MARKUPS AND WELFARE COSTS OF BUSINESS CYCLES IN TURKEY

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ABSTRACT

The paper, using a simple theory-based measure of the variations in aggregate economic efficiency in a New Keynesian structure, analyses the nature of the business fluctuations and estimates their welfare costs in Turkey during the period 1998–2009. The measure contains two components: a price markup and a wage markup. It seems that the latter mainly drives the fluctuations in Turkey. The paper also shows that inefficient fluctuations in the allocation of resources do generate moderate welfare costs on average. However, the aggregate efficiency costs increase much more during deep recessions.

Keywords: business cycles, countercyclical markups, welfare costs

JEL classification numbers: E32

I. INTRODUCTION

Keynesian literature mainly claims that to the extent that there exist price and wage rigidities, or possibly other types of market frictions, the business cycle is likely to involve inefficient fluctuations in the allocation of resources. This paper mainly searches for the relevance of the Keynesian view of the cycle for Turkey. For this we use the Gali et al. (2007) model to provide a quantitative assessment of the business cycles in Turkey.

The measure proposed for a quantitative assessment of the business cycles—called ‘the inefficiency gap’ or ‘the gap’—is based on the size of the wedge between the marginal product of labour and the marginal rate of substitution between consumption and leisure. The existing literature has studied this measure in simple versions of the standard business cycle model (see, for instance, Hall, 1997; Mulligan, 2002; Chari, et al., 2007; Gali, et al., 2007; Shimer, 2009). Deviations of this gap from zero can be interpreted as a measure of inefficiency in the economy. Furthermore the gap can be decomposed into a wage markup (the deviation of the wage from the marginal rate of substitution) and a price markup. This approach differs from much of the recent literature on business cycles and markups by allowing for the possibility that the movement in the overall markup depends on variation in a wage markup as well as in a price markup. This lets us to see the relative importance of price versus wage rigidities for overall fluctuations in

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the inefficiency gap. In this respect, we are able to ascertain not only the degree of cyclical inefficiency but also the extent to which product market versus labour market rigidities may be responsible.

By constructing a time series measure of the inefficiency gap, we are able to obtain some insight into both the nature and welfare costs of business cycle. This paper helps us to understand this fact in the special case of Turkey. Although Turkey has been facing deep economic crises over decades, surprisingly little is known about how large are the costs of business cycles in Turkey because, to the best of our knowledge, there is no empirical study about this issue. Moreover, this issue still remains an open question for other developing countries as well since there exist only a few studies about this issue (e.g., Ramey and Ramey, 1995; Pallage and Robe, 2003). The empirical studies have been confined largely to the developed countries, especially the USA. Hence this study aims to fill such a gap in a simplified theoretical structure.

The empirical analysis in Turkey during the period 1998–2009 points to the fact that the inefficiency gap exhibits large procyclical swings, thus implying that deviations of this gap can be interpreted as a measure of inefficiency in the economy. In addition, most of its variation is associated with countercyclical movements in the wage markup, while the price markup has a relatively weak contemporaneous relation with the inefficiency gap. These large and dominant fluctuations in the wage markup detected in our empirical analysis point to the importance of wage rigidities. These results are also consistent with the findings of recent studies (e.g., Sbordone, 2000; Christiano et al., 2001; Mulligan, 2002; Comin and Gertler, 2006; Chari et al., 2007). Therefore, since it seems that wage rigidities dominate the observed fluctuations in wage markups, these kinds of labour market frictions should be taken into account in the design of economic policies in Turkey.¹

We also consider the possibility that preference shocks underlie the variation in our gap measure. The macroeconomic literature has discussed whether these movements in the labour wedge are endogenous markups or exogenous shocks. Hall (1997) treats this wedge simply as an exogenous driving force, interpretable, for example, as reflecting shifts in preferences. Subsequent literature followed this approach. However, several studies (e.g., Rotemberg and Woodford, 1999; Gali et al., 2007; Shimer, 2009) discussed other possibilities. For example, Shimer (2009) is sceptical to the idea that movements in the labour wedge are due to exogenous shocks to preferences or markups. He instead favours an explanation based on search frictions and real wage rigidities. Gali et al. (2007) focus on the endogeneity of wage markups and find such evidence in the USA, as in Rotemberg and Woodford (1999). The evidence in Turkey also supports this, thus the variation in markups in Turkey is endogenous and is largely responsible for the movement in the inefficiency gap.

In the paper we also show that the average welfare cost of the fluctuations in Turkey for the period 1998–2000 is moderate, but the average efficiency costs increase up to about 8 percent as we reduce labour supply elasticity and increase risk aversion. Since there is no empirical evidence concerning how large are the costs of business cycles in Turkey, it is not possible to compare our results with other studies. However, it seems that the welfare costs of business fluctuations in Turkey are notably higher than the findings of most of the studies done for the US economy (e.g., Lucas, 1987; Imrohoroglu, 1989; Gali et al., 2007), but lower than the mean of the welfare costs in developing countries (Pallage and Robe, 2003).

However, we should express that our estimates of the efficiency costs of business fluctuations are likely to be conservative from various perspectives. First, since the model used in the paper only considers welfare deviations from steady state, the welfare losses may be underestimated.¹

¹ See, e.g., Christiano et al. (2005) for discussions about the design and effects of monetary policies under labour market frictions.
Second, it does not take into account the welfare costs of inflation variability that may be associated with cyclical fluctuations. Rotemberg and Woodford (1999) and several other studies suggest that these efficiency costs may be highly significant. Third, it is clear that our assumption of a representative household neglects an important role for microeconomic heterogeneity, hence disregarding asymmetrical effects of business fluctuations on households.\(^2\)

Finally, using our gap measure it is possible to derive a measure of the lost surplus in the labour market at each point in time, which differs significantly from Lucas (1987, 2003), who examines the welfare costs of consumption variability associated with the cycle. Thus our approach permits not only a measure of the costs of fluctuations on average, but also an assessment of the costs of particular episodes. When looking at the aggregate efficiency costs at each point in time, it increases much more during deep recessions; for example, there is a welfare cost of about 10 percent of yearly consumption for the recession of the late 1990s, even for low labour supply inelasticity and risk aversion levels. The recessions do indeed reduce welfare more than expansions increase it. This supports the Keynesian argument of asymmetry between recessions and expansions. In this regard, our measure may give a better sense of the potential gains from improved stabilization policy in Turkey.

Our paper is organized as follows. We introduce the gap variable in Section II. Next we give the estimation techniques and the empirical results in Section III. Finally, we conclude in Section IV.

**II. THEORETICAL METHODOLOGY**

Following the approach developed by Gál et al. (2007), we can observe variations in the aggregate level of (in)efficiency by a variable called \(\text{gap}\)

\[
\text{gap}_t = \text{mrs}_t - \text{mpn}_t,
\]  

where \(\text{mrs}_t\) and \(\text{mpn}_t\) denote, respectively, the (log) marginal rate of substitution between consumption and leisure and the (log) marginal product of labour.

We now relate the gap to the markups in the goods and labour markets. Under the assumption of wage-taking firms, and in the absence of labour adjustment costs, the nominal marginal cost is given by \(w_t - \text{mpn}_t\), where \(w_t\) is (log) compensation per additional unit of labour input. So the price markup is given by

\[
\mu^p_t = p_t - (w_t - \text{mpn}_t),
\]  

where \(\text{mpn}_t = y_t - n_t\); here \(y_t\) is output per capita and \(n_t\) is hours per capita.

The wage markup is given by

\[
\mu^w_t = (w_t - p_t) - \text{mrs}_t,
\]  

Equation (3) corresponds to the difference between the real wage and the marginal disutility of work, both expressed in terms of consumption.

Using (1), (2), and (3), we get

\[
\text{gap}_t = -\left(\mu^p_t + \mu^w_t\right)
\]  

\(^2\) In fact, although it is clear that the representative agent approach misses much of the richness that we observe in the world, it is less clear that this has important effects on the business cycle properties of models. For example, Krusell and Smith (1998), in a non-representative agent business cycle model with uninsurable idiosyncratic risk and discount factor heterogeneity, show that the business cycle properties of the model are virtually identical to an analogous representative agent model.
TABLE 1
Growth rates in turkey

<table>
<thead>
<tr>
<th>Period</th>
<th>Mean (%)</th>
<th>SD (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1998.I–2002.I</td>
<td>−0.02</td>
<td>2.81</td>
</tr>
<tr>
<td>1998.I–2009.I</td>
<td>0.65</td>
<td>2.57</td>
</tr>
</tbody>
</table>

Since it is expected that $\mu_t^p \geq 0$ and $\mu_t^w \geq 0$ for all $t$, $\text{gap}_t \leq 0$ for all $t$. An increase in the gap variable implies a decrease in the distortions of economic activities.

Assume that a representative agent’s utility function with the following preferences is given by

$$U(C_t, N_t) = \frac{1}{1 - \sigma}C_t^{1-\sigma} - \frac{1}{1 + \phi}N_t^{1+\phi}$$  (5)

where $C_t$ and $N_t$ denote consumption and hours, respectively. Hence the (log) marginal rate of substitution for a representative consumer given by (5) can be written (up to an additive constant) as

$$mrs_t = \sigma c_t + \phi n_t - \xi_t$$  (6)

where $c_t$ is (log) consumption per capita and $\xi_t$ is a low frequency preference shifter, $\sigma$ is related to the coefficient of relative risk aversion and $\phi$ measures the curvature of the utility function.

We now discuss the estimation of the preference shifter, $\xi_t$. Define

$$\tilde{\mu}_t^w = (w_t - p_t) - (\sigma c_t + \phi n_t)$$  (7)

This implies that the wage markup can be written as

$$\mu_t^w = \tilde{\mu}_t^w + \xi_t.$$  (8)

Since $\tilde{\mu}_t^w$ is the observable component of the wage markup given the values of $\sigma$ and $\phi$, then we can decompose this observable variable as cycle component $\mu_t^w$ and (minus) the ‘trend’ component $\xi_t$. We estimate the low frequency movements of the wage markup $\tilde{\mu}_t^w$ by using the Hodrick–Prescott (HP) filter.

III. ESTIMATION AND EMPIRICAL EVIDENCE

Our evidence is based on the quarterly Turkish data over the sample period 1998.I–2009.I.\textsuperscript{3} We used this sample period because the new time series developed by the Turkish Statistical Institute starts in 1998. This period is important due to the fact that it includes both highly stable segments (2004–2007) and deep recessions in 1999–2001 and 2008. Therefore it is crucial to measure the welfare costs of economic fluctuations throughout this period.

As can be seen in Table 1, the most stable and highest average growth period is 2002.I–2008.I. The other sub-periods of 1998.I–2002.I and 2008.I–2009.I are highly unstable periods and have

\textsuperscript{3} The data used to construct the gap variable and its components were obtained from the Turkish Statistical Institute database. The time series used include compensation per hour, hours all persons, real and nominal output, and private consumption. In addition we also use population over sixteen to express variables in per capita terms, real output, implicit GDP deflator, the 3-month Treasury Bill rate, and a consumer price index.
lower average growth rates. It clearly seems that there is a positive connection between stability
and average growth along the whole period.

In line with Galí et al. (2007), we assume that the price markup fluctuates around some con-
stant value. Figure 1 shows that there is a countercyclical movement in price markup under our
baseline assumptions of $\sigma = 1$ and $\varphi = 1$, which are incompatible with many theoretical and
empirical studies. Figure 2 presents the times series measure of our gap variable under our
baseline assumptions of $\sigma = 1$ and $\varphi = 1$. This variable co-moves strongly with the business
cycle, displaying large declines during recessions.

We then decompose the movements of the gap into its wage and price markup components
using (2) and (8). Figure 3 shows the behaviour of the gap against the wage markup (both
relative to their means) in Turkey for the period 1998–2009. We plot the inverse of the wage
markup for visual inspection. It is seen that there is a strong co-movement between the gap and
the (inverse) wage markup. This means that the evidence shows that the inefficiency gap seems
to be greatly driven by countercyclical movements in the wage markup. This in turn suggests
that some form of wage rigidity, either real or nominal, may be central to business fluctuations
in Turkey.

Table 2 reports some basic statistics that support the visual evidence in Figures 1, 2, and
3. In particular, Table 2 gives a set of second moments for the gap, its two components (the
wage and price markup), and detrended (log) GDP using the HP filter, representing the business
cycle.

\footnotetext[4]{The parameter $\varphi$ is given by the inverse of the Frisch wage elasticity of labour supply, which has been estimated to fall in the interval between 0.05 and 0.5 in the micro literature (see, e.g., Card, 1994) and to have values of unity and higher in the macro literature (see, e.g., Cooley and Prescott, 1995). In a similar way, there is a controversy between the macro and micro literature over the value of the coefficient of relative risk aversion, $\sigma$. We choose to use $\sigma = 1$, which has been suggested by Lucas (1987), in addition to $\sigma = 5$.}

\footnotetext[5]{We also checked the robustness of the cyclical components of the (log) GDP to an alternative detrending, which is the band-pass filter. Both filters give similar results.}
Note first that the percent standard deviation of the gap is much larger relative to detrended output. Furthermore, the wage markup and price markup are nearly as volatile as the overall gap as can be seen in Table 2, but they are weakly negatively correlated with each other. However, both wage markup and price markup are strongly negatively correlated with detrended GDP. This confirms the visual evidence that movements in the gap are strongly associated with
TABLE 2

(baseline calibration (σ = 1, ϕ = 1))

<table>
<thead>
<tr>
<th>Variable</th>
<th>SD (%)</th>
<th>GDP</th>
<th>Gap</th>
<th>Price markup</th>
<th>Wage markup</th>
</tr>
</thead>
<tbody>
<tr>
<td>GDP</td>
<td>3.77</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gap</td>
<td>11.96</td>
<td>0.72</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Price markup</td>
<td>8.53</td>
<td>−0.51</td>
<td>−0.30</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Wage markup</td>
<td>8.81</td>
<td>−0.48</td>
<td>−0.90</td>
<td>−0.12</td>
<td>1</td>
</tr>
</tbody>
</table>

GDP represents the (log) GDP detrended by the HP filter.

TABLE 3

Alternative measures of technology (CES production function)

<table>
<thead>
<tr>
<th>Variable</th>
<th>SD (%)</th>
<th>GDP</th>
<th>Gap</th>
<th>Price markup</th>
<th>Wage markup</th>
</tr>
</thead>
<tbody>
<tr>
<td>GDP</td>
<td>3.77</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gap</td>
<td>12.91</td>
<td>0.75</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Price markup</td>
<td>8.07</td>
<td>−0.60</td>
<td>−0.36</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Wage markup</td>
<td>8.81</td>
<td>−0.48</td>
<td>−0.89</td>
<td>−0.08</td>
<td>1</td>
</tr>
</tbody>
</table>

GDP represents the (log) GDP detrended by the HP filter.

countercyclical movements in the wage markup and price markup. On the other hand, while the wage markup exhibits a strong contemporaneous correlation with the gap, the price markup does not show a strong contemporaneous correlation with the gap.

We also show that the gap measure is robust to alternative assumptions about production that yield alternative measures of the marginal product of labour. Our baseline case is based on Cobb–Douglas production function, which assumes constant elasticity of output with respect to hours. We modified Cobb–Douglas to constant elasticity of substitution (CES) production function. We follow the parametrization recommended in Rotemberg and Woodford (1999). As Table 3 indicates, our gap measures are quite robust to this alternative assumption.

III.1 Preference shocks and the gap

Hall (1997) defines the marginal rate of substitution with a preference shock $\xi_t$ that has a cyclical component, $\tilde{\xi}_t$, and a trend component, $\bar{\xi}_t$:

$$mrs_t = c_t + \varphi n_t - \xi_t$$ (9)

where $\xi_t = \tilde{\xi}_t + \bar{\xi}_t$.

The difference between $mrs$ and $mpn$ is defined as the residual $x_t$. Using the marginal rate of substitution allowing for preference shocks and the inefficiency gap, it is possible to express $x_t$ as follows

$$x_t = (mrs_t - mpn_t) + \xi_t$$

$$= -\left(\mu_p + \mu_w\right) + \xi_t$$ (10)
TABLE 4
Granger causality tests

<table>
<thead>
<tr>
<th>Variable</th>
<th>Baseline</th>
<th>CES</th>
</tr>
</thead>
<tbody>
<tr>
<td>GDP</td>
<td>0.01</td>
<td>0.01</td>
</tr>
<tr>
<td>Nominal interest rate</td>
<td>0.03</td>
<td>0.02</td>
</tr>
</tbody>
</table>

The values reported are p-values for the null hypothesis of no Granger causality from each variable to Hall x.

If there is perfect competition in both goods and labour markets as assumed by Hall (1997), then we have \( \mu^c_t = \mu^w_t = 0 \). So the variable \( x_t \) can be assessed as a preference shock, hence \( x_t = \xi_t \). Thus the gap variable is modelled by Hall (1997) as a preference shock rather than the countercyclical markup behaviour in his study. If the gap indeed reflects exogenous preference shocks, it should not depend on exogenous disturbances. We now present two tests regarding whether the preference shock hypothesis is valid or not.

We first test the hypothesis of no-Granger-causality. The variables we use are detrended GDP and the nominal interest rate. The nominal interest rate represents a measure of the monetary policy, while detrended GDP is treated as a cyclical indicator. Table 4 gives the p-values for several Granger-causality tests. They indicate that the null of no Granger-causality from the relevant variable to the gap variable is rejected for all specifications. This is also robust to alternative calibrations of \( \sigma \) and \( \varphi \). In short, the Granger causality test does not verify the hypothesis that \( x_t \) mainly reflects variations in preferences.

The dynamic response of our gap variable to an exogenous monetary policy shock can also be used as a kind of test. It is based on a VAR that includes measures of the gap variable, the wage markup, output, the price level, and the interest rate. We identify the monetary policy shock as the orthogonalized innovation to the interest rate, under the assumption that this shock does not have a contemporaneous effect on the other variables.

Figure 4 shows the estimated responses to a contractionary monetary policy shock. The responses of the output, prices, gap and markups are very similar to those found in Galí et al. (2007). It seems that the gap declines significantly in response to the unanticipated monetary shock (negative). Its response is very similar to the response of output. Hence this endogenous reaction is inconsistent with the preference shock hypothesis.

Notice that the monetary shock induces a rise in the wage markup that mirrors the decline in the gap. This countercyclical movement in the wage markup is consistent with evidence on correlations presented in Table 2. Although we did not give it here, the price markup also rises, though with a significant lag. The sluggish behaviour of the price markup can give a clue about the inertial behaviour of inflation, manifested by the delayed response of inflation to the monetary shock as shown in Figure 4.

III.2 Welfare losses of business cycles

The economy is assumed to fluctuate around a constant gap level:

\[
\frac{MRS_t}{MPN_t} = \exp(-\mu) = 1 - \Phi < 1
\]

where \( \overline{MRS} \) and \( \overline{MPN} \), denote steady state values of \( mrs \) and \( mpn \), respectively, and \( \mu \) is the steady state value of the gap variable. We set \( \mu \) equal to 0.5. This in turn leads to \( \Phi \approx 0.5 \),
Fig. 4. Dynamic effects of monetary shocks in Turkey for the period 1998–2009.
which is also the the benchmark calibration proposed by Gali et al. (2007) and is consistent with the sum of the plausible steady state wage and price markups.\textsuperscript{6}

In order to obtain a welfare loss that is a function of only the gap, we need two additional assumptions: (i) in line with Gali et al. (2007) that the entire output is consumed, thus $\tilde{c}_t = \tilde{y}_t$; and (ii) the capital stock is proportional to the number of working hours, thus $y_t = a_t + n_t$, implying $\tilde{n}_t = \tilde{y}_t$.\textsuperscript{7}

Hence we can write a second order approximation of the utility function (5) from its steady state as follows:

$$
\Delta_t = U(C_t, N_t) - U(\overline{C}_t, \overline{N}_t) = \overline{U}_{c_t} \frac{1}{2} \varphi \left( \tilde{c}_t + \frac{1 - \sigma}{2} \tilde{c}_t \right) + \overline{U}_{n_t} \frac{1}{2} \varphi \tilde{n}_t + \frac{1 + \varphi}{2} \tilde{n}_t^2 \tag{12}
$$

where $\tilde{c}_t = \log(C_t)$, $\tilde{n}_t = \log(N_t)$, $\varphi = -\frac{\varphi_{nn}}{\varphi_{cc}}$, and $\sigma = -\frac{\varphi_{cc}}{\varphi_{cc}}$.

Using two assumptions above and the marginal rate of substitution defined in (6), we obtain

$$
\hat{\text{gap}}_t = (\sigma + \varphi) \tilde{y}_t \tag{13}
$$

where $\hat{\text{gap}}_t = \text{gap}_t - \text{gap}$, which denotes the difference between the gap and the steady-state gap.

Let $\omega$ denote the utility deviation expressed in consumption units. Inserting (13) into (12) gives

$$
\frac{\Delta_t}{\overline{U}_{c_t} \overline{C}_t} = \frac{1}{\sigma + \varphi} \left[ \Phi \hat{\text{gap}}_t - \Psi \hat{\text{gap}}_t^2 \right] = \omega(\hat{\text{gap}}_t) \tag{14}
$$

where $\Psi = \frac{1}{2} \left[ 1 - \frac{(1-\varphi)(1+\varphi)}{\sigma + \varphi} \right]$.

Since, by assumption, $\hat{\text{gap}}_t$ is zero on average and hence the expected value of $\hat{\text{gap}}_t^2$ becomes a variance, we obtain

$$
E \left\{ \frac{\Delta_t}{\overline{U}_{c_t} \overline{C}_t} \right\} = -\frac{\Psi}{(\sigma + \varphi)} \text{var}(\hat{\text{gap}}) \tag{15}
$$

where $\text{var}(\hat{\text{gap}})$ is the variance of the gap.

Using the above methodology we present the average welfare cost of the fluctuations in Turkey for the period 1998–2000 in Table 5. We estimate the average welfare cost for alternative measures of the parameters $\sigma$ and $\varphi$ based on Equation (15). For the baseline case ($\sigma = 1$ and $\varphi = 1$), the average efficiency cost of the business fluctuations in Turkey is about 2.5 percent of steady state consumption. The estimates of efficiency losses go up as we increase labour

\textsuperscript{6} This range is also consistent with the evidence of price markup in Rotemberg and Woodford (1999) and wage markup in Mulligan (2002).

\textsuperscript{7} We assume a Cobb–Douglas production function, hence we obtain $Y = (kN)^{1-\alpha} N^\alpha$, thus output is proportional to working hours, which is reasonable in the short run.
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Fig. 5. The welfare effects of fluctuations in Turkey for the period 1998.1–2009.1 (baseline calibration).

supply inelasticity and risk aversion. For example, with the parameters of $\sigma = 5$ and $\varphi = 5$, the average efficiency costs increase to about 8.4 percent.

We can use Equation (14) to calculate a time series of the efficiency gain or loss in each quarter. Using the baseline parametrization, Figure 5 shows the resulting time series over the sample 1998.1–2009.1. The value at each period can be interpreted as the efficiency gain or loss in percentage units of consumption associated with the deviation of the inefficiency gap from its steady state. Figure 5 indicates that while efficiency-based welfare losses during the major recession in 2001 are on average around 10 percent of period consumption, they are about 4 percent in the 2008 recession. This implies that any measure of the average cost of business cycles, however, obscures the fact that individual recessionary episodes may be rather costly. Furthermore, during the major recessions these large welfare losses tend to persist for a number of years.

IV. CONCLUSION

We aim at analysing and measuring business cycle costs in a realistic economy with market imperfections. The Turkish empirical evidence shows that business cycle fluctuations are associated with large variations in the degree of aggregate efficiency in the economy. It also shows that the markup is highly countercyclical in Turkey. This countercyclical markup variation is driven primarily by labour market behaviour, hence labour market frictions are the key factor. Another message of this paper is that to the extent that our markup interpretation of the efficiency gap is correct, business cycles may involve significant welfare costs in Turkey, especially during deep recessions.

Since business cycles lead to a varying gap between the actual level of activity and the social optimum in Turkey, such fluctuations have important welfare implications which may
call for an active economic policy. However, further research is needed to assess how the relative importance of nominal/real wage and price rigidities affect the design of an optimal monetary policy for the Turkish economy.

We should also emphasize that our estimates of the welfare costs of business fluctuations are likely to be conservative because they do not take into account some factors such as the welfare costs of inflation variability that may be associated with cyclical fluctuations and microeconomic heterogeneity. Recent studies suggest that these factors may be highly significant. Accounting for these factors in the overall welfare measure is something that can be a subject for future research.

REFERENCES


