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MALI

Selected Issues

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Approved by the African Department

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INTRODUCTION

Selected issues papers provide background information and analytical support for key policy issues discussed in the 2005 Article IV consultation discussions with Mali.

The first paper assesses the distributional effects of increased fuel prices. The rise of international oil prices during 2004–05 poses a policy dilemma for policymakers in Mali as to whether pass through price increases to consumers or to temper price increases by reducing taxes. The paper shows that gasoline and diesel prices affect mainly non-poor households while kerosene prices affect the poor more than the non-poor. Thus, with the exception of kerosene, high-spending households would benefit disproportionately from not passing through increases of international prices to pump prices, i.e. implicit oil price subsidies. In order to mitigate the impact of rising fuel prices on poor households in an efficient manner the paper considers measures including support rural electrification, transport subsidies, or kerosene coupons as worthy of further investigation.

The next paper applies cointegration analysis to simulate the evolution of Mali's long-run equilibrium real exchange rate during the period 1982-2004. The empirical results point to statistically significant long-term relationships between the real exchange rate, fiscal deficits, the terms of trade, technological progress, and openness to trade. The paper finds that the actual real exchange rate has appreciated relative to the long-run equilibrium in recent years. The paper recommends accelerated reforms of product and factor markets, to speed up the adjustment of prices and hence the flexibility of the actual real exchange rate, given the policy constraint of a pegged exchange rate to the Euro.

The third paper assesses the impact of structural reforms on Mali's aggregate output growth, using a growth accounting framework that disaggregates output growth into factor accumulation and total factor productivity (TFP). The paper explores cointegrating relationships between output and stocks of physical and human capital over the period 1968-2004. The estimated parameters are used to derive overall TFP growth over the sample period. The paper shows that the bulk of Mali's growth stems from factor accumulation rather than TFP growth. The paper demonstrates the link between good economic policies and strong institutions that promote economic growth through improvements in factor productivity.

The final paper explores the scope for creating and using fiscal space over the medium term under a range of illustrative policy scenarios. It illustrates the potential resource envelope that could be reasonably expected to be available to further achievement of development goals. The paper shows that the majority of fiscal space is likely to be created internally from projected real GDP growth, reforms that boost tax revenues and reduce unproductive spending, that would be unlikely to engender "Dutch disease" symptoms in the Malian economy. The strength of reforms is shown to be critical to the magnitude of fiscal space created. Aid and debt relief are important, but not pivotal, in creating fiscal space. The paper illustrates how estimates of the cost of scaling up public services could be used to assess the adequacy of the fiscal space identified under different scenarios.

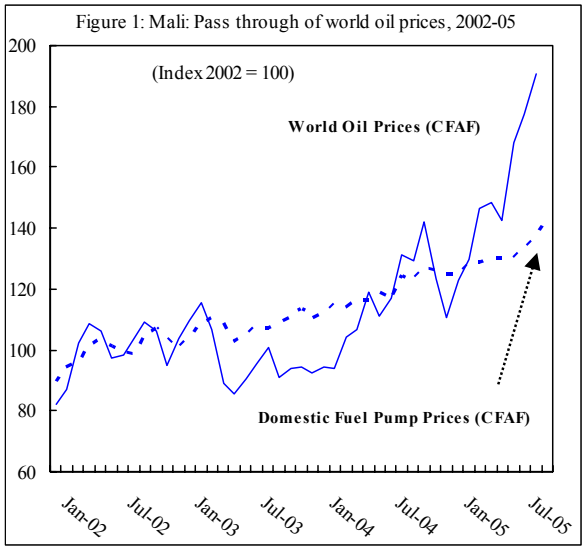
I. How Fuel Prices Affect Household Spending: Evidence from Mali[1]

Using an input-output model and a household dataset for Mali, this paper assesses the distributional effects of a rise in petroleum product pump prices. The results show that rising gasoline and diesel prices affect mainly non-poor households while rising kerosene prices are most harmful to the poor. Overall, the impact of fuel prices on household budgets displays a U-shaped relationship with expenditure per capita. However, with the exception of kerosene, high-spending households would benefit disproportionately from not passing through increases of international prices to pump prices, i.e. implicit oil price subsidies. To mitigate the impact of rising fuel prices on poor households in an efficient manner transport subsidies, support for rural electrification, or kerosene coupons could be considered. A non-discretionary formula for passing through prices could make such increases less politically controversial.

1. **Mali is highly dependent on imported oil products**. Mali's fuel import dependence, measured by the ratio of net oil imports to GDP, reached 5.4 percent in 2001, compared with an average of 3.3 percent for all oil importers and 4.0 percent for landlocked oil importers. Mali's vulnerability results from a lack of domestic oil resources, and long and costly routes of importation (the nearest ports are nearly 1,000 kilometers from the capital).

2. **The dramatic rise of international oil prices during 2004–05 poses a policy dilemma for policymakers in oil importing countries** (Figure 1). A full pass-through of increases in international oil prices to administratively set pump prices lowers household purchasing power and may increase poverty. However, by not passing on higher prices, lowering fuel taxes, a revenue loss would result jeopardizing spending objectives. The size of the revenue loss is a function of the extent of pass-through and whether international price rises are permanent or temporary.

Figure 1: Mali: Pass through of world oil prices, 2002-05



[1] This paper was finalized by Chris Lane based on a working paper undertaken by Kangni Kpodar during a summer internship at the IMF (Kpodar, 2005; forthcoming). The assistance of the IMF Poverty and Social Impact Analysis (PSIA) unit in undertaking the quantitative analysis is also gratefully acknowledged.

A. International Oil Prices and Pass Through to Domestic Prices

3. **Market fundamentals, together with expectations of continued narrow margins between global supply and demand, have been the primary influence on international crude oil prices during the past two years** (IMF, 2005). The crude oil price increases of 2004 can be broadly explained by the unexpectedly rapid growth in consumption, which grew at the fastest rate in 20 years. Oil producers were unable to significantly increase production relative to original plans. Price increases in 2005, while still supported by market fundamentals, appear largely to reflect the uncertain environment and expectations of future tightness in the market. Strong demand pressures continue to put pressure on production capacity, in contrast to earlier periods when OPEC production increases were able to offset surges in demand. As a result, there has been a significant rise in longer-dated futures prices reflecting the perception of continued tightness in the oil market. CFA franc appreciation against the dollar has only moderately dampened the effect of the rising dollar-denominated price of international crude oil.

Indicative ceiling prices for fuel products in Mali are set administratively on a monthly basis. Through end-2002, changes in pump prices followed a more or less automatic formula, with an element of smoothing (in line with a 2001 UEMOA directive on fuel taxation). [2]From 2003 onwards, price changes have been more discretionary leading to larger divergences between domestic and international prices. The policy of a discretionary and gradual pass-through of increases in international oil prices to pump prices poses significant fiscal risks given that the recent international price increase is likely to be sustained.

Table 1. Mali: Structure of Fuel Pump Prices, [June] 2005
(In percent of pump prices) 1/

	Kerosene	Gasoline	Diesel
Supplier price	60.1	34.3	49.3
Tax	21.6	48.6	31.5
of which: TIPP	3.9	30.9	12.1
VAT	13.3	13.3	13.1
Transport costs	13.2	9.1	11.7
Margins	5.2	8.0	7.5
Total	100	100	100

Note: 1/ Data for imports from Dakar.
Source: Ministry of Economy and Finance.

[2] Ceiling pump prices expressed in CFAF/liter are calculated as: Pump price = {(c.i.f. import price)(1+import duty rate)+excise tax}{1+VAT} + transport cost + margin.

B. The Impact of Rising Fuel Pump Prices on Households

Methodology and Data[3]

4. **Rising pump prices have both a direct and an indirect effect on household spending**. Pump price increases directly affect household spending through the higher prices for the fuel products they consume, and indirectly through price changes of other goods that use fuel as a production input. The direct effect on household expenditure of a rise in pump prices is calculated by multiplying the household budget share of each fuel product by its change in price. The indirect effect is calculated by multiplying the household budget share of each non-fuel product by its change in price derived from an input-output model. The input-output model requires less data than a computable general equilibrium (CGE) model. It is also.

5. **While the input-output model is easy to implement and can indicate the magnitude and distributional effects of the impact of *marginal* price changes on real household spending it does rely on a fairly restrictive set of assumptions**. Specifically, the input-output model is based on the following assumptions: homogeneity of output, no substitution between inputs, fixed proportions between inputs and outputs, absence of economies of scale, exogeneity of primary inputs and final demand components. Some of these restrictions are reasonable: spending patterns would likely not change significantly in the short term; given that there are few close substitutes for fuel products, the level of technology is also unlikely to change significantly in the short run. In the medium term, the first-order effects will nonetheless tend to overestimate the income loss that results from price increases. Finally, unlike a CGE model, the input-output approach does not take into account the labor market effects of producer price changes.

6. **The expenditure data used in this paper are from the Mali 2000–01 household survey**. The average expenditure per capita in urban areas is more than double that in rural areas, partially because of the smaller size of urban households. Expenditure on food is the primary spending item in both urban and rural areas. Oil product spending in urban areas is equivalent to 3.8 percent of spending (primarily for transport purposes), compared to 2.3 percent in rural areas (primarily for cooking/light).

[3] Appendix I gives a full explanation of the methodology adopted.

7. **Household expenditure levels and equipment ownership help to explain oil consumption patterns**. The budget share (per capita) of gasoline and diesel rises with overall spending while the budget share for kerosene falls (Table 2). Holding constant the level of expenditure per capita, agricultural households that own a tractor or a cultivator tend to consume more oil products (Table 3). Similarly, households that possess a car or a moped tend to have higher petroleum consumption. A household's access to electricity is also negatively associated with kerosene consumption.

Table 2. Household Budget Shares of Energy Spending by Product
(percent of total spending)

Quintile	Kerosene	Gasoline	Diesel	Charcoal	Electricity
Top	0.88	1.98	0.10	0.91	1.47
Fourth	1.30	1.07	0.06	0.54	0.45
Third	1.47	0.67	0.01	0.29	0.16
Second	1.54	0.68	0.01	0.10	0.07
Bottom	2.04	0.61	0.04	0.06	0.01
All	1.45	1.00	0.04	0.38	0.43

Note: Shares are calculated using data from the 2000-01 household survey. Quintiles are based on the national distribution of consumption per adult equivalent.

8. **The 1998 input-output table is used to define the technology of production**.[4] The petroleum sector is strongly linked to other sectors in the economy and has the highest sum of domestic input coefficients. The most oil-intensive sector consists of services intended for the agricultural sector, with a per unit requirement of 0.29, followed by the electricity and transport sectors, which have, respectively, 0.27 and 0.19 per unit requirements.[5] A sector's dependence on oil products determines the increase in the cost of production following a rise in oil prices.

Table 3. Equipment Ownership and Oil Consumption
Sign of coefficients from regressing fuel spending shares on the level of expenditure per capita (log) and a dummy variable for each piece of equipment.

	Total	Kerosene	Gasoline	Diesel
Expenditure per capita	+ ve	-ve	+ ve	+ ve
Equipment				
Tractor	+ ve	...	+ ve	+ ve
Cultivator	+ ve	...	+ ve	+ ve
Mill	+ ve	...	+ ve	+ ve
Generator	+ ve	- ve	+ ve	...
Car	+ ve	- ve	+ ve	+ ve
Moped	+ ve	- ve	+ ve	+ ve
Pirogue (canoe)	...	+	- ve	...
Access to electricity	+ ve	- ve	+ ve	+ ve
Power-driven pump	+ ve	- ve	- ve	+ ve

9. **Firms consume a major share of oil products**. All the resources of the

[4] By applying 1998 input-output data to the 2000-01 household expenditure survey it is assumed that the economy did not experience a major technological shock in the intervening period.

[5] For example, cotton ginning, protection and treatment of crops, and tool and agricultural machine rental.

petroleum sector are imported. Approximately 76 percent of fuel products are used by firms as intermediate inputs, 20 percent consumed by household (balance is re-exported). Across sectors, transport and metallurgy consume the largest shares of oil products.

Simulation Results

10. **Simulations are presented of a full-pass through of a 34 percent rise in domestic fuel prices** (equivalent, for example, to the actual increase between September 2003 and September 2005). For convenience, we assume that a rise in expenditure resulting from higher product prices is equivalent to a decrease in real spending.

11. **The direct expenditure effect as a share of spending of the rise in oil prices is modest, and its distribution is nonlinear.** By expenditure quintile, the highest spending households are most affected, and the lowest spending the next most affected (Table 4). A 34 percent rise in the prices of all oil products leads to a 1.0 percent decrease in real spending for the top quintile, while the spending of households in the bottom quintile drops by 0.9 percent. The kerosene prices has a slight regressive effect on income, whereas the gasoline price is almost progressive. The impact of higher diesel prices is almost negligible for the three bottom quintiles. Nonparametric estimates support the above findings (not reported in this paper see: Kpodar, 2005).

Table 4. Direct Expenditure Effects of 34 Percent Fuel Price Increase

Quintile	Expenditure Effect (percent of spending)	Annual Expenditure Per Capita (CFAF '000)	Annual Nominal Expenditure Effect (CFAF '000)	Share of Expenditure Effect (In percent)			
				All Oil Products	Kerosene	Gasoline	Diesel
Top	1.0	316	3.6	43.5	19.2	59.0	71.1
Fourth	0.8	151	1.3	19.9	22.4	18.3	17.0
Third	0.7	100	0.8	14.1	23.0	8.3	2.5
Second	0.8	70	0.5	11.5	17.6	7.6	3.3
Bottom	0.9	42	0.4	11.2	17.8	6.7	6.1
All	0.9	136	1.3	100.0	100.0	100.0	100.0

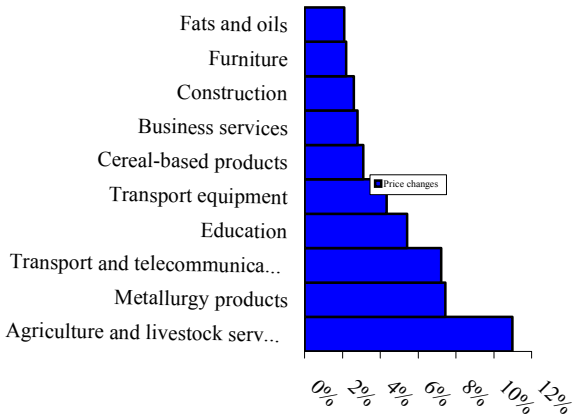
Source: 2000-01 Household survey.
Note: 1/Expenditure effects are obtained by multiplying the sum of oil product spending shares by the oil price increase. Quintiles are based on the national distribution of consumption per adult equivalent. Average expenditure per capita is based on annual per adult equivalent consumption.

12. **The distribution of the direct expenditure effect indicates that higher expenditure groups would benefit most from not passing through increases of international prices to pump prices**. Assuming the cost of not passing through is carried by the budget in the form of lower taxes, overall 40 percent of such tax expenditures would accrue to the top expenditure quintile, nearly four times the amount accruing to the lowest quintile. For

gasoline and diesel the tax expenditures captured by the top quintile are 59 and 71 percent respectively. Urban households are, on average, more affected directly by fuel price increases than rural households in absolute spending terms particularly in the top quintile.

13. **The indirect effects of fuel price changes depend on both the pattern of consumption on non-fuel products and the sensitivity of non-fuel product prices to fuel prices**. Low expenditure households are likely to be disproportionately affected indirectly if food prices are highly sensitive to oil prices as their expenditure is skewed towards food. Using the input-output matrix to find the sensitivity of non-fuel products to fuel price changes shows that services to the agricultural sector are the most sensitive, followed by metallurgy products, transport and telecommunication. These simulations assume that cost increases caused by higher oil prices are fully passed through to output prices, except the prices for electricity and public services, that are assumed to be controlled by the government (Figure 3).

Figure 3. Simulated non-fuel product price changes, with 34 percent increase in fuel prices



Source: Based on 1998 input-output matrix.

14. **The bulk of the indirect expenditure effect on households comes through increases in food expenditures, although food price increases are relatively small** (Table 5). Expenditure effects for foods are the largest mainly because of their high budget shares. Likewise, the expenditure effects for transport and telecommunication are also large, albeit because of high price increases rather than high budget shares.

Table 5. Indirect Price and Expenditure Effects by Sector 1/
(In percent)

Sector	Price change	Budget share	Expenditure effect
Flour and processed cereals	1.8	13.4	0.24
Fatty substances	2.1	3.8	0.08
Food products	2.4	3.1	0.08
Transport and telecommunication services	7.2	0.9	0.07
Textile and clothing	1.2	4.5	0.05
Chemical products	1.8	2.2	0.04
Cereal-based products	3.1	1.1	0.04

Note: 1/ Only sectors with an average expenditure effect greater than 0.03 percent are presented.

15. **The indirect expenditure effects of pump price increases are modest, although overall the bottom quintile and rural residents experience the biggest expenditure share increase** (Table 6). This is the case because of the relatively high food budget shares of poor and rural households and the assumption that the electricity price is fixed (benefiting urban residents). Similar to the direct effects, the main beneficiaries of not passing through world prices to pump prices (by cutting taxes) would accrue to the top quintile, where the nominal effect of price increases is three times larger than that accruing to the bottom quintile.

Table 6. Indirect Expenditure Effects by Quintile, Rural and Urban
(34 percent increase of pump prices)

	Impact on total spending (percent)			
Quintile	All	Urban	Rural	Share of expenditure effect
Top	0.86	0.83	0.90	39.8
Fourth	0.78	0.75	0.80	19.4
Third	0.76	0.70	0.78	15.4
Second	0.83	0.71	0.84	13.7
Bottom	0.88	0.71	0.88	11.8
All	0.82	0.78	0.84	100.0

Note: Quintiles are based on the national distribution of consumption per adult equivalent. Data derived by aggregating the expenditure effects in Table 8 for each household.

16. **Total expenditure effects yield a conclusion similar to the direct effects, which account for half of the total effect** (Table 7). First, the simulated pump price increases have a limited impact on household expenditures, with urban households being more affected than rural households. Upper quintile households are most affected (in nominal spending terms) because they consume a larger share of oil products, and thus would benefit most from not passing through price increases.

Table7. Total Expenditure Effects by Quintile
(For 34 percent pump price increase)

	Percent of total spending			Share of total expenditure effect
Quintile	All	Urban	Rural	(in percent)
Top	1.86	1.94	1.73	41.7
Fourth	1.61	1.69	1.56	19.6
Third	1.50	1.42	1.51	14.7
Second	1.59	1.45	1.60	12.5
Bottom	1.79	1.74	1.79	11.5
All	1.67	1.76	1.64	100.0

17. **Upper quintile households also benefit from controlled electricity prices** (Table 8). When we remove the assumption of a fixed electricity price, a 34 percent rise in oil prices leads to a 10.7 percent increase in the electricity price. The distributional effects show that the removal of electricity subsidies is slightly progressive. However, the urban poor are likely to be affected negatively by a higher electricity price and might therefore need to be protected.

Table 8. Indirect Expenditure Effects by Quintile, Rural and Urban: Distribution Effects of Controlled Electricity Price

	Noncontrolled Electricity Price (1)			Controlled Electricity Price (2)			Difference (1)-(2)		
Quintile 1/	All	Urban	Rural	All	Urban	Rural	All	Urban	Rural
Top	1.24	1.32	1.11	0.86	0.83	0.90	0.38	0.49	0.20
Bottom	1.04	1.09	1.04	0.88	0.71	0.88	0.17	0.38	0.16
All	1.06	1.20	1.01	0.82	0.78	0.84	0.24	0.42	0.17

Note: 1/ Quintiles are based on the national distribution of consumption per adult equivalent.

C. Cross-Country Comparisons

18. **The estimated average expenditure effect of oil price increases in Mali falls in the range of findings identified in other country studies**.[6] A 20 percent increase in oil prices leads to 1 percent rise in household expenditures in Mali,[7] which is similar to that for Pakistan (0.85 percent) but significantly lower than that for Ghana (3.4 percent). The difference between expenditure effects in Mali and Ghana likely results from higher oil subsidies that lead to much higher oil product consumption in Ghana, e.g., the kerosene budget share is 3.5 percent in Ghana compared with 1.5 percent in Mali (2001).

19. **The distributional effects across income groups vary across country studies**. Fuel price rises have a progressive effect in South Africa and Indonesia, and regressive effect in Ghana, the Islamic Republic of Iran, and Pakistan. Mali and Mozambique show a different pattern, with the top quintile most affected and the bottom quintile second most affected. In part these differences can be explained by differing assumptions on the price increases by product. In Mali, the U-shaped impact results from a high level of kerosene consumption in low spending quintiles. However, the Pakistan case study is puzzling because the oil price increase is regressive even though the kerosene price is held constant. Further data investigation reveals that the poor are affected by increases in food prices (milled grains, vegetable oils, wheat, and so on) which are sensitive to transport costs (and hence diesel prices).

20. **The relative importance of the direct effect varies across countries**. In Mali, the direct effect of the oil price increase accounts for 50 percent of the total effect, compared with 20 percent in Ghana. This disparity is explained by the fact that households in Ghana directly consume 6.2 percent of petroleum products, less than a third of the level of household consumption in Mali. The indirect effects are higher in Ghana because households consume more energy-intensive products. In particular, transport costs represent 3.2 percent of household expenditures in Ghana and only 0.9 percent in Mali.

[6] See Appendix II.

[7] The impact estimated using the input-output approach is linearly proportional to the level of the price increase. In Mali, a 34 percent rise in oil prices leads to a 1.67 percent decrease in real income, so real income will decrease by 0.98 percent if oil prices rise by 20 percent.

D. Policy Implications

21. **Oil price increases have a clearly adverse impact on household expenditures in Mali**. A simulation of large increase (34 percent) in oil prices leads to a 1.67 percent average increase in household expenditures, with the impact on rural households (1.64 percent) being slightly smaller than that on urban households (1.76 percent). The indirect effect caused by the rise in the prices of other goods and services is calibrated through input-output linkages with the petroleum sector; it represents roughly 50 percent of the total effect.

22. **Although the lowest and the highest expenditure quintiles are most adversely affected by oil price rises, the benefits of not passing through price increases accrue largely to the nonpoor**. Mali therefore could realize significant gains by trying to target subsidies to achieve its poverty reduction objectives. Likewise, control of the electricity price to smooth the impact of oil price increases benefits high spending households rather than poor households.

23. **However, these results represent the maximum short-run impact of the oil price increase.** In the medium term, households and firms will adjust their demand for oil products, leading to smaller expenditure effects as consumers and producers reduce their demand for oil, either by switching to a different fuel or by switching to other goods or products.

24. **In order to mitigate the economic and social impact of fuel price increases, a number of palliative measures can be considered**:

(i) Limiting the impact of kerosene price increases is of more benefit to low spending quintiles than other products although still relatively inefficient (benefits are spread equally across quintiles);
(ii) kerosene coupons could more effectively target low spending consumers, though such subsidies would likely be temporary and transparent to discourage the diversion of subsidized kerosene to other purposes;
(iii) temporary support for public transport might provide a cushion for urban low income consumers in the event of sharp increases of fuel prices;
(iv) subsidies for rural electrification (as proposed by the World Bank in Mali) could also help shield the poor from kerosene price increases by substituting electricity for kerosene;
(v) below-cost electricity disproportionately benefits high spending urban households. To protect the urban poor, the existing subsidized block tariff rate should be maintained at a modest level of consumption. This would lessen poor households' incentive to switch to kerosene.

25. Finally, the introduction of a formula to determine pump prices can lessen the onus of blame on the government for price increases as pass-through of international fuel prices to domestic prices is often politically difficult. A clear explanation to the public of the rationale for such a mechanism is important in this respect. The formula can employ price smoothing

to lessen market disruption. In the medium run, it would be desirable to allow market mechanisms to determine domestic oil prices and to promote the efficient use of fuel.

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Appendix I. Methodology for Calculating Impact on Household Expenditure of Fuel Price Increase

The Direct expenditure effect

The budget shares of oil products determine the direct effect on consumers of the increase in oil prices.

$$\partial \log Y_{dir} = \sum_{t=1}^{m} b_t * \partial \log P_t$$

where $\partial \log Y_{dir}$ is the direct expenditure effect (expressed in percentage), b_t is the budget shares of the oil product t, P_t is the change in the price of oil product t, and m is the number of oil products consumed by households.

The Indirect expenditure effect and the input-output approach

The formula of the indirect effect is similar to that of the direct effect:

$$\partial \log Y_{ind} = \sum_{i=1}^{n-m} b_i * \partial \log P_i$$

where $\partial \log Y_{ind}$ is the indirect expenditure effect (expressed in percentage), b_i is the budget shares of final goods other than oil products, P_i is the change in the price of good i, n and m are respectively the number of final goods and the number of oil products.

To compute the change in commodity prices following a change in oil prices, we follow the input-output approach adopted by Coady and Newhouse (2005). We consider two categories of sectors: the *noncontrolled sectors* and the *controlled sectors*. For noncontrolled sectors, the relationship between user and producer prices is given by

$$P_{nc}^{u} = P_{nc}^{p} + t, \quad (1)$$

where P_{nc}^{u} is the price paid by consumers, P_{nc}^{p} is the price received by producers,[8] and t is the tax imposed by the government.[9] Changes in the user prices are then given by

$$\Delta P_{nc}^{u} = \Delta P_{nc}^{p} + \Delta t. \quad (2)$$

For controlled sectors, producer prices are determined by the government. Therefore, the change in consumer prices is equal to the change in producer prices, assuming that the tax remains constant.

$$\Delta P_{c}^{u} = \Delta P_{c}^{p}, \quad (3)$$

[8] Producer prices are a function of intermediate goods costs and factor prices.

[9] Note that t is a trade tax when we consider traded goods, but a domestic tax when we consider nontraded goods. A tax on domestic production of traded goods does not affect user prices, but reduces producer prices.

where ΔP_c^u is the change in consumer prices, and ΔP_c^p is the change in producer prices.

The technology of production is captured by an input-output coefficient matrix *A*, with a_{ij} denoting the cost of input *i* in producing one unit of output *j*. Also, a_{ij} represents the change in the production cost of a unit of *j* resulting from to a unit change in the price of input *i*. This implies a Leontief production function, where the firm's demand for inputs is relatively insensitive to the changes in input prices.

Using the input-output coefficient matrix and assuming that factor prices are fixed, the change in producer prices is derived as

$$\Delta P_{nc}^p = \Delta P_{nc}^u \cdot A + \Delta P_c^p \cdot A\,, \tag{4}$$

$$(1,n) \quad (1,n)\cdot(n,n) \quad (1,n)\cdot(n,n) \quad .$$

Substituting in from (2) for ΔP_{nc}^u and rearranging (4), we obtain

$$\Delta P_{nc}^p = (\Delta t \cdot A + \Delta P_c^p \cdot A)\cdot(I - A)^{-1}, \tag{5}$$

where I is an $n \times n$ identity matrix. Assuming that the tax on controlled-sector commodities is constant ($\Delta t = 0$), the following equation gives the effect of a change in controlled prices on the prices of noncontrolled sectors:

$$\Delta P_{nc}^p = \Delta P_c^p \cdot A \cdot (I - A)^{-1}\,. \tag{6}$$

Appendix II. Distributional Effects of Oil Price Changes: Selected Country Studies

Study/Author	Country	Context	Data	Main results for a 20 percent increase in average oil prices (unless otherwise specified)
		I. Input-Output Approach		
Coady and Newhouse (2005)	Ghana	The application of a new pricing formula requires, on average, a 50 percent increase in pump prices.	The 1999 Living Standard Survey and the 1993 Social Account Matrix (SAM).	The average real income decreases by 3.4 percent, with the poor being the most affected (3.64 percent). However, the removal of subsidies is a progressive policy. The indirect effect accounts for 80 percent of the total effect.
Valadkhani and Mitchell (2002)	Australia	Impact of a rise in oil prices on price level and income distribution	The 1998-99 Household Survey and the 1996-97 Input-Output table	Based on budget share analysis, the authors conclude that a rise in oil prices is regressive. However, they did not provide a clear estimate of real income effects.
World Bank (2003)	Iran, Islamic Rep. of	A 308 percent rise in the average energy price, intended to bring all energy prices to import parity	The 1994-95 Input-Output table and the corresponding household survey.	Households experience, on average, a 1.98 percent decrease in real income. The effect is regressive because poorer households are hit harder than better-off households, especially in rural areas (3.1 percent for poor households compared with 1.92 percent for rich households).
ESMAP[10] Report (2001)	Pakistan	Assessment of a 33 percent rise in gasoline and diesel prices; other oil products remained unchanged.	The 1989-90 Input-Output table and the 1996-97 Household Survey.	The cost of living of households increases by 0.85 percent on average. The impact is higher for urban households (0.90 percent) than for rural (0.79 percent). In both areas, the impact is regressive, with the poor experiencing a 1.15 percent increase in expenditures.
Nicholson and others. (2003)	Mozam-bique	Increase in oil tax to improve road maintenance, raise domestic revenue, and reduce aid dependency.	Data come from the 1993-94 Social Account Matrix and the 1996-97 Household Survey.	The increase in the average fuel price, assuming kerosene remains tax-exempt, leads to a 0.42 percent increase in the average expenditure of households. The lowest quintile feels the impact slightly more than all other quintiles except the rich. The impact is significantly higher on urban households than on rural households.

[10] The Energy Sector Management Assistance Programme.

II. CGE Analysis

Study/Author	Country	Context	Data	Main results for a 20 percent increase in average oil prices (unless otherwise specified)
McDonald and van Schoor (2005)	South Africa	Simulation of various oil price shocks.	The model is calibrated on data from the 2000 SAM.	The rise in oil prices is progressive. Poor households tend to be less adversely affected and rural households have a slightly smaller drop in income than urban households (0.76 percent versus 0.83 percent).
Clements, Hong-Sang, and Gupta. (2003)	Indonesia	Assessment of real and distributives effects of petroleum price liberalization in Indonesia.	The model is calibrated on data from the 1995 SAM.	A 25 percent increase in oil prices would lead to a 2.5 percent decrease in average real consumption. The impact is slightly progressive because high-income groups are the most affected, especially in urban areas.

II. Estimation of the Equilibrium Exchange Rate for Mali[11]

Exchange rate competitiveness is an important concern in countries that are members of a fixed peg currency area. This paper uses multivariate cointegration to simulate the evolution of Mali's long-run equilibrium real exchange rate (ERER) during the period 1982-2004. The ERER is the value of the exchange rate that is simultaneously consistent with internal and external balance. Internal balance occurs when the markets for nontraded goods and labor are both in equilibrium and external balance occurs when the current account deficit is equal to the value of sustainable capital inflows. The deviations of the actual real exchange rate (RER) from its long-run equilibrium path are interpreted as a measure of disequilibrium.[12]

A. External Trade Performance and the Real Exchange Rate

1. **Trade liberalization coupled with a depreciation in the RER contributed to a reduction of Mali's trade deficit from 14 percent of GDP to broad balance during the 1980's and 1990's** (Figure 1). Mali began liberalizing its trade regime in 1986, by eliminating export monopolies and simplifying import licensing. Over the period 1988-91 further reforms removed many impediments to trade: (i) the liberalization of trade quotas and the abolition of import monopolies (1988); (ii) the abolition of all export licensing requirements (1989); (iii) the abolition of export taxes, the simplification of the structure of import taxes, the streamlining of administrative procedures for both imports and exports; and the elimination of restrictive quotas and import licensing requirements (1990); and, (iv) the lowering of import tariffs to a range from 6 to 41 percent from zero to 200 percent (1991). Following the devaluation of the CFA franc in 1994-95, the trade deficit increased on account of "J curve" effects. The trade balance moved into surplus in 1997-98 following successful gold exploration that boosted gold exports.

2. **Mali's economy has become increasingly open to external trade**. The ratio of exports plus imports to GDP increased from 26 percent in 1986-87 to more than 45 percent in 2000-04, a striking gain in openness to international trade.

3. **Despite trade liberalization and increased openness, exports remain concentrated on cotton, gold, and livestock.** In the first half of the 1990's, cotton and livestock, Mali's traditional exports, accounted for over 70 percent of export revenues, with gold accounting for most of the balance. Gold production increased dramatically from 1997

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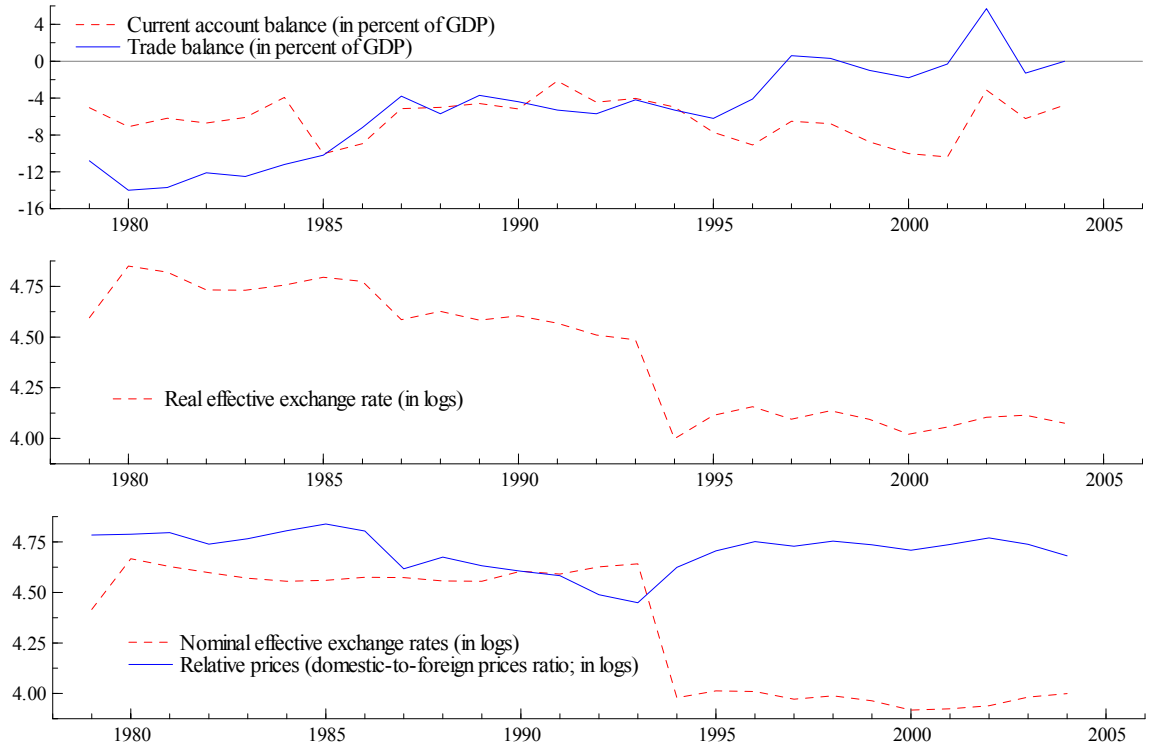
[11] This paper was prepared by Jean-Claude Nachega and has benefited from comments at a seminar held in Bamako.

[12] The RER is defined as consumer prices in Mali compared to a trade-weighted average of consumer prices of trading partners expressed in a common currency. Ideally, the RER would be defined on the basis of unit labor costs, but such data are unavailable in Mali.

onwards rising to over half of Mali's export revenues. However, export diversification remains elusive with gold, cotton and livestock accounting for about 90 percent of export revenues during 2000-04. Mali's continued lack of export diversification, and the related vulnerability to external shocks, illustrates the need for a second generation of trade reforms.

Figure 1. Mali: External Accounts, Exchange Rates, and Prices, 1979-2004



4. **The recent evolution of Mali's RER can be divided into four phases**: (i) 1994-98, the RER appreciated somewhat as a result of the surge in domestic wages and prices after the 1994 CFA franc devaluation; (ii) 1999-2000, the RER depreciated owing to the decline in the terms of trade (declines in key export commodity prices and an increase in oil prices) as well as the slowdown in the world economy; (iii) 2001-02, the RER appreciated, mainly reflecting the strengthening of the euro against the U.S. dollar; and (iv) 2003-04, the RER depreciated, mainly reflecting a downward trend in prices offsetting the opposite trend in the nominal effective exchange rate (euro appreciation).

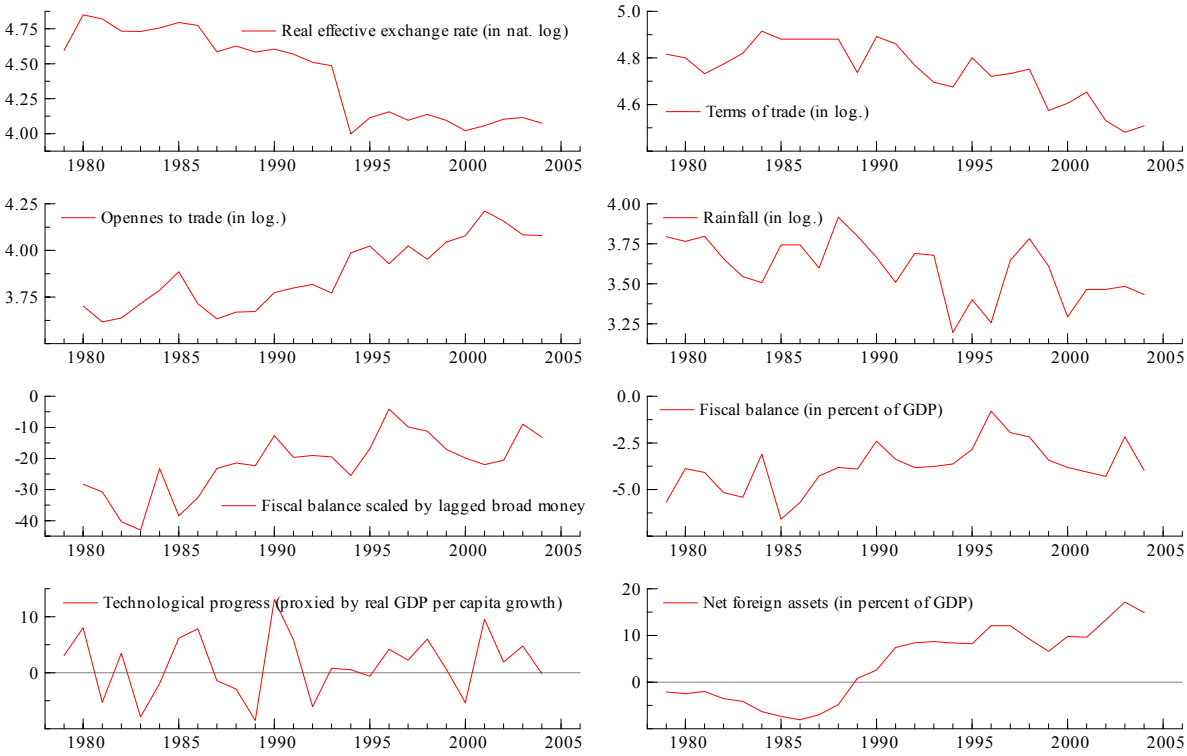
B. Theory, Methodology, and Data

5. **Edwards' (1989) dynamic model of a three-good (exportables, importables and nontradables) small open economy with a fixed exchange rate provides a coherent framework to identify the fundamental variables that are associated with the ERER of Mali**. Specifically, we investigate the existence of a long-run cointegrating relationship between the RER and the fundamental variables. After determining the presence of a long-run relationship between the RER and the fundamental variables, the path of ERER is then

calculated using the estimated parameters. Cointegration analyses are based on the Johansen and Juselius (1990) systems approach.

6. **The following fundamental determinants of ERER are considered: productivity growth, openness to trade and financial flows (as proxied respectively by imports plus exports and the net foreign asset position in percent of GDP), the fiscal balance, and the terms of trade**. The dataset consists of annual observations for the period of 1980-2004 (Figure 2). The model is estimated with a rainfall series included in the information set to capture the vagaries of weather on food prices (50 percent of the CPI basket).

Figure 2. Mali: Selected Macroeconomic Variables, 1979-2004



7. The empirical model estimated is:

$$\ln(RER) = a_0 + a_1 \ln(TOT) + a_2 \ln(OPEN) + a_3 \ln(FISCB) + a_4 TPROG + a_5 NFAY + \varepsilon_t \quad (1)$$

where ln denotes the natural logarithm, ε_t is an error term and

RER = Real effective exchange rate index.
TOT = Terms of trade (of goods and services) index;
OPEN = Sum of imports and exports (of goods and services) divided by GDP (in percent);

FISCB = Fiscal deficit as a share of GDP (*FISCBY*) or of the lagged broad money stock (*FISCBM*);
TPROG = Technological progress (proxied by per capita real GDP growth);
NFAY = Capital inflows (proxied by net foreign assets in percent of GDP).

8. The expected signs of the variable coefficients are:

- Terms of trade of goods. The expected sign is *positive*. The terms of trade affect the RER through the demand effect with a positive terms of trade shock inducing an increase in domestic demand, hence an increase in the relative price of non-tradable goods, which results to a RER appreciation.[13]

- Fiscal deficit. The expected sign is *positive*. Higher deficits that are—directly or ultimately—monetized as well as domestic credit creation generate a higher domestic price level and an appreciation of the RER. In addition, to the extent that deficits reflect increased government spending that is primarily directed towards nontradable goods, this will result in an appreciation of the RER.

- Technological progress. The expected sign is *positive*. This captures the Balassa-Samuelson effect: an increase in the productivity of tradables versus nontradables raises wages, thus increasing the relative price of nontradables and causing a RER appreciation. As in most studies, this is proxied by real per capita GDP growth.

- Openness to capital flows, proxied by the NFA position as a share of GDP. The expected sign is *positive*. Increased capital inflows cause higher demand for nontradables and hence an appreciation of RER.

- Openness to trade flows. The expected sign is *negative*. Trade liberalizing reforms should depreciate the RER.

9. **The empirical model is estimated using the multivariate cointegration procedures developped by Johansen (1988) and Johansen and Juselius (1990)**. Equation (1) assumes an instantaneous adjustment of RER to its equilibrium level given its fundamental determinants. However, instantaneous adjustment is unlikely, given the effects of transaction costs and the uncertain speed of adjustment in the goods market where the RER is ultimately determined. In addition, the equilibrium level of RER is unobservable. Therefore, a distinction is made between the long- and short-run behavior of the RER, by specifying an error-correction mechanism of the actual RER toward its long-run level (ERER). Furthermore, the time series data have stochastic trends, and various subsets could be cointegrated. Therefore, the empirical study proceeds in three steps. First, the time-series

[13] Empirical evidence suggests that the income effect tends to dominate the substitution effect.

properties of the data are investigated to avoid the spurious regression problem that arises when statistical inferences are drawn from nonstationary time series. Second, the Johansen multivariate cointegration procedures are used to determine empirically the number of cointegrating vectors. Third, the deviations of the RER from its long-run equilibrium path, which are interpreted as a measure of disequilibrium, are used in least squares regression analysis to check how well they fit the macroeconomic history of Mali.

C. Econometric Results

Unit-Root Tests

10. **All the series considered here are nonstationary and integrated of order one (or I (1)) since stationarity is achieved once expressed in first differences.** The integrating properties of the variables are investigated by conducting unit-root tests (augmented Dickey-Fuller or ADF tests). The null hypothesis is the presence of a unit root. The lag length in the ADF regression is selected using the Akaike information criterion. The ADF tests are performed by including both a constant and a deterministic time trend. With the exception of *TPROG*, all series are found to be unequivocally nonstationary; that is, the null hypothesis that they contain a unit root could not be rejected at the 5 percent critical value or less. Given the low power of the ADF test and on the basis of visual inspection, the *TPROG* series is assumed I(1). This conjecture is later confirmed through multivariate cointegration analysis.

The Long-Run Equilibrium RER

11. **Cointegration analysis confirms the existence of a stable, long-run relationship among the real exchange rate, the terms of trade, openness to trade, the fiscal deficit, and technological progress.** The *NFAY* variable was not found to impact the ERER and was hence removed from the econometric analysis. The Johansen procedure is applied to a second-order vector autoregression (VAR) simplified version of equation (1) using either measure of the fiscal deficit (*FISCBY* or *FISCBM*) and conditioning on the rainfall series. The maximal and trace eigenvalue statistics reject the null hypothesis of no cointegrating vector in favor of one cointegrating vector at the 1 percent level :

$$\ln(RER) = 0.7 \ln(TOT) - 1.2 \ln(OPEN) + 0.5 \ln(FISCBM) + 0.1\ TPROG \quad (2)$$

and

$$\ln(RER) = 0.8 \ln(TOT) - 1.9 \ln(OPEN) + 0.5 \ln(FISCBY) + 0.1\ TPROG \quad (3)$$

Estimated constants and random error terms are omitted for brevity. All the variables have the expected sign. Equations (2) and (3) suggest that the long run real exchange rate in Mali appreciates when the terms of trade improves and productivity rises, and depreciates when the fiscal position improves and openness to trade increases, all of which are consistent with

the theory of the previous section. Since higher government deficits tend to appreciate the ERER, it follows that increases in government spending fall mostly on nontraded goods.

12. **All variables are statistically significant at conventional levels in equation (3), but not in equation (2) owing to collinearity issues.** *TOT* and *OPEN* in equation (2) are collinear and therefore statistically significant only when considered jointly (Table 1). Note also that *TOT* and *OPEN* have higher correlation coefficients with *FISCBM* (0.36 and -0.45, respectively) than with *FISCBY* (0.16 and -0.28, respectively), explaining their lower coefficients (and hence lower significance) in equation (2) compared to equation (3).

Table 1. Correlation Matrix, 1980-2004 1/

	RER	*OPEN*	*TOT*	*FISCBY*	*FISCBM*	*TPROG*	*RAINFALL*
RER	1.00	-0.88	0.73	0.45	0.61	-0.05	0.65
OPEN	-0.88	1.00	-0.71	-0.28	-0.45	0.22	-0.61
TOT	0.73	-0.71	1.00	0.16	0.36	0.09	0.43
FISCBY	0.45	-0.28	0.16	1.00	0.93	-0.20	0.34
FISCBM	0.61	-0.45	0.36	0.93	1.00	-0.23	0.33
TPROG	-0.05	0.22	0.09	-0.20	-0.23	1.00	0.00
RAINFALL	0.65	-0.61	0.43	0.34	0.33	0.00	1.00

Source: WEO and Staff calculations.

1/ Variables are in natural logarithms.

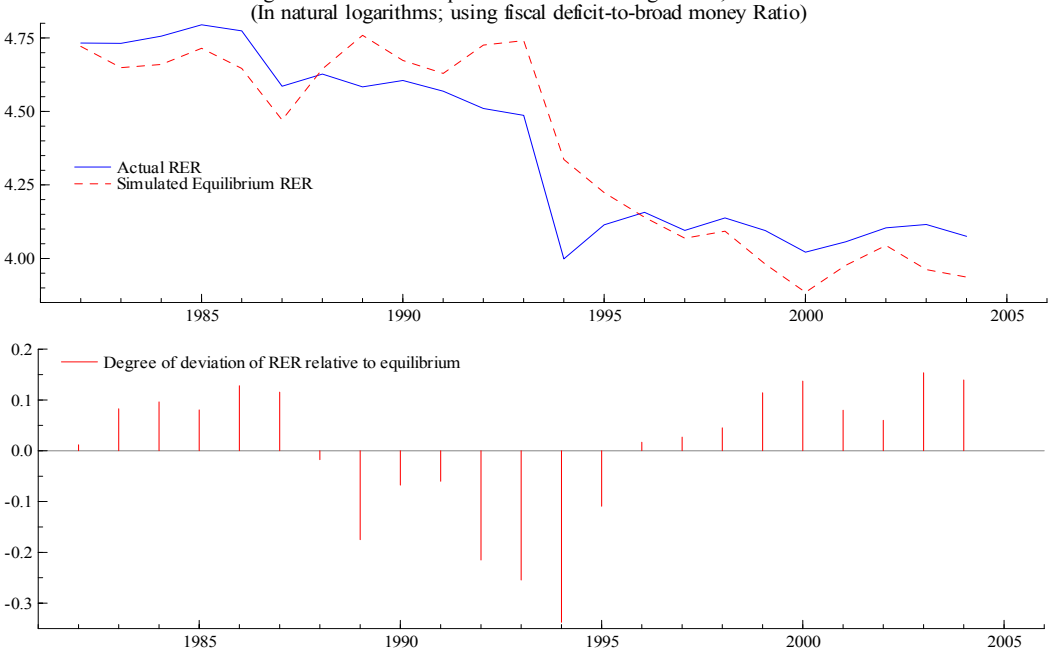
13. **The derived measures of disequilibrium using equation (2) and (3) are almost identical and reveal three periods: deteriorating competitiveness during 1982-87; improving competitiveness during 1988-1996/97; and deteriorating competitiveness during 1999-2004**. When estimated " permanent" values of the fundamentals are substituted into the right hand side of equations (2) and (3), the fitted values provide estimated time series for the ERER. Figure 3 plots movements of the RER and the resulting estimated ERER (using equation 2) for the sample period. When the RER is above (below) ERER, the real effective exchange rate is overvalued (undervalued) relative to the theoretical equilibrium rate. An increase in RER and ERER implies an appreciation. A comparison of the RER with estimated ERER suggests that the real exchange rate was undervalued at the time of the devaluation in 1994, but has become overvalued relative to the theoretical equilibrium rate over the recent years.

RER Deviation from Long-Run Equilibrium, External and Fiscal Accounts

14. **How well do estimates of actual RER deviations from equilibrium based on theory and estimation of the long-run ERER fit the macroeconomic history of Mali?** The effect of the RER deviations from equilibrium on Mali's external accounts can be seen in Figure 4. The deviation from equilibrium explains the behavior of the current account balance for the entire sample period, but only explains the trade balance up to 1996 (the pre-gold export boom period). With the inclusion of a dummy variable over 1997-2004, the

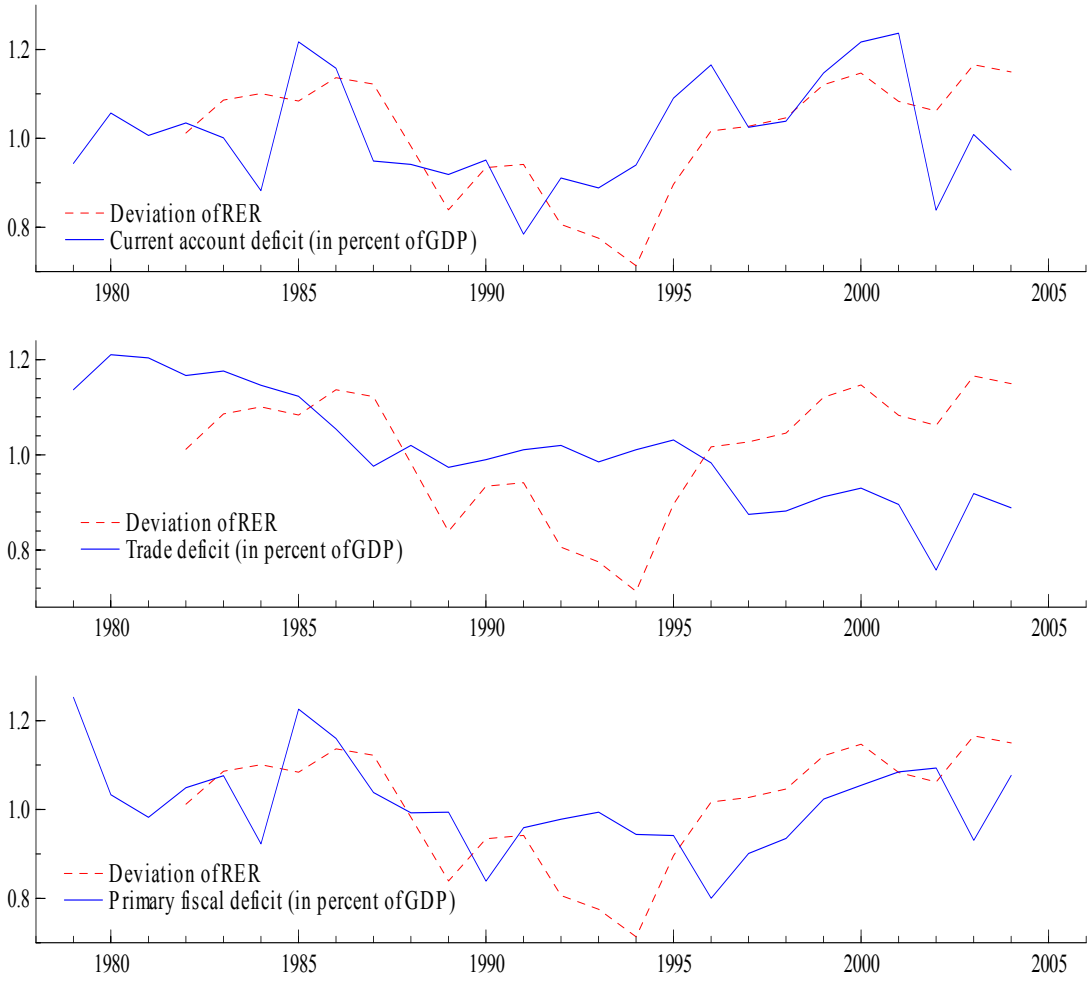
measure of RER deviation from equilibrium explains also well most of the changes in the trade balance over the entire sample period.

Figure 3. Actual and Equilibrium Real Exchange Rates, 1982-2004
(In natural logarithms; using fiscal deficit-to-broad money Ratio)



15. **Episodes of estimated positive RER deviation from the equilibrium tend to correspond to high deficits in Mali's primary fiscal balance, through the erosion of fiscal revenues** (Figure 4). More specifically, positive deviations from equilibrium reduce both budgetary revenues and expenditures, but the impact on the latter variable is lower, leading to a deterioration in the primary fiscal balance. The adverse impact of positive deviation from equilibrium on budgetary expenditure may thus be explained by the reduction of budgetary revenue that it triggers. These stylized facts with respect to the effect of the RER deviations from equilibrium on Mali's fiscal and external accounts are confirmed through OLS regression analysis (Appendix I).

Figure 4. Mali: Deviations of RER from equilibrium, Fiscal and External Accounts



D. Conclusions and Policy Implications

16. **This study applied multivariate cointegration analysis to investigate the fundamental determinants of the equilibrium real effective exchange rate in Mali during the period 1980-2004.** The ERER is modeled using Edwards' (1989) model with due attention to economic theory and empirical issues. The empirical results point to strong and statistically significant long-term relationships among the RER, fiscal deficits, terms of trade, technological progress, and openness to trade.

17. **The empirical analysis indicates that the 1994 devaluation of the CFA franc occurred when Mali's RER was below its equilibrium level.** However, the devaluation effectively prepared Mali for the subsequent depreciation of the ERER caused by adverse movements in the terms of trade. The derived measure of RER deviation from equilibrium explains well the evolution of the current and trade accounts over the sample period. The

analysis also shows that Mali's actual real exchange rate has appreciated relative to the long-run equilibrium real exchange rate over the past decade.

18. **With a view to curbing the deviation from the long-run equilibrium real exchange rate and enabling Mali achieve its export diversification and growth potential, structural reforms of products and factor markets that can increase the flexibility and productivity of the economy are key**. Fiscal policy may help through the improved provision of public goods and restraint on key factor prices, such as wages, and through labor market reforms that increase the flexibility of wage setting.

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APPENDIX I. Regression Analysis: Deviations of RER, External and Fiscal Accounts

1. Regression of deviation of RER (from equilibrium) and the external current account balance

Modeling **current account balance** (in % of GDP) by OLS. The estimation sample is 1982-2004.

	Coefficient	Std.Error	t-value	t-prob	Part.R^2
Constant	1.41172	3.642	0.388	0.702	0.0071
Deviation of RER	-7.61622	3.575	-2.13	0.045	0.1777

sigma	2.17575	RSS	99.4119424
R^2	0.177677	F(1,21) =	4.537 [0.045]*
log-likelihood	-49.469	DW	1.57
no. of observations	23	no. of parameters	2
mean(CaBalGdp)	-6.28681	var(CaBalGdp)	5.25615

AR 1-2 test: F(2,19) = 0.50152 [0.6134]
ARCH 1-1 test: F(1,19) = 0.57801 [0.4564]
Normality test: Chi^2(2) = 0.35541 [0.8372]
hetero test: F(2,18) = 1.4269 [0.2659]
hetero-X test: F(2,18) = 1.4269 [0.2659]
RESET test: F(1,20) = 0.043641 [0.8366]

2. Regression of Deviation of RER (from equilibrium) and the trade balance

Modeling **trade balance** (in % of GDP) by OLS. The estimation sample is 1983-2004.

	Coefficient	Std.Error	t-value	t-prob	Part.R^2
Constant	4.80600	4.462	1.08	0.295	0.0575
Deviation of RER	-11.6694	4.602	-2.54	0.020	0.2529
dummy1997-2004	8.30715	1.241	6.69	0.000	0.7022

sigma	2.39033	RSS	108.560043
R^2	0.707895	F(2,19) =	23.02 [0.000]**
log-likelihood	-48.7755	DW	1.32
no. of observations	22	no. of parameters	3
mean(TradeBal)	-3.96818	var(TradeBal)	16.8931

AR 1-2 test: F(2,17) = 0.62722 [0.5460]
ARCH 1-1 test: F(1,17) = 0.080989 [0.7794]
Normality test: Chi^2(2) = 1.9236 [0.3822]
hetero test: F(3,15) = 0.94657 [0.4430]
hetero-X test: F(4,14) = 1.3069 [0.3150]
RESET test: F(1,18) = 0.14329 [0.7095]

3. Regression of deviation of RER (from equilibrium) and the primary fiscal balance

Modeling **primary fiscal balance** (in % of GDP) by OLS. The estimation sample is 1983-2004.

	Coefficient	Std.Error	t-value	t-prob	Part.R^2
Constant	1.25621	2.050	0.613	0.547	0.0194
Deviation of RER	-3.68283	2.030	-1.81	0.086	0.1476
GDP growth	0.0347398	0.04706	0.738	0.469	0.0279

sigma	1.22239	RSS	28.3903604
R^2	0.156284	F(2,19) =	1.76 [0.199]
log-likelihood	-34.0217	DW	1.64
no. of observations	22	no. of parameters	3
mean(PriBalGDP)	-2.32288	var(PriDefGDP)	1.52951

AR 1-2 test: F(2,17) = 0.36372 [0.7004]
ARCH 1-1 test: F(1,17) = 0.86696 [0.3648]
Normality test: Chi^2(2) = 2.6244 [0.2692]
hetero test: F(4,14) = 1.2271 [0.3436]
hetero-X test: F(5,13) = 1.1944 [0.3645]
RESET test: F(1,18) = 0.015361 [0.9027]

4. Regression of deviation of RER and budgetary revenue

Modeling **budgetary revenue** (in % of GDP) by OLS . The estimation sample is 1983-2004.

	Coefficient	Std.Error	t-value	t-prob	Part.R^2
Constant	23.6234	3.462	6.82	0.000	0.7102
Deviation of RER	-6.28203	3.429	-1.83	0.083	0.1501
GDP growth	0.131065	0.07948	1.65	0.116	0.1252

sigma	2.06438	RSS	80.9715734
R^2	0.218369	F(2,19) =	2.654 [0.096]
log-likelihood	-45.5503	DW	0.703
no. of observations	22	no. of parameters	3
mean(GCRGgdp)	17.8147	var(GCRGgdp)	4.70878

AR 1-2 test: F(2,17) = 4.5145 [0.0268]*
ARCH 1-1 test: F(1,17) = 10.625 [0.0046]**
Normality test: Chi^2(2) = 0.51666 [0.7723]
hetero test: F(4,14) = 0.76470 [0.5655]
hetero-X test: F(5,13) = 0.56820 [0.7232]
RESET test: F(1,18) = 0.088757 [0.7692]

III. Economic Growth and Total Factor Productivity in Mali[14]

This paper assesses the impact of structural reforms on Mali's aggregate output growth. It uses the growth accounting framework, which disaggregates output growth into that resulting from the accumulation of factors of production and the efficiency with which these factors are used separately and jointly. The paper employs econometric estimates of the Cobb-Douglass functions for Mali's aggregate output, taking into account the relevant issues for empirically modeling production functions: economic theory, data measurement, returns to scale, parameter constancy, cointegration, exogeneity, and policy implications. The empirical methodology explores cointegrating relationships among output, physical and human capital stocks, and labor force over the period 1968-2004. The estimated parameters are used to derive overall total factor productivity (TFP) growth over the sample period. Single-equation models are used to estimate the determinants of overall TFP growth.

A. Analytical Framework

19. There is a large literature on the sources of economic growth following the work of Krugman (1994) and Young (1995). Krugman in particular argued that the growth in the East Asian economies was unsustainable because it was largely driven by capital and labor accumulation, rather than gains in productivity. In this perspective, identifying the sources of growth is crucial to assessing a country's long-term economic prospects.

20. The point of departure is the standard Cobb-Douglas aggregate production function linking output to factor inputs (capital and labor) and productivity (along the lines of the neoclassical growth model; see, for instance, Barro and Sala-i-Martin, 1995):

$$Y_t = A\, e^{bt}\, K_t^{\alpha} L_t^{1-\alpha} \qquad (1)$$

Where t is a time index, Y is real gross domestic product, K is real capital stock, L is total employment, α is the contribution of capital to output, and the expression $A\, e^{bt}$ is total factor productivity (TFP)—the fixed component of TFP (A) is assumed to grow at a rate b. The TFP measures the shift in the production function at given levels of capital and labor. Dividing by L and taking the natural logarithms of the left and right hand sides of equation (1) yields:

$$y_t = a_t + bt + \alpha k_t \qquad (2)$$

[14]This paper was prepared by Abdoul Aziz Wane and Jean-Claude Nachega.

Where the lowercase variables *y* and *k* denote respectively the natural logarithms of output and physical capital, measured in per capita terms. For the purpose of estimation, the variable *a* (or natural logarithm of *A*) is unobservable and will be captured through the residuals of equation (2). This production function is widely used and has many convenient properties such as perfect competition, constant returns to scale (CRTS), and constant factor income shares.

21. Data used in this exercise are from the Malian authorities, and the IMF World Economic Outlook database. Estimates of the capital stock are computed using the perpetual inventory method, and assuming a depreciation rate of 5 percent and a capital-output ratio of 1.5 in the base year. Given the severe data limitations, the population aged 15-60 is used as a proxy for the labor force. We also use a literate labor force variable to give insights of the impact the quality of labor on growth.

22. Unit root tests (ADF) are ran to assess the series statistical properties. If the series are not stationary, a long-run relationship between output per capita and physical stock per capita will exist only if they are cointegrated. The finding of cointegration will imply the existence of a stable, long-run equilibrium relationship among the two series in the sense that they tend to move together in the long run rather than move independently. To estimate the long-run production function, we apply the Johansen (1988, 1991) and Johansen and Juselius (1990) multivariate cointegration procedure to the output per capita and physical capital stock per capita series over the sample period. In addition to taking into account the nonstationarity of the data, the Johansen cointegration test does not assume a priori that the physical capital stock is exogenous. The potential endogeneity of factor inputs (capital and labor) has been often advanced in the growth literature as an argument against the estimation of production functions for determining the share of physical capital.

B. Empirical Findings

Statistical properties of the data

23. The main statistical properties of the data are shown in Table 1 and Figure 1:

Table 1. Mali: Descriptive statistics on Solow model variables

	Real output	Physical capital	Labor force	Literate labor force
Mean	3.6	6.1	2.1	6.9
Maximum	16.8	19.6	2.6	11.1
Minimum	-7.5	-7.5	1.7	-7.3
Std. Dev.	6.0	5.5	0.2	3.7
Observations	37	37	37	37

- GDP growth is very volatile, averaging 3.5 percent over the period or ½ percentage point per year, on a per capita basis.

- Physical capital is also very volatile, but increases more rapidly than GDP growth, the labor force, and population. The elasticity of output growth to capital is less than one supporting a hypothesis of decreasing returns to scale.

- Owing to a scarcity of data, the labor force is equated to the population aged 15-60 years. The literate labor force is the product of literacy rate and population aged 15–60 years. Overall, efforts to cut illiteracy have outpaced labor force growth during the period, albeit with relatively high volatility.

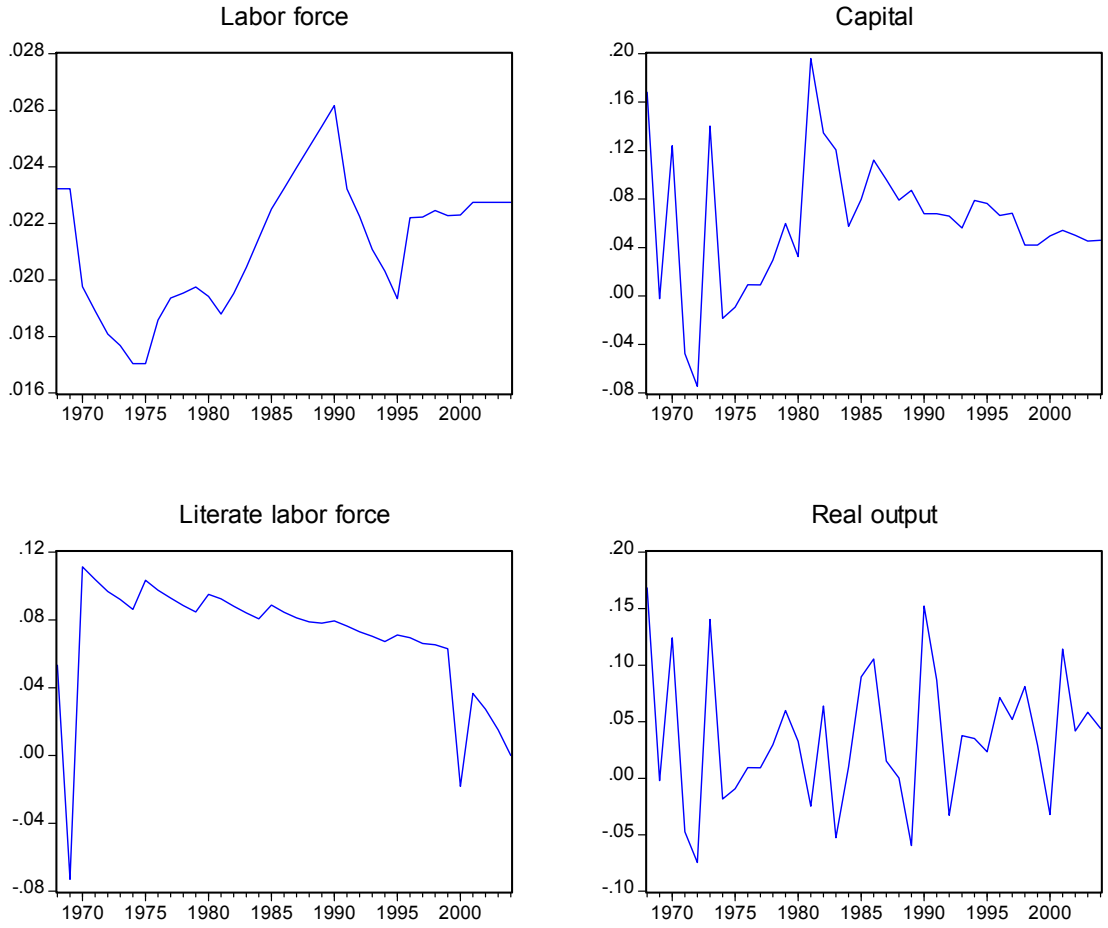


Figure 1. Mali: Growth Patterns of Solow Variables

24. The Augmented Dickey-Fuller (ADF) test statistic shows that output growth, growth of physical capital and growth of literate labor force are stationary variables. Labor force growth and growth of the literate labor force display a drift, and contain a unit root. Regressions of output growth on variables with the same order of integration capture the long-run relationship between these variables (Table 2).

Table 2: Mali: Results of Solow model regression				
Dependent Variable: Output growth				
Method: Least Squares				
Sample: 1968 2004				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
Constant	-0.085	0.085	-1.006	0.321
Growth of physical capital	0.451	0.170	2.648	0.012
Growth of labor force	4.396	4.049	1.086	0.285
R-squared	0.232	Mean depend. var.		0.036
Adjusted R-squared	0.187	S.D. depend. var		0.060
S.E. of regression	0.054	Akaike info criterion		-2.905
Sum squared resid	0.101	Schwarz criterion		-2.775
Log likelihood	56.749	F-statistic		5.132
Durbin-Watson stat	2.163	Prob(F-statistic)		0.011

Sources of growth

25. **Labor and investment growth explain only about one quarter of fluctuations of GDP growth**. The remainder stems from technology innovations and shocks. Investment is positively and significantly related to growth. The elasticity of output growth to physical capital is estimated at 0.451 slightly higher than typically assumed in the literature (0.4). The null hypothesis of constant returns of scale ($\beta_k+\beta_l = 1$) could not be rejected. Although the sign of the coefficient on labor is consistent with the literature, this variable is not significant in explaining output growth. This could stem from quality of data on the labor force and also because of the nonstationarity of the series. When the regression is run using the first difference of this series (a stationary variable), the series affect growth significantly and with a positive sign. However, results that use first differences of growth variables are difficult to interpret in the context of the Solow model.

26. **Two methodologies can be used to account for growth changes**. The first one sets by assumption the elasticity of output to capital. The estimate used in the literature is an elasticity of 0.4. Once the elasticity is known and under the assumption of constant returns to scale, all Solow series can be retrieved by difference. We prefer an alternative approach in which we use our estimate of the elasticity of output to capital obtained in Table 2. Total factor productivity growth is then computed on the basis of the following Solow model regression:.

$$Y_t = \alpha + \beta * g_{kt} + \gamma * g_{ht} + \varepsilon_t$$

Where: g_{kt} and g_{ht} represent growth rates of physical capital and labor force, respectively. The parameters α (constant of the regression), and β and γ (output elasticities of capital and

labor, respectively) are estimated. With the estimates for β and γ, the series of unobserved residuals ε can be derived. The series ε is filtered using the Hodrick-Prescott Filter method, that decomposes the original series into the sum of two series.[15] The smoothed series represent the permanent component of ε and is interpreted as TFP growth. Differences between the smoothed series and the original series represent exogenous shocks.

Table 3. Mali: Growth Accounting Results

	1968-72	1973-79	1980-85	1986-93	1994-2000	2001-04
Real GDP growth	3.4	3.2	2.0	3.8	3.7	6.5
Factor accumulation	2.7	2.4	5.8	4.9	3.9	3.5
Solow residual	0.7	0.7	-3.8	-1.1	-0.2	3.0
Total factor productivity	2.6	0.1	-2.2	-1.6	0.5	1.5
Exogenous shocks	-1.9	0.6	-1.6	0.5	-0.7	1.5
Memorandum items						
Investment-GDP ratio	5.7	10.1	16.7	17.8	19.2	17.5
Real investment growth	11.5	13.1	1.6	5.6	5.2	4.0
Assumptions						
Initial capital stock ratio (K/Y)	0.72					
Capital depreciation rate	0.05					
Output elasticity to capital	0.45					
Output elasticity to labor	0.55					

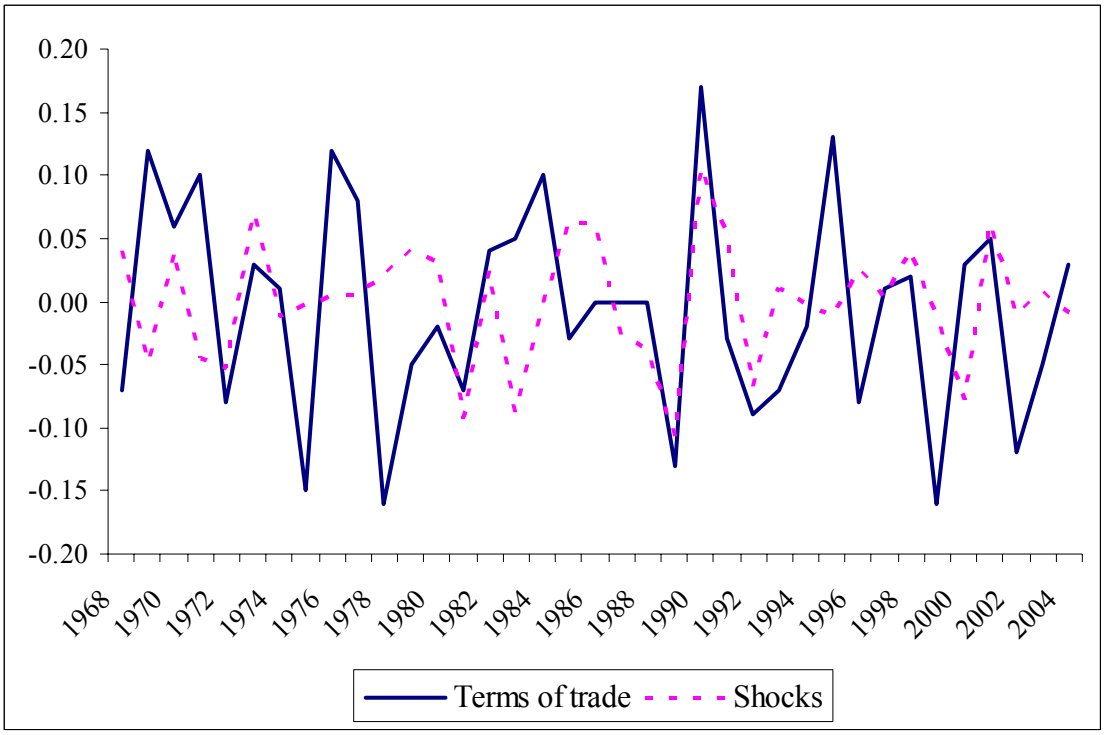
27. **The growth accounting analysis is divided into sub-periods to illustrate changes over time in factor accumulation and productivity** (Table 3). In the early sub-periods, central planning of the economy was dominant. During the 1980's Mali embarked on a process of adjustment and reform. Post-1994, following CFA franc devaluation, economic reforms have been pursued further, including in the areas of domestic and international trade policies and regulations, financial sector, and privatization. However, structural reform implementation has been mixed and uneven across time.

28. **The results consistently point to the predominance of factor accumulation over total factor productivity growth in explaining output growth, particularly before 1994**. Total factor productivity is estimated to have been nil over the period 1968–2004, although

[15] The Hodrick-Prescott Filter is a series decomposition method aimed at obtaining a smooth estimate of the long-term trend component of a series.

productivity tended to improve during and after periods of intensive economic reforms. Such reforms began in the mid-1980's with a series of economic adjustment and refrom programs.

Figure 2. Mali : Solow Shocks and Changes in Terms of Trade



29. Economic shocks have also hit Mali with a 10-year cycle pattern, with droughts and terms of trade shocks being the main driving factors of these shocks. Figure 2 shows that shocks obtained from the accounting exercise display broadly the same patterns as changes in terms of trade: both have a sizable magnitude and are difficult to predict. The difference of magnitude between both series could be partially explained by natural shocks such as drought, bird or locust infestation. This underscores the need to broad Mali's economic base through diversification to absorb exogenous shocks.

Determinants of TFP growth

30. **The possible determinants of TFP growth (are selected on the basis of the most frequently proposed explanatory variables in empirical studies as determinants of economic growth**.[16] The variables selected are: (i) the ratio of credit to the government to

[16] Early empirical work exploring the impact of policy, institutional, or exogenous variables on a number of African countries includes Easterly (1996), Ghura and Hadjimichael (1996), and Elbadawi and Ndulu (1996), Sachs and Warner (1997), Collier and Gunning (1999).

(continued…)

GDP as an indicator of the fiscal stance; (ii) the ratio of domestic credit to the private sector to GDP to represent financial sector role in allocating efficiently savings between competing uses; (iii) the ratio of merchandise trade to GDP to assess Mali's integration into the global economy; (iv) aid per capita to analyze the impact of resources transfers on Mali's economy; (v) the overall quality of institutions (using a Maryland worldwide data base on institutions quality); and (vi) a dummy variable to capture the effect of the devaluation. These variables are used to identify factors contributing to TFP growth calculated using the Solow regression approach (Table 4).

Table 4. Mali: Explaining Total Factor Productivity Growth

Dependent Variable: Total Factor Productivity Growth				
Method: Least Squares				
Sample (adjusted): 1969 2001				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.014	0.013	-1.117	0.275
Credit to the government	-0.066	0.022	-2.975	0.007
Consumer price inflation	0.003	0.004	0.795	0.434
Credit to the private sector	0.050	0.020	2.470	0.021
Trade as a share of GDP	0.011	0.011	1.070	0.295
Aid per capita	-0.003	0.002	-1.249	0.224
Overall quality of institutions	0.001	0.000	2.349	0.027
Devaluation dummy	0.008	0.003	3.144	0.004
AR(1)	0.879	0.024	37.023	0.000
R-squared	0.986	Mean dependent var		-0.003
Adjusted R-squared	0.981	S.D. dependent var		0.016
S.E. of regression	0.002	Akaike info criterion		-9.144
Sum squared resid	0.000	Schwarz criterion		-8.736
Log likelihood	159.884	F-statistic		203.941
Durbin-Watson stat	1.234	Prob(F-statistic)		0.000
Inverted AR Roots	0.88			

31. **The results are broadly in line with the literature and show that prudent fiscal polices, sound financial institutions, and strong institutions that foster stability and promote the private sector are key to boosting TFP growth**. Thus high government deficits are found to be an impediment to growth, particularly when the deficit is financed through domestic banks. Such policies may increase inefficiencies in resource allocation, and are facilitated where government is heavily involved in the banking sector. We also find that

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Recent developments in growth theory have stressed the importance of good institutions (North, 1990) and sound policies in creating an environment that fosters economic development through the accumulation of factors of production and the efficient use of resources.

openness to financial flows and financial development, proxied by the private sector credit-to-GDP has a positive and significant effect on TFP growth. The results point to the importance of the economic, political, and legal environment in fostering investment and TFP growth. Political instability has a negative impact on economic growth by disrupting the business environment and economic activity. A well-functioning, dynamic market economy requires a set of "good" institutions that secure property rights and political stability, by promoting the rule of law, guaranteeing low-cost enforcement of contracts, creating an effective and predictable judiciary, and limiting the power of rulers.

32. **However the results could not confirm the role of inflation and aid predicted generally in the literature.** The literature conjectures that high inflation has a negative effect on growth by reducing long-term investment and the productivity of capital. However, in Mali a significant and negative impact of inflation on TFP growth could not be confirmed. This may result from the relatively low and stable level of inflation achieved in Mali. A credible monetary policy conducted by the BCEAO has led to low inflation expectations by investors and consumers. Our results also show a negative and marginally significant effect of aid on TFP growth. This could result from an endogenity problem (aid pours into the country when shocks reduce growth) or inefficiencies in aid delivery.

33. **The variables used to predict TFP growth capture an important part of TFP growth volatility** (Figure 3). Using the above results, and historical data on factor accumulation since 2000 (3.5 percent on average), TFP growth would need to be boosted to an average 3.2 percent (from its 1 percent average during 1994-2004) to achieve the Poverty Reduction Strategy growth targets of 6.7 percent per year. Moreover, this assumes that Mali's economy is shielded from exogenous shocks (Table 5). The increase in productivity and investment needed to attain PRGF annual growth objectives of 5½ percent appear more attainable, albeit still optimistic given Mali's track record. In brief, this shows the extent to which Mali's PRSP growth objectives are ambitious, and the urgency of advancing the structural reform agenda and stay the course on macroeconomic management and promotion of diversification to increase Mali's resilience to shocks. Under both scenarios, investment would also need to be boosted substantially to raise the contribution of factor accumulation to growth, notably through improving the investment climate. Improving labor skills and human capital would help achieve the growth objective under more plausible target for investment growth.

Figure 3. Mali: Total Factor Productivity Growth: Actual against Fitted

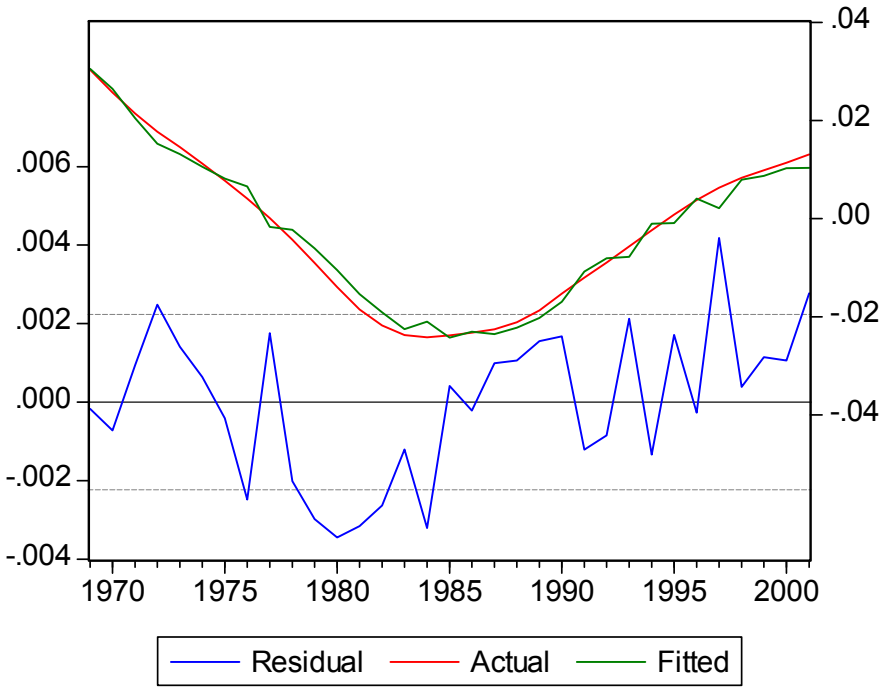

Table 5. Mali: TFP growth required to achieve selected output growth objectives

	2 percent negative shock		No shocks		2 percent positive shock	
Real GDP growth	5.6	6.7	5.6	6.7	5.6	6.7
Factor accumulation	2.5	3.5	2.5	3.5	2.5	3.5
Total factor productivity	5.1	5.2	3.1	3.2	1.1	1.2
Average investment growth	21.4	26.7	21.4	26.7	21.4	26.7

C. Conclusions and Implications for Future Growth

34. **The growth accounting exercise produced results consistent with the economic literature on the sources of growth**. On the basis of historical data, the elasticity of output to physical capital has been estimated for Mali at 0.45 in line with estimates used in similar analyses (0.4). A test for constant returns to scale could not be rejected. The results also show that the bulk of Mali's growth results from factor accumulation rather than TFP growth. Mali's TFP growth declined during period of economic centralization, and increased with the liberalization of the economy, peaking after the devaluation. This result pointing to

the impact of economic policies on TFP growth is confirmed by the analysis of determinants of TFP growth. Sound economic policies underpinned by strong institutions promote economic growth through improvements in factor productivity. However we find a puzzling negative impact of aid per capita on growth, which could possibly be explained by aid endogeneity and/or inefficiencies in aid delivery and usage.

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IV. MALI: CREATING FISCAL SPACE[17]

"In its broadest sense, fiscal space can be defined as the availability of budgetary room that allows a government to provide resources for a desired purpose without any prejudice to the sustainability of a government's financial position." (Heller, 2005a; p.3)

1. The strengthened global focus on poverty reduction has prompted much discussion of the concept of fiscal space as a tool for medium-term budgetary analysis (Heller 2005b, Williams and Hay 2005, Foster 2005). In particular, the shared commitment to achieving the Millennium Development Goals (MDG's), new proposals for debt reduction and the proposed scaling up of development assistance has made the concept of fiscal space a useful tool for both developing countries and external partners. Creating fiscal space relates directly to fiscal sustainability, such that additional desired spending can be maintained without compromising the solvency of a government.

2. This paper explores the scope for creating and using fiscal space over the medium term in Mali under a range of illustrative policy scenarios. It is intended as an aid to policymakers to gauge the relative importance of various reform options over the medium term, and the potential resource envelope that could be reasonably expected to be available to further achievement of poverty reduction and other development goals. The paper does not attempt to model the macroeconomic effects of higher levels of public spending, which would require a more detailed medium-term spending and financing program than is currently available, and additional data concerning labor and goods markets supply factors. Such an analysis could usefully be undertaken as part of the preparation of the second generation poverty reduction strategy covering the period 2007–11.

A. Sources of Fiscal Space

3. Fiscal space can be created through five main channels:

- **Real revenue increase from real output growth**. For a given tax system and structure, real output growth will generate additional tax revenues that create fiscal space, for an unchanged revenue to GDP ratio.

- **Improving revenue yield**. Raising the average tax burden to GDP creates fiscal space while at the same time reducing the disposable incomes of taxpayers, which may in turn reduce output, consumption or investment.

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[17] This paper was prepared by Chris Lane and Marshall Mills. The authors acknowledge helpful comments received at presentations of a draft version of the paper in Bamako to selected government officials and to external partners.

- **Grants and debt relief**. The extent to which external grants and debt relief create additional fiscal space depends in large part on the conditionality attached. If conditionality distorts public spending priorities (by, for example, linking grants to spending outside the medium-term spending framework) the additionality of such support is reduced.

- **Reducing unproductive spending**. Fiscal space can be created by reducing public spending with zero or low productivity. Typical examples are reduction of ghost workers, poorly targeted subsidies and transfer payments and defense spending.

- **Borrowing**. Increases in borrowing or printing money (seignorage) represent other options for financing increased public spending. Increased borrowing is not viewed as a durable method of increasing fiscal space over the medium term, as loan repayments reduce future fiscal space. The scope for seignorage is strictly limited by the monetary arrangements in the West African Monetary Union.

B. Illustrative Scenarios of Creating Fiscal Space

4. **This subsection indicates the fiscal space that could be created using the PRGF medium-term baseline macroeconomic framework for Mali for each channel identified above**.[18] The projections assume adherence to the West African Economic and Monetary Union (WAEMU) growth and convergence pact primary convergence criteria from 2007. Specifically, inflation below 3 percent, basic fiscal balance of at least zero (excluding foreign financed investment and HIPC spending), nominal debt/GDP below 70 percent and no domestic or external payment arrears.

5. **Real revenue increase from real output growth**. Average real GDP growth is assumed to average 5.6 percent per year through 2015, compared to 5.0 percent over the decade to 2003 on the basis of strong pro-growth structural reforms. Real annual growth per head averages 3.5 percent. For the illustrative scenario, it is assumed that the elasticity of tax revenue to GDP is equivalent to the average tax burden to total GDP, thus real tax revenue increases at the same rate as GDP.

6. **Revenue yield**. Yield is assumed to rise 1.9 percent of GDP by 2010 (from 17.6 percent of GDP in 2005 to 19.2 percent of GDP) and remains stable thereafter. The yield increase derives from improvements in tax administration efficiency resulting from computerization and audit rather than increases in marginal tax rates. This assumption reduces the risk that increases in fiscal space are zero-sum or negative transfers from the

[18] This scenario has been discussed with the Malian authorities, and underlies the debt sustainability analysis presented in the 2005 Article IV consultation staff report (Country Report No. 06/73). The authorities' medium-term macroeconomic projections do not extend beyond 2006, the end year of the poverty reduction strategy.

private to public sector that also hamper growth. The increase assumed is considerably lower than the improvement of 3.8 percent of GDP in the revenue to GDP ratio over the five years to 2005.

7. **Grants**. Real grant aid is projected to rise at the same rate as real GDP (i.e. 5½ percent per year). While conservative, this assumption reflects the volatility of grant flows. In Mali, grants halved as a share of GDP between 1994 and 2002, and have again started to increase (from 3.7 percent of GDP in 2002 to 5.6 percent of GDP in the 2006 budget). It is assumed that grants and debt relief are consistent with medium-term spending priorities and therefore fully additive to fiscal space.

8. **Debt relief**. In the baseline, debt service payments are projected on the basis of HIPC relief. The impact of the proposed multilateral debt relief initiative (MDRI) is shown in the following section.

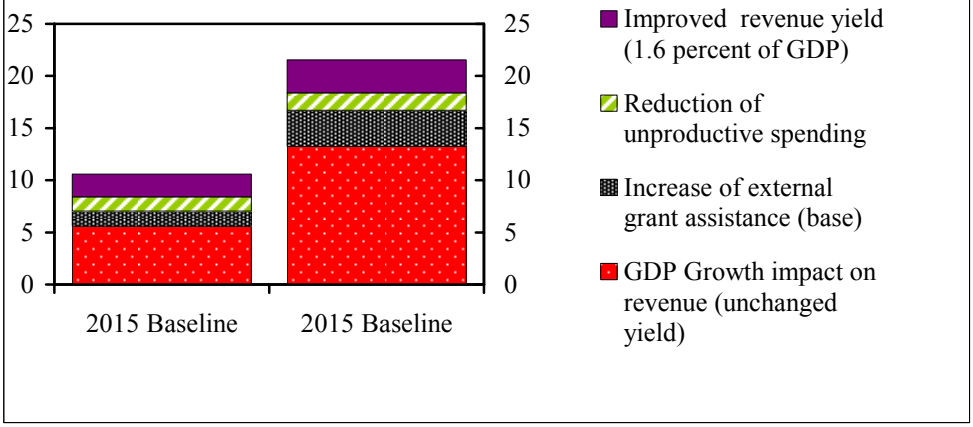
9. **Reducing unproductive spending**. Expenditure savings are projected to be realized through: (i) privatizing the state cotton company in 2008 saving 1 percent of GDP in net lending compared to 2005; (ii) eliminating the operating deficit of the civil service pension scheme by 2015 (saving transfers of 0.6 percent of GDP compared to 2005). The former measure is a specific program commitment, while the latter measure a possible outcome of a process underway to reduce the operating deficit over the medium term.

10. **Borrowing**. Net borrowing is assumed to be unchanged in real terms (a stylized assumption to simplify the presentation corresponding to the projected gradual narrowing of the overall deficit in relation to GDP over the medium term). It is assumed that increased borrowing is not a strategy for increasing fiscal space, as monetary union convergence criteria restrict both the flow of new borrowing and the stock of borrowing. This strategy is also prudent from viewpoint of maintaining debt sustainability.

11. **In the baseline scenario four factors increase fiscal space expressed in constant 2005 prices over the medium term: GDP growth; increased external grants; a reduction of unproductive spending; and, an improved revenue yield**. The revenue contribution of GDP growth is quantitatively the most important, accounting for over half of the fiscal space created in 2010 and 2015 (Figure 1). These estimates of fiscal space assume that there is zero real increase in spending. Real spending increases would reduce fiscal space as discussed below.

12. **Overall, constant price fiscal space increases by 2 percentage points of 2005 GDP per year, of which half results from revenue growth from increasing real GDP**. A steady increase of grant support is shown to be the second most important factor over the medium term, as improvements in the revenue yield and spending efficiency are both assumed to be frontloaded factors.

Figure 1. Fiscal Space: Program Baseline Scenario
(constant 2005 prices, percent of 2005 GDP



Adverse and Reform-Plus Scenarios

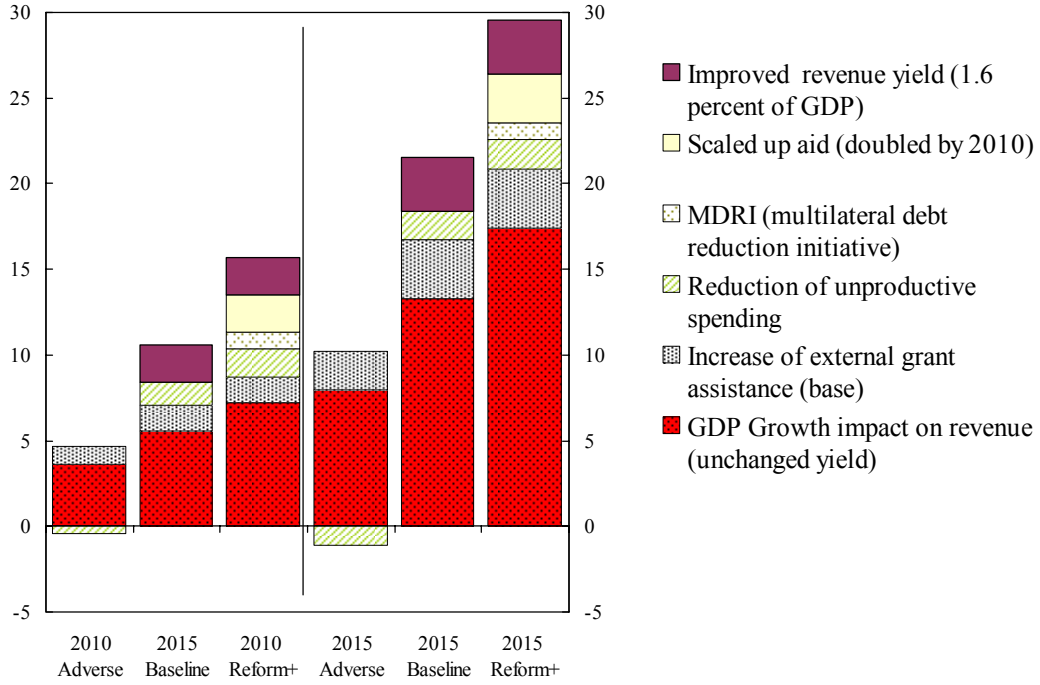
13. To illustrate some of the policy trade offs involved in creating fiscal space we consider two alternative scenarios: (i) an adverse scenario; (ii) a strengthened reform and growth scenario with additional external support.

14. **Under the adverse scenario**, policy reform is significantly weaker. Owing to the non-implementation of public finance management reforms there is no increase in revenue yield over the medium term. The expenditure savings in the baseline relating to cotton sector support are not realized (delay to privatization of cotton company). The absence of parametric reform of the civil service pension fund results higher operating deficits and significantly higher transfers that reduce fiscal space. Annual growth of both GDP and of grant support slows to 4 percent, reflecting the reduced economic potential in a slow reform environment.

15. **Under the reform-plus scenario,** both policy reform and external support are assumed to strengthen significantly. Growth supporting structural reforms boost average annual GDP growth from 5½ percent to 7 percent (the Malian authorities medium-term growth objective) through institutional strengthening, higher public and private investment, the decentralization of government service provision and raised standards for health and education that raise the quality of human capital. Expenditure savings increase through elimination of civil service pension fund losses by 2010 (compared to 2015 in the baseline). A factor also underpinning higher growth is that the implementation of the multilateral debt reduction initiative (MDRI) in 2006 frees up an additional 1 percent of GDP per year (in constant 2005 prices). Also, a doubling of aid levels by 2010 (consistent with, for example, a number of recent bilateral donor commitments) results in a significantly faster increase of aid flows (11 percent real annual growth to 2010).

16. **The resulting fiscal space projections for the adverse and reform-plus scenarios differ significantly from the baseline** (Figure 2). The adverse scenario cuts the increase in fiscal space by 2010 in half, to 5 percent of 2005 GDP, while reform-plus delivers an increase of a similar magnitude. Growth remains the most important factor in comparing the scenarios, accounting for about half of the difference across scenarios and also affecting the impact of revenue yield improvement. In the reform-plus scenario, the contribution of additional debt relief and aid is a significant addition to fiscal space, although debt relief alone is relatively modest.

Figure 2. Sources of Fiscal Space Under Three Illustrative Scenarios
(Constant 2005 prices, in percent of 2005 GDP)



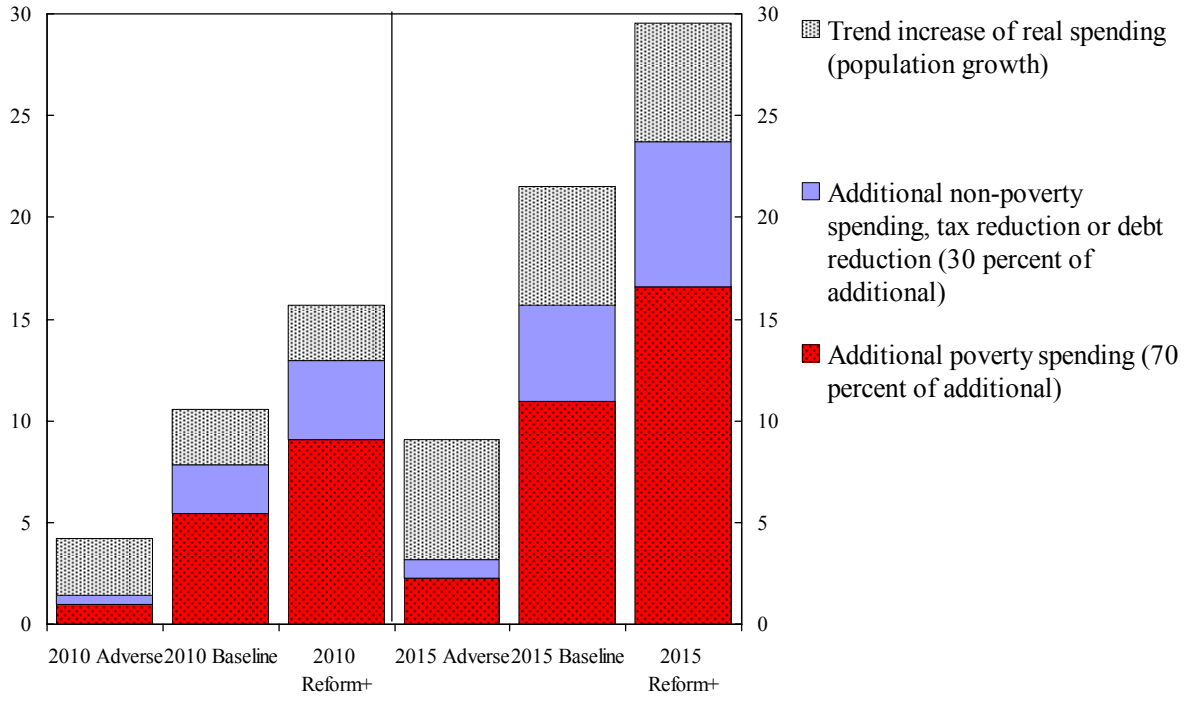
C. Uses of Fiscal Space

17. **While all three scenarios show a significant increase of fiscal space over the medium term, the impact on achieving specific developmental goals will depend critically on the uses of fiscal space**. Key factors are the trend increase of real public spending (the illustrations above assume zero real increase), notably real wages, and the proportion of fiscal space allocated for developmental purposes.

18. To illustrate, for each of the three scenarios considered above, it is assumed that the trend increase in real public spending is equal to the population growth rate (just over 2 percent). The trend increase represents additional spending required to maintain a constant level of public service provision to a growing population. It could also be seen as an increase in real public sector wages. The trend increase reduces the fiscal space available to achieve

development goals. The fiscal space residual after trend growth is then allocated in the proportions of 70:30 to poverty reducing and non-poverty reducing spending respectively.[19] Nonpoverty reducing spending also could encompass tax or debt reduction uses of public resources. The resultant allocation of fiscal space is shown in Figure 3.

Figure 3. Uses of Fiscal Space Under Three Illustrative Scenarios
(In constant 2005 prices, in percent of 2005 GDP)



19. The three scenarios produce significantly different outcomes for the scope for creating fiscal space for poverty reduction or development objectives ranging from 2.3 percent of 2005 GDP in 2015 in the adverse scenario to as much as 16.7 percent 2005 GDP in the reform-plus scenario.

[19] In recent years government expenditure tracking in Mali shows some 65 percent of spending is in broadly defined poverty-reducing spending categories

Additional Fiscal Space for Poverty-Reducing Spending (constant 2005 prices, as a percent of 2005 GDP)			
Scenario	Adverse	Program	Reform-Plus
2010	1.0	5.4	9.0
2015	2.3	10.2	16.7

D. Medium-Term Impact of Poverty-Reducing Spending

20. The projections above can also serve as a basis indicating the likely progress toward public policy objectives, providing that information on costs of service provision are available.

21. A worked example in the health sector concerns the cost of essential medical service provision. The UN Commission on Macroeconomics and Health (2001) estimates that provision of a basket of essential health services costs some US$38 per head per year at 2008 prices, although this estimate does not explicitly include the cost of scaling up physical infrastructure in areas without health service infrastructure. Such expenditure would amount to approximately 7.2 percent of GDP in Mali (2005 GDP). Current public health spending amounts to 1.7 percent GDP. Thus, to publicly provide essential health services would require the use of 5.5 percent of 2005 GDP fiscal space.

22. Under the adverse scenario such an increase of health spending would not be feasible even by 2015, with no other additional poverty reducing spending. Conversely, such an increase would be achievable by 2010 in both the program and reform-plus scenarios.

23. In principle, a costing of all key public sector development objectives, for example in the context of the second poverty reduction strategy in Mali, would enable an assessment of whether the fiscal space likely to become available would be sufficient to finance the delivery of such objectives.

E. Concluding Remarks

24. The simple framework shown above can be useful in showing how policy reform options can create fiscal space over the medium term, and to illustrate whether costed public sector objectives could be achieved within the fiscal space generated by the medium-term macroeconomic framework and while maintaining fiscal sustainability.

25. The main caveats regarding the approach adopted are the neglect of the impact of increased absorption of aid upon other macroeconomic indicators. While higher aid flows could support higher economy-wide growth, such flows could place upward pressure on wages and competitiveness in the private sector that reduce the net additionality of aid. Nonetheless, as shown in baseline program scenario, the majority of additional fiscal space is created internally: from projected real GDP growth; reforms that boost tax revenues; and reductions of unproductive spending. These sources of fiscal space would be less likely to result in "Dutch disease" symptoms in the Malian economy than increased external aid. The macroeconomic risks from higher aid would be higher in the reform-plus scenario, though correspondingly, so would be the potential benefits for increasing poverty reducing and growth enhancing spending.

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