

# The impact of structural adjustment reforms on public sector expenditures: Evidence from developing countries

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## Abstract

The paper attempts to analyze the impact of structural adjustment policy reforms on aggregated and disaggregated public expenditure. The study investigates the extent to which structural adjustment reforms were able to reshape public expenditure in developing countries as expected. A comparative analysis has been made of aggregated and disaggregated public expenditure before and after implementing structural adjustment reforms. The model is tested using panel data of sixteen developing countries for the period of 1975-95. The fixed effects technique was used to control for country-specific differences. It was found that although some of the developing countries from our sample have shown a downward trend in total public expenditure, the results become statistically insignificant when we use panel data for total public expenditure. There is evidence that the downward trend in total public expenditure may be due to a cut in public spending on health and education.

## 1. Introduction

Economic adjustment, policy reforms, liberalisation and privatisation have become key features in the global economic environment in the past two decades. Many developing countries have adopted World Bank structural adjustment and IMF stabilization reforms to liberalise their economies through more market-oriented policies. Since reducing the budgetary deficit is one of the key policy measures in structural adjustment reforms<sup>1</sup>, the countries involved in these reforms are expected to reduce their government expenditures. At the same time current orthodoxy also suggests reshaping public spending priorities in favor of

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<sup>1</sup> The other measures include controlling the money supply and credit.

human resource development through education, training and health services (Huther *et al.*, 1997). It has been argued that the returns to public investment in education and health are greater than the returns to public investment in infrastructure (Baffes and Shah, 1993; Devarajan *et al.*, 1996).

The literature provides some evidence on both positive and negative impacts of structural adjustment (SA) policies on social sectors such as education and health. For instance, Tumwine (1992) evaluates the impact of SA policies on health and education in Zimbabwe and concludes that after a short honeymoon period, SA policies began to have a negative impact. Phillips (1993) looks at the impact of SA policies on urbanisation and human health and finds that a cut in public expenditure on health services and nutrition under SA reforms has increased the vulnerability of the poor. Laurell and Wences (1994) argue that SA policies have considerably increased poverty through a sustained reduction in wages and job losses in Latin America and Africa. In Zimbabwe, Bassett *et al.*, (1997) suggest that the introduction of fees for health services not only reduced the utilisation of services but also reduced the quality of care. Gordon (1997) argues that in Zimbabwe, the cut in public spending and the introduction of cost recovery measures have eroded much of the progress made in the health and education sectors during the decades after independence in 1980. Potts and Mutambirwa (1998) conclude that although the adverse effects of SA policies can also be seen on urban life, the rural population has suffered more due to increases in the price of basic commodities and by the introduction of fees for health services.

On the other hand, there is also some evidence of the positive impact of SA policies. For instance, Thorbecke (1991) argues that SA policies in Indonesia were successful in restoring equality and improving income distribution. Kendie (1995) argues that SA policies have encouraged agricultural extensification in Ghana, and Gogue (1996) reports that SA policies have increased public spending for education in Togo.

Although many researchers have evaluated the positive and negative impacts of structural adjustment policies on health, education, and poverty, the literature is fragmented and deals either with individual countries or individual sectors. Hardly anyone has tried to investigate the impact of SA reforms on total or sectoral public expenditure as a whole. The few attempts have lacked adequate econometric analysis. For example, Huther *et al.*, (1997) evaluated the effectiveness of SA policies in 83 countries during 1979-95. They used only trends<sup>2</sup> of relevant indicators to explain the positive and negative effects of reforms. Since their purely descriptive analysis lacked any statistical or econometric bases, it cannot be used to

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Without performing regression analysis.

support either side of the argument. Similarly Van der Gaag and Barham (1998) studied the impact of SA policies on government spending according to the date of implementing the SA\_reforms. They also used trends of real per capita public and private spending on health and child mortality in four groups of countries<sup>3</sup> during the period 1985-95. They concluded that government spending on health-care increased in those countries that had started the adjustment process earlier and implemented it seriously. However, they did not analyze the overall situation of public expenditure before and after structural adjustment reforms. Therefore, these type of studies cannot be used to generalize the outcomes. To bridge this gap, the present study was designed to investigate the impact of SA policies on aggregated and disaggregated public expenditure within the context of the preceding and subsequent situation in sixteen developing countries for which we have adequate data. Further, since the study performs an econometric analysis using the fixed effect approach with panel data, the results are more reliable and provide a stronger basis to make generalizations.

## 2. Data and methodology

The link between SA policies and public expenditure, either at the sectoral level or in total, can be seen through a simple regression technique. The general econometric model can be specified as follows:

$$EXPR_{it} = C + \alpha T + \beta_i (POL)_{it} + U_{it} \quad (1)$$

Here EXPR, the dependent variable, denotes the ratio of public expenditure (either total or sectoral) to GNP,  $C$  is a constant,  $T$  is the time trend, and POL is the dummy variable for the policy reforms where years onwards from the starting date of structural adjustment reforms are represented as 1 and years prior to that as zero. Subscripts  $i$  and  $t$  refer to countries and years respectively while  $\alpha$  and  $\beta$  are coefficients for the time trend and policy dummy respectively. The panel data approach has been used in the present study since it combines both time series and cross section data, and provides multiple observations on each individual country in the sample.

In the analysis, the coefficient on the time trend  $T$  captures the normal trend of expenditure; a positive sign indicates a rise in the public expenditure ratio over time. The coefficient on POL reflects the impact of

<sup>3</sup> They divided all countries involved in SAP on the basis of the time of their implementation of reforms. Their four groups were i) countries that started to borrow for the adjustment process early – early adjustment lending countries, ii) other adjustment lending countries, iii) non-adjustment lending countries whose economies grew during the period 1985-95 and iv) non-adjustment lending countries whose economies did not grow during this period.

policy reforms, with a negative sign indicating that reforms have caused a decline in public expenditure.

Among several methods of panel data analysis, two are more popular. The first is the simple OLS (Ordinary Least Squares) method in estimating the coefficients of the model, which is likely to lead to a considerable misspecification bias because, under simple OLS, it is assumed that there is no difference between individual elements in terms of both intercept and slope. The alternative variable intercept method assumes that the intercept, slope or both are different for each country in the data set, at a point in time and over time. The underlying assumption of this model is that the effects of the numerous omitted individual time-varying variables may be unimportant individually but may be significant collectively. There are two types of variable intercept models - random and fixed effects. Under the random model, it is assumed that differences between countries are stochastically determined. This may not be an appropriate assumption for the present study since it is well known that there are marked differences between countries or groups. Thus, it is very important to control the cross-country differences in regression analysis. Among the various procedures to control the cross-countries differences, the most common is the fixed effects model (Greene, 1990). Under the fixed effects or the so-called Least Squares with Dummy Variable (LSDV) technique, one can use a dummy variable for each cross-section unit (for each country in our case) to take into account the effect of those variables that are specific to that unit, but remain constant over time. It is also possible to see the effects that are variable over time but are the same for all cross-sections. Due to these advantages the fixed-effects technique has been used in the present study to analyze the impact of structural adjustment reforms.

Data for the analysis are taken from the World Bank database available from the internet. They cover the period 1975-95. The sample size of 16 countries is determined by data availability. For each country the dummy variable POL takes a value of 1 in each year after the commencement of reforms. For the countries concerned the initial year of reforms is taken from World Bank (1992).<sup>4</sup> In the analysis it is assumed that the impact of SA lasts from the commencement of reform until the end of the period. However, the analysis is also carried out assuming five years to be the duration of the impact of reforms. Hence, in this alternative case for each country, POL takes a value of unity for five years only. Since the results are very similar for both alternatives, only the first case is reported in detail.

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<sup>4</sup> Initial years of reforms are; Argentina (1989), Brazil (1980), Botswana (1983), Chile (1983), Egypt (1991), Ghana (1983), Indonesia (1983), India (1985), Kenya (1982), Korea (1980), Mexico (1982), Morocco (1983), Malaysia (1984), Philippine (1983), Thailand (1980), Turkey (1980).

### 3. Empirical results

The fixed-effects estimates using a panel data of 16 developing countries for the period 1975-95 on total expenditure to GNP ratio are presented in Table 1. The results show that both trend and policy dummies possess positive signs but are not significant. A positive sign for both trend and policy dummy indicates that they move in the same direction and that the total public expenditure increases after SA reforms as well as over time. A higher coefficient for the trend (0.011156) compared to the coefficient for the policy dummy (0.010606) however indicates that the public expenditure has increased at a lower rate after SA reforms. Since the results are statistically insignificant, this interpretation may not be very convincing. In other words, generally from

**Table 1**  
Fixed-Effect Estimates of Total Public Expenditure from Panel Data  
of 16 Developing Countries for the Period of 1975-95

Parameters	Coefficient	t-Value	R <sup>2</sup>
T	0.001156 <sup>NS</sup>	0.7794	
POL	0.010606 <sup>NS</sup>	0.6706	0.77

NS indicates that the coefficients are non-significant at the 5% level.

Number of observations are 336.

The F-statistic is 3.099. Since the critical value for F-statistics is 6.2865, we accept the null hypothesis that the country effects are the same in this case.

our analysis for the sample as a whole it appears that the reforms have not had any impact on total aggregate public expenditure. Nonetheless, there may still be differences between countries or between sectors in terms of the impact on public expenditure.

The OLS method was used to evaluate the impact of SA reforms on the ratio of total public expenditure to GNP for the period 1975-95 in each country of our sample separately. Since time series data is involved initially the stationarity properties of each series must be determined. Two methods, Augmented Dickey-Fuller's (1979, 1981) and Phillips and Perron's (1988), are commonly used for unit root tests. To test the unit root property of the series  $X_t$ , we use the following regression equation (Dickey and Fuller, 1979, 1981; Philips and Perron, 1988).

$$\Delta X_t = c + \alpha X_{t-1} + \sum_{i=1}^p \gamma_i \Delta X_{t-i} + \varepsilon_t \quad (2)$$

$\Delta$  is the first-difference operator and  $\varepsilon_t$  is assumed to be Gaussian white noise. The number of lags 'p' in the dependent variable is chosen by the Akaike Information Criteria (AIC) to ensure that the errors are white noise.<sup>5</sup> Unit root tests of this type are called Augmented Dickey-Fuller (ADF) tests.<sup>6</sup> The null hypothesis is that the series is non-stationary against the alternative hypothesis of stationarity. The ADF test is based on the estimated parameter  $\alpha$  and its corresponding t-statistics. When  $\alpha = 0$ , the time series  $X_t$  is non-stationary which means that the standard asymptotic analysis cannot be used to obtain the distribution of test statistics. The main problem with the ADF test is that it involves the inclusion of extra difference terms in the testing equation. This results in a loss of degrees of freedom and a resultant reduction in the power of the testing procedure, particularly when the number of observations is limited. Alternatively, the Philips-Perron (PP) approach allows for the presence of unknown forms of autocorrelation and a structural break in time series, and conditional heteroscedasticity in the error term, and is based on testing the same regression equation as ADF except that  $p = 0$ . Since there are no such problems in the series under consideration, the ADF test has been used to test for a unit root. For both tests, a t-statistic larger in absolute value than the critical value results in the rejection of the null hypothesis of a unit root in favour of the stationarity alternative. The results for unit root tests are presented in Appendix 1. Results show that the levels of all

<sup>5</sup> Two methods, which are commonly used for the selection of lag length, are the Akaike Information Criteria (AIC) and the Schwartz Criteria (SC). The AIC is used in this study.

<sup>6</sup> When the order of augmentation is zero, the ADF tests work as DF (Dickey and Fuller, 1979).

series are trend stationary. Since the trend is a part of our model, the resulting regression would not be spurious.

The OLS estimates for the 16 developing countries are presented in Table 3. The theoretical framework for interpreting these results is presented in Table 2.

**Table 2**  
Framework for Interpreting the Regression Results of Table 2

<i>Trend</i>	<i>Policy</i>	<i>Impact</i>
+	+	Neutral
+	-	Positive
-	+	Negative
-	-	Neutral

Positive Impact: Declining public expenditure after SA reforms.

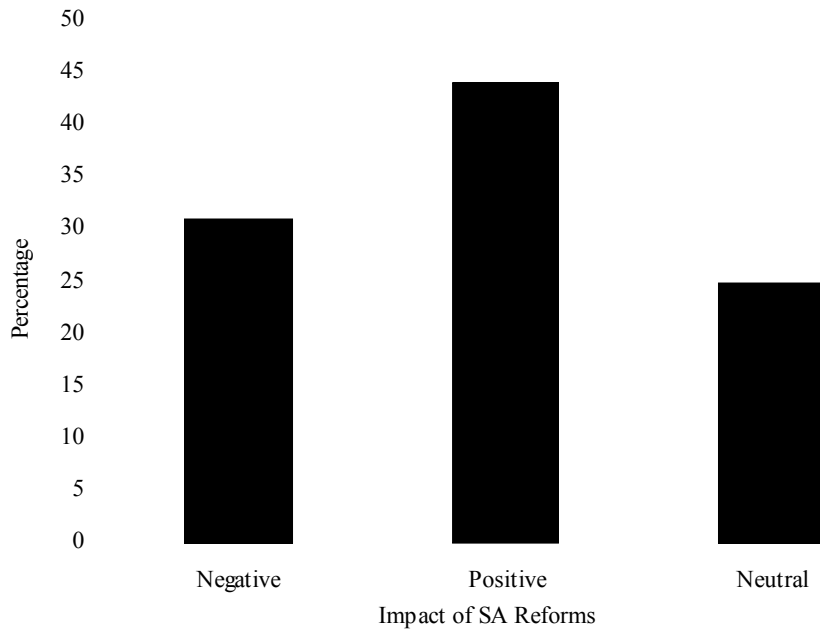
Negative Impact: Increasing public expenditure after SA reforms.

Neutral Impact: Situation remains unchanged before and after SA reforms.

In general, 44 % of the total sample (seven out of sixteen countries) show a positive impact of policy reforms on total public expenditure. The positive sign for the trend and a negative sign for the policy dummy indicate that the total public expenditure to GDP ratio decreased after SA reforms in these cases. 31 % (five countries out of sixteen) show a negative impact of SA reforms, where the trend shows a negative and policy dummy shows a positive sign. This indicates that, in these countries, public expenditure increased after implementing SA reforms. However, there were three countries in the sample (India, Turkey and Brazil) which do not show any impact of policy reforms since both the trend and policy dummy variables possess the same sign (Figure 1). When the condition of five years after SA reforms is introduced into the analysis, it had little impact on the results (the one exception was the case of India where the sign on the policy dummy became negative). Although this analysis shows that nearly half of the countries in our sample have a reduction in total public expenditure after SA reforms, it does not indicate which sector or sectors were the main targets of these reductions. To address this important issue we have performed a more disaggregated analysis.

### Figure 1

Significance of Structural Adjustment Reforms in Developing Countries



The main objectives of World Bank structural adjustment reforms in most cases have been to shift public resources from capital and military expenditure toward education and health services (World Bank 1992). Our test of to what extent this has happened is reported in Table 4. A panel data of 16 developing countries comprising 336 observations was used to obtain the fixed-effect estimates for each category of public expenditure. The basic equation (1) was applied to six categories of public expenditure, the first four of which are self-explanatory. “Economic Affairs” refers to public bureaucracy such as public investment in state-owned enterprises, law enforcement and constitutional structure, while “Others” includes physical infrastructure such as railway, roads, water and sanitation, airports and ports. In the case of defense, the negative sign for the trend coefficient indicates that public expenditure on defense was decreasing over time before SA reforms, and the negative sign on POL dummy reveals that defense expenditure decreased further relative to this trend after SA reforms, as expected. Neither coefficient, however, is significant. On the other hand,



**Table 3**  
OLS Estimates of Total Public Expenditure as a Share of GNP  
for 16 Developing Countries

Country	T	POL	R <sup>2</sup>
Argentina	0.011993** (3.4059)	-0.081862 <sup>NS</sup> (-1.6352)	0.47
Botswana	0.024571** (7.4422)	-0.049983 <sup>NS</sup> (-1.2486)	0.37
Brazil	-0.009631 <sup>NS</sup> (-1.6802)	-0.006814* (-2.0925)	0.42
Chile	-0.007705** (-3.1308)	0.019734* (2.6613)	0.63
Egypt	-0.010519* (-2.0133)	0.271230** (2.9999)	0.40
Ghana	0.000391* (2.1370)	-0.024829 <sup>NS</sup> (-1.7167)	0.79
India	0.004506** (3.1864)	0.020407 <sup>NS</sup> (1.17935)	0.81
Indonesia	-0.007444 <sup>NS</sup> (-1.4807)	-0.59680* (-1.9790)	0.59
Kenya	0.020459** (11.5209)	-0.058049* (-2.5448)	0.94
Korea	-0.000600 <sup>NS</sup> (-1.7989)	0.019426* (2.0135)	0.56
Malaysia	0.003421 <sup>NS</sup> (1.1674)	-0.011299** (-3.3180)	0.55
Mexico	-0.004746 <sup>NS</sup> (-1.7730)	0.140414** (4.2870)	0.68
Morocco	0.003278 <sup>NS</sup> (1.2076)	-0.086739* (-2.6353)	0.45
Philippines	0.003403** (2.9464)	-0.020575 <sup>NS</sup> (-1.4691)	0.49
Thailand	-0.003988** (3.6566)	0.061268** (4.3737)	0.55
Turkey	0.000047* (2.0204)	0.020055* (2.6776)	0.79

Notes: Figures in parentheses are t-values and the figures above t-values are coefficients.

\* and \*\* indicate that the coefficients are statistically significant at 5% and 1% levels respectively.

NS indicates that the coefficients are statistically non-significant at 5% and 1% levels.

21 observations are involved in each case.

SA reforms show a negative impact on education and health because the policy dummies show a negative sign for these sectors and the results are significant. This indicates that the public expenditure ratio decreased significantly after SA reforms in these cases relative to a positive long-run trend, contrary to the stated objectives. The positive sign of the policy dummy in the case of economic affairs and other activities reveals that the public expenditure ratio increased relative to the long-run trend after SA

reforms in these countries. In the case of ‘other public expenditure’ this may be due to the need to maintain infrastructure during adjustment. Such inferences require detailed econometric analysis.

**Table 4**  
The Fixed-Effects Estimates from Disaggregated Panel Data  
of 16 Developing Countries, 1975 – 95

Variables #	T	POL	R <sup>2</sup>	F-statistics
Defense	-0.009621 (-1.0981)	-0.00546067 (0.4674)	0.70	1.42
Education	0.006753* (2.1013)	-0.00977455* (-2.1988)	0.86	1.97
Health	0.002352 (1.2090)	-0.003263* (-2.3849)	0.80	2.13
Social Security	0.002965** (3.5523)	0.000209** (2.9754)	0.85	1.51
Economic Affairs	-0.008655** (-4.9349)	0.016925** (3.7516)	0.69	2.60
Others	0.006183** (3.8516)	0.029838* (2.4859)	0.54	1.73

Notes: # Sectoral expenditure is the ratio of the total public expenditure.

\* and \*\* show that the coefficients are significant at 5% and 1% levels respectively.

Figures in parentheses are t-values and the figures above t-values are coefficients. Since the critical value for F-statistics is 6.2865, we accept the null hypothesis that the country effects are the same in this case.

336 observations are involved in each case.

#### 4. Conclusions

Structural adjustment policies aim to reduce budgetary deficits and to reshape public expenditure in favor of human resource development such as education, training and health services. It is now widely recognized that *a priori* one cannot predict the distributional consequences of adjustment reforms and that actual distributional outcomes will depend upon the precise package of measures. Hence protection of public expenditure on social measures is seen as critical in avoiding inequitable outcomes. The empirical evidence shown in this study reveals that, in general, total public expenditure did not decline significantly after structural adjustment reforms. It is also evident that some countries that show a reduction in public expenditure may have cut their public spending on education and health services rather than the expected targets of defense and other economic activities. There could be many reasons for this outcome. First, budgetary inflexibility in many developing countries means limited opportunities to reshape spending priorities. Therefore, several large expenditure categories such as statutory transfers, defense funding and debt charges may not be adjusted quickly. Second, education and health

expenditure were rarely mentioned in SA packages in the early period of lending, although they became considerably more important from the late 1980's onwards, so that in some countries, initially, maintaining social expenditure may not have been a priority. Third, our data cannot distinguish between different sectoral expenditure headings such as primary, secondary, and tertiary education expenditure and between rural medical centers and hospitals. Different patterns of expenditure within education or health budgets may have different distributional outcomes. It is often argued that there is a need to protect education and primary health care expenditure relative to other categories. Due to lack of sufficiently detailed data we cannot comment on the extent that this has taken place. Finally, our findings may be partly explained by incomplete implementation of SA packages, which would call for more detailed investigation.

Our results do provide support for the view that when public expenditure has fallen as a share of GDP, it is often social expenditure of the type that may be most necessary for both poverty alleviation and long run growth that has fallen. This is a cause for concern and casts doubt on the desirability of post-SA distributional outcomes.

**Appendix 1**  
Results of Augmented Dickey-Fuller Unit Root Tests for Total Public  
Expenditure as a Ratio of GNP

Countries	Total Public Expenditure as a Ratio of GNP
Argentina	-4.2872*
Botswana	-4.4486*
Brazil	-3.3263*
Chile	-4.8092**
Egypt	-3.7092*
Ghana	-3.8919*
India	-5.0122**
Indonesia	-3.9220*
Kenya	-4.8888**
Korea	-3.2748*
Malaysia	-4.5175*
Mexico	-3.7943*
Morocco	-5.2075**
Philippines	-4.0744*
Thailand	-4.6252**
Turkey	-4.5990**

*Notes:* The corresponding critical values are 4.5743 and 3.6920 at the 1% and 5% levels of significance. These values are obtained from Mackinnon (1991).

\*\* and \* indicate the rejection of the null hypothesis of a unit root at the 1% and 5% levels of significance respectively.

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## Özet

### Yapısal reformların kamu sektör harcamaları üzerinde etkileri: Gelişmekte olan ülkelere bir uygulama

Bu makale, yapısal reformların toplu ve ayrıştırılmış kamu harcamaları üzerindeki etkilerini incelemeye çalışmıştır. Çalışma, yapısal reformların kalkınmakta olan ülkelerin kamu harcamalarını ne derece beklenildiği gibi yeniden şekillendirdiğini incelemektedir. Yapısal reformlardan önce ve sonra yapılan toplu ve ayrıştırılmış kamu harcamaları karşılaştırmalı olarak incelenmiştir. Model, 16 ülke ve 1975-95 yıllarını kapsayan panel veri kullanarak sınanmıştır. Sabit etkiler tekniği kullanılarak ülkeye özgü etkiler kontrol edilmiştir. Örnekleme bulunan bazı kalkınmakta olan ülkelerin toplam kamu harcamaları açısından bir düşüşe girdiği görülürken, bu sonuçlar toplam kamu harcamaları için panel veri kullanıldığında istatistiksel anlamda önemli değildir. Toplam kamu harcamalarındaki düşüşün sağlık ve eğitime yapılan harcamalardaki kesintilerden kaynaklandığı düşünülmektedir.