Military Expenditure and Employment in Turkey

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Abstract

Even though the military expenditure economic growth relationship has been intensively investigated in defence economics literature, few studies have been devoted to investigate the nature of military expenditure related employment in armed forces, civil service and in the industries that supply defence material. In the literature, there is not a general agreement concerning this issue. Military spending would increase employment, as vast numbers of workers are employed either directly by military related operations or in a variety of service or supporting roles, or spending on the armed forces may generate increased demand in the economy. However, military expenditure devoted to high-technology labour saving weapon systems can be expected to increase unemployment. The purpose of this study is to asses the importance of the military expenditure, among other things, in determining the level of employment in Turkey. Employment equation is specified using a CES production function and modelled employing ARDL technique. Our findings indicate that military expenditure negatively effects employment in Turkey.

Keywords: Military expenditure, employment, real wages, Turkey

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Introduction

The bulk of the previous studies analysing the economics of military expenditure have generally focused on the possible effects of military expenditure on economic growth. Military spending may affect output through shifts in aggregate demand in models, which are in Keynesian tradition. Other models emphasise the reallocation of resources that occurs when spending changes across sectors of the economy and the consequent loss of output and decrease in measured employment during the transition period. However, there is no general agreement regarding the question of how and in what respects, if any, military spending affects economic growth.

Empirical studies give conflicting results concerning this issue. Even though Deger (1986a, 1986b), Deger and Smith (1983), Huang and Mintz (1990), Dunne et al (2000) report a negative relationship between defence spending and growth, Biswas and Ram (1986), Grober and Porter (1989), Ward and Davis (1992), Smith (1980), Ozsoy (2000) found no significant relationship between the two variables. Benoit (1973,1978), Ward et al (1991), Sezgin (1997, 2000) and Yıldırım and Sezgin (2001) report that military expenditure enhances economic growth, by raising aggregate demand or its spin-out effects. Overall the findings are inconclusive.

Given the imperfect relationship between economic growth and job creation, another important issue would be concerned with the effects of military expenditure on employment. There are alternative views on the employment effects of military expenditures.[1] Conservative thought argues that the growth of military expenditures would reduce unemployment as vast numbers of workers are employed either directly by military-related operations or in a variety of service or supporting roles. Liberal thought, on the other hand, maintains the argument that the military spending is a concern for issues of waste, inefficiency, procurement fraud, private sector crowding out, and trade-off with the social budget, and thus increased military expenditure should result in a decrease in employment. The radical approach states that large scale military spending could bring economies out of depressions. Nations with high levels of military spending would experience defence-led economic growth and thus there would be an increase in employment. Furthermore, since 1980s there has been a perceptible shift towards

1 For a review of contemporary thinking on this issue see Carson (1987).

labour-saving high technology weapons system. Therefore, expenditure on these high-technology, capital intensive weapons can be expected to generate fewer employment gains.

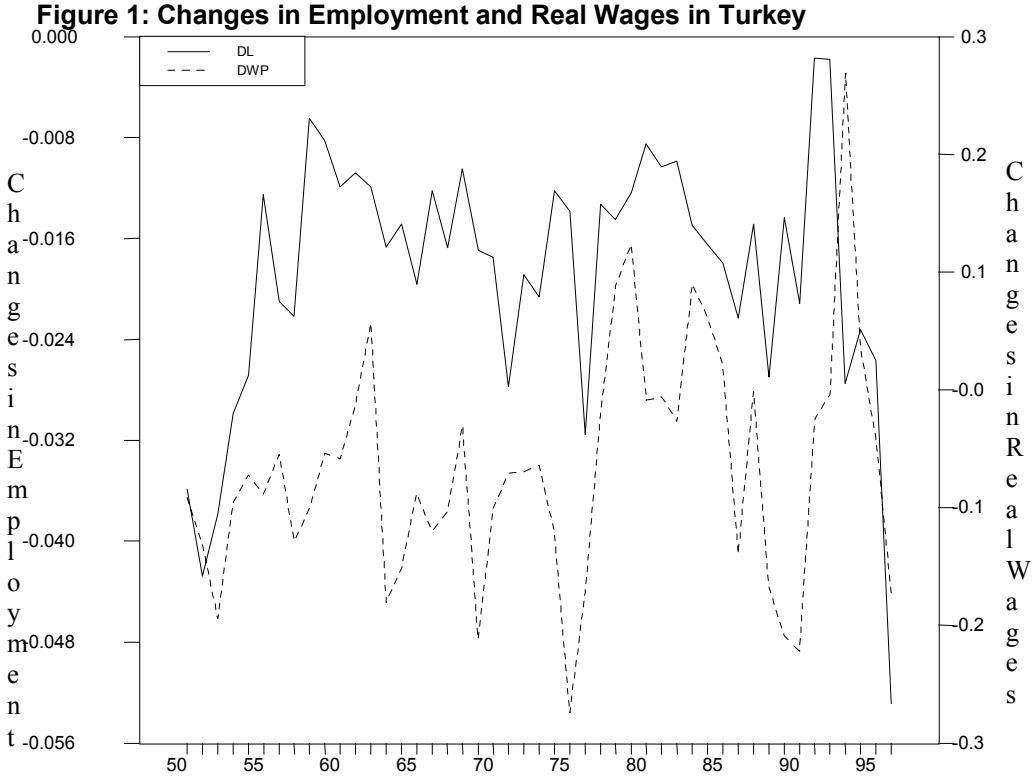
There is little empirical evidence addressing the employment effects of military expenditure employment. Smith (1978) and Chester (1978) report that unemployment rates do not improve along with military spending. Dunne (1990) argues that military expenditure and unemployment are Granger independent and the share of military expenditure does not have any significant effect on unemployment. This paper is an attempt to broaden the scope of this issue by examining the relationship between military expenditure and employment in Turkey for the time period 1950-1997, employing ARDL approach to cointegration proposed by Pesaran and Shin (1996). As Turkey's defence spending constitutes a substantial part of aggregate demand, its defence burden is the highest in NATO, one would expect a relationship between military expenditure and employment. The paper is organised as follows: the next section reviews the structure of the Turkish labour market. Section III provides a brief statement of underlying theory of the demand for labour. Estimation method is presented in Section IV. Empirical results are provided in section V. Finally section VI concludes.

I. The Structure of Labour Market in Turkey

Since the early1960s, Turkey has implemented an import substitution policy for economic growth. There has been a secular rise in employment since the 1950s until the early 1980s. The developments in employment and real wages are presented in Figure 1. The general consensus of the import-substituting era together with powerful trade unions in pre-1980 period helped to maintain high real wages. In 1974 the oil price shock and Cyprus conflict adversely affected Turkish development, then in late 1970s the Turkish economy faced a crisis. After the first oil price shock, which lead to an imported inflation real wages declined drastically from 1975 until 1980. One would expect an increase in employment in that time period. However, employment has increased only from 1975 to 1977, then falling due to the internal conflicts and closures of factories. In 1979 real gross national product had fallen for the first time in a decade and annual inflation rate was 116%.

From the early 1980s onwards there has been a change in the industrialisation strategy towards an export-led growth regime, aiming the integration of the country into the global economy. "A pro-capital incomes policy has been a major component of this process, but changes in labour law and the institutional structure of the labour market have also

Figure 1: Changes in Employment and Real Wages in Turkey



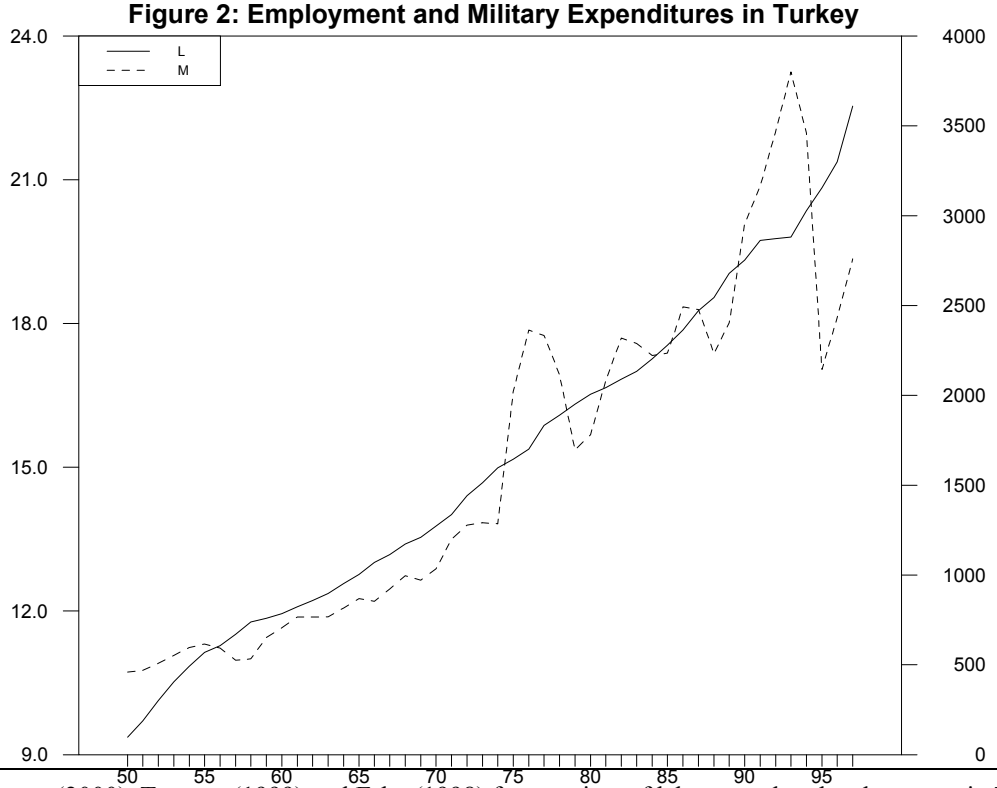
contributed significantly" (Onaran, 1999: 5). Labour union activities have been banned by the military rule of 1980-1983, which brought drastic restrictions to union activity, limiting the right to strike to collective bargaining disputes. Moreover, trade unions were not allowed in engaging political activity.

Even though export growth increased in post-1980 period, there has been a decrease in the growth rate of employment compared with the import-substitution period, with a drastic decline in real wages.[2] Before 1980 both wages and employment generally moved together. However this parallel movement has been reversed after 1980s without any significant improvement in the employment growth. In order to justify the repression of wages, it was

argued that greater openness would eventually lead to an increase in employment and real wages. However employment and real wage increases have never been achieved. With the liberalization of capital movements, government was able to increase its spending with help of foreign capital entries prior to 1989 elections. Thus in 1989-1997 period increases in real wages were recorded. Onaran (1999) argues that wage demands of the trade unions were found acceptable by the employers for two reasons: First, an increase in public spending indicated an increase in domestic demand. Second, there has been a decline in non-labour input costs due to the appreciation of the domestic currency so that wages could be increased without undermining profits. However, with the 1994 financial crisis exchange rate has depreciated sharply with large interest rate rises, reducing the real wage gains of post-1989 period.

Overall, the suppressed real wages and increased labour market flexibility have not encouraged high employment growth rates in the post-1980 period. Compared to the import-substitution period, a lower rate of growth in employment was recorded even though there has

Figure 2: Employment and Military Expenditures in Turkey



2 See Onaran (2000), Taymaz (1999) and Erlat (1998) for a review of labour market developments in Turkey.

been an increase in export growth in post-1980 period. Onaran (2000) states that the poor employment creation capacity of the Turkish economy in a period of downward flexibility of real wages points to structural problems of the economy. "The strategy of export promotion based on wage suppression proved unable to stimulate new investments and, consequently, employment growth has been weak in the absence of industrial restructuring." (Onaran 1999:9)

Figure 2 presents the employment and real military expenditures developments in the period 1950-1997. Both employment and real military expenditures exhibit an increasing trend. However, 1974 Cyprus conflict and 1991 Gulf Crisis mark jumps in military spending in these years. After 1994 financial crisis, on the other hand, there has been a sharp reduction in real military expenditures.

II. Theoretical Structure

The analysis in this paper is based on an economy, which can be represented by a constant elasticity of substitution (CES) production function.[3]

$$Y = [\alpha L^{\rho} + (1-\alpha)K^{\rho}]^{\rho} \qquad \textbf{(1)}$$

Where Y denotes output, L is the quantity of labour, K is the quantity of capital and α, ρ are parameters such that $0<\alpha<1$, $-\infty \le \rho \le 1$.

Taking the first partial derivative with respect to labour and equating the marginal product to the real wage yields

$$\alpha\left(\frac{Y}{L}\right)^{(1-\rho)} = \frac{w}{p} \qquad \textbf{(2)}$$

Where $\frac{w}{p}$ is the real wage. Taking logarithms and rearranging yields

$$LogL = A - \left(\frac{1}{1-\rho}\right)\log\left(\frac{w}{p}\right) + LogY \qquad \textbf{(3)}$$

A time trend, denoted by t, can be added to allow for Hicks-neutral technical progress to obtain the following estimating equation

$$LogL = \alpha_0 + \alpha_1 \log\left(\frac{w}{p}\right) + \alpha_2 LogY + \alpha_3 t \quad \textbf{(4)}$$

It is expected, a priori, that there would be a negative relationship between real wages and employment and a positive relationship between output and employment. Moreover, it is generally assumed that technical progress would be labour saving, thus α_3 is also expected to be negative. In order to analyse the relationship between the military expenditure and employment, it is assumed that military expenditure is a fraction of income such that

$$M = kY \quad \textbf{(5)}$$

where M denotes military expenditure and k is a constant such that 0<k<1.

When this equation is substituted in the labour demand equation, we obtain

$$LogL = \beta_0 + \beta_1 \log\left(\frac{w}{p}\right) + \beta_2 LogM + \alpha_3 t \quad \textbf{(6)}$$

In this equation β_2 would be positive indicating that military expenditure enhances economic growth, and thus creates employment. Alternatively, it would be negative, indicating either that military expenditure is a waste for the economy, or military expenditure is devoted to capital-intensive equipment, reducing labour.

IV. Estimation Method

The autoregressive distributed lag approach to cointegration (ARDL) following the methodology outlined in Pesaran and Shin (1999) is employed in this study. The main advantage of this procedure is that it can be applied regardless of the stationary properties of the variables in the sample and allows for inferences on long-run estimates, which is not possible under alternative cointegration procedures. Moreover, the number of variables in the model may be large, contrary to the VAR models.

Pesaran and Shin (1997) consider well-known ARDL model given by

$$\phi(L)y_t = \alpha_0 + \alpha_1 w + \beta'(L)x_i + + u_t \quad \textbf{(7)}$$

where

3 See Hamermesh (1993) for a comprehensive analysis of the demand for labour.

$$\phi(L) = 1 - \sum_{i} \phi_i L^i$$

$$\beta(L) = \sum_{j} \beta_j L^j$$

and L is the lag operator and w_t is a s×1 vector of deterministic variables such as the intercept term, seasonal dummies, time trends or exogenous variables with fixed lags.

Most of the standard model specifications can easily be derived by imposing restrictions on the parameters. For example, the standard static model can be obtained by imposing the restriction $\beta_1 = \phi_1 = 0$. The restrictions $\beta_1 = 0$ and $\phi_1 \neq 0$, on the other hand, implies the partial adjustment mechanism. The corresponding long run solution to equation (7)

$$\delta = \alpha_1 / \phi(1),\ \theta = \beta / \phi(1) \qquad \textbf{(8)}$$

is invalid but they provide an alternative method, which yields consistent estimates of the parameters and their standard errors.[4]

The ARDL approach to cointegration consists of three steps. In the first step the existence of a long-run relationship between the variables is established by testing for the significance of lagged variables in an error correction mechanism regression. In this paper the regression estimated in the first step is

$$DL = a_0 + \sum_{i=1}^{4} bDL_{t-i} + \sum_{i=0}^{4} cDWP_{t-i} + \sum_{i=0}^{4} dDM_{t-i} + e_i \qquad \textbf{(9)}$$

where DL is the difference in logarithms of employment

DWP is the difference in logarithms of real wages

DM is the difference in logarithms of real military expenditure.

Then the first lag of the levels of each variable are added to the equation to create the error correction mechanism equation and a variable addition test is performed by computing an F-test on the significance of all the lagged variables. The error correction version of the ARDL (4,4,4) model in this study is

4 For an elaborate analysis of ARDL approach to cointegration see Pesaran et al (1996) and Pesaran and Shin (1997).

$$DL = a_0 + \sum_{i=1}^{4} b_i DL_{t-i} + \sum_{i=0}^{4} c_i DWP_{t-i} + \sum_{i=0}^{4} d_i DM_{t-i} + \delta_1 L_{t-1} + \delta_2 WP_{t-1} + \delta_3 M_{t-1} + e_i \quad \textbf{(10)}$$

The hypothesis that will be tested is the null of non-existence of the long-run relationship defined by

$H_0 : \delta_1 = \delta_2 = \delta_3 = 0$

against

$H_1 : \delta_1 \neq 0,\ \delta_2 \neq 0,\ \delta_3 \neq 0$

The relevant statistic is the F-statistic for the joint significance of δ_1, δ_2 and δ_3. The tests are distributed according to a non-standard F-statistic irrespective of whether the explanatory variables are stationary or non-stationary. The critical value bounds for these tests are computed by Pesaran *et al.* (1996). If the F statistic exceeds the upper bound of the critical value band the null of no long-run relationship between the variables can be rejected irrespective of their order of integration. If the F test lies below the lower bound, then the long-run relation ship can be rejected. However if the computed statistic falls between the two bounds then the standard techniques for unit roots should be applied.

The second stage is to estimate the ARDL form of equation (7) where the optimal lag length is chosen according to one of the standard criteria such as the Akaike Information or Schwartz Bayesian. Then the restricted version of the equation is solved for the long-run solution. The third stage entails the estimation of the error correction equation using the differences of the variables and the lagged long-run solution, and determines the speed of adjustment of employment to equilibrium.

The above procedure is carried out for equation (7) using the logarithms of total employed labour force (L), real wage (WP) and real military expenditure (M). GDP deflator is used to deflate the wages and GDP: The defence expenditure is taken from various issues of SIPRI yearbooks. GDP, GDP deflator, total employment, and annual payments made to employee data are taken from State Institute of Statistics yearbooks.

V. Empirical Results

Before moving on to the estimation of the employment equation, a decision has to be made

regarding how to account for the changes in the wage dynamics in the passage from import substitution to export orientation, together with the different phases of structural adjustment, namely during the periods 1950-1973, 1974-1979, and 1980-1997. In order to capture these different dynamics, the employment variable is taken as a separate variable for each period, rather than introducing dummy variables with respect to a base period, following Onaran (1999). Thus, the signs and significance levels of the coefficient in different periods can be examined, without referring to the joint t-tests. Accordingly, the employment equation is modified as follows:

$$DL = a_0 + \sum_{i=1}^{4} b_i DL_{t-i} + \sum_{i=0}^{4} c_{i1} DWP5073_{t-i} + \sum_{i=0}^{4} c_{i2} DWP7479_{t-i} + \sum_{it=0}^{4} c_{i3} DWP8097_{t-i}$$

$$+ \sum_{i=0}^{4} d_i DM_{t-i} + \delta_1 L_{t-1} + \delta_{21} WP5073_{t-1} + \delta_{22} WP7479_{t-1} + \delta_{23} WP8097_{t-1} + \delta_3 M_{t-1} + e_1 \qquad \textbf{(11)}$$

The error correction mechanism tests for the existence of a long-run relationship are carried out for the variables, which are total employment in each period, real wages and real military expenditure. A trend term, which is supposed to capture the effects of technical progress, is also included in the models. The inspection of preliminary estimations indicated that there are outliers in the models. Two dummy variables are included in the model, which are D74 taking the value of one for 1974 to capture the effects of Cyprus conflict and D94 taking the value of one in 1994 to capture the effects of financial crisis in Turkey. The F value for the long-run significance test is F(5,13)= 8.1043(0.001), which is significant at 1 Per cent level indicating that there is a long-run relationship between the variables considered.

After establishing the existence of long-run relationship among the variables, the regression results are obtained. The labour demand equation for employment is estimated using ARDL method and all estimations are carried out by using Microfit 4.0. The equations are estimated using several optimisation criteria. The underlying ARDL equation also passes all diagnostic tests. The F statistic is also highly significant and the Durbin-Watson statistic does not indicate any sign of serial correlation.

The short-run error correction estimates presented in Table 1, reveal that changes employment is affected by its lagged values, third lag being the most significant one. Past values of employment lead to higher employment in the following years. The most striking observation

in Table 1 is the varying effect of changes in real wages on employment among periods.[5] The coefficient of real wage in the periods 1950-1973 and 1980-1997 are negative and significant, as expected, indicating an inverse relationship between employment and real wages. However, the real wage coefficient for the time period 1974-1979 is significantly positive, suggesting that real wages and employment move together. As pointed out in Onaran (2000a), There have been increases in unemployment during 1974-1979 period. However, the powerful trade unions and the political conjuncture of the period made the trade unions powerful enough to resist an offer for wage decreases in spite of rising unemployment.

5 This finding is in line with the findings reported in Onaran (1999), where the wage setting mechanism in Turkey has been investigated.

Table 1: Error Correction Model for Employment

Dependent Variable ΔL		
	Coefficients	t statistics
ΔL1	0.1444	1.0687
ΔL2	0.2417	1.8617
ΔL3	0.3170	2.2708
ΔWP5073	-0.0137	-1.9651
ΔWP7479	0.0017	4.0656
ΔWP8097	-0.0007	-1.7268
ΔM	-0.0369	-4.1585
ΔM1	0.0225	2.6068
ΔM2	-0.2014	-1.8746
ΔTREND	0.0101	5.3362
ΔCONS	4.8908	4.7229
ΔD74	-0.2320	-3.1308
ΔD94	0.0101	1.5230
ECM(-1)	-0.4842	-4.4068
R^2=0.7750	DW=1.8643	F(13,30)=7.4196

Here ECM is the error correction term, Δ denotes the first difference and

ΔL1=L(-1)-L(-2) ΔL2=L(-2)-L(-3)

ΔL3=L(-3)-L(-4) ΔM1=M(-1)-M(-2)

ΔM2=M(-2)-M(-3) ΔM3=M(-3)-M(-4)

The change in military expenditure has a negative and significant effect on employment. However, when the lags of military expenditure growth are considered, the first lag has a significantly positive but the second lag has a significantly negative effect on employment growth. The changes in trend, which is assumed to represent technological

progress has a positive effect on employment growth, contrary to our expectations. This could be due to the imports of inefficient labour intensive technology from abroad, as labour is relatively cheap in Turkey compared to other parts of the world.

When the dummy variables are considered, the Cyprus conflict dummy has a negative effect on employment growth as increased military expenditure in that year might have reduced the funds available for other productive purposes. 1994 financial crisis dummy, on the other hand, has a marginally significant and positive effect on the changes of employment. Due to the high levels of inflation in that year, there has been a fall in real wages (see Figure 1), which might have contributed to an increase in employment. The ECM coefficient, estimated at –0.4842, is statistically highly significant, reflecting the joint significance of the long-run coefficients. Additionally, the ECM coefficient is quite high indicating a quick adjustment to any disequilibrium in the short run. The larger the error correction term (in absolute value) the faster the economy's return to the equilibrium, once there has been a shock.

Table 2: Estimated Long-Run Coefficients:

Dependent Variable L		
	Coefficients	t statistics
WP5073	-0.0028	-2.1169
WP7479	0.0069	3.4888
WP8097	-0.0015	1.7333
M	-0.1054	-3.1819
CONS	10.1009	26.3029
TREND	0.0207	13.9286
D74	-0.0479	-2.8246
D94	0.2105	1.3361

The estimated long-run coefficients are presented in Table 2. The long-run solution of the estimated ARDL model is in line with the findings reported in the short-run model. Every variable is significant, except the 1994 dummy. Military expenditure has a negative effect on

employment in the long run. Real wages in periods 1950-1973 and 1980-1997 has a negative effect on employment and that of 1974-1979 period has a positive effect, as explained above.

VI. Conclusion

This paper is motivated by the positive relationship between military expenditure and economic growth in Turkey, reported by Yıldırım and Sezgin (2001), even though other empirical studies give conflicting empirical results on this issue. Given the imperfect relationship between economic growth and job creation, this paper has empirically investigated the effects of military expenditure on employment in Turkey over the period 1950-1997, employing ARDL approach to cointegration.

The empirical findings indicate that military expenditure negatively affects employment both in the short run and in the long run. Even though this seems contrary to the findings of Yıldırım and Sezgin (2001), when the nature of military spending is considered, it becomes plausible. The great part of military expenditure in Turkey has been devoted to arms and capital-intensive technology imports form abroad. As Carson (1987) points out the additional money spent on these high technology, capital intensive areas generate fewer and fewer employment gains.

Moreover, this study has highlighted the volatile nature of labour market in Turkey. The changes in wage dynamics in the passage from import substitution to export orientation, and in the adjustment periods in between, have been accounted for by taking the employment as a separate variable for each phase. It has emerged that real wages and employment move together in the adjustment period, whereas there is a negative relationship between these variables in other phases. Additionally, the coefficient of time trend, which is supposed to represent the labour saving technological changes, is found to be positive, suggesting that Turkey might have imported inefficient labour intensive technology from abroad. The analysis provided an adjustment coefficient of 0.42, indicating that 42 per cent of disequilibrium in income is eliminated every year and the disequilibriums are corrected quite quickly.

Overall, even though there is an argument against high military expenditures for developing countries as the scarce resources are allocated to unproductive projects, it appears

that for Turkey this is not the case. Increased military expenditure leads to economic growth in Turkey. However, even though a major part of military spending is allocated to payments of salaries to armed forces, this does not seem to induce a demand increase enough to cause an increase in employment. Rather, high technology, capital-intensive military arms imports seem to negatively affect employment in Turkey.

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