

**The determinants of fiscal deficit and fiscal adjustment
in Côte d'Ivoire**

Oussou Kouassy

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AERC Research Paper 15

African Economic Research Consortium, Nairobi

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CAA	Caisse autonome d'amortissement (Agency for public debt management)
CCCE	Caisse Centrale de Coopération Economique (French International Co-operation Agency)
CPAF	Fonds de la Communauté Financière Africaine (African Financial Community fund)
COPPOC	Caisse générale de régulation des prix de produits de grande consommation (Product marketing board)
CSPPA	Caisse de stabilisation et de soutien des prix des produits agricoles (Agricultural marketing board)
DCOTX	Présidence de la République (Office of the President of the Republic of Côte d'Ivoire)
DD	Droit de douane (Customs duty)
DEE	Droit fiscal d'entrée (Duty for entry)
DUS	Droit unique de sortie (Exit tax)
GRCF	Gross fixed capital formation
IGR	Impôt général sur le revenu (Wages and salaries tax)
SAP	Structural adjustment programme
UOMA	Union Monétaire Ouest Africaine (West African Monetary Union)

List of acronyms

BCEAO	Banque Centrale des Etats de l'Afrique de l'Ouest (Central Bank of West African States)
BEPN	Budgets des établissements publics nationaux (Budget of public autonomous agencies)
BGF	Budget général de fonctionnement (Budget for the functioning of the administration)
BIC	Impôt sur les bénéfices industriels et commerciaux (Profit tax)
BSIE	Budget special d'investissement et d'équipement (Budget for investment and equipment)
CAA	Caisse autonome d'amortissement (Agency for public debt management)
CCCE	Caisse Centrale de Coopération Economique (French International Co-operation Agency)
CFAF	Franc de la Communauté Financière Africaine (African Financial Community franc)
CGPPPGC	Caisse général de péréquation des prix de produits de grande consommation (Product marketing board)
CSSPPA	Caisse de stabilisation et de soutien des prix des produits agricoles (Agricultural marketing board)
DCGTX	Présidence de la République (Office of the President of the Republic of Côte d'Ivoire)
DD	Droit de douane (Customs duty)
DFE	Droit fiscal d'entrée (Duty for entry)
DUS	Droit unique de sortie (Exit tax)
GFCF	Gross fixed capital formation
IGR	Impôt général sur le revenu (Wages and salaries tax)
SAP	Structural adjustment programme
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Acknowledgements

Abstract

This paper is extracted from the first results of an ongoing research programme on the recent fiscal policy of Côte d'Ivoire, conducted by the authors and sponsored by the AERC. We are grateful to the Rockefeller Foundation and the staff of AERC Nairobi. We are also thankful for suggestions made by colleagues from GERIDA, Faculty of Economics of Abidjan and the University of Warwick, who helped to finalize the paper. The opinions expressed here and any weaknesses in the paper are exclusively the responsibility of the authors.

This paper contains five main sections. It starts the problem: It covers the institutional framework for fiscal policy in Côte d'Ivoire. It gives a description of central economic and fiscal events in the country between 1970 and 1989. It shows the building up of a comprehensive model and presents conclusions. It discusses the impact of the model on the country's economic growth level. Such a policy requires measures to reduce the compression of public expenditure and raising of taxes and other public revenues.

Tax revenue was raised through tax rate adjustments and the extension of some existing taxes. The outcome of these measures was a stable increase in tax revenues and greater fluctuations in tax level. For instance, tax rates

Abstract

Facing serious economic and financial difficulties from the early 1980s, Côte d'Ivoire has adopted a wide range of policy reforms through adjustment programmes, supported by the World Bank, the IMF and the French International Co-operation Agency (CCCE). Fiscal adjustment, in the form of fiscal deficit (*FD*) reduction, has been a major component of these reforms, given the rigidities attached to monetary policy within the Franc Zone and the careless expansionary fiscal policy followed previously by the country.

Using regression analysis to illustrate the fiscal profile and the determinants of fiscal deficit of Côte d'Ivoire over the two past decades allows a full discussion of the instruments utilized currently for fiscal deficit reduction.

It was possible to show that the government resorts chiefly to public investment (*Ip*) cuts and tax increases to make fiscal adjustments. In doing so, the government was right for public investment on the short run but wrong for tax rates (*t*). Indeed, the regression analysis showed *Ip* was positively linked to *FD*, whereas tax revenue is significantly sensitive to *Ip* in the medium term, which might cause *FD* to increase as a result of *Ip* cuts. Tax rates were positively linked to *FD*, and should be lower for *FD* reduction. Further investigations are necessary to shed more light on the links between instruments (those which are utilized currently and others which exist) and GDP, which is negatively linked to *FD*, since the use of any policy instrument that affects GDP negatively may result in an increasing fiscal deficit thereafter.

This paper contains five main sections: I states the problem; II covers the institutional framework for fiscal policy in Côte d'Ivoire; III gives a description of critical economic and fiscal events in the country between 1970 and 1989; IV shows the building up of a comprehensive model; and V presents conclusions.

UIMOA

Union Monétaire Ouest Africaine (West African Monetary Union)

the reduction of its fiscal deficit. Though the need for a policy to reduce the deficit is not disputed, the means of making it efficient and at the minimum cost in terms of growth in developing countries are still controversial. A full description of the pattern of fiscal adjustment.

I Introduction

Since the early 1980s, in the face of an unprecedented and lasting economic and financial crisis, Côte d'Ivoire has introduced a wide range of policy reforms. These reforms are organized within successive structural adjustment programmes (SAP), supported by the IMF, the World Bank and, more recently, the French International Co-operation Agency (CCCE).¹

A major component of these programmes is fiscal adjustment. The interest for fiscal policy in Côte d'Ivoire relates to the fact that it belongs to a monetary union, the franc zone, which weakens the traditional monetary policy instruments, namely foreign exchange, monetary base and domestic credit, and interest rates, etc. (M'bet and Niamkey, 1990; Riddell, 1989; Pegatienan, 1988a; Guillaumont and Guillaumont, 1984; World Bank, 1987). It has been argued that in such a context fiscal policy and relative prices policy are the main domestic instruments for short and medium-term structural adjustment (Devarajan and de Melo, 1987; World Bank, 1987; Bourguignon and Berthelemy, 1985).

In the case of Côte d'Ivoire it is also known that the main sources of financing of fiscal operations during the 1970s were export earnings and external loans. These sources started to dry up by the early 1980s, while the narrowness of the domestic financial markets and the rules of the West African Monetary Union (UMOA) did not allow a shift towards more domestic financing.

Given the constraints on the financing of fiscal operations faced by the Government at the beginning of the 1980s, the means left for fiscal adjustment was a sharp reduction of the fiscal deficit. The problem then became the design of a policy for the reduction of the fiscal deficit which would preserve a minimum growth level. Such a policy comprises measures relating to a compression of public expenditure and raising of taxes and other public revenues.

Tax revenue was raised through tax rate manipulations and the extension of some existing taxes. The outcome of these measures was a sizable increase in tax revenues and greater fluctuations in taxation level. For instance, tax rates

which were relatively stable over the 1970s started to fluctuate after 1980, as shown in Table 1.

Table 1 Average tax rates (as percentage of GDP)

Year	t/Y	Year	t/Y	Year	t/Y
1970	15.5	1980	24.7	1986	23
1973	16	1981	25.5	1987	24.5
1976	16.3	1982	25.4	1988	20.6
1979	16.5	1984	20		

Sources: Présidence de la République, DCGTX, 1990a, and BCEAO, *Statistiques économiques et monétaires*.

The compression of public spending can be observed in the sharp reduction of investment and the relative stability of current spending after 1981. For instance, public investment declined at an annual average rate of 15% from 1983 to 1989 with peaks in 1988 (16.7%) and 1989 (30.7%).

As can be seen, the new fiscal policy of Côte d'Ivoire is a contractionary one, aiming at reducing the fiscal deficit. The recommendation of fiscal contractionary policies is based on three theoretical considerations:

- It is thought that an expansionary policy in the context of external funds scarcity and a tight monetary policy leads to an increase in fiscal deficit and tax burden;
- The rise in public spending is generally associated with a 'crowding out' effect on the private sector;
- The expansionary fiscal policy is seen as fuelling the external imbalances.

When combined, these theories regard expansionary fiscal policy as a major obstacle to structural adjustment in countries such as Côte d'Ivoire. Therefore, it was suggested that the fiscal deficit be reduced without reviewing the different measures available or discussing their appropriateness with respect to growth.

Our aim is to discuss the appropriateness of the measures adapted for fiscal adjustment in Côte d'Ivoire and the determinants of its fiscal deficit over the past two decades. We intend to investigate the impact of public investment cuts and tax rate manipulations on the fiscal deficit over the short and medium

term. We also look at the other instruments available to the Government for the reduction of its fiscal deficit. Though the need for a reduction of the fiscal deficit is not disputed, the means of making it efficient and at the minimum cost in terms of growth in developing countries are still controversial. A full description of the fiscal deficit is necessary to the design of an appropriate pattern of fiscal adjustment.

First we break down government spending into its productive and consumption components, and government revenue into its tax and non-tax components. This will help us to analyse the behaviour of the fiscal deficit of Côte d'Ivoire with respect to these components.

The operational objectives of the research are as follows:

- To describe the fiscal system of Côte d'Ivoire;
- To analyse the fiscal profile of Côte d'Ivoire over the past two decades;
- To build up a comprehensive model of the fiscal deficit in Côte d'Ivoire and use it to discuss the current fiscal reform programme being followed in the country.

II Côte d'Ivoire's fiscal profile

The Ivorian fiscal system is governed by the Constitution of November 1960, Law Nb 59-249 of 31 December 1959, and Law Nb 80-1070 of 13 September 1980 and various regulatory acts relating to the budgeting of investment expenditures (Mahieu, 1983).

From these and the actual practice of the government, we can depict the institutional framework of fiscal policy in Côte d'Ivoire. It is characterized by the existence of several budgets and sources of institutional power, with the added weight of belonging to the Franc Zone and UMOA.

The different budgets

The Ivorian budget consists of three documents: the budget for the functioning of the administration (BGF), the budget for investment and equipment (BSIE), the budget of public autonomous agencies (BEPN), and special accounts.

The main expenditure items in BGF are provisions for guarantees to private sector borrowing, rents related to accident or death of civil servants, funds for the functioning of basic services and transfers (to local authorities, public enterprises and agencies, etc).

The items relating to basic services cover operational spending of the central government (the presidency, the Supreme Court, the Economic and Social Council, parliament, ministries, and other services). It also performs various transfers to public agencies and enterprises and to the other budgets. Transfer expenditures are different from the other outlays of BGF, since their final use is often productive when directed to public companies or to BSIE. In fact, such productive transfers are dominant in BGF transfers.

The BSIE deals with the investment and equipment programme of the government and other public bodies. This budget is generally presented either according to its financing sources or by expenditure programmes.

The different sources of financing of BSIE are the Treasury (BSIE-Trésor), through transfers from BGF, internal and external borrowing (BSIE-CAA), and receipts from the marketing boards. From this side of financing sources, the

weight of borrowing funds and surpluses of marketing boards is dominant. For instance, the latter are counted for an average of 78% of BSIE from 1976 to 1982 (Mahieu, 1983).

The investment outlays are also organized into major development programmes (economic, social, cultural or development support), or a set of detailed projects. Economic and development projects represented more than 51% of BSIE in the early 1980s. We should add that BSIE programmes and projects are designed and implemented within a scheme of proposal assessment and development which might facilitate an accurate check of their achievements. In fact, these projects and programmes are the annual phases of a triennial government investment programme.

Many public agencies have autonomous budgets (BEPN). The BEPN and Treasury Special Accounts are adopted at the same time as BGF and BSIE. The former allow for the capture of resources which are generated by commercial activities of some public services and agencies, the use of non-permanent resources and the achievement of special objectives (often political).

The complexity of Côte d'Ivoire's fiscal framework is worsened by inappropriate administrative structures. In addition to the existence of several budgets, their monitoring is carried out by several ministries.

The Ministry of Budget is in charge of the expenditure side of BGF, while the Ministry of Economics and Planning is responsible for the expenditures of BSIE; the Ministry of Budget and the management of specific agencies are in charge of the expenditures of BEPN, whereas the Ministry of Finance and the Treasury are responsible for the collection of most of the resources and the expenditure side of the special accounts.

The different ministries create great confusion in the documentation of fiscal operations and their control. This makes an efficient planning and control of budgetary expenditures very difficult, despite the existence of a financial co-ordination committee which is supposed to centralize all the financial interventions of the government (Bourguignon and Berthelemy, 1985).

From the presentation of the spending side of the Ivorian fiscal framework it appears that the existence of several budgets does not facilitate the study of the budgetary spending of Côte d'Ivoire, the relative weight of different sources of financing and the linkages between the budgets. The transfers item of BGF is of particular concern for our study since it is closer to productive spending than consumption. Hence, we have decided to treat transfers of BGF as budgetary productive spending to follow the Ivorian planners. So we include the transfers in public investment (*Ip*).

We have also decided to limit ourselves to a narrow definition of public sector in this research. We consider here only the central government and the autonomous agencies as far as their spending or payments appear in the

accounts of central government. This in turn will limit the definition of fiscal deficit adopted here. To avoid any double counting, and given the problem of insufficient data sets, we do not take into account all of the components of the Ivorian budget mentioned above. We adopt a narrow budget comprising BGF and BSIE. Fiscal deficit is then calculated on this basis.

The treatment of fiscal revenues

The components of the fiscal revenue of Côte d'Ivoire do not exactly match the structure of the budgetary expenditure. Indeed, resource collection centres are limited to the Treasury, marketing boards, and parastatals specialized in the collection of borrowing funds (CAA). These collection centres coincide with the different components of fiscal revenue: tax revenues, other ordinary fiscal revenue, and funds from public borrowing.

Tax receipts come from duties and taxes on international trade (imports and exports), excise taxes on domestic products and services and direct taxes (income tax, tax on car users, tax on land, etc.).

Since the early 1970s, tax and duties on international trade have represented a very important component of tax receipts, amounting to an average of 40% of the total from 1980 to 1988 (Présidence de la République de Côte d'Ivoire (DCGTX), 1990). Taxes on external trade include taxes and duties on imports (VAT on imports, duty for entry (DFE); customs duty (DD), and other taxes and duties on imports), and on exports (gate duty for timber, exit taxes (DUS) and other taxes and duties on exports).

Excise taxes have been the major component of tax receipts since 1981, representing close to 46% of the total since this date (DCGTX, 1990). They are based on VAT on domestic products, taxes on services, employers contributions, taxes on fuel and petrol and other excise taxes.

The other component of tax receipt is direct taxes, which makes a moderate contribution of approximately 15% of the total. This component comprises taxes on profits (BIC), on salaries and wages (IGR), on land, and other direct taxes.

Other ordinary fiscal revenues cover the receipts from public corporate companies (R_c) and from marketing boards (R_m). R_c is determined by the results of the public productive sector and the importance of public shares in private corporate companies. It is collected by the Treasury. R_m depends on quantities handled and price differentials applied by marketing boards.

The contribution of R_c to overall fiscal revenue has been generally very weak except during the period 1976-82 when it amounted to more than 15 million CFAF per year. The contribution of R_m was very important from 1975

III Economic setting and fiscal sequences

An overview of the economy

The Ivorian economy experienced high growth rates and many other development records (industrialization, educational enrolment, health service ratio, literacy level, etc.), but since the early 1980s, the country has been facing a persistent depression and serious external payments problems.² These features of the Ivorian economy are illustrated in Table 2.

Table 2 Major macroeconomic aggregates (CFAF billion)

Year	GDP	Consumer price index ¹	Money and quasi money	Gross fixed capital formation	Exports	% current account deficit
1965-70	343.2	21.3	72.0	55.9	213.0	27.8
1970-73	425.5	25.2	123.7	74.5	146.8	114.8
1974-76	807.5	35.4	167.5	196.7	286.6	229.7
1977-82	1830.5	70.2	592.3	512.5	735.5	1109.1
1983-85	2570.0	97.4	819.1	386.2	744.5	308.6
1986	2911.0	107.3	963.9	386.2	1184.3	300.9
1987	2717.0	107.7	930.6	349.0	1318.1	750.5
1988	2718.0	115.2	944.0	362.0	1160.4	1280.8
1989	2820.0	117.0	913.1	284.0	929.1	1320.0

Sources: IMF, 1989, France, 1990.

Notes: 1. 1985=100.

From Table 2, we can identify three major periods: 1965-73, 1974-82, and after 1982. The first period is characterized by the stability of the main macroeconomic aggregates. GDP, for instance, grew in real terms by less than

0.5% and gross fixed capital formation (GFCF) by only 2.5% (prices increased by 16% per annum). Over the next period, which ran from 1974 to 1982, all the aggregates show a remarkable boom. GDP doubled, GFCF increased by more than 2.5 times, and exports were moving very fast (exports increased from an annual average value of 180 billion CFAF over the period 1965-73, to 511 billion CFAF over the period 1974-82).

Table 3 Structural features of the Ivorian economy at the beginning of the 1980s

	Côte d'Ivoire	Sub-Saharan Africa
Level and structure of GDP		
GNP per capita (current USD)	950	491
Origin of GDP (%)		
Agriculture	26	33
Manufacturing	12	08
Other industry	11	19
Services	51	40
Gross domestic saving	24	12
Structure of trade (%)		
Composition of exports		
Fuel, minerals, metals	08	40
Other primary commodities	82	49
Manufactured exports	10	09
Composition of imports		
Food	20	15
Fuel	22	18
Equipment	22	29
Other manufactured goods	34	35
Structure of labour force (%)		
Agriculture	63.9	72
Industry	33.3	12
Services	32	16

Source: World Bank, 1985, and Bourguignon and Berthelemy, 1985.

The last period, which started in 1983, is one of deep depression following the prosperity period. This period is characterized by a constant degradation of

growth records, a stagnation and fall of export earnings, a collapse of investments and a degradation of the current accounts.

From Table 2, we can see that while GFCF was declining by an annual average rate of 10.5%, the current account deficit was growing at an average rate of 106.5% over the period.

The economic and financial difficulties of Côte d'Ivoire in the 1980s are certainly linked to negative external shocks (the second oil shock, the rise in international interest rates, and the fluctuations of the US dollar), but they are also a reflection of inappropriate domestic policies and structural weaknesses. The Ivorian economy was still agrarian with insufficient industrial development and a strong reliance on the export of cash crops (Pegatienan, 1988a; Mytelka, 1989; Riddell, 1989). The features at the beginning of the 1980s are shown in Table 3.

The economic and financial crisis in Côte d'Ivoire resulted also from the domestic policies followed by the country during the 1970s. These include expansionary fiscal and monetary policies (in the form of an expansion of public spending and the derived high fiscal deficits) and inappropriate incentive structures which could not help to shift productive structures towards industrial exports and more productive techniques.

Structural adjustment programmes

To cope with this crisis, several SAPs have been implemented with the support of the World Bank and the IMF.³

SAPs are aimed at restoring the external and internal balances. This is expected to be achieved through a strong policy of export promotion coupled with a dismantling of domestic protection and sharp cuts in public spending. It was thought that adjustment measures, by improving the financial situation of the government and the incentive structures, would create the conditions of a recovery of the economy. Actually fiscal policy was a major component of the SAP, as in programmes supported by the World Bank and the IMF elsewhere (World Bank, 1987; IMF, 1986; Barbier, 1988; Ekpo and Ndebbio, 1990; Bourguignon and Berthelemy, 1985). The objective was a reduction of the fiscal deficit using spending cuts and appropriate measures to improve the mobilization of budgetary revenues.

SAPs affect fiscal policy directly through spending cuts, credit ceilings to the government, tax-rate manipulations, as well as through the impact of the measures on GDP and international trade, which may reduce the tax base (Ekpo and Ndebbio, 1990; Tanzi, 1989). We should mention here that inconsistencies often arise between SAP measures and fiscal objectives. For

instance, measures relating to a reduction in domestic tariff protection, and cuts in some import items may result in tax revenue losses, whereas export promotion by the introduction of export subsidies brings about additional fiscal spending items (Barbier, 1988; CCCE, 1990; DCGTX, 1990). These tend to raise the fiscal deficit rather than achieve the objective of fiscal deficit reduction.

Fiscal profile of Côte d'Ivoire

The fiscal profile of Côte d'Ivoire is depicted in Table 4, from which we can derive the trend in BGF and BSIE from 1970 to 1989 as shown in Table 5. We can note from Table 5 that BGF is characterized by a sustained increase over the period under review, with a peak between 1974 and 1982, whilst BSIE was fluctuating. Following a sharp increase during the 1970s, peaking in 1977-82, BSIE declined sharply after 1982.

Though the growth of BGF decreased slightly after 1982, the fall of BSIE over this period is the most striking feature of the spending side of fiscal policy in Côte d'Ivoire during the adjustment period. This is also proof of the unwillingness or inability of the government to reduce operational spending, which resulted in a contraction of BSIE only.

Table 4 Fiscal variables from 1970 to 1989 (billion CFAF)

Year	BSIE	<i>lp</i>	G	OB	OB/GDP %	TR/GDP %	FD/GDP %
1970-73	40	52.9	53.6	108.6	25.5	15.91	4.1
1974-76	46.9	73.1	91.6	176.7	21.81	15.7	4.0
1976-82	301	368.5	184.1	611.2	33.36	16.4	8.3
1983-85	201.7	300	316.6	629.2	24.48	8.5	7.0
1986	180.5	291.8	323.9	639.3	21.96	15.5	3.8
1987	176	292	363.9	656.9	24.2	18.3	4.9
1988	148.4	262.2	355.2	641.9	23.6	19.0	4.2
1989	102.9	209.3	371.1	586.2	20.78	18.1	

Source: Computed by the authors using data from the Ministry of Economy and Finance of Côte d'Ivoire and IMF (1989).

Note: *lp*, overall public productive spending (BSIE + transfers of BGF); G, public consumption spending; OB, overall budget of the central government; TR, tax revenues; and FD, fiscal deficit.

Table 5 Critical periods in the evolution of *BGF* and *BSIE*

(% / previous period)	1974-76	1977-82	1983-89
BGF	83	142	53.7
BSIE	17	552.3	-65.8

Looking at fiscal deficit (*FD*), it appears that it represented a moderate level of 4-5% of GDP, except the periods 1977-82 and 1983-85, when it approached an average value of 7.5%. This high level of fiscal deficit over the period 1977-82 confirms the connection between *FD* and primary commodities prices in African countries that are exporters of cash crops (Bevan, Collier and Gunning, 1989; Tanzi, 1989).⁴

On the resource side, the major changes over the adjustment period relate to tax revenue. Tax revenues represented a stable fraction of GDP (around 15.5%) during the 1970s, they collapsed in 1983-85 (8.5% of GDP), and started to rise in 1986. The increase in taxes over the last period was brought about by measures related to tax rates and the tax base. For instance, VAT on imports, tax on alcohol and petrol, and stamps for car users were raised in 1980. In 1982, VAT on domestic products and tax on services, DUS, DFE, tax on wages and salaries of expatriate workers, and stamps on car users were raised again. In the same way, VAT was extended to some services and distribution activities in 1987, stamps for car users were increased by 50%, and some other administrative stamps doubled the same year.

These measures resulted in a growth in overall tax revenues while tax revenues on international trade were decreasing. The consequence of this move was a sharp increase in the domestic tax burden. According to DCGTX, the relative share of domestic taxes in total tax revenue grew by 15% between 1980 and 1988, whilst the share of taxes on international trade fell by 18.7% (DCGTX, 1990). Given the weak record of GDP and other elements of the tax base, we can say that such an increase in the share of domestic taxes is essentially the result of tax rate manipulations.

From the economic overview and the fiscal changes in Côte d'Ivoire since 1970, the following conclusions may be drawn:

- The Ivorian economy has been facing a deep and lasting crisis since the beginning of the 1980s following the economic boom of the mid-1970s. Adjustment programmes adopted to cope with the crisis have been a major fiscal feature.

- Fiscal deficit reduction seems to be the main objective of fiscal adjustment in Côte d'Ivoire. This has been achieved through a sharp reduction of public investment and attempts to raise tax revenues by rate manipulations. However, since 1986 the fiscal deficit has remained 4-5% of GDP. It seems that the Government cannot reduce it further by using these instruments. The fiscal measures have never been studied in terms of their impact on the main macroeconomic aggregates or in relation with the other fiscal variables.

These arguments justify the need for a model of the fiscal deficit in Côte d'Ivoire. Such a model will provide us with a device for fiscal policy analysis and management based on a full description of fiscal deficit determinants.

IV The model

The analysis of the determinants of fiscal deficit raises two problems: that of fiscal deficit measurement, and that of relevant variables affecting fiscal deficit. The measurement of fiscal deficit depends on the definition adopted. If a narrow definition, which considers only spending and receipts of the central government, is adopted, there is a serious risk of an understatement of actual fiscal deficit, whereas the extension of fiscal deficit to parastatals and other autonomous agencies brings about many problems including those of consolidated accounts (Tanzi, 1989; Blejer and Cheasty, forthcoming). As already mentioned, we adopt a narrow approach in this study to limit measurement problems.

Another approach consists of the determination of fiscal deficit excluding interest payments in order to get what is called an operational deficit. This estimation of fiscal deficit is difficult to calculate because it requires a full estimate of domestic debts, a precise measurement of domestic rate of inflation, appropriate assumptions about expected inflation, and so forth.

Measurement problems also arise in the calculation of fiscal deficit. It can be calculated directly by taking the difference between total budget spending (*OB*) and government ordinary revenues, or indirectly through the government borrowing requirements. Generally the World Bank and the IMF estimate fiscal deficit by credit to the government (Tanzi, 1989; IMF, 1986).

The final problem related to the measurement of fiscal deficit is that of inflation rate and public domestic arrears. It has been argued that price inflation affects the spending as well as the revenue sides of fiscal deficit (Ekpo and Ndebbio, 1990; Ariyo and Raheem, 1990; Tanzi, 1989).

In fact, rapid inflation increases the prices of goods, services and nominal interest rates, pushing public current expenditures upwards, while time lags in tax collection may result in a sizable relative fall in the real value of tax revenue in such a context.

The accumulation of public domestic arrears can affect seriously the size of the fiscal deficit. Indeed, Côte d'Ivoire, as with most African countries, has run high arrears since the early 1980s (580 billion CFAF in 1990). This means that payments due for existing outlays may not be made on time. An accurate measure of fiscal deficit should include changes in these arrears and the

deriving interest. But their integration raises numerous practical problems. For these reasons we do not include them in our estimation of the fiscal deficit of Côte d'Ivoire. The variables which will be retained are developed during the modelling process itself.

The model is based on a disaggregation of the different components of fiscal deficit. Leaving aside the traditional impact of fiscal policy on aggregate demand (Blinder and Solow, 1973; Choudhry, 1968) and on debt and current accounts issues (Plane, 1988; Roe, 1988; Devarajan and de Melo, 1987), we will focus on the factors determining fiscal deficit.

Our starting point is the following budget constraint picked from Choudhry's basic model for our purpose:

$$(1) \quad G + Ip = TR + dM + dV + EX$$

where G , Ip and TR are as already defined, dM and dV and EX stand for money, bond and external financing of fiscal operations.

From this budget constraint and introducing returns on public investment (RIp) we derive fiscal deficit and its model of financing:

$$(2) \quad FD = (G + Ip) - (TR + RIp) = dM + dV + EX, \text{ and}$$

$$(2)' \quad FD = (G + Ip) - (TR + RIp)$$

Equation (2)' offers possibilities of modelling FD from the spending and revenue sides.

Modelling the spending side through the structural equations of G and Ip

$$(3) \quad G = f(Y, EC, P, G_{t-1})$$

where EC stands for the civil servant wage bill ($EC=Nc*Wc$ with Nc the number of civil servants and Wc a wage correcting factor), P for price inflation rate, G_{t-1} for previous year consumption budget.

From equation (3), we can see that EC will capture budgetary weight of civil servants, G_{t-1} the time lag and the other spending items effects. Y and P

are generally retained to take into account distributional effects of GDP and the impact of inflation on G mentioned above.

Since Ip is exogenous, it comes as an argument in the equation of fiscal deficit as follows:

$$(4) \quad FD = f(Ip, dO)$$

where dO is a dummy, with zero from 1971 to 1976 and unity otherwise.

Modelling the revenue side through the structural equations of TR and RIp

$$(5) \quad TR = f(Y, t, tp, Ip)$$

where t stands for annual average variation of tax rates, tp for tax sensitivity to public investment ($tp = (dTR/dIp) * (Ip/TR)$).

tp plays a fundamental role in our model. Since Ip affects GDP directly (through the contribution of public sector to GDP) or indirectly (through the impact of Ip on the productivity of the private sector (Pegatienan, 1988a; Ndulu, 1990)), it logically affects the tax base. But given the two channels of this influence, it relates to both the amount of Ip and the efficiency in its use. Such efficiency should be reflected in the subsequent tax yield. tp is a measure of this efficiency.

In order to take into account the long-run effects we introduce a time lag in the tax revenue equation. This gives us the next equation:

$$(5') \quad TR' = f(Y, t, tp, Ip, TR_{t-1})$$

$$(6) \quad RIp = Rc + Rm,$$

where Rc are receipts from public corporate companies, and Rm are receipts from marketing boards.

Rm can be expanded by breaking down its contribution into price differentials ($d1$) and quantities handled by the two marketing boards (K). From that the structural equation of RIp is:

$$(7) \quad RIp = f(Rc, d1, K)$$

with $d1$ the average of price differentials between international and domestic prices applied on cocoa, coffee, cotton, rice and sugar.⁵

The full model

From equations (3) to (7), we can write the final expression of FD :

$$(8) \quad FD = f(Y, EC, P, G_{t-1}, X, F, t, tp, Rc, d1, K)$$

Before moving to the tests let us summarize the version of the model which will be used.

The structural functions:

1. $G = f(y, EC, P, G_{t-1})$
2. $FD = f(Ip, dO)$
3. $TR = f(Y, t, tp, Ip)$ or
- 3'. $TR' = f(Y, t, tp, TR_{t-1})$
4. $RIp = f(Rc, d1, K)$

The reduced form model:

$$5. \quad FD = f(Y, G_{t-1}, Ip, t, tp, TR_{t-1}, Rc)$$

We can also note that there is a positive correlation between fiscal deficit and Ip (the relation is highly significant statistically). The exogeneity of Ip , its relative controllability by the government, and this positive link with fiscal

are generally retained to take into account distributional effects of GDP (and the impact of inflation on G mentioned above).

Since I_p is exogenous, it comes as an argument in the equation of fiscal deficit to highlight all its variations as a result of the average of price differentials between international and domestic prices applied on cocoa, coffee, cotton, rice and sugar.

V Results and conclusions

Our results are presented in two groups, the tests of the structural functions and those of the reduced form model. All the empirical results are obtained by estimating the model on Time Series Processor software and using the Ordinary Least Squares.

The structural functions

Regression results from structural functions

From Table 6 we can see that none of the structural functions is subject to serial correlation. The computed DW statistic and the T-ratio are all above their critical values at 5%. The high level of R^2 confirms the effectiveness of the method.

The following conclusions can be drawn concerning the statistical significance of the explanatory variables.

- For the equation of the current expenditure, G , the most significant variables are Y and G_{t-1} (significant at 5%) but their coefficients of correlation are relatively low compared with those of EC and P . But the latter are not statistically significant. G is positively related to Y through the income and public consumption effect of GDP changes (Tanzi, 1989).

The high significance and interesting coefficient of correlation of G_{t-1} , which includes non-salary expenses, combined with the poor significance of EC and its negative coefficient of correlation probably indicate that the civil servant expenses component of G is not as important as the traditional approach of fiscal adjustment tends to consider. Perhaps one should look at the other consumption expenses more carefully for the adjustment operations.

We can also note that there is a positive correlation between fiscal deficit and I_p (the relation is highly significant statistically). The exogeneity of I_p , its relative controllability by the government, and this positive link with fiscal

deficit mean that I_p is likely to be a good instrument in the hands of the government for the reduction of its fiscal deficit.

- The equation of tax revenue, TR , shows only one significant explanatory variable, Y (at 5%) an inconclusive DW statistic for non-serial correlation between T , Y and tp , and a negative link between TR , t and I_p . The relation between TR and Y is consistent with traditional economic arguments relating to the tax base effect of GDP (Ekpo and Ndebbio, 1990; Ariyo and Raheem, 1990; and Tanzi, 1989).

The relation between TR , tp and I_p is much more unexpected. It means that improvements in the use of public investments are more likely to bring about additional tax revenues than an increase in the investments themselves. This result should be looked at in conjunction with those obtained by Blejer and Khan (1984), according to whom public investments seem to affect private activities through their level rather than their changes. A wise combination of an appropriate level of I_p and a desirable efficiency ratio (tp), may result in increasing tax revenues.

The negative correlation between TR and t is surprising. We expected a positive link between these two variables. This result probably confirms Laffer's Law, arguing that increases in the tax rate may result in decreasing tax revenue at certain levels since very high tax rates generally lead to smuggling and other forms of tax evasion. It is also worth noting that tax revenue of the previous year does not affect current tax revenue. This relation is statistically significant at 5%.

The equation relating to the last structural function is characterized by only one significant explanatory variable, RC , and an inconclusive DW statistic. In particular, we note negative correlation between RIp , $d1$ and K . This negative correlation is unexpected.

We anticipated a positive link between RIp and these variables taking into account the differentials as providing additional resources to the Government for its programmes.⁶

The negative relationship between RIp and $d1$ certainly raises a problem of simultaneous inference. It makes sense to think that when the Government faces falling ordinary revenues, including RIp , it can raise the differentials applied by marketing boards. This possible cyclical use of Pd does not clarify the direction and the actual sign of the causality between RIp and $d2$.

obvious shortcoming of the current mode of adjusting fiscal operations in Côte d'Ivoire.

Table 6 Summary of the results of the regression

Dependent variables	The regression lines
G	$30.13 + 0.05Y - 1.14EC + 27.69P + 0.78G_{7-1}$ $(1.94) (2.09) (-0.91) (0.53) (1.54)$ $R^2 = 0.98 \quad DW = 1.86$
FD	$-22.91 + 0.80Ip - 75.81dO$ $(-1.37) (5.21) + (-1.88)$ $R^2 = 0.82 \quad DW = 0.95$
TR	$-4.20 + 0.18Y - 196.20t + 8.33tp - 0.08Ip$ $(-0.20)(12.96) (-0.59) (1.23) (-0.72)$ $R^2 = 0.96 \quad DW = 1.56$
TR'	$20.33 + 0.05Y - 426.4t + 16.45tp + 0.67TR_{t-1}$ $(1.22) (1.65) (-1.77) (3.00) (3.49)$ $R^2 = 0.97 \quad DW = 2.11$
Rlp	$17.80 + 8.55Rc - 99.70d1 - 0.02K$ $(0.56) (5.13) (-1.32) (-0.69)$ $R^2 = 0.64 \quad DW = 1.51$

DW = Durbin Watson statistics; T-ratios in parentheses

The reduced form model

Combining the explanatory variables of the spending and revenue sides of *FD*, we estimate the full model through its reduced form. This estimate retains the most significant explanatory variables taken from the structural equations:

The following structural equations were used: *G*, *FD*, *TR'*, *Rlp*. The regression line shows a positive link between *FD* and G_{t-1} , *Ip*, and *t*; and a negative link between *FD* and *Y*, *tp*, TR_{t-1} and *Rc*. The coefficients of correlation are very high for *t* (426), *tp* (-16.45) and *Rc* (8.55). They are moderate for the other explanatory variables, and particularly weak for *Y* (0.008).

We can also note that there is a positive correlation between fiscal deficit and *Ip* (the relation is highly significant statistically). The weakness of *Ip*, its relative controllability by the government, and this positive link with fiscal

Table 7 Regression results from the reduced form model

Dependent variable	The regression line
<i>FD</i>	$108.35 - 0.008Y + 0.78G_{t-1} + 0.80Ip + 426.27t$ $(0.59)(-1.87) \quad (4.54) \quad (5.21) \quad (1.77)$ $-16.45tp - 0.67TR_{t-1} - 8.55Rc$ $(-3.00) \quad (-3.49) \quad (-5.13)$
	$R^2 = 0.94$

There is an interesting relationship between *FD*, *tp* and *Ip*. The two explanatory variables are significant, *Ip* is positively linked to *FD*, whereas *tp* is negatively linked. Here too, we can note that the efficiency in the use of public investment is more likely to reduce *FD*. An evaluation only of the level of *Ip*, generally considering the financing possibilities, may be misleading for policy design and implementation as far as fiscal deficit reduction is concerned. It follows that the determinants of *FD* in Côte d'Ivoire can be summarized as in Table 8.

From our results, it appears that seven instruments are available to the government of Côte d'Ivoire for a reduction of *FD*. The first group of variables (positive linkage) must be lowered, whereas the second group (negative linkage) should be raised for this purpose. But the final choice of a set of instruments depends on their feasibility (financial, economic and political). In particular the impact of each instrument on the growth prospect of the country should be cautiously studied.

Looking at the means used by the Government of Côte d'Ivoire for the reduction of its fiscal deficit during the 1980s, it appears that it resorts to public investment cuts for short-term adjustment. However, the negative relationship between fiscal deficit and *Y* and *tp* could offset the gains of such a policy. Investment cuts might affect these two variables negatively, which in turn could deepen that fiscal deficit. Tax rate manipulation does not seem appropriate since its final outcome could be an increase in fiscal deficit. Furthermore, the neglect of the other instruments such as *G*, *tp* and *RC* is an obvious shortcoming of the current mode of adjusting fiscal operations adopted by Côte d'Ivoire.

Table 8 A summary of statistical results

	Positive linkage	Negative linkage
FD	$G_{t,1}; LCC + HSS$ $lp; LCC + HSS$ $t; HCC + LSS$	$Y; LCC + HSS$ $tp; HCC + HSS$ $RC; HCC + HSS$ $TR_{t,1}; LCC + HSS$

LCC and *HCC* stand for low and high coefficient of correlation respectively, *HSS* and *LSS* for high and low statistical significance respectively.

Concluding remarks

From these results it can be seen that Côte d'Ivoire's new fiscal policy makes sense in the short-term, but suffers from shortcomings related to the narrow basis of the choice of instruments used. In particular there is no indication of an evaluation of the impact of investment cuts and tax rate manipulation, the main instruments of the latter, on the growth prospects for the country and the feedback on fiscal deficit in the medium term.⁷

Notes

1. Four programmes were introduced in 1981-83, 1984-86, 1987-89 and after September 1989. For interesting discussions of the adjustment process of Côte d'Ivoire see Durefle (1986), Pegatienan (1988a and 1988b), World Bank (1987, 1988), Barbier (1988), and Devarajan and de Melo (1987).
2. For development records of Côte d'Ivoire see World Bank (1987, 1988), Barbier (1988), and Bourguignon and Berthelemy (1985). Barbier, for example, showed that the manufacturing sector in Côte d'Ivoire grew by an average annual rate of 9.3% from 1965 to 1980.
3. The IMF support came through one extended facility from 1981 to 1983 and three confirmation agreements in 1984, 1986 and 1988. The World Bank intervened in Côte d'Ivoire through four structural adjustment loans in 1981-83, 1986 and 1989 and sectoral adjustment loans.
4. The period 1977-82 was that of the cocoa and coffee booms with international prices close to 630 CFAF/kg for cocoa and 626 CFAF/kg for coffee.
5. Cocoa, coffee and cotton represent more than 50% of quantities handled by CSSPPA, and rice and sugar are the major products handled by CGPPPGC.
6. One of the major sources of financing of BSIE, the government investment budget, is the receipts from the marketing boards.
7. A study of the impact of the different instruments available to the government for fiscal adjustment is the focus of the second phase of this research.

Table 6. A summary of statistical results

Positive linkage Negative linkage

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