74.8	-95.4
Change in arrears (net reduction -)	-2.0	1.2	-31.7	-1.7	-13.2
Domestic	-4.0	-1.9	-15.0	-3.9	-1.0
External	2.0	3.0	-16.7	2.2	-12.1
Discrepancy	-0.2	5.5	1.0	13.5	-8.2
Deficit (cash basis)	-27.6	0.8	-42.6	-30.9	-27.2
Financing					
Foreign financing (net)	21.5	11.4	40.9	30.5	22.0
Drawings	29.2	18.8	34.7	41.7	21.3
Amortization	-11.0	-10.4	-9.2	-14.0	-15.0
Exceptional financing	3.3	3.0	15.4	2.8	15.7
Of which: HIPC assistance	0.0	0.0	0.2	0.1	0.0
Domestic financing	6.2	-12.2	1.7	0.4	5.2
Banking system (monetary survey)	7.1	-9.2	-0.4	2.8	5.3
Of which: HIPC assistance subaccount 1/	...	...	-3.8	...	...
Nonbank sector (including CSR repayment) 2/	-0.9	-3.0	2.1	-2.4	0.0

Sources: Ministry of Finance and Economic Planning; and Fund staff estimates.

1/ Assistance from IMF only.
2/ CSR (Caisse Sociale du Rwanda).

Table 11. Rwanda: Budgetary Receipts, 1999-2003

	1999	2000	2001	2002	2003
			(In billions of Rwanda francs)		
Revenue and grants	100.7	136.9	148.2	160.3	195.5
Total revenue	63.6	68.7	86.2	101.2	122.3
Tax revenue	60.4	65.3	79.5	94.6	114.6
Direct taxes	15.8	18.5	24.5	30.1	35.1
Tax on income and profits	15.2	17.9	23.9	29.7	34.4
Companies	7.4	10.0	14.4	17.9	17.5
Large companies	6.2	9.0	12.4	14.8	13.7
Small enterprises	1.2	1.0	2.1	3.1	3.8
License fees	0.4	0.4	0.4	0.4	0.0
Individuals	6.1	7.5	9.0	11.1	16.5
Others	1.3	0.0	0.1	0.4	0.4
Property taxes	0.6	0.6	0.6	0.7	0.7
Taxes on goods and services	33.6	35.2	41.0	47.4	57.5
Excise taxes	17.9	18.8	14.2	14.4	16.2
Beer	7.7	7.1	5.7	5.0	6.0
Wine and liquor	0.4	0.3	0.3	0.3	0.3
Petrol	6.7	7.9	5.5	5.9	6.5
Cigarettes	1.0	1.4	1.2	1.6	1.7
Lemonade	2.1	2.1	1.6	1.6	1.6
Automobiles	0.0	0.0	0.0	0.0	0.1
Airtime	0.0	0.0	0.0	0.0	0.1
Turnover tax	12.9	13.8	24.2	29.9	38.2
Of which : on imports	9.0	9.4	14.6	15.5	19.4
Road fund	2.7	2.5	2.6	3.2	3.1
Taxes on international trade	11.0	11.6	14.0	16.7	22.1
Export tax	0.0	0.0	0.0	0.0	0.0
Import tax	8.4	9.3	11.1	12.9	18.0
Other	2.6	2.4	2.9	3.8	4.1
Nontax revenue	3.2	3.3	6.7	6.6	7.7
Grants	37.1	68.2	62.0	59.1	73.1
Budgetary grants	13.4	39.9	33.9	39.3	51.0
Capital (project) grants	23.7	28.3	28.1	19.8	22.1
			(Annual percent change)		
Revenue and grants	1.7	35.9	8.3	7.9	22.3
Total revenue	-3.6	7.9	25.5	16.9	21.4
Tax revenue	-3.5	8.1	21.7	18.5	21.7
Direct taxes	-13.6	17.4	32.2	22.7	16.6
Tax on income and profits	-14.7	18.1	33.2	22.7	17.3
Property taxes	24.8	-1.1	1.2	22.3	-9.8
Taxes on goods and services	17.8	4.7	16.7	15.5	21.2
Excise taxes	29.9	5.1	-24.5	1.1	12.9
Turnover tax	5.9	6.6	75.4	23.5	27.8
Road fund	9.2	-7.7	4.5	19.9	-3.3
Taxes on international trade	-30.3	5.5	20.1	19.7	32.3
Export tax	-100.0	...	...	...	...
Import tax	-38.5	9.8	19.9	16.2	39.9
Other	405.8	-8.8	21.0	33.7	6.8
Nontax revenue	-6.1	4.4	100.4	-2.0	17.3
Grants	12.3	84.0	-9.1	-4.6	23.8

Sources: Ministry of Finance and Economic Planning; and Fund staff estimates.

Table 12. Rwanda: Central Government Expenditure, 1999-2003
(In billions of Rwanda francs) 1/

	1999	2000	2001	2002	2003
General public services	24.7	35.7	53.7	69.7	107.1
National Assemby	0.5	0.8	0.8	1.0	2.0
Vice Presidency 2/	0.5	0.2	...	...	...
Cabinet of the Prime Miniser	0.8	0.4	0.4	0.5	0.7
Supreme Court	0.3	0.4	1.4	2.1	1.7
Ministry of Interior and Local Development	1.3	3.2	4.4	5.4	6.2
Ministry of Justice	1.7	1.3	1.7	1.5	1.9
Ministry of Civil Service, Labor, and Training	0.4	0.3	0.3	0.4	0.4
Ministry of Finance 3/	13.8	19.2	28.1	39.4	65.7
Ministry of Foreign Affairs and International Cooperation	3.0	2.3	2.4	2.8	2.9
Ministry of Information	0.6	…	…	…	…
Ministry of Lands, Resettlement, and Environment	0.2	0.1	0.4	0.8	0.6
Ministry of Local Government	1.1	5.1	9.0	9.4	12.7
Defense (Ministry of National Defense)	29.0	25.8	28.6	36.5	24.5
Economic services	2.6	2.1	4.9	7.5	11.9
Ministry of Water and Natural Resources	0.2	0.2	0.3	0.5	…
Ministry of Agriculture, Husbandry, and Forestry	1.2	1.1	1.7	1.7	1.8
Ministry of Public Works, Transport, and Communications	0.7	0.4	2.3	4.2	9.0
Ministry of Commerce and Industry	0.5	0.4	0.6	1.0	1.0
Social services	30.3	30.5	36.2	25.2	29.7
Ministry of Education	21.7	24.0	29.8	18.9	20.8
Ministry of Youth and Associative Movements	1.0	0.8	0.9	0.8	0.9
Ministry of Family and Social Affairs 4/	4.3	1.9	0.4	0.6	0.7
Ministry of Health	3.3	3.8	5.1	4.9	7.4
Total	86.6	94.1	123.4	138.8	173.2

Sources: Ministry of Finance and Economic Planning; and Fund staff estimates.

1/ Owing to differences in classifications, aggregates in Tables 10, 12, and 13 differ.
2/ Unit discontinued in 2001.
3/ Includes interest on public debt; excludes amortization and domestic arrears repayments.
4/ In 1999, includes newly created Ministry of Gender.

Table 13. Rwanda: Functional Classification of Central Government Recurrent Expenditure, 1999-2003
(In billions of Rwanda francs)1/

	1999	2000	2001	2002	2003
General public services	31.5	35.7	53.7	57.6	78.6
Defense2/	27.0	25.8	28.6	36.0	24.8
Social services	21.9	30.5	36.2	23.3	40.6
Education3/	17.2	24.0	29.8	17.2	20.2
Health	3.3	3.8	5.1	4.7	7.4
Other	1.4	2.7	1.3	1.3	13.1
Economic services	2.6	2.1	4.9	6.7	8.4
Agriculture	1.2	1.1	1.7	1.5	1.3
Mining and manufacturing	0.2	0.2	0.3	1.0	0.8
Public works4/	0.7	0.4	2.3	3.8	5.5
Transport and communications 4/	…	…	…	…	…
Other economic affairs	0.5	0.4	0.6	0.4	0.8
Interest payments on public debt	4.0	1.8	2.8	8.3	10.5
Total current expenditure	87.1	95.9	126.2	131.9	162.8

Sources: Ministry of Finance and Economic Planning; and Fund staff estimates.

1/ Owing to differences in classifications, aggregates in Tables 10, 12, and 13 differ.
2/ In 1997, includes RF 1.0 billion for exceptional expenditure for demobilization and RF 0.8 billion for transfers.
3/ In 1997, includes transfers to the University of Rwanda.
4/ In 1999, public works and transport and communications were merged into one ministry.

Table 14. Rwanda: Priority Expenditure, 1999-2003
(In billions of Rwanda francs)

	1999	2000	2001	2002	2003
Total priority expenditure (recurrent, including University of Rwanda (UNR))	25.1	28.5	40.1	50.4	59.1
Wages and salaries (excluding UNR)	13.1	14.5	17.5	19.2	22.3
Goods and services (excluding UNR)	5.1	7.2	12.3	16.9	20.8
Transfers	6.9	6.9	10.3	14.3	16.0
UNR	3.2	3.0	3.7	5.1	5.7
Scholarships	2.6	3.0	3.8	5.3	6.0
ISAE, IRST, primary school, other 1/	0.5	0.6	0.8	1.1	1.2
Health	3.3	4.3	5.2	6.7	5.2
Wages and salaries	1.4	1.5	1.6	1.8	1.5
Goods and services	1.8	2.6	3.1	4.2	2.9
Transfers	0.1	0.2	0.5	0.7	0.7
Social affairs/gender, women, and development	20.4	22.7	26.3	32.5	37.8
Wages and salaries	11.3	12.7	13.5	14.9	16.1
Goods and services	2.8	3.5	4.5	6.2	8.8
Transfers	6.3	6.5	8.3	11.4	12.8
Youth, culture, and sports	1.4	1.5	8.6	11.2	16.0
Wages and salaries	0.4	0.3	2.3	2.6	4.6
Goods and services	0.5	1.1	4.7	6.4	9.0
Transfers	0.5	0.1	1.6	2.2	2.4

Sources: Rwandese authorities; and Fund staff estimates.

1/ ISAE and IRST are agricultural and technical research institutions; "other" includes higher-education activities.

Table 15. Rwanda: Government Domestic Debt by Creditor, 1999-2004
(In millions of Rwanda francs)

	1999	2000	2001	2002	2003	2004 Jun.
Banking sector	58,218.7	55,291.9	53,469.3	57,826.0	58,419.4	52,786.2
Central bank	50,710.6	44,618.2	43,469.2	42,911.8	43,916.8	42,125.7
Consolidated debt 1/	43,469.2	43,469.2	43,469.2	42,911.8	42,427.9	42,125.7
Commercial banks	7,508.1	10,673.7	10,000.1	14,914.2	14,502.6	10,660.5
Of which : treasury bills	7,508.1	10,673.7	10,000.1	14,914.2	14,502.6	10,660.5
Nonbank financial institutions	29,074.9	27,184.9	26,752.1	28,786.9	32,578.2	39,711.9
Treasury bills	3,424.1	3,179.6	2,915.4	6,534.5	10,325.8	17,459.5
Of which : CSR	669.8	669.8	669.8	1,900.0	150.0	2,100.0
Development bonds	25,650.9	24,005.4	23,836.7	22,252.4	22,252.4	22,252.4
Of which : CSR	24,135.4	23,335.4	22,535.4	21,735.4	21,735.4	21,735.4
Total domestic debt	87,293.6	82,476.8	80,221.4	86,612.9	90,997.6	92,498.1
Memorandum items:						
Interest in arrears on government paper held by CSR	...	...	...	...	...	...
Penalty interest on government paper held by CSR	...	...	...	...	...	...

Sources: Ministry of Finance and Economic Planning; and the National Bank of Rwanda.

1/ Excludes RF 9.0 billion in central bank claims on government arising from exchange losses related to the exchange system in March 1995, as well as a RF 2.0 billion overdraft to the prewar government.

Table 16. Rwanda: Public Enterprises and Public Financial Institutions 1/

Nonfinancial enterprises

  Bugarama rice mill
  Butare rice mill
  BRALIRWA (brewery) 2/
  Cimenterie du Rwanda (CIMERWA)
  Compagnie Rwandaise d'Hôtellerie de Tourisme (CRHT)
  Couvoir National de Rubirizi
  ELECTROGAZ (electricity, water, and gas)
  Gishwati dairy plant
  Laiterie de Nyabishindu
  Magasins Généraux du Rwanda (MAGERWA) 2/
  Office des Cultures Industrielles du Rwanda - Café (OCIR-Cafe)
  Office des Cultures Industrielles du Rwanda - Thé (OCIR-Thé) 3/
  Office National des Transports en Commun (ONATRACOM)
  Office Rwandais du Tourisme et des Parcs Nationaux (ORTPN)
  Office de Valorisation Pastorale du Mutara (OVAPAM)
  Office National des Postes
  Papeterie du Rwanda
  Prime Holdings (hotels)
  REDEMI (mining)
  Rwandair Express
  Rwanda Télécommunications (Rwandatel)
  Rwamagana rice mill
  Régie des Aéroports du Rwanda (RAR)
  Riziculture
  Rwandair Express
  RWANDEX (coffee)
  RWANTEXCO (textiles)
  Société des Transports Internationaux du Rwanda (STIR)
  Société pour la Production Rizicole (SOPRORIZ)
  SOPAB (animal food)
  SOPROTEL (hotel)
  SORWATHE (tea) 2/
  TRAFIPRO (marketing of food products)

Financial institutions

  Banque Nationale du Rwanda
  Banque Commerciale du Rwanda (BCR)
  Banque Continentale Africaine du Rwanda (BACAR)
  Banque de Kigali (BK) 4/
  Banque Rwandaise de Développement (BRD)
  Caisse Hypothécaire du Rwanda
  Société Nationale d'Assurance du Rwanda (SONARWA)
  UBPR

Source: Ministry of Finance and Economic Planning.

Note: The above list excludes public entities (*établissements publics*) that serve social purposes
(e.g., universities, research institutes, museums, the information office, and the population office).
It includes enterprises that have private as well as public shareholders.

1/ As of December 2003
2/ The government has a minority interest.
3/ Includes nine tea factories.
4/ The government holds 50 percent.

Table 17. Rwanda: Monetary Survey, 1999-2004 1/

	1999	2000	2001	2002	2003 Mar.	Jun.	Sep.	Dec.	2004 Mar.	Jun.
Monetary authorities										
Net foreign assets	27.0	37.4	51.3	72.6	71.1	70.6	58.9	65.5	67.0	70.2
Foreign liabilities	33.9	44.7	45.8	52.1	53.1	57.2	55.2	58.8	57.9	56.7
Net domestic assets	13.4	0.3	-11.1	-27.6	-24.6	-24.1	-8.8	-15.1	-15.7	-17.1
Domestic credit	31.7	23.2	12.8	-2.6	-0.6	2.2	17.5	15.6	9.7	8.6
Government (net) 2/	30.4	20.1	16.0	-5.2	1.9	3.5	15.3	12.7	11.0	7.3
Claims	50.7	43.5	43.5	43.1	42.4	42.4	51.2	43.9	44.4	42.1
Deposits	20.3	23.4	27.5	48.2	40.5	38.9	35.9	31.2	33.5	34.8
Treasury (including	0.0	1.5	2.2	4.8	2.0	2.4	0.0	0.0	0.0	0.6
Line ministries	20.3	21.9	25.3	43.4	38.5	36.5	35.9	31.2	33.5	34.3
Nongovernment credit	3.0	4.2	-1.9	3.5	-1.6	-0.3	3.1	3.9	-0.3	2.3
Private sector	1.0	1.4	1.9	2.2	2.2	2.3	2.3	2.4	2.5	3.0
Public enterprises	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Commercial banks	1.8	2.6	-3.9	1.2	-3.9	-2.7	0.7	1.4	-3.0	-0.9
Of which: money market	0.0	0.8	-5.4	-0.1	-5.1	-4.0	-0.7	0.0	-4.6	-2.4
Other items, net (asset:+)	-18.3	-22.9	-24.0	-25.0	-24.0	-26.4	-26.3	-30.7	-25.3	-25.7
Reserve money	40.4	37.7	40.2	44.9	46.5	46.5	50.1	50.4	51.3	53.0
Currency in circulation	21.5	22.6	25.8	28.0	26.4	29.4	32.1	34.1	31.9	37.5
Commercial bank reserves 3/	16.8	12.3	10.7	13.2	15.5	12.9	14.9	13.4	15.4	13.2
Other nonbank deposits	2.0	2.8	3.7	3.7	4.6	4.3	3.2	3.0	4.0	2.4
Of which: Caisse Sociale du Rwanda,										
and other autonomous public agenci	0.5	1.5	1.1	1.0	1.3	0.7	0.4	0.7	0.7	0.2
Commercial banks										
Net foreign assets	17.9	29.5	29.7	31.2	33.2	33.3	31.7	38.7	36.7	39.0
Foreign assets	19.8	32.9	34.3	39.1	40.1	44.9	42.3	49.8	50.1	51.9
Foreign liabilities	1.9	3.5	4.6	8.0	6.9	11.7	10.5	11.1	13.4	12.9
Reserves	16.8	12.3	10.7	13.2	15.5	12.9	14.9	13.4	15.4	13.2
NBR deposits	14.3	10.3	7.9	10.5	11.0	8.3	11.6	11.0	11.9	10.6
Required reserves	8.5	7.3	8.4	9.7	10.2	10.8	11.4	11.9	11.8	11.5
Excess reserves	5.9	2.9	-0.5	0.8	0.8	-2.4	0.1	-0.9	0.0	-0.9
NBR borrowing from money market	0.0	0.0	5.4	1.1	5.1	4.0	0.7	0.0	4.6	2.4
Cash in vault	2.5	2.0	2.8	2.7	4.4	4.5	3.3	2.4	3.5	2.6
Credit from NBR (rediscount; liability -)	-1.8	-2.6	3.9	-1.2	3.9	2.7	-0.7	-1.4	3.0	0.9
Domestic credit	64.2	74.3	78.4	93.7	85.2	91.6	103.8	104.4	96.6	98.6
Central government (net)	3.7	4.1	2.1	7.1	3.6	2.5	5.7	4.8	-2.7	-1.2
Credit	7.7	7.3	8.2	14.7	13.9	20.5	16.6	15.2	10.4	11.5
Deposits	4.0	3.1	6.1	7.6	10.3	18.0	10.9	10.4	13.1	12.7
Public enterprises	0.7	0.7	0.8	3.4	2.3	3.2	4.6	4.8	4.0	5.0
Private sector	59.7	69.4	75.5	83.3	79.3	85.8	93.4	94.8	95.4	94.8
Other items, net (assets:+)	-16.3	-19.5	-21.9	-23.6	-25.2	-27.8	-26.6	-25.0	-24.8	-30.1
Deposits	80.8	93.8	100.7	113.3	112.6	112.7	123.1	130.0	126.9	121.6
Private	68.5	80.3	85.5	97.9	96.6	97.6	102.1	110.1	105.1	103.0
Public (nongovernment)	12.3	13.6	15.2	15.4	16.0	15.1	21.0	19.9	21.9	18.6
Monetary survey										
Net foreign assets	44.9	66.9	81.0	103.7	104.3	103.8	90.6	104.2	103.7	109.2
Net domestic assets	59.4	52.4	49.3	41.3	39.4	42.5	67.7	62.9	59.2	52.2
Domestic credit	94.0	94.8	95.1	90.0	88.6	96.6	120.5	118.6	109.3	108.1
Central government (net)	34.2	24.2	18.1	1.9	5.5	6.0	21.0	17.5	8.2	6.1
Public enterprises	0.9	0.8	1.0	3.5	2.4	3.3	4.8	4.9	4.1	5.1
Private sector	60.7	70.9	77.4	85.5	81.5	88.1	95.7	97.2	97.9	97.8
Other items, net (assets: +)	-34.6	-42.4	-45.9	-48.6	-49.2	-54.1	-52.9	-55.7	-50.1	-55.8
Broad money	104.3	119.2	130.2	145.1	143.7	146.3	158.3	167.1	162.9	161.4
Currency in circulation	21.5	22.6	25.8	28.0	26.4	29.4	32.1	34.1	31.9	37.5
Deposits	82.8	96.7	104.4	117.0	117.2	116.9	126.2	133.0	131.0	124.0
Of which: foreign currency deposits	19.5	26.7	27.9	29.4	30.3	36.0	38.0	41.5	37.9	35.9
Net foreign assets	-3.4	21.1	11.8	17.5	27.3	24.5	12.9	0.3	-0.4	3.7
Net domestic asset	10.0	-6.8	-2.6	-6.1	-15.4	-15.2	6.0	14.8	13.8	6.7
Domestic credit	12.8	0.7	0.3	-4.0	-8.1	-4.2	13.7	19.7	14.4	7.9
Government (net)	8.0	-9.6	-5.1	-12.4	-13.1	-11.4	0.7	10.7	1.9	0.1
Economy	4.8	10.3	5.4	8.5	5.0	7.2	13.0	9.0	12.5	7.8
Other items, net	-2.8	-7.5	-2.9	-2.1	-7.2	-11.1	-7.7	-4.9	-0.6	-1.2
Broad money	6.5	14.3	9.2	11.4	11.9	9.2	19.0	15.2	13.4	10.4
Memorandum items:										
Currency/broad money ratio	20.6	18.9	19.8	19.3	18.4	20.1	20.3	20.4	19.6	23.2
Reserve money annual growth	13.3	-6.6	6.6	11.9	5.8	12.5	26.0	12.2	10.4	14.1
Reserves/deposits	50.0	40.2	39.9	39.7	41.3	41.3	40.7	38.8	40.4	43.6
Money multiplier	2.6	3.2	3.2	3.2	3.1	3.1	3.2	3.3	3.2	3.0
Velocity (GDP/M2; end of period)	6.2	5.9	5.8	5.7	...	...	...	5.4	...	...
Velocity (GDP/M2; avg.)	6.3	6.5	6.0	6.5	...	...	...	7.0	...	...
Nominal GDP (in billions of Rwanda fra	644.9	705.7	754.3	825.0	...	...	...	905.3	...	...

Source: National Bank of Rwanda (NBR).

1/ Actual figures are based on current exchange rates and are not adjusted for program adjustments, as described in the technical memorandum of understanding.
2/ Net credit to government
3/ The reserve requirement was reduced in July 1998 from 12 percent to 10 percent.

Table 18. Rwanda: Summary Accounts of the National Bank of Rwanda, 1999-2004

(In billions of Rwanda francs; end of period)

	1999	2000	2001	2002	2003 Mar.	2003 Jun.	2003 Sep.	2003 Dec.	2004 Mar.	2004 Jun.
Foreign assets	60.9	82.1	97.1	124.7	124.1	127.7	114.0	124.5	124.9	126.8
SDR holdings	...	...	5.6	5.2	15.0	16.0	16.7	17.0	17.1	16.9
Claims on government	50.7	43.5	43.5	42.9	42.4	42.4	51.2	43.9	44.4	42.1
Ordinary advances	7.2	0.0	0.0	0.0	0.0	0.0	8.8	1.5	2.3	0.0
Special advances	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Consolidated debt	43.5	43.5	43.5	42.9	42.4	42.4	42.4	42.4	42.1	42.1
Postal checking system	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Claims on public enterprises	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Claims on the private sector	0.6	1.1	1.7	2.1	2.1	2.2	2.2	2.3	2.4	2.6
Claims on deposit money banks	1.8	1.8	1.5	1.2	1.2	1.3	1.4	1.4	1.6	1.5
Money market loans	0.0	0.8	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0
Claims on other financial institutions	0.4	0.3	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.4
Unclassified assets	43.1	53.1	56.4	60.6	62.4	66.9	71.1	76.7	79.2	81.3
Total assets	157.7	182.8	200.5	232.7	232.5	240.7	240.2	249.0	252.8	254.9
Reserve money 1/	40.4	37.8	40.2	44.9	46.7	46.5	50.1	50.4	51.3	53.0
Currency outside banks	21.5	22.6	25.8	28.0	26.5	29.4	32.1	34.1	31.9	36.9
Out of: total currency	24.0	24.6	28.6	30.7	30.9	33.9	35.4	36.5	35.4	40.0
Currency in commercial banks	2.5	2.0	2.8	2.7	4.4	4.5	3.3	2.4	3.5	3.2
Bank deposits	14.3	10.3	7.9	10.5	11.0	8.3	11.6	11.0	11.9	10.6
Money market deposits	0.0	0.0	6.5	1.1	5.3	4.0	0.7	0.0	4.6	2.4
Commercial banks	0.0	0.0	6.5	1.1	5.1	4.0	0.7	0.0	4.6	2.4
Nonbanks	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0
Other deposits	0.7	0.9	0.8	0.4	0.4	0.3	0.3	0.4	0.4	1.8
Private sector deposits	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.1	0.0
Public enterprises	0.6	0.4	0.3	0.3	0.4	0.2	0.3	0.3	0.3	0.3
Caisse Sociale du Rwanda and other agencies	0.5	1.6	1.3	1.8	2.8	2.3	1.4	1.6	2.5	0.8
Coffee funds	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Public institutions	0.4	0.5	0.9	1.0	0.7	0.6	0.3	0.7	0.7	0.5
Community deposits	0.1	0.1	0.2	0.0	0.1	0.3	0.1	0.4	0.5	0.2
Social security fund+RAMA	0.1	1.0	0.2	0.1	0.8	0.2	0.4	0.1	0.3	0.0
Other financial institutions' deposits	0.1	0.6	0.3	0.6	1.1	1.2	0.5	0.4	0.9	0.1
More deposits	0.9	0.4	1.6	1.7	1.6	2.0	1.6	1.4	2.1	1.8
Import deposits	0.1	0.1	0.1	0.3	0.3	0.7	0.3	0.1	0.5	0.3
Other	0.8	0.4	1.6	1.4	1.3	1.3	1.3	1.3	1.6	1.4
Foreign liabilities	33.9	44.7	45.8	52.1	53.1	57.2	55.2	58.9	57.9	56.7
Of which: Structural Adjustment Facility	1.3	0.5	0.0	1.3	1.3	0.9	0.9	0.5	0.0	0.0
Enhanced Structural Adjustment										
Facility	16.0	29.4	35.4	43.0	43.5	46.8	49.3	52.5	52.6	53.6
Project import fund	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Government deposits	22.0	24.4	28.6	49.1	41.3	39.6	36.7	31.8	33.9	35.6
OTR (Central Treasury Account)	0.0	1.5	2.2	4.8	2.0	2.4	0.0	0.0	0.0	0.6
Rwanda Revenue Authority	0.9	0.7	0.4	0.9	0.5	0.4	0.7	0.8	0.7	0.7
Other (including projects)	19.5	20.9	25.2	42.8	37.9	36.0	35.4	30.4	32.5	33.5
Counterpart funds	1.6	1.3	0.8	0.6	0.8	0.7	0.6	0.7	0.7	0.8
Long-term liabilities (Trust Fund Loans)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Capital, reserves, and SDR allocations	15.6	15.4	18.1	23.1	21.6	22.2	22.7	29.0	28.0	28.0
Unclassified liabilities	45.7	60.6	61.3	62.5	64.6	71.1	74.7	78.5	76.6	79.0
Total liabilities	157.7	182.8	200.5	232.9	232.5	240.7	240.2	249.0	252.8	254.9

Source: National Bank of Rwanda (NBR).

1/ Reserve money excludes money market deposits of commercial banks.

Table 19. Rwanda: Summary Accounts of Commercial Banks, 1999-2003
(In billions of Rwanda francs)

	1999	2000	2001	2002	2003 Mar.	2003 Jun.	2003 Sep.	2003 Dec.
Reserves	16.8	12.3	17.1	14.3	20.5	16.8	15.6	13.4
Cash	2.5	2.0	2.8	2.7	4.4	4.5	3.3	2.4
Deposits at the NBR	14.3	10.3	7.9	10.5	11.0	8.3	11.6	11.0
Money market loans	0.0	0.0	6.5	1.1	5.1	4.0	0.7	0.0
Foreign assets	19.8	32.9	34.3	39.1	38.8	44.9	42.3	49.8
Claims on government	7.7	7.3	8.0	14.7	13.9	19.7	16.6	15.1
Claims on nongovernment sector	77.2	85.1	93.1	107.3	102.3	113.1	122.8	124.1
Claims on public enterprises	0.7	0.7	0.8	3.4	2.3	3.2	4.7	4.8
Claims on private sector	59.6	69.3	75.3	83.2	79.1	85.0	93.2	95.2
Claims on other financial institutions	0.2	0.1	0.2	0.1	0.2	0.8	0.2	0.2
Other	16.7	15.0	16.8	20.6	20.7	24.1	24.7	23.9
Total assets	121.5	137.7	152.5	175.4	175.5	194.5	197.2	202.4
Total deposits	87.5	97.8	106.5	123.2	126.4	134.1	136.4	141.9
Nongovernment sector deposits	75.1	87.5	99.8	111.4	112.3	111.1	122.0	128.8
Demand deposits	36.3	36.8	38.4	43.4	43.9	46.2	49.3	49.4
Of which: other financial institutions	0.8	0.6	0.0	3.2	1.8	3.0	3.0	3.2
Time and saving deposits	19.3	24.1	33.6	39.5	38.2	29.3	35.6	38.1
Of which: other financial institutions	2.9	4.6	0.0	13.1	13.2	5.1	11.1	10.1
Foreign currency deposits	19.5	26.7	27.9	28.5	30.2	35.6	37.2	41.3
Of which: other financial institutions	0.0	0.0	0.0	1.3	1.1	1.5	1.6	1.2
Deposits by other banks	2.7	0.8	0.8	3.5	3.3	4.6	3.5	2.6
Government deposits	9.7	9.4	5.9	8.4	10.9	18.4	10.9	10.5
Foreign liabilities	1.9	3.5	4.6	8.0	6.9	11.7	10.5	11.1
Credits from the NBR	1.6	2.4	1.4	2.2	1.2	1.3	1.4	1.4
Own capital	19.9	23.4	26.2	23.8	22.8	24.4	26.9	27.9
Provisions and Guarantee Fund	4.0	1.3	1.9	1.5	1.1	1.1	1.6	2.6
Reserves	3.7	2.5	2.7	2.8	2.9	3.1	3.1	3.1
Capital	2.9	7.5	9.1	9.6	9.6	9.6	10.8	10.6
Specific provisions	8.6	11.7	12.7	21.1	21.2	21.1	21.4	21.6
Net profit	0.6	0.3	-0.2	-11.2	-12.0	-10.5	-9.9	-9.9
Other liabilities	10.7	10.7	13.8	18.2	18.2	23.0	21.9	20.1
Total liabilities	121.5	137.7	152.5	175.4	175.5	194.5	197.2	202.4

Source: National Bank of Rwanda (NBR).

Table 20. Rwanda: Commercial Bank Credit, 1999-2004[1]
(In millions of Rwanda francs)

	1999	2000	2001	2002	2003	2004 Mar.
Total	66,606	71,553	81,714	89,347	101,901	105,019
Agriculture	876	967	1,065	1,410	2,381	2,262
Mining	38	23	13	29	74	76
Manufacturing	10,660	12,190	13,311	12,099	14,419	15,691
Construction	1,301	1,791	1,891	2,056	1,929	2,503
Real estate, including Housing	11,136	12,409	13,368	16,100	18,822	19,865
Distribution and tourism	30,432	30,593	36,703	36,176	43,444	44,768
Transport and communications	4,027	4,322	5,674	8,217	9,478	8,466
Other	8,136	9,258	9,689	13,260	11,354	11,388
Short term (< one year)	40,681	44,675	51,157	54,937	54,762	54,400
Agriculture	133	339	249	158	499	197
Mining	0	0	0	0	0	0
Manufacturing	5,380	7,217	7,805	5,831	6,046	7,014
Construction	1,224	1,723	1,794	1,960	1,733	2,337
Real estate, including Housing	1,599	1,242	1,523	3,071	2,941	2,320
Distribution and tourism	25,662	25,596	30,656	30,359	33,026	33,324
Transport and communications	644	1,329	1,774	3,243	3,812	2,681
Other	6,039	7,229	7,356	10,315	6,705	6,527
Medium term (one to five years)	16,613	15,373	17,959	17,186	26,607	29,664
Agriculture	233	259	255	450	1,021	1,176
Mining	25	10	0	16	13	12
Manufacturing	2,970	2,487	3,162	1,891	3,842	4,333
Construction	58	49	78	77	177	147
Real estate, including Housing	5,446	5,262	5,444	5,561	7,526	8,813
Distribution and tourism	3,643	3,740	4,345	3,492	7,085	8,195
Transport and communications	2,841	2,356	3,256	4,290	4,832	4,882
Other	1,397	1,210	1,419	1,409	2,111	2,106
Long term (> five years)	9,312	11,505	12,598	17,224	20,532	20,955
Agriculture	510	369	561	802	861	889
Mining	13	13	13	13	61	64
Manufacturing	2,310	2,486	2,344	4,377	4,531	4,344
Construction	19	19	19	19	19	19
Real estate, including Housing	4,091	5,905	6,401	7,468	8,355	8,732
Distribution and tourism	1,127	1,257	1,702	2,325	3,333	3,249
Transport and communications	542	637	644	684	834	903
Other	700	819	914	1,536	2,538	2,755

Source: National Bank of Rwanda (NBR).

1/ including BRD, CHR & Caisse centrale de l'UBPR

Table 21. Rwanda : Financial Sector Indicators, 1999-2004
(In billions of Rwanda francs, unless otherwise indicated)

	1999	2000	2001	2002	2003	2004 Mar.
Commercials banks						
Nonperfoming loans	27.2	29.2	38.5	34.4	37.4	35.6
(in percent of private sector loans)	37.5	36.1	37.9	41.0	33.9	29.5
Required provisioning	16.8	17.9	22.5	21.2	21.9	22.7
Actual provisioning	12.2	14.2	15.5	22.3	21.4	22.6
Required capital adequacy ratio (in percent)	5.0	8.0	8.0	8.0	8.0	10.0
Actual capital adequacy ratio (in percent)/	6.2	8.0	3.4	0.5	3.0	2.3
Required foreign currency exposure limit	...	...	...	...	...	...
Required reserve	...	...	...	...	...	...
(in percent of total depositis)	10.0	8.0	8.0	8.0	8.0	8.0
Actual reserves	...	...	...	...	...	...
(in percent of total depositis)	20.8	13.1	10.6	11.7	10.3	12.1

Source: National Bank of Rwanda (NBR)

Table 22. Rwanda: Interest Rates, 1999-2004

(In percent; end of period)

	1999				2000				2001				2002				2003				2004	
	Mar.	Jun.	Sep.	Dec.	Mar.	Jun.	Sep.	Dec.	Mar.	Jun.	Sep.	Dec.	Mar.	Jun.	Sep.	Dec.	Mar.	Jun.	Sep.	Dec.	Mar.	Jun.
Discount rate	11.6	11.1	10.7	11.2	10.0	10.0	10.0	10.0	10.0	10.0	13.0	13.0	13.0	12.0	13.2	13.0	13.0	13.5	14.5	14.5	14.5	14.5
NBR money market borrowing rate 1/	7.5	7.1	7.7	8.2	8.9	9.1	9.3	9.9	9.9	7.8	7.6	9.5	8.4	7.5	9.8	10.5	10.2	9.3	11.0	11.6	11.9	11.4
Deposit rates																						
1 month	6.1	8.6	7.5	7.5	7.4	7.7	7.6	8.3	8.3	9.3	7.9	8.7	8.7	7.8	7.0	7.1	7.1	8.2	7.9	8.5	7.1	...
3 months	8.0	7.6	7.2	7.3	7.6	8.9	9.8	10.1	9.4	10.2	8.1	7.6	7.4	8.3	8.0	7.8	8.0	8.5	7.9	8.4	8.0	...
6 months	8.5	8.7	8.1	8.8	9.7	9.7	9.7	9.8	9.0	9.5	9.8	9.8	9.8	9.8	7.7	7.9	7.9	9.4	9.0	9.4	7.9	...
12 months	9.8	10.5	10.2	10.1	10.3	10.0	9.7	10.0	9.7	9.5	9.8	10.0	10.0	9.9	8.6	8.7	8.4	9.7	8.6	8.6	8.4	...
Lending rates																						
Maximum	18.0	18.0	18.0	18.0	18.0	18.0	18.0	17.9	17.7	17.2	22.0	21.2	22.0	19.0	18.0	18.0	19.0	18.0	18.0	19.5	19.5	...
Range/Minimum	15.9	16.1	16.3	16.8	15.6	16.9	16.4	17.0	16.9	15.8	18.2	17.3	16.8	16.7	17.3	16.4	14.9	16.9	16.4	17.1	16.3	...
Interbank money market rate	8.0	8.4	8.5	8.8	10.0	10.2	10.0	8.7	10.0	10.2	10.0	11.1	9.7	10.2	10.0	9.9	9.1	9.5	10.8	10.4	10.2	11.1

Source: National Bank of Rwanda (NBR).

Table 23. Rwanda: Balance of Payments, 1999-2003
(In millions of U.S. dollars)

	1999	2000	2001	2002	2003
Exports, f.o.b.	62.0	89.8	93.5	67.3	63.0
Of which					
Tea	17.5	24.3	22.7	22.0	22.5
Imports, f.o.b.	248.8	239.8	237.9	234.7	244.0
Trade balance	-186.7	-150.1	-144.4	-167.4	-181.0
Services (net)	-143.0	-141.4	-125.3	-125.1	-143.4
Transfers (net)	193.7	216.6	191.9	194.8	223.8
Private	18.2	11.0	21.7	24.5	31.3
Public	175.5	205.6	170.1	170.3	192.5
Current account balance (including official transfers)	-147.5	-90.2	-100.3	-116.7	-131.1
Current account balance (excluding official transfers)	-323.0	-295.8	-270.5	-287.0	-323.6
Capital tranfers	70.1	71.8	63.4	41.6	41.1
Direct investment	1.7	8.1	3.8	2.6	4.7
Long-term borrowing	86.5	47.3	78.4	83.9	39.9
Scheduled amortization (-)	-34.7	-26.4	-19.4	-29.4	-28.0
Other	10.4	3.7	19.1	9.5	9.3
Capital and financial account balance	134.0	104.6	145.3	108.1	66.9
Errors and omissions	-3.7	-18.1	-20.6	27.9	27.3
Overall balance	-17.2	-3.8	24.4	19.3	-36.9
Financing	17.2	3.8	-24.4	-19.2	36.9
Change in net foreign assets of NBR (increase -)	10.1	-9.8	-25.1	-29.7	28.8
Net credit from the Fund	20.8	14.0	1.5	-6.0	-0.9
Change in gross official reserves (increase -)	-4.7	-16.5	-21.4	-31.6	29.4
Change in other foreign liabilities (increase +)	-6.0	-7.3	-5.3	7.9	0.3
Change in arrears (decrease -)	-2.7	7.1	-37.8	4.6	-22.6
Exceptional financing	9.7	6.4	38.6	5.9	30.7

Sources: National Bank of Rwanda (NBR); and Fund staff estimates.

Table 24. Rwanda: Exports, 1999-2003
(In millions of U.S. dollars, unless otherwise indicated)

	1999	2000	2001	2002	2003
Total exports, f.o.b.	62.0	89.8	93.5	67.3	63.0
Percent change	-3.3	44.7	4.2	-28.1	-6.3
Moving indices (1992=100)					
Price index	127.9	154.7	117.8	102.2	110.2
Percent change	-14.2	20.9	-23.8	-13.2	7.9
Volume index	70.5	84.4	115.5	95.8	83.1
Percent change	12.7	19.7	36.8	-17.1	-13.2
Fixed indices (1992=100)					
Price index	97.8	174.7	153.8	91.7	87.0
Percent change	-10.9	78.6	-12.0	-40.4	-5.2
Volume index	92.2	74.7	88.5	106.7	105.4
Percent change	22.4	-3.3	1930.1	17.7	-18.4
By commodity					
Coffee	26.5	22.5	19.4	14.6	15.0
Percent change	-5.9	-14.9	-14.1	-24.7	2.9
Volume (1,000 tons)	18.3	16.1	17.8	19.8	14.7
Percent change	22.2	-12.2	10.6	11.3	-25.7
Unit value (cents per lb.)	65.5	63.5	49.4	33.4	35.4
Unit value (U.S. dollars per kg.)	1.4	1.4	1.1	0.7	1.0
Percent change	-23.0	-3.0	-22.3	-32.4	38.6
Tea	17.5	24.3	22.7	22.0	22.5
Percent change	-23.2	38.4	-6.5	-3.0	2.2
Volume (1,000 tons)	12.7	13.7	15.2	14.6	14.3
Percent change	-16.0	7.9	10.6	-3.9	-1.7
Unit value (f.o.b., U.S. dollars per kg.)	1.4	1.8	1.5	1.5	1.6
Percent change	-8.6	28.3	-15.4	0.9	3.9
Cassiterite and tin	1.2	1.0	1.1	1.4	4.5
Percent change	182.5	-18.5	18.6	24.3	219.7
Volume (tons)	529.0	365.0	555.0	672.0	1458.0
Percent change	179.9	-31.0	52.1	21.1	117.0
Unit value (U.S. dollars per kg.)	2.2	2.6	2.0	2.1	3.1
Percent change	0.9	18.1	-22.0	2.7	47.4
Hides and skins	0.5	0.4	0.8	2.6	3.8
Percent change	-73.6	-20.6	83.0	238.3	43.7
Volume (tons)	632.0	479.0	510.9	1983.8	2728.0
Percent change	-27.9	-24.2	6.7	288.3	37.5
Unit value (U.S. dollars per kg.)	0.9	0.9	1.5	1.3	1.4
Percent change	-63.4	4.7	71.9	-13.1	4.5
Pyrethrum and chincona	0.3	0.0	1.8	1.1	1.3
Percent change	-65.1	-96.8	17612.0	-40.2	20.9
Volume	4.8	0.0	21.6	13.2	20.0
Percent change	-65.6	-99.8	215900.0	-38.9	51.5
Unit price (U.S. dollars per kg.)	65.4	65.4	82.0	80.2	64.0
Percent change	1.5	0.0	25.3	-2.2	-20.2
Other products	15.9	41.6	47.8	25.6	16.0
Value index	275.7	719.8	827.7	443.4	276.6
Percent change	62.6	161.1	15.0	-46.4	-37.6
Volume index	242.5	469.0	536.8	322.6	222.7
Percent change	61.1	93.4	14.5	-39.9	-31.0
Price index (1992=100)	113.7	153.5	154.2	137.4	124.2
Percent change	0.9	35.0	0.5	-10.9	-9.6
Other adjustments	0.1	0.0	0.0	0.0	0.0

Sources: National Bank of Rwanda (NBR); and Fund staff estimates.

Table 25. Rwanda: Imports, 1999-2003
(In millions of U.S. dollars, unless otherwise indicated)

	1999	2000	2001	2002	2003
Total c.i.f.	316.7	327.7	312.6	320.2	325.2
Total, f.o.b.	248.8	239.8	237.9	234.7	244.0
Moving indices (1992=100)					
Price index	95.2	107.3	104.1	109.6	113.5
Percent change	2.9	12.7	-3.0	5.4	3.5
Volume index	108.4	92.7	94.8	88.8	89.2
Percent change	-5.5	-14.5	2.3	-6.4	0.4
Fixed indices (1992=100)					
Price index	96.5	106.8	103.2	110.5	114.0
Percent change	4.8	10.6	-3.3	7.1	3.1
Volume index	106.9	93.2	95.6	88.1	88.8
Percent change	-7.2	-12.8	2.6	-7.9	0.8
Total, c.i.f.	316.7	327.7	312.6	320.2	325.2
Capital goods	55.4	53.0	50.6	55.5	61.2
Public	49.8	47.7	45.5	49.9	55.4
Private	5.5	5.3	5.1	5.5	5.8
Intermediate goods	48.0	43.3	43.8	44.6	53.8
Energy products	40.9	44.9	41.2	40.4	40.5
Other imports	167.2	137.3	144.0	124.4	134.2
Food	34.6	46.6	51.7	25.2	28.3
Other	132.5	90.7	92.4	99.2	105.9
Other adjustments (elec. energy)	5.3	49.1	33.0	55.3	35.5
By category					
Capital goods	55.4	53.0	50.6	55.5	61.2
Value index (1992=100)	80.2	76.8	73.3	80.4	88.7
Volume index (1992=100)	87.0	88.0	86.4	92.3	88.6
Percent change	-6.3	1.1	-1.8	6.9	-4.0
Price index (1992=100)	92.1	87.3	84.9	87.1	100.1
Percent change	-1.8	-5.3	-2.8	2.6	14.9
Intermediate goods	48.0	43.3	43.8	44.6	53.8
Value index (1992=100)	51.9	46.9	47.3	48.3	58.2
Volume index (1992=100)	56.1	53.5	55.6	55.3	58.0
Percent change	-25.7	-4.6	3.9	-0.6	4.9
Price index (1992=100)	92.4	87.6	85.1	87.4	100.4
Percent change	-1.8	-5.3	-2.8	2.6	14.9
Energy products	40.9	44.9	41.2	40.4	40.5
Value index (1992=100)	110.5	121.3	111.3	109.1	109.5
Volume index (1992=100)	112.7	78.8	83.9	80.2	69.5
Percent change	-14.5	-30.1	6.5	-4.4	-13.4
Price index (1992=100)	98.1	154.0	132.7	136.1	157.6
Percent change	37.5	57.0	-13.8	2.5	15.8
Food	34.6	46.6	51.7	25.2	28.3
Value index (1992=100)	119.4	160.8	178.3	87.0	97.8
Volume index (1992=100)	134.3	177.7	192.6	93.3	99.1
Percent change	-31.8	32.3	8.4	-51.6	6.2
Price index (1992=100)	89.0	90.5	92.6	93.2	98.7
Percent change	-11.6	1.7	2.3	0.7	5.9
Other	132.5	90.7	92.4	99.2	105.9
Value index (1992=100)	215.6	147.5	150.3	161.4	172.2
Volume index (1992=100)	189.0	127.5	127.6	134.9	142.1
Percent change	25.1	-32.5	--	5.8	5.3
Price index (1992=100)	114.1	115.7	117.8	119.6	121.2
Percent change	0.9	1.4	1.8	1.6	1.3

Sources: National Bank of Rwanda (NBR); and Fund staff estimates.

Table 26. Rwanda: Services and Transfers, 1999-2003
(In millions of U.S. dollars)

	1999	2000	2001	2002	2003
Services (net)	-143.0	-141.4	-125.3	-125.1	-143.4
Credit	51.1	59.9	63.6	65.4	76.5
Nonfactor services (net)	-143.0	-141.4	-125.3	-125.1	-143.4
Credit	51.1	59.9	63.6	65.4	76.5
Freight	5.8	5.6	5.4	2.2	4.5
Other transportation	9.3	8.6	8.6	10.0	13.9
Travel	17.0	23.5	24.7	31.1	30.1
Foreign governments	14.7	18.7	20.4	17.7	22.7
Other	4.3	3.4	4.4	4.3	5.3
Debit	194.1	201.3	188.9	190.4	219.9
Freight	48.2	58.6	53.1	60.7	55.2
Other transportation	25.0	24.9	25.3	28.9	39.2
Travel (excluding bourses)	18.3	21.9	23.2	23.9	26.1
Government of Rwanda (net)	12.2	19.2	12.2	13.6	20.0
Private services	14.2	8.2	11.6	10.8	16.1
Technical assistance	76.3	68.5	63.6	52.5	63.4
Other (adjustment)	12.8	17.2	17.7	20.9	19.9
Factor services (net)	-11.4	-15.4	-22.5	-19.1	-30.5
Credit	7.8	13.9	13.8	8.5	6.2
Investment income	7.8	10.8	11.7	8.5	6.0
Other	--	3.0	2.1	0.0	0.2
Debit	19.2	29.2	36.3	27.5	36.7
Dividends and private investment income	1.2	3.3	4.4	0.5	6.6
Investment income	13.3	13.2	14.0	13.2	15.4
Labor income	4.1	12.2	17.5	13.6	14.5
Property income	0.6	0.6	0.4	0.2	0.3
Transfers (net)	263.7	288.5	255.3	236.4	264.9
Credit	276.5	305.6	273.1	257.3	284.9
Debit	12.8	17.2	17.7	20.9	19.9
Private (net)	18.2	11.0	21.7	24.5	31.3
Credit	29.7	27.3	38.1	43.6	49.4
Debit	11.6	16.3	16.4	19.0	18.1
Public (net)	245.6	277.4	233.6	211.9	233.6
Credit	246.8	278.3	234.9	213.8	235.5
Current grants for budgetary support	39.7	101.5	77.5	82.9	95.8
Support for public investment projects	70.1	71.8	63.4	41.6	41.1
Other current grants	137.1	105.0	94.0	89.3	98.6
Debit	1.3	0.9	1.3	1.9	1.9

Sources: National Bank of Rwanda (NBR); and Fund staff estimates.

Table 27. Rwanda: Scheduled Principal and Interest, 1999-2003 1/ 2/
(In millions of U.S. dollars)

	1999		2000		2001		2002		2003	
	Principal	Interest	Principal	Interest	Principal	Interest	Principal	Interest	Principal	Interest
Total	41.6	10.2	30.7	11.8	36.6	11.5	33.3	12.3	28.8	14.2
IBRD-IDA	5.3	4.6	6.4	5.2	8.7	5.1	10.6	5.2	12.2	6.9
African Development Fund	2.6	1.6	3.1	1.6	3.3	1.6	4.5	2.0	3.6	1.9
African Development Bank	0.5	0.3	0.6	0.3	0.6	0.2	0.5	0.4	0.4	0.2
International Fund for Agricultural Development	0.2	0.3	0.2	0.3	0.3	0.3	0.8	0.4	1.1	0.4
Arab Bank for Economic Development in Africa (BADEA)	2.6	0.0	2.0	0.9	3.8	0.8	3.4	0.2	3.4	0.8
Arab League	0.0	0.0	0.0	0.0	0.0	0.0	-	-	-	-
European Union/European Investment Bank	1.5	0.3	1.3	0.3	1.3	0.3	1.2	0.3	1.4	0.3
OPEC Fund	0.4	0.0	0.4	0.0	0.4	0.0	0.1	0.1	0.1	0.3
IMF	8.5	1.4	11.1	1.4	10.6	1.0	6.7	0.6	1.7	0.4
Bilateral	20.0	1.8	5.4	1.5	7.7	1.9	5.5	3.0	4.8	2.9
Paris Club	4.9	1.3	0.0	1.3	2.3	1.7	3.4	1.7	3.5	1.7
Official development assistance (ODA)	3.7	1.0	0.0	0.6	2.1	1.0	3.2	1.1	3.5	1.2
Austria	0.2	0.2	0.0	0.0	0.4	0.1	0.4	0.1	0.4	0.1
France	2.8	0.7	0.0	0.5	1.3	0.7	2.2	0.8	2.5	0.9
Japan	0.7	0.2	0.0	0.1	0.4	0.2	0.6	0.2	0.7	0.2
Non-ODA	1.2	0.2	0.0	0.7	0.2	0.7	0.2	0.6	0.0	0.5
Canada	0.3	0.1	0.0	0.2	0.2	0.2	0.2	0.2	0.0	0.1
France	0.9	0.2	0.0	0.4	0.0	0.4	0.0	0.4	0.0	0.4
United States	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Non-Paris Club	15.1	0.5	5.4	0.3	5.4	0.2	2.2	1.3	1.3	1.2
ODA	15.1	0.5	5.4	0.3	5.4	0.2	2.2	1.3	1.3	1.2
China	2.2	0.0	2.2	0.0	2.2	0.0	0.0	0.0	0.7	0.0
Abu Dhabi Fund for Development	0.1	0.0	0.0	0.0	0.0	0.0	0.4	0.1	0.3	0.1
Kuwaiti Fund for Arab Economic Development	1.8	0.3	1.6	0.1	1.6	0.1	1.7	0.5	0.0	0.5
Libya	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saudi Fund for Development	2.1	0.2	1.6	0.1	1.6	0.1	0.1	0.6	0.3	0.5
Unallocated amounts	8.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Non-ODA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Commercial	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1
Banque Nationale de Paris (BNP)/Amsterdam	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1
BNP/Paris	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Source: National Bank of Rwanda.

1/ Excluding rescheduling and new drawings.
2/ The stock of debt in 1999 has been adjusted to include amounts previously rescheduled.

Table 28. Rwanda: External Public Debt, Stock Outstanding, 1999-2003 1/

(In millions of U.S. dollars)

	1999	2000	2001	2002	2003
Total external debt	1256.5	1300.5	1336.1	1401.0	1432.8
IBRD-IDA	691.1	722.4	767.4	833.9	847.3
African Development Fund	218.3	219.3	228.0	226.7	222.4
African Development Bank	7.3	5.8	5.2	4.6	4.0
International Fund for Agricultural Development	32.9	36.7	42.1	40.6	40.1
Arab Bank for Economic Development in Africa (BADEA)	28.3	27.5	25.0	23.0	19.6
Arab League	0.0	0.0	0.0	0.0	0.0
European Union/European Investment Bank	29.4	28.2	26.8	25.5	32.8
European Union	29.4	28.1	26.8	25.5	24.1
European Investment Bank	0.0	0.1	0.0	0.0	8.6
OPEC Fund	6.7	6.8	6.4	9.8	15.5
IMF	75.9	85.8	84.3	84.9	91.9
Bilateral	166.1	167.4	150.4	151.5	158.6
Paris Club	73.0	73.0	74.1	75.5	76.7
Official development assistance (ODA)	62.6	62.6	63.6	64.9	66.1
Austria	9.3	9.3	9.4	9.5	9.7
France	38.1	38.1	38.9	39.8	40.7
Japan	15.2	15.2	15.4	15.6	15.8
Non-ODA	10.4	10.4	10.5	10.6	10.7
Canada	3.0	3.0	2.9	2.8	2.8
France	6.9	6.9	7.1	7.2	7.3
United States	0.6	0.6	0.6	0.6	0.6
Non-Paris Club	93.1	94.3	76.3	76.0	81.8
ODA	93.1	94.3	76.3	76.0	81.8
China	32.0	32.1	14.3	14.2	15.9
Abu Dhabi Fund for Development	2.5	2.5	2.5	2.5	5.0
Kuwaiti Fund for Arab Economic Development	27.6	27.7	27.8	27.8	27.9
Libya	1.1	1.1	1.1	1.1	2.2
Saudi Fund for Development	30.0	30.9	30.7	30.4	30.9
Unallocated amounts	0.0	0.0	0.0	0.0	0.0
Non-ODA	0.0	0.0	0.0	0.0	0.0
Commercial	0.5	0.6	0.5	0.6	0.6
Banque Nationale de Paris (BNP)/ Amsterdam	0.5	0.6	0.5	0.6	0.6
BNP/ Paris	0.0	0.0	0.0	0.0	0.0

Sources: Rwandese authorities; and Fund staff estimates.

1/ After rescheduling, including arrears.

Table 29. Rwanda: External Debt, Outstanding Arrears, 1999-2003
(In millions of U.S. dollars; end of period)

	1999	2000	2001	2002	2003
Total	54.1	61.2	23.2	31.8	14.7
IBRD-IDA	0.0	0.0	0.0	0.0	0.0
African Development Fund	0.0	0.0	0.0	0.0	0.0
African Development Bank	0.0	0.0	0.0	0.0	0.0
International Fund for Agricultural Development	1.0	1.0	1.0	0.0	0.0
Arab Bank for Economic Development in Africa (BADEA)	0.0	0.0	0.0	0.1	0.0
Arab League	0.0	0.0	0.0	0.0	0.0
European Union/European Investment Bank	0.0	0.1	0.0	0.0	0.0
OPEC Fund	5.5	6.0	0.0	2.9	0.0
IMF	0.0	0.0	0.0	0.0	0.0
Bilateral	47.6	54.1	22.2	28.8	14.7
Paris Club	0.0	0.0	0.0	5.8	11.4
Official development assistance (ODA)	0.0	0.0	0.0	5.8	10.9
Austria	0.0	0.0	0.0	0.0	0.0
France	0.0	0.0	0.0	4.6	8.8
Overseas Economic Cooperation Fund (Japan)	0.0	0.0	0.0	1.2	2.1
Non-ODA	0.0	0.0	0.0	0.0	0.5
Canada	0.0	0.0	0.0	0.0	0.2
France	0.0	0.0	0.0	0.0	0.3
United States	0.0	0.0	0.0	0.0	0.0
Non-Paris Club	47.6	54.1	22.2	23.0	3.3
ODA	47.6	54.1	22.2	23.0	3.3
China	10.6	12.8	0.0	0.0	0.2
Abu Dhabi Fund for Development	2.5	2.5	2.5	2.7	2.7
Kuwaiti Fund for Arab Economic Development	15.3	17.0	18.6	19.9	0.0
Libya	1.1	1.1	1.1	0.4	0.4
Saudi Fund for Development	18.1	20.7	0.0	0.0	0.0
Unallocated amounts	0.0	0.0	0.0	0.0	0.0
Non-ODA	0.0	0.0	0.0	0.0	0.0
Commercial	0.0	0.0	0.0	0.0	0.0
Banque Nationale de Paris (BNP)/Amsterdam	0.0	0.0	0.0	0.0	0.0
BNP/Paris	0.0	0.0	0.0	0.0	0.0

Sources: National Bank of Rwanda; and Ministry of Finance and Economic Planning.