

**Budgetary Trade-offs Between Social Services,
Development Services and Defense*
in Jordan**

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* Defence includes Internal Security Expenditures.

Introduction

The development of human resources and infrastructure particularly public spending on social services and economic development services has long been an important policy objective of the Jordan government. Government initiative in this area can be judged from the fact that, in the period 1967 to 1995, (15.6) percent of GDP was spent on social and economic development services, a staggeringly high amount in absolute terms considering the poverty level of Jordan. Data from the same period show that on the average, (11) percent of GDP was spent on defense in Jordan. This is a high ratio relative to the international standards.

It is plausible to argue that when public expenditures exceed the available public revenues, budgetary trade-offs are bound to occur between and among different policy sectors. It is possible that increases in defense spending may come at the expense of social and economic development services.

The purpose of this study is to examine empirically the extent, direction, and form of budgetary trade-offs between spending on defense and spending on social and economic development services in Jordan over the period 1967-1995. Our concern is to provide a tentative answer to these specific questions: Does defense spending cut spending on social and development services? Is there a significant relationship between spending on defense and spending on social and economic development services over time? Is the trade-offs relationship linear or nonlinear in Jordan?

1- Trade-offs Literature

It may be instructive at this stage to review some of the trade-offs literature concerning the relationship between spending on defense and spending on other public service sectors. Unfortunately few studies of trade-offs have been reported, especially in the developing countries. Analyses of budgetary trade-offs have produced conflicting, mixed results on the developed countries [1]. Domke and Kelener argue that governments have been able to avoid decreases in social spending in the face of increases in defense spending because of governments' ability to raise taxes or run larger budget deficits. This there has been no clear trade-offs between defense and social spending for the U.S. and other advanced industrial democracies [2]. Musgrave, in a study of the existence (or otherwise) of the trade-offs relationship between different components of government expenditures in various developed countries concluded that such a trade-offs relationship exists [3].

In developing countries few studies of the trade-offs relationship have been reported. Saadet Deger, in a study of the impact of defense spending on education spending in 50 developing countries, concludes that such a trade-offs relationship exists [4]. Ali in a study of the trade-offs relationship between spending on defense and administration and spending on other services in the Sudan, found a significant negative trade-offs relationship [5].

Coffman and Mahar, in studying the development of government expenditures in less developed countries conclude that such a trade-off relationship exists [6].

Roe, in studying the government revenue share in poorer African countries, concluded that such a trade-offs relationship exists [7]. Lall, in studying government expenditures in developing countries found such a trade-offs relationship [8].

From all the above, it is apparent that conclusion about the relevance of the trade-offs relationship in advanced countries is conflicting and inconclusive. However it is plausible to argue, a priori, that in less developed countries (for example, Jordan) such a trade-off relationship exists, since they have very limited resources and it is difficult to increase taxes, so an increase in the spending on one component will force the government to reduce spending on others.

In Jordan, during the period 1967-1973, expenditures on defense had been increased sharply due to the involvement of Jordan in Israeli-Arab wars which resulted in a high increase in defense expenditures. Also the continuous Israeli aggression resulted in a continued rise in military and national security expenditures. The loss of the west bank of Jordan in 1967 war resulted in a great damage to the economy and imposed a new heavy burden in terms of meeting the domestic needs for security. Since Jordan's natural and financial resources are limited, the increase in Jordan's defense expenditures may come at the expenses of other public expenditures, such as social and development expenditures.

A study on Jordan government expenditures during the period 1967-1987, concluded that current government expenditures come at the expenses of public social development expenditures [9]. It also showed that during the period 1967-1987, the share of total public expenditures in GDP was 47 percent, of which 17 percent is due to the defense expenditures.

Alziued, in analyzing the functional distribution of government expenditures in Jordan during the period 1967-1987 concluded that defense expenditures may come at the expenses other government expenditures. He argued that Jordan's government may not be able to avoid decrease in social and development expenditures in the face of the increase in defense spending because of limited resources of the Jordan's economy [10].

From all above, it is plausible to argue, a priori, that in Jordan such a trade-offs relationship exists because of the following reasons:

- 1- Jordan's government ability to raise taxes or run larger budget deficits in the face of the increase in defense spending is limited due to low levels of per capita income and to the internal and external constraints.
- 2- The natural and financial resources of the Jordan economy is very limited, so any increases in defense spending may come at the expenses of other components of government expenditures.

In the following analysis, we attempt to build upon that study to date and to specify more precisely the extent, direction, and form of the trade-offs relationship between expenditures on defense and expenditures on social and economic development services in Jordan.

2- Research Design

A review of the trade-offs literature shows that there has been some controversy over the appropriate definition and measurement of the expenditure variables. Also, there is some controversy over the type of data format that is most appropriate for a proper assessment of the trade-offs hypothesis. Which format should be used a time-series or a cross-section?

Concerning the first problem, some trade-offs studies measured the defense and social services expenditure terms as a percentage of total public expenditures [11]. Other studies measured the defenses and education expenditure terms as a percentage of GDP [12].

In order to avoid the problem of choosing the measure which may affect the results of our analysis, we have measured the defense, social services and economic development services expenditure terms as a percentage of total public expenditure and as a percentage of GDP. Social and economic development services expenditures are treated as the dependent variable in the regression analysis while defense spending is entered as the independent variable. It is expected that as defense spending increases, social and economic development services expenditure will decrease. That is, a substitution effect (Negative Trade-offs) is hypothesized. The rationale underlying this was mentioned earlier.

Concerning the second problem "which formate should be used", Peroff and Warren have argued that "cross-sectional analysis is an inadequate approach to this problem in that this type of analysis only indicates whether different countries exhibit different priorities at a single point in time [13]. Therefore, in order to determine the nature of budgetary trade-offs in Jordan, budgetary patterns over time must be examined. In our study, the analysis are based on 29 annual time-series data sets for the 1967-1995 time period [14].

3- Empirical Analysis

To get a quantitative idea about the relationship between spending on defense and spending on social services and economic development services, we use regression models to test empirically the extent, direction, and form of the budgetary trade-offs between defense and

social and economic development services expenditures in Jordan. The functional form of the trade-offs equation must be specified. In this study we will use only two of the various plausible types. The first type takes the form of a linear equation which assumes that the marginal rate remains the same. This form is given by the following equations:

$$\frac{E}{G} = a_1 - B_1 \frac{D}{G} + U_0 \dots\dots\dots(1)$$

$$\frac{E}{GDP} = a_2 - B_2 \frac{D}{GDP} + U_0 \dots\dots\dots(2)$$

where:

E = Social and economic development services expenditures.

D = Defense and social security spending

G = Total Government spending

GDP = Cross Domestic Product

$a_1, a_2, B_1, B_2, \dots\dots\dots$ the parameters of the models

U = error term.

For our purpose we have used two measurements of the expenditure terms-social and economic development services as a percentage of total government expenditure and as a percentage of GDP. The reasoning underlying this was mentioned earlier.

The second functional form is the logarithmic one, which assumes that both the average and the marginal rates vary (elasticity remaining constant) [15].

The use of this logarithmic (Log) transformation is to increase the probability of normal distribution of the variables, which is a basic assumption in regression analysis. The above form is given by the following equations:

$$\text{Log } \frac{E}{G} = \log a_1 - B_1 \log \frac{D}{G} + U \dots\dots\dots(3)$$

$$\text{Log } \frac{E}{\text{GDP}} = \log a_2 - B_2 \log \frac{D}{\text{GDP}} + U \dots\dots\dots(4)$$

The trade-offs hypothesis is accepted or rejected according to the usual tests of statistical significance in conjunction with the a priori argument. It is plausible to argue, a priori, as mentioned earlier, that in Jordan with its limited resources base, revenue constitutes an important constraint on government expenditures; therefore one should expect a trade-offs relationship between different components of government expenditures, that is, any increases in defense spending should be at the expense of other expenditures (social and economic development expenditures).

To test empirically for the existence (or absence) of the above trade-offs relationship in Jordan, the types of trade-offs equations were estimated during the period 1967-1995.

The signs of the coefficients (equations 1-4) represent the expected theoretical direction of the relationship.

4- Regression Results

Using data for Jordan's economy, during the period 1967-1995, equations 1 to 4 were estimated by using the ordinary least squares method (OLS). The empirical results were as follows:

$$\frac{E}{G} = 200.55 - 416.21 \frac{D}{G}$$

$$(-6.777)$$

$$R^2 = 67.6, \bar{R}^2 = 0.6614, F(\text{value}) = 45.93, D.W = 1.92$$

$$\frac{E}{GDP} = 223.57 - 915.45 \frac{D}{GDP}$$

$$(-10.849)$$

$$R^2 = 0.842, \bar{R}^2 = 0.835, F(\text{value}) = 117.70, D.W = 1.65$$

$$\log f(E, G) = -0.2440 - 3.5012 \log \frac{D}{G}$$

$$(-10.355)$$

$$R^2 = 0.829, \bar{R}^2 = 0.822, F(\text{value}) = 107, D.W = 1.83$$

$$\log(E, GDP) = -0.30743 - 7.122 \log \frac{D}{GDP}$$

$$(-11.32)$$

$$R^2 = 0.975, \bar{R}^2 = 0.9973, F(\text{value}) = 491.7, D.W = 1.70$$

After examining the above results, it is evident from results (1) to (4) that the relationship between spending on defense and spending on social and economic development services is (in line with our expectations) negative and significant at the 1% level of confidence. Also the value of the t-ratio in parenthesis indicates that there is a negative and a highly significant association between the two variables. This is so at the 1% level of confidence. The percentages of variations in the social and economic development services shares explained (R^2) by the independent variables is fairly high, i.e. more than 56% in all of the estimated equations. The Durbin-Watson ratio (D.W) indicates the absence of the auto correlation in each estimated equation.

It is worth mentioning that the hypothesis presented earlier in this study is confirmed when both linear and nonlinear (log form) forms are assumed. That is, there is a negative trade-offs relationship between spending on defense and spending on social and economic development services in Jordan.

Furthermore, it seems that when the relationship is assumed to be non-linear (log form), the results improved and the fit became better, i.e. higher R^2 and higher t-values.

Conclusions:

The study reported here has focused on a very specific and central question in Jordan: Did defense spending cut spending on social and economic development services in Jordan over the period 1967 to 1995? The major empirical work done in this study supports our initial hypothesis, i.e. a negative trade-offs relationship exists between spending on defense and spending on social and economic development relationship is better examined when the relation is assumed to be non-linear in Jordan. One broad implication of the present findings is that because of the lack of revenue and the importance of the size of defense expenditures in affecting other public expenditures in Jordan, there would appear to be a considerable scope for a closer integration of defense planning with economic planning, which in Jordan have so far had very little to do with each other. The introduction of standards of economic efficiency and cost-benefit analysis into defence planning might reduce the size of these expenditures, and therefore more resources could be devoted to social and economic development services in Jordan.

References and Footnotes

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(Millions JD)

Year	economic Development expenditure	Defense	Total Government expenditure	GDP at Market Price	Social Service	Security and internal order
1967	13.1	24.2	68.2	225.6	8	5
1968	12.7	35.2	80.5	200.4	8	4.8
1969	13.7	41.5	88.4	249.6	8.6	5.2
1970	12.6	33.1	80.7	228.4	10.2	5.1
1971	10	33.8	83.1	242.2	9.5	5.1
1972	19.8	39.3	101.5	281.6	10	5.9
1973	27.9	42	119.5	310.1	10.9	6.4
1974	31.5	44.5	146.6	385.7	18.4	8
1975	49.6	48.3	204.9	435.9	23.9	16.1
1976	33.9	93.3	262.5	547.4	31.6	11.4
1977	97.6	82.6	337.8	676.4	35.6	14.4
1978	106.9	88.9	361.5	779.3	40.9	16.6
1979	115	114.9	515.7	981	56.1	23
1980	142.1	118.2	563.1	1180.3	63.7	24.7
1981	151.4	138	647.1	1469.3	79.4	30.2
1982	151.1	156.7	693.5	1701.1	94.6	34.7
1983	145.9	168	705.3	1828.7	86.9	36
1984	136.8	168	720.8	1981.4	87.8	36.9
1985	159.6	190.2	805.7	2020.2	95.2	43.2
1986	179.6	209	981.3	2163.6	105.1	51.7
1987	166.7	209	965.8	2208.6	115.7	59.8
1988	160.5	209.9	1054.5	2264.4	126.5	62.3
1989	159.2	204	1102.3	2372.1	121.4	63.4
1990	147.8	205	1120.1	2668.3	135.1	66.6
1991	143.5	219	1234.2	2855.1	159.1	67
1992	149.8	220.7	1348.7	3493	185.3	72.1
1993	182.1	236	1647.8	3811.4	219	90.5
1994	216.9	272	1580.3	4190.6	243.5	105.4
1995	253.9	296	1758.8	4620.8	278.8	123.5