

# Benefit-Cost Analysis of Reforming the Turkish Social Insurance Institution for the Self- Employed (Bağ-Kur)<sup>1</sup>

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## Abstract

The purpose of this study is to estimate social benefits and social costs associated with a Feldsteinian-type gradual privatization of the Turkish Social Insurance Institute for Self –Employed Persons, “BK”. Based on data provided by the International Labor Organization, financial projections of the institution were made and extended to apply benefit-cost model of privatization. Present value of the change in net social benefit was estimated. The effect of privatization on representative individuals has also been quantified. Results indicate that social benefits associated with a privatization alternative exceed the social costs even after adjustments for changes in key parameters that reduce social net benefits. However, privatization affects current representative individuals so negatively that it may constitute a “good political reason” to be against, rather than in favor of, choosing privatization.

## 1. Introduction

The Turkish social security system has been facing an extended financial crisis since the early 1990s. A low minimum retirement age,

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<sup>1</sup> This paper is derived partly from my doctoral dissertation entitled “Benefit-Cost Analysis of Turkish Social Security Reform Proposals” which covered each of the three state-run social security institutions in Turkey. This paper focuses on the Social Insurance Institution for Self-Employed Persons (BK) alone. For the SSK component, see Gümüş, E. (2005).

generous benefits relative to contributions, frequent political interventions, low contribution collection rates, existence of a large share of unregistered workers, underreporting of earnings, and other factors had made the system financially unsustainable.

To overcome this problem and achieve long-run financial sustainability the Turkish government adopted new measures in 1999 based mostly on a special report done by the International Labor Office<sup>2</sup> (ILO, 1996a). With this new Law, the Turkish social security system has been restructured, but the pay-as-you-go financing method has been retained. Given that ILO outlined a privatization option for the Turkish social security system in its report and Turkey chose the restructured pay-as-you-go option, one can question whether this was a rational choice from social point of view. Would Turkey be better off with the privatization alternative instead? This paper is designed to answer this question. To do so, we estimate and evaluate the social benefits and costs of switching from re-structured Social Insurance Institution for Self-Employed Persons, “BK,” to a counterfactual privatization reform alternative.

Plan of the paper is as follows. The next section gives brief information on the Turkish social security system. Section 3 reviews the literature on reform efforts of social security systems, while section 4 lists assumptions of the study. Section 5 builds a simple actuarial model and makes financial projections under both re-structured pay-as-you-go and privatization scenarios for BK. The benefit-cost model is developed in section 6, and results are discussed in section 7. Finally, the last section concludes the paper by discussing some of the policy implications of results obtained.

## 2. Turkish social security system

The Turkish social security system was made up mainly of three institutions each run by the state:<sup>3</sup> “The Social Insurance Institution” (hereafter “SSK”)<sup>4</sup>, “The State Employees’ Pension Fund” (hereafter

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<sup>2</sup> See ILO (1996a).

<sup>3</sup> There are other organizations that provide social security to their members; however, they are not included in this study on account of their small size in terms of covered population and the lack of data. Among these are the Armed Forces Mutual Assistance Fund (OYAK), Special Institution for Personnel of Banks, Private Insurance Companies and Stock Exchanges, Eregli Miners’ Pension Fund, and Primary School Teachers’ Sickness and Provident Fund.

<sup>4</sup> SSK was established to provide social protection for wage earners in 1945. It was reorganized in 1964 to increase its capacity. Persons covered by this institution are

ES)<sup>5</sup>, and “The Social Insurance Institution for Self-Employed Persons” (hereafter BK). They operate on a pay-as-you-go basis, and thus have the usual financial problems of such a system.<sup>6</sup> However, just recently, as a part of continued reform efforts, a new law (Law number 5502) was approved by the Turkish parliament in May 2006. According to this new law, SSK, ES and BK will function under a single social security authority, called “Social Security Institution”. The purpose of unifying these three institutions is to harmonize the requirements for entitlement and health-retirement benefits for future members of all three institutions. The newly established agency will take a long time to function effectively and its merit may be evaluated in a separate study. In this paper, we focus on balances of BK as its mission will not be completed for many years to come.

### *2.1. Types of insurance, contribution, and retirement benefits of BK*

Bağ-Kur was established in 1971 as the last social security institution in Turkey and became the second largest in terms of coverage. It covers self-employed workers and other professionals, including workers and farmers in agriculture. It provides both mandatory and voluntary insurance. The contribution rate is 20 percent for old age, disability and death insurance.<sup>7</sup> The insurable base is set by Laws numbered 2926 (for workers in the agricultural sectors) and 1479 (for self-employed persons). There is an income schedule in each of these Laws, with 24 pre-determined income levels which are used to calculate contribution. A person, once insured, may choose an income level on which his or her insurance premium can be calculated and he or she cannot change this level of income later. However, the chosen level goes up automatically from year to year one level for the first 12 mandatory levels. The last 12 income levels are voluntary and go up once every two years. It is important to mention that the pre-

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those employed by one or more employers on a contract basis. It covers approximately 38 percent of the total population (Cavusoglu, 1998).

<sup>5</sup> ES was established in 1949 as a part of the Ministry of Finance to provide social security to all civil servants employed by the central government, local governments, state economic enterprises and army members. It covers nearly 15 percent of the total population (Cavusoglu, 1998).

<sup>6</sup> Although two components of the Turkish social security system (SSK and BK) were originally designed as fully-funded institutions, they operated as pay-as-you-go institutions in practice, due largely to insufficient income to fully cover the actuarial commitments (Undersecretariat of Treasury, 1999).

<sup>7</sup> In this study, we concentrate on long-term insurance. For health insurance please see TUSIAD (2004).

determined amount of income in each level increases from the first level to the last in income schedule. Thus, contributions, and benefits upon retirement go up too. Concerning entitlement and calculation of benefits, there are different requirements for each type of benefits. To get entitled for disability benefit, for example, one must have loss of working ability and must have paid contribution for five complete years. Benefit would be 65 percent of average level of income on which the contributions were made. For full old age benefit, age requirement has to be fulfilled (58 for women and 60 for men) and the insured must have full contribution payment record of 25 years. If fulfilled, benefit would be calculated as  $(WA \times RR) + SAP$ . Here WA represents weighted average of contributions paid at each income level considering time of payment, RR stands for replacement ratio, and SAP indicates social assistance payment. Requirement and calculation of death benefit is also similar to old age benefit.<sup>8</sup> In this study, we use insurable base figures from ILO (1995b).

## 2.2. *Financial difficulties*

In evaluating the financial strength of an individual institution, or the system all together, one simply needs to look at the difference between total revenue it generates through payroll taxes or contributions that contributors pay to the system and total amount it spends (on benefits and other expenses), the difference between these two figures, and how this difference is likely to evolve over the years as the number of contributors and/or beneficiaries change. To do that, benefit formulas, magnitude of the contribution rates, conditions for retirement entitlements, the age structure of population covered, share of underground economy, underreporting of earning, the growth rates of wages and GDP, future interest rates and price levels need to be considered. A consideration of these indicated as of the mid-1990's that the Turkish social security system was financially insolvent due mainly to a low retirement ages (Cavusoglu, 1998; TUSIAD, 1997; ILO, 1996a, 1996b; Sayan and Kiraci 2001a, 953), a low contribution collection rate (TUSIAD, 1996; ILO, 1996a), a low contribution base (TUSIAD, 1997), a low number of contributors<sup>9</sup> (TUSIAD, 1997), a high number of retirees (Ercan and Gokce, 1998), and a high level of benefits relative to costs (Fisunoglu, 1998; Sayan and Teksoz, 2002), an increasing share of unregistered workers due to underground economic sectors, common underreporting of earnings. All these

<sup>8</sup> See TUSIAD (2004, 46, 53-55) for more detailed information.

<sup>9</sup> It is about half of the current labor force. See TUSIAD (1997) for details.

factors revealed that the system could not survive unless appropriate measures were taken.

Table 1 presents information about the number of contributors (active persons) and pensioners (passive persons) from 1985 to 2002 for BK. It shows how the system's membership composition has evolved over time, with the growth rate of the number of pensioners exceeding the growth of active members.

**Table 1**  
Number of Active and Passive Persons by Year (000)

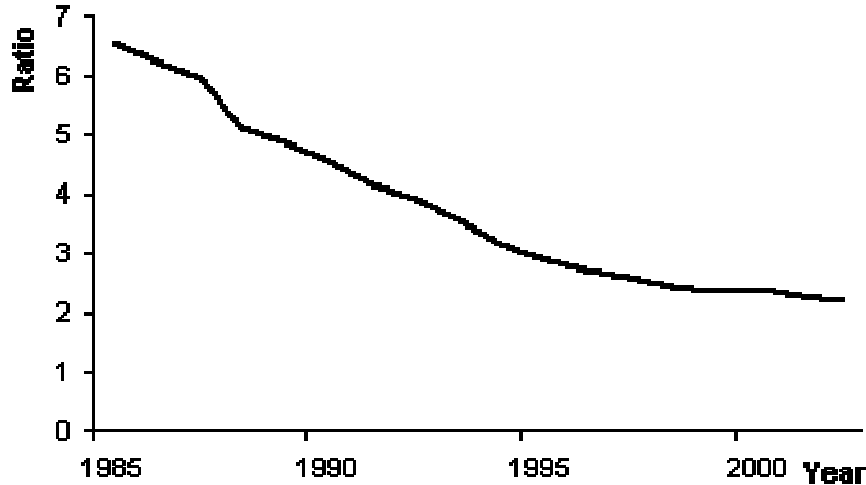
Year	Active	Passive	Year	Active	Passive
1985	1927	294	1994	2617	826
1986	2257	362	1995	2590	881
1987	2451	411	1996	2564	947
1988	2501	487	1997	2676	1032
1989	2654	545	1998	2708	1105
1990	2719	596	1999	2800	1180
1991	2722	656	2000	3049	1277
1992	2791	712	2001	3087	1344
1993	2779	778	2002	3084	1394

*Source:* Turkish State Planning Organization, Economic and Social Indicators, Part VIII, Developments in Social Sectors: Table 8-4. (<http://www.dpt.gov.tr/dptweb/esg/esg-i.html>).

*Note:* Active voluntary insured is not included in the table.

The resulting decline in the active/passive ratios, continued to pull the current ratio below 3 as Figure 1 shows. Unlike the case in most developed countries, the reason for this decline was not the demographic change Turkey experienced. Rather, it was political choices that forced the system to pay benefits to individuals who paid little or no contribution (TUSIAD, 1997, 80).

**Figure 1**  
Active/Passive Ratios of BK.



As social security deficit in Turkey continued to grow, increasingly more studies on reform alternatives before the Turkish social security system began to appear in the second half of the 1990s. While some such as the ILO report (1996a) argued that restructuring the existing pay-as-you-go system by adjusting the pension parameters in such ways to achieve higher contribution revenue and/or lower benefit payments would be enough to restore the long run financial equilibrium of the system, others have argued for replacing the current pay-as-you-go system with privately managed pension plans. Between these two polar cases, numerous alternatives were proposed. TUSIAD (1997), for example, suggested introduction of mandatory individual retirement accounts (IRA) to complement the publicly managed pay-as-you-go schemes, or a so-called “two-tiered” system, whereas TUSIAD (2004) recommended a three-pillar system. Likewise, ILO developed four reform options for the Turkish social security system (1996a). Revenue-expenditure balances under each option have been quantified by using long-term actuarial projection models. Of these options, the first and second correspond to restructured pay-as-you-go and mandatory individual saving accounts options, respectively. The former represents continuity of the defined-benefit pay-as-you-go financing method and the latter represents a defined contribution method of privatization. The third and fourth options are designed as multi-tiered systems with basic insurance components. While the third

alternative supplements the basic insurance with a modest mandatory savings component, the fourth alternative gives workers and employers freedom to develop their own supplementary pension.<sup>10</sup>

Despite a lively debate on the results of these studies and others surveyed in the next section, no study has so far estimated the benefits and costs of the proposed reform options. This study aims to do this for BK, one of the three components of Turkish social security system. The study specifically uses standard tools of benefit-cost analysis to evaluate BK under two financing methods, one (pay-as-you-go) that has long been used in most countries and another (privatization) that has recently been adopted by many Latin American countries and received much attention worldwide. Little attention has been paid so far to the comparison of social costs and benefits. No study has evaluated benefits and costs of privatization for Turkey. This study aims to fill this gap for BK.

### 3. The literature

There are a significant number of studies that investigate the Turkish social security system, offering different reasons as to why the system has faced such a financial crisis, and suggesting ways to reform it. Many studies evaluated the social security reform act of 1999 and offered additional parametric reform alternatives based on formal actuarial/computational analyses (see for example Sayan and Kiraci, 2001a and 2001b; TUSIAD, 1997; ILO, 1996a; Ercan and Gokce, 1998; Tuncay, 2005; Guzel, 2005; Alper, 2003). Yet, much emphasis in the literature in Turkey has been placed on the discussion of administrative structure of institutions. Whether administrative autonomy or privatization would solve the system's long-run funding problem has been the subject of a long debate (Aydin 1998; Centel 1997). Centel (1997) who discussed the issue in the context of EU accession, for example, argued that in order for the Turkish economy to integrate with the European economy, the Turkish social security system should be restructured in a way similar to European social security systems, concluding that the three Turkish social security institutions should be united under one organization with financial and administrative autonomy.

Even though many scholars agreed on the need for financial and administrative autonomy for these institutions, pointing to the role of

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<sup>10</sup> TUSIAD (1997) developed a two-tiered system similar to ILO's (1996a) third reform option.

politically motivated interventions as the main cause of the crisis, there was no consensus on the need for unification. Granting autonomy would prevent deterioration in actuarial balances due to such political pressures (Akalin, 1999; Tuncay, 2000; Alper, 1999). Akalin (1999) noted that social security in Turkey is legally structured as a natural government monopoly that does not leave room for competition, causing economic inefficiency to prevail. The only way that the system may become efficient in providing its services and using its resources, the author argued, is to design the system within which the “invisible hand” could operate.

Still, an opposition to unification was defended on different grounds. Alper (2003), for example, argued that the unification of the system is not an urgent policy. Unification requires more detailed records which are not currently available. Guzel (2005) and Tuncay (2005) insisted that there was no need to change the institutional structure of the system, suggesting that a solution within the current institutional setting was possible through employment policies that create more jobs.<sup>11</sup> While the debate on unification of the system continued, the legislation process for unification of the system was completed.

As the number of studies on pay-as-you-go defined benefit social security systems has increased in the last two decades, much more attention has been given to identifying the weaknesses of the Turkish systems so that new policies can be developed accordingly. Sayan and Kiraci (2001a and 2001b) have in fact studied the Turkish social security system in this context. They have identified Turkish social security system parameters to minimize deficits generated by the system. They developed optimization models that find combinations of contribution and replacement rates as well as minimum retirement ages that will minimize pension deficits over their model horizons and concluded that if contribution and replacement rates were to be held at their current values, the minimum retirement age would have to be increased significantly.

Since state managed pay-as-you-go systems have started having fiscal problems in other countries as well due mostly to demographic pressures to which, pay-as-you-go financing method is particularly vulnerable, there has been a search for alternatives beyond parametric

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<sup>11</sup> We agree with Alper (2003) in that organizational reform was not a priority step to take, since the lack of harmonization was not related with the core of the problem.



adjustments (Bovenberg and Sorensen, 2003). A switch to a funded system through privatization has emerged as such an alternative and has already been adopted in different parts of the world. Privatization of social security started in Chile and has spread to other countries such as Argentina, Australia, Bolivia, Mexico, Peru, Columbia, and the United Kingdom (Kotlikoff, 1996).

The choice between reforming or restructuring publicly managed defined-benefit pay-as-you-go schemes and moving to privately managed defined contribution plans has also been studied in comparative set ups. Imrohorglu summarizes reform efforts of OECD member countries in this respect in a chapter in TUSIAD Report (2004, 77-101). Further, Kotlikoff (1996) illustrated the effects of social security privatization by using the Auerbach-Kotlikoff model and considering a rather simple privatization model for the United States. He concluded, based on simulation results under specific assumptions that privatizing social security would be likely to have a positive effect in the long-run on output and living standards, with a 4.5 percent of GDP welfare gain to future generations (Kotlikoff, 1996).

While many scholars argue that the solution to social security problem may be privatization, everyone recognizes that the switch to private plans would be too costly. This is called the transition problem and involves the need to increase social security taxes (or impose a heavy burden) on current generations. Opponents of privatization argue that the transition path would be too costly to be politically acceptable even for the United States, given the current benefit and cost structure of the system (Feldstein and Samwick, 1998). Feldstein and Samwick (1998) have examined the transition issues and described an alternative transition path for the United States' social security system and concluded that privatization would generate very substantial long-run benefits which would be more than 5 percent of GDP every year and the transition costs would be relatively modest (Feldstein and Samwick, 1998). The transition issue has also been studied by TUSIAD (2004). It is argued in this report that the transition cost to a similar system<sup>12</sup> would be reasonable given a high enough number of insured registering to this system (TUSIAD, 2004, 173-174).

Another potential problem with privatization of social security is unrealistic expectations of high rate of return. Opponents of

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<sup>12</sup> See TUSIAD Report (2004) for more detail of the suggested new system.

privatization often state that the rate of return from privatization would not be much higher than what it is under the pay-as-you-go system, given the risky nature of the private securities. Baker (1998) criticizes privatization and argues that rates of return from privatization are often overstated, whereas the rates of return from the current pay-as-you-go system are underestimated.

Also, it is widely believed that administration costs under privatization will be much higher than under the current system (Schulz, 2000; Mitchell and Zeldes, 1996). This argument has been a powerful tool in policy debates for opponents of privatization. Although the conceptual debate continues, Mitchell (1996) has done empirical work on this particular subject and found, by using private and public retirement system data for a number of countries, that administrative costs of publicly-managed social security systems differ significantly across countries and institutional settings. She states that even though privately-managed social security systems are likely to have higher administrative costs than their public counterparts, she concludes, quality will be much better under private systems (Mitchell, 1996, 1-2).

There are also studies that consider co-existence of public pay-as-you-go and private schemes as in the so called multi-tiered or multi-pillar systems. Feldstein and Samwick (1999, 11) considered this combination for the US social security system and suggested a personal retirement account (PRA) program funded initially by a 2.3 percent tax on earnings in addition to maintaining the existing social security trust fund at a level high enough to pay promised future benefits. In fact, many countries have been trying to find financially sustainable multi-tiered system. In a special report, for instance, TUSIAD (2004) has offered a new multi-tiered system for Turkey.<sup>13</sup>

#### 4. Assumptions<sup>14</sup>

In this study, we have developed two alternative models for BK. The first alternative is the restructured Turkish BK based on a pay-as-you-go underfunded method. The second alternative, the counterfactual, is a two-tier system, combining pay-as-you-go with a defined contribution method based on individual savings accounts. In this alternative, we assume a Feldsteinian-type privatization model that provides for a gradual privatization of the BK. Under the

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<sup>13</sup> See TUSIAD report (2004) for further details of the proposed retirement system.

<sup>14</sup> Please see Gümüő, E. (2001) for details.

privatization option, benefits will be paid and taxes will be collected out of two systems for the length of the period. Current workers as well as new workers will pay social security plus privatization taxes. While pay-as-you-go based taxes will be completely used to pay pay-as-you-go benefits, privatization taxes will be used to pay benefits and administrative costs under the privatization alternative and any excess taxes will be invested.<sup>15</sup>

To keep a common element between the two alternatives, benefits are held the same under both alternatives. In this way, the change in financing method and tax revenue will be the sole source of benefits and costs. Thus, we assume that the current restructured system<sup>16</sup> benefits will not be different under privatization and that the tax base will be the same regardless of the system for the length of the period, which is from year 2000 to 2050.<sup>17</sup>

In this study, ILO's (1995b) data were used. Actual contribution rate is assumed to be at its statutory level for both reform options. We also use required, or effective, social security tax and privatization tax rates. We will explain each of them where appropriate.

One vital assumption of the privatization option is the assumed real rate of return on investment. It is assumed that privatization tax revenue will be invested, and that a 9 percent real rate of return will be earned for each year in the length of the period.<sup>18</sup> In sensitivity analysis, we alter this rate.

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<sup>15</sup> All monetary figures stated in this study are in constant TL valued at 1995 price level.

<sup>16</sup> In this study, current system or restructured system is based upon the 1999 reform as set out by the Law numbered 4447.

<sup>17</sup> The length of the period seems short for examining multiple generations; however, secondary data were not available beyond 2050, and the generation of data beyond 2050 raises difficult estimation problems. It is possible to generate data for another 50 years or so but new projections on different variables may not be consistent with the ILO's secondary data. If longer period beyond year 2050 needs to be extended, the data should be generated by the same method for the whole period. We leave this extension as a subject of separate research.

<sup>18</sup> TUSIAD (1997) used 9 percent real rate of return in its study, and we choose this rate as a maximum attainable rate in such a dynamic middle developing country where daily political agenda easily affects the directions of the main economic indicators. Thus, the real return can vary overtime, but on average 9 percent may be a good approximation.

## 5. Financial projections of BK under pay-as-you-go system

### 5.1 Data and actuarial model

Data used in this study are taken from ILO (1995b). However, ILO (1995b) reports annual data up to 2005 and every 5 to 10 years thereafter. Thus, we converted some of the data to yearly bases<sup>19</sup>. Additional parametric data were taken from the literature and their sources were mentioned in the text.

In order to evaluate financial future of the institution, we develop a simple actuarial simulation model to make long-term financial projections. The actuarial simulation model is based on the following methodology which was first developed in Author (2001).

Let  $Z$  represent the financial balance of the “Trust Fund” of a social security institution. Then the following equation can be written

$$Z_t = GA_t - TE_t + OY_t \quad (5.1)$$

where  $GA$  stands for gross assets of an institution at the end of year  $t$ , consisting of the sum of previous year assets (PYA) and total social security contribution revenue (TR) at the end of year  $t$ . Hence,  $GA$  may be expressed as

$$GA_t = PYA_t + TR_t \quad (5.2)$$

$TE$  in equation 5.1 represents total expenditure of an institution at the end of year  $t$ . It includes benefits (B) paid to beneficiaries and administrative costs (AC) of an institution. This can be expressed in the following equation

$$TE_t = B_t + AC_t \quad (5.3)$$

Lastly, the term  $OY$  stands for other income of an institution such as interest earnings, and other non-contributory income. Here we assumed that an institution can earn interest income by investing net assets (NA) which may exist if revenue is greater than spending. If there exists such net assets (NA) in year  $t$ , they may be invested at rate  $g$  and generate income. Thus,  $OY_t$  can be represented by the following equation

$$OY_t = NA_t * g \quad (5.4)$$

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<sup>19</sup> See Gümüş, E. (2001, 25-26) for details on data conversion method.

There are two more expressions implicit in equations (5.1) and (5.2) that can be represented in equation form. The first one is

$$TR_t = TB_t * t_t \quad (5.5)$$

This equation is a simple revenue expression; however, it includes two very important variables for this study. TB stands for social security tax base or insurable base as the ILO (1995b) calls it. To estimate the social security tax base for the next fifty years or so requires a number of assumptions about primary economic and other related demographic and socio-economic variables. Fortunately, the ILO (1995b) has done that for Turkey and we rely on its data in this study. The second term in equation (5.5) represents the statutory social security tax rate in year t. We use both statutory and effective tax rates. While the former does not change from year to year, the latter is assumed to change every year so as to put the institution in financial balance.

The second implicit equation mentioned above is the following:

$$NA_t = GA_t - TE_t \quad (5.6)$$

This equation gives the expression for net assets of an institution. NA is one of the sources of other income. If  $NA > 0$ , then it will be invested and a positive investment income will be earned.<sup>20</sup> We assumed the rate of return from investing in government securities (required by law) to be 3 percent for the entire period.<sup>21</sup>

Our objective in developing the simple actuarial model is to make Z (and hence NA)  $\geq 0$  each year for the entire period. Since the ILO reported that the deficit of the three Turkish social security institutions would continue in the entire period no matter which option is adopted, we assumed Z to be equal to zero.

### 5.2. Financial projection of BK under PAYG alternative

It is instructive to visualize the financial projection under each option so that we can understand BK's financial structure and develop

<sup>20</sup> Feldstein and Samwick (1998) says that pay-as-you-go based social security earns, on average, a real rate of return equal to the growth rate of the economy. So we assumed this rate to be same growth rate of GDP in this study.

<sup>21</sup> If  $NA=0$ , then, revenues and expenditures of the institution in question are equal, and no difference between statutory and effective tax rate exists. If, on the other hand,  $NA < 0$ , then, there has to be income sufficient to pay the deficit. It may be obtained by borrowing. If it is, this is considered equivalent to an effective tax rate that will be increased sufficiently to eliminate deficit years in which  $NA < 0$ .

alternative policies. Under the pay-as-you-go financing system, which is based on 1999 reform, BK will not generate sufficient revenue to pay its obligation each year as shown in Figure 2.

The effective contribution rate is the rate at which the revenues of the institution are just equal to the outlays. In other words, the statutory rate is not sufficient to provide promised benefits and the rate has to be increased to generate required revenue. Hence, the effective contribution rate is the one at which current promised benefits can be provided.

As can be seen in Figure 2, BK will eventually face a large deficit that is increasing at an increasing rate. Although it will have a surplus for ten years, it will have deficit that gets larger every year after 2010. This is not a surprise, given the facts of the institution.<sup>22</sup> Up to year 2026 the deficit is less than revenue of the institution. In year 2027 and thereafter, however, the deficit will be higher than the institution's revenue. While the deficit in year 2026 is TL 129 Trillion (in 1995 TL values), income is TL 130 Trillion. In 2027 however, they are TL 136 and TL 135 Trillion, respectively. It gets even worse by 2050 with the deficit corresponding to 52.5 percent of the spending in that year.

Figure 3 shows both rates. Starting in year 2005, the effective contribution rate increases constantly, reaching 43 percent, or 115 percent higher than the statutory rate. At the end of the period it ends up at 44 percent.

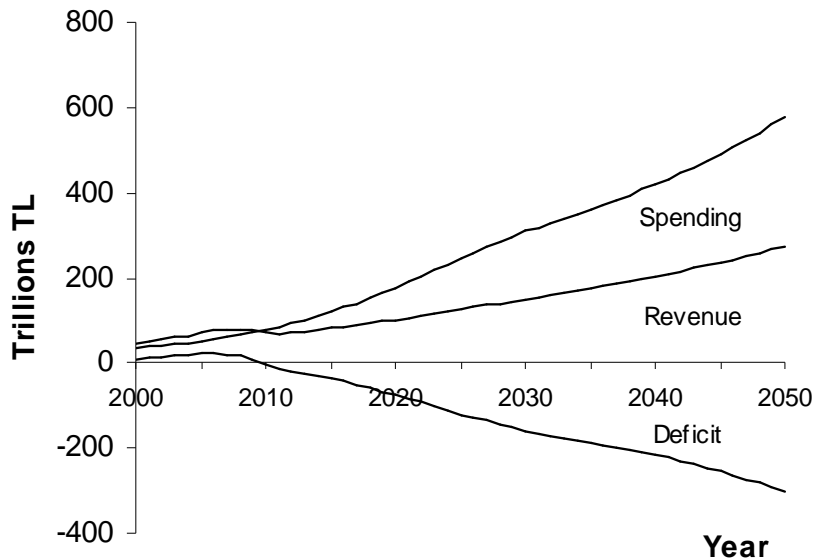
### 5.3. Privatization alternative

There are two components under privatization alternative. One is a pay-as-you-go component that is maintained until the transition to privatization is completed.<sup>23</sup> The other component is the individual

<sup>22</sup> This institution was designed for self-employed individuals. There is no employer portion of the contribution. An insured person has to pay the entire statutory contribution rate, which is 20 percent of insurable base, if he or she wants to be covered. Further, collecting contributions from the insured is hard. This makes it difficult to have a financially sound institution.

<sup>23</sup> Pay-as-you-go component: The methodology is similar to the one that we just developed in the previous section. We assumed that the pay-as-you-go contribution rate would be paid by current workers as well as new entrants to the system. Benefits will be paid to those who are already retired and to those who are eligible under law numbered 4447. However, the number of eligible retirees will decline along with total benefit payments over time and the opposite will be true for ISAs. Thus, the same procedure developed above will be applied for the pay-as-you-go component of privatization.

**Figure 2**  
Financial Outlook Under Current Law for BK



savings accounts that are invested in private securities.<sup>24</sup> We assumed such a gradual privatization that the transition period would last for the entire projection period.

The statutory BK contribution rate is assumed to be 20 percent of insurable base.<sup>25</sup> Maintaining the promised benefit for the entire period requires a much higher effective contribution rate.

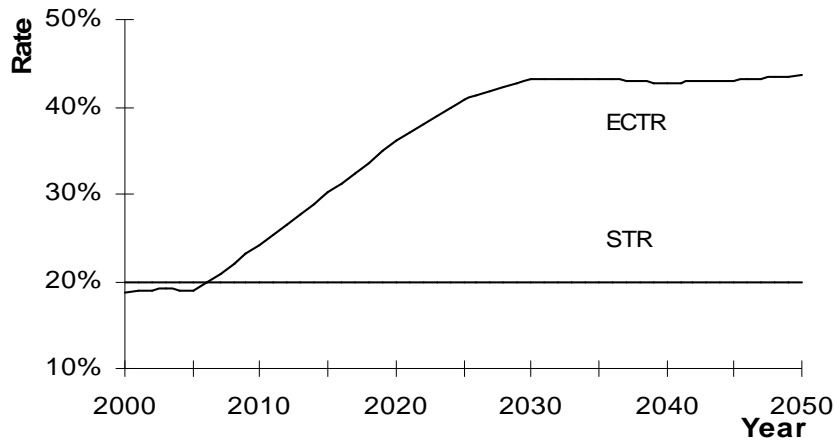
#### *5.4. Financial projections under privatization alternative*

Since most of the South American countries privatized their retirement systems, other countries have been closely watching the performance of these privatized retirement systems. The privatization

<sup>24</sup> Individual Savings Accounts Component: The same methodology is also employed here with some modifications. First, there are two administrative cost components that need to be separated. One is the cost of administering the disability and survivorship component. The other is the administration cost of individual savings accounts. Under the privatized part of the system, the disability and survivorship components require separate administration. Thus, the cost for this might be much less than the administrative costs of managing ISA funds. We followed the ILO (1995b) and assumed that one half of 1 percent (0.005) of the social security tax base will be sufficient for paying the administrative costs of the disability and survivorship components.

<sup>25</sup> Data on insurable base for BK was taken from ILO (1995b).

**Figure 3**  
Tax Rates Under Current Law for BK



experience led the ILO to develop a reform option under Turkish parameters.

The privatization alternative in this study is modified from the ILO's original work in two ways. First, in order to make comparisons among the alternative reform options, ILO kept the contribution rate, but in this study, we keep benefits the same under both alternatives. More explicitly, benefit expenditures for each institution from year 2000 to 2050 will be same under both alternatives. Second, there will be no surplus in any fund or individual savings accounts (ISA) beyond year 2050.

##### *5.5. Financial projections under privatization alternative*

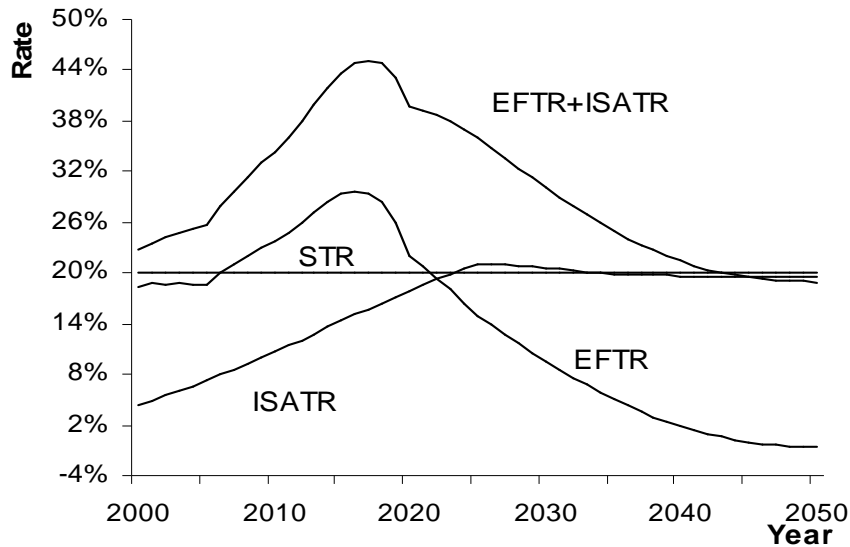
The privatization of BK seems very challenging. Figure 4 shows the tax rates under privatization for BK. STR shows the statutory contribution rate that is set at 20 percent. EFTR represents the effective contribution rate of the pay-as-you-go component.

Although this rate is smaller than the statutory rate for the first 6 years, it would increase as the transition to privatization progresses and reaches 30 percent in year 2016. As the privatization trust fund grows, the effective contribution rate of the pay-as-you-go component declines below the statutory contribution rate by year 2022. It would eventually be zero by the year 2044.

ISATR is the contribution rate that would be applied to individual savings accounts. It starts at 4 percent and increases constantly, reaching 21 percent by the year 2025, stays at this rate for



**Figure 4**  
Tax Rates Under Privatization for BK

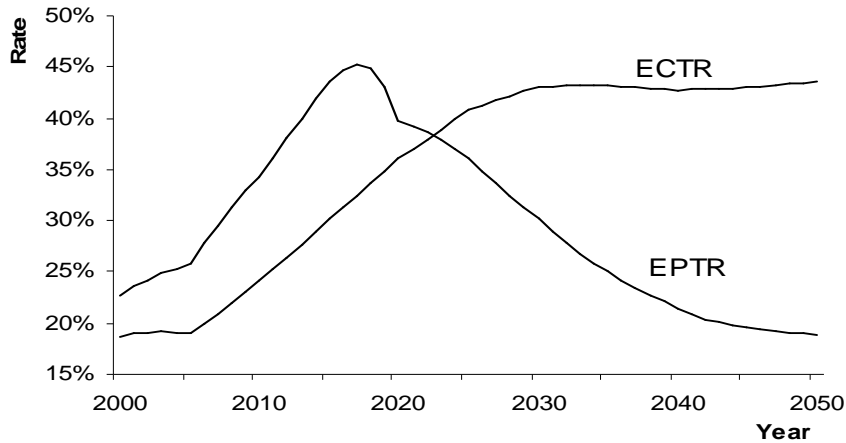


a couple of years, then stays roughly equal to the statutory rate until the end of the period in 2050. When we sum up both rates required under privatization, ISATR and EFTR, we see that the total effective privatization tax rate (EPTR) would be higher than statutory tax rate for almost the entire period.

This pattern in which the total privatization tax rate would be higher than the statutory contribution rate deserves further explanation. The following figure helps. As shown in that figure there are two tax rates that would exist under both alternatives. ECTR is the effective tax rate that would prevail under the current law pay-as-you-go system. EPTR is the effective rate that would prevail under the privatization system.

Thus, the effective privatization tax would be higher than effective pay-as-you-go tax for the first 22 years and lower for the rest of the period. Indeed, the comparison between these effective tax rates is the one that matters, for benefit-cost analysis, not the comparison between statutory rates and effective rates. Furthermore, the prevailing effective contribution rates seem too high to be politically acceptable. Our aim here, however, is to show that if the promised benefits can only be financed by contribution rates what the rate would have to be.

**Figure 5**  
Effective Tax Rates with (EPTR) and Without (ECTR) Privatization  
for BK



## 6. Benefit-cost analysis

As Feldstein (1996a) explained in his paper, social security privatization has primarily three impacts on the economy. The first impact has to do with the effect of taxes that government collects on the labor supply. The second impact of privatization is on the nation's capital stock. More specifically, privatization will allow some of the taxes used to finance social security to be invested in the stock market. The real rate of return on these investments is expected to be higher than the real rate of return on government securities. Thus, it will help to increase the nation's capital stock. This is especially important for developing economies.

Because of privatization, there would be also a change in government saving. The change in government saving will have an impact on capital accumulation through its effect on crowding-out or crowding-in of private investment.

The last impact would be the change in the costs of administering the system. It is widely believed that the administration cost of social security under privatization would be much higher than it is under the current pay-as-you-go financing method.

These impacts are the sources of the social benefits and social costs of privatization. We think that changes in tax rates and in national saving would generate social benefits that exceed social costs, while changes in administration costs will generate social costs. The

net benefit will depend upon the difference between the values of these impacts.

### 6.1. The model

In order to estimate the changes in benefits and costs outlined in the previous section, we will use the traditional benefit-cost model that is widely used in evaluating public programs and projects. A benefit-cost analysis requires a comparison of two scenarios: one “without” the alternative being evaluated, and one “with” the alternative in place. The “without” scenario is a projection of the future with the current Turkish social security system, as recently reformed. The “with” scenario is a projection of the future with the privatization alternative instead of the current system. The ILO has developed the basic elements of both of these scenarios. We will use these scenarios in our analysis, supplemented by additional data, as necessary<sup>26</sup>. We will examine these scenarios carefully, however, for debatable assumptions and parameters and incorporate reasonable alternative assumptions and parameters in the sensitivity analysis.

In its simplest form, net benefit (NB) can be expressed as

$$NB = B - C \quad (6.1)$$

Where B is benefit and C is cost.

Since benefits and costs are often realized at different times they are not comparable unless they are expressed in terms of present values that can be obtained by using appropriate discounting (Gramlich, 1990). The present value of a benefit,  $B_t$ , in any future year  $t$  is  $B_t/(1+r)^t$ , where  $r$  is the discount rate. Similarly, the present value of a cost,  $C_t$ , in any future year  $t$  is  $C_t/(1+r)^t$ . The present value of the net benefit in a future year,  $t$ , can be expressed as

$$PVNB_t = \frac{B_t}{[1+r]^t} - \frac{C_t}{[1+r]^t} \quad (6.2)$$

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<sup>26</sup> The cost-benefit analysis in this study requires the use of a number of additional parameter values and data in addition to that generated from our actuarial model and data provided by ILO (1995b). Some of these come from relevant literature, and we have calculated some of them ourselves. To calculate the marginal welfare cost of taxation, we need the aggregate marginal tax rate,  $m$ , the compensated labor supply elasticity,  $\eta$ , and total labor income,  $wL_2$ . We use 30.5 percent for  $m$ , which is taken from OECD (1998, 156). The value of the labor supply elasticity is taken from Sayan and Kenc's study (2001). As for the total labor income, there were no data projections available for the period this study covers. By using national average wage from ILO (1996b) we calculated total labor income.

The present value of a stream of net benefits can be expressed as

$$PVNB_{0,T} = \sum_{t=0}^T \frac{B_t}{[1+r]^t} - \sum_{t=0}^T \frac{C_t}{[1+r]^t} \quad (6.3)$$

Given the benefits and costs described above, the model can be expressed in the following way symbolically;

$$\sum_{t=0}^T \Delta(PVNB) = \sum_{t=0}^T \frac{\Delta(B)_t}{[1+r]^t} - \sum_{t=0}^T \frac{\Delta(C)_t}{[1+r]^t} \quad (6.4)$$

In equation (6.4) sources of benefits and costs would be “increases or decreases in GDP due to changes in contribution, government savings, administrative costs and private savings.

It is important to mention that all items except administrative costs are the source of costs for some years and of benefits for other years. Hence, we express them in “change in net present value” term.

Given the need to pay promised benefits to current retirees while simultaneously building up privatized trust funds for future retirees, an initial increase in taxes, or reduction in other government expenditures, is required. We assume the former. Thus, welfare cost of taxation,  $WC_t$ , will be positive initially. If the rate of return on private securities exceeds the rate of return on government securities, the required trust funds can be achieved eventually with lower taxes. Thus,  $WC_t$  will eventually turn negative as the privatization alternative matures.

Privatization will initially increase the government budget deficit, or reduce government saving resulting in reduced GDP. Eventually, however, the deficit will fall and GDP will increase as a result.

The effect of privatization on administrative cost is expected to have an unambiguous effect on net benefits. That is, privatization should increase administrative costs throughout the entire study period.

In evaluating public programs, choosing the right discount rate is very important. We will use the discount rate,  $r$ , that is known as the social discount rate.

The basic question is whether the “present value of change in net benefit” ( $\Delta PVNB$ ) in equation (6.4) is greater than zero. If it is, then privatizing the social security system will produce a potential Pareto improvement.

Given reasonable doubt about the value of certain parameters, sensitivity analysis will be performed.

From the individual viewpoint, the change in wealth of representative individuals will also be estimated under both alternatives. This will be done by calculating the present value of benefits and costs with and without privatization. The change in wealth of each representative individual is the difference between the change in present value of benefits and costs.

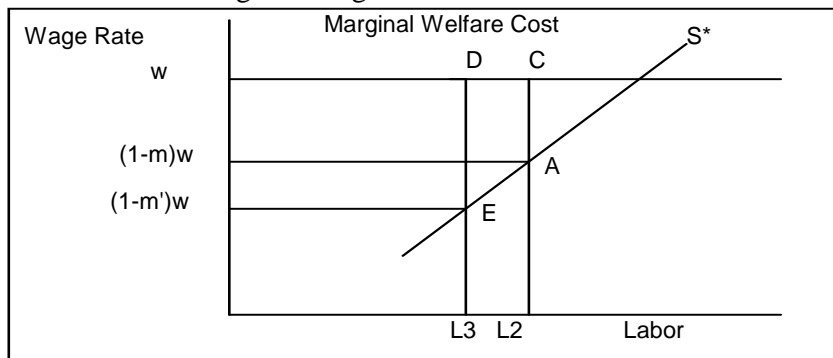
6.2. Sources of costs and benefits

6.2.1. Marginal welfare cost of taxation

Economic theory suggests that the social security payroll tax distorts the labor supply decision. Feldstein (1995, 1996a) states that the payroll tax distorts occupational choice, location, number of hours individuals work, and work effort. In this study we emphasize the effects of social security on number of hours worked and the subsequent welfare cost of taxation. We will estimate the marginal welfare cost of taxation for each year through the year 2050 using Browning's (1987) partial equilibrium model of marginal welfare costs.

Browning's model is illustrated in figure 6. Here  $S^*$  is a compensated labor supply curve, the worker's wage rate is  $w$ , the aggregate marginal tax rate is  $m$  and the net marginal wage rate is  $(1-m)w$  which corresponds to the aggregate marginal tax rate without privatization. An increase in the tax rate would increase the aggregate marginal tax rate to  $m'$  and the net wage rate would be  $(1-m')w$ .

**Figure 6**  
Change in marginal welfare cost of taxation



Source: Browning (1987, 17).

The privatization option will necessitate an initially larger subsidy to social security from general revenue than under the restructured system or an effective increase in taxes required to finance social security. After a transition period the general revenue subsidy will fall relative to the pay-as-you-go restructured system and there will be a decrease in the marginal tax rate. The increase (decrease) in the marginal tax rate creates a marginal welfare cost (benefit). When the marginal tax rate increases from  $m$  to  $m'$  (as in Figure 6), there will be a reduction in the quantity of labor supplied along the compensated supply curve to  $L_3$ . Therefore, marginal welfare cost resulting from a change in the tax rate is equal to the area of ACDE in figure 6 and represented by WC. ACDE is equivalent to

$$WC = \frac{1}{2} [wm + wm'] dL_2 \quad (6.5)$$

Because  $m'$  is equal to  $m + dm$  and  $dL_2$  is equal to  $[\eta L_2 / (1 - m)] dm$ , equation (6.5) can be expressed as

$$WC = \left[ \frac{m + 0.5dm}{1 - m} \right] \eta w L_2 dm \quad (6.6)$$

In equation (6.6) the new parameter  $\eta$  is the labor supply elasticity.

The equation (6.6) briefly says that when contribution rate increases (decreases), through labor market distortions, it would create cost (benefit) to society by reducing (increasing) welfare. Thus, we will calculate this marginal welfare cost of tax contribution using equation (6.6).

### 6.2.2. Private saving

Changes in taxes will also affect the value of the wealth represented by the retirement system and thus potentially affect GDP. Actually, there have been many studies that investigate the relationship between private saving and pay-as-you-go-based social security system both theoretically and empirically. These studies include Barro (1974) and Feldstein (1974). While Barro (1974) argues that there is no significant adverse effect of social security on private saving, Feldstein (1974) argues and found evidence otherwise. They continued their arguments empirically. These studies include Barro (1978) and Feldstein (1978; 1996b). More recently, Meguire (1998), Attanasio and Paiella (2001), and Alessie and Kapteyn (2001) looked these issues again. They found evidence that supports Feldstein's

view. Coronado (1997) for instance, studied the effects of privatization on household saving from Chilean social security privatization experience. He also found evidence that supports Feldstein's view.

In this study we follow Feldstein (1996a) view as he indicates, social security wealth (SSW) will be changed as taxes change. Social security wealth is the net present actuarial value of expected future benefits and costs. An increase in taxes reduces SSW and a reduction in taxes increases SSW. Feldstein (1974, 1996b) studied the relationship between social security and saving and concluded that social security wealth reduces private saving. Changes in private saving affect the capital stock and GDP. Specifically, an increase in private saving will have a positive effect on the capital stock and GDP.

#### *6.2.3. Government saving*

There is another potential impact of privatization on the capital stock and GDP. This impact comes from the changes in government saving as a result of privatization. Privatization will change the size of the government's net budget balance-the surplus or deficit. If the budget deficit shrinks (grows), government borrowing will decrease (increase), "crowding in" (out) private investment. If privatization crowds in (out) private investment, the capital stock and potential GDP will increase (decrease). Under both the existing BK system and privatization scenario, there will be no social security surplus. There will be a change in the size of the social security deficit, however. We assume that this deficit will be financed by borrowing rather than by reductions in other government expenditures. Therefore, the costs and benefits from changes in the deficit will come from changes in private investment, rather than from changes in other government programs.

#### *6.2.4. Administrative costs*

The fourth source of benefits and costs of privatization is from the changes in the cost of administering the system. It is widely believed that the privatization of social security would increase administrative costs (Schulz, 2000; Mitchell, 1996; Mitchell and Zeldes, 1996), given the higher cost of managing portfolios of private securities than the cost of managing government securities. Thus, we will estimate the changes in the cost of administering the BK under the privatization alternative.

## 7. Benefit-cost results<sup>27</sup>

There are four benefit-cost categories that have been identified and estimated.

### 7.1. Marginal welfare cost of taxation

The marginal welfare cost of taxation (MWC) in this study essentially tells us that a change in social security tax rates produces costs or benefits to society depending on the direction of the change. In other words, a change in social security tax rates will alter the well-being of the society either negatively or positively.

Change in contribution rate of BK may have important welfare implications for two primary reasons. First, insurees in this institution pay the whole contribution; there is no employer contribution. Second, the rate of compliance may decrease if the rate of contribution increases rapidly. Figure 7 shows the changes in marginal welfare cost of taxation ( $\Delta$ MWC) due to change in contribution rate for BK assuming no change in compliance. For the early transition years, the social cost of privatizing this institution increases. By the year 2023, however, the social cost disappears and social benefits begin (as taxes fall) and increase at an increasing rate. Overall, the change in the contribution rate produces social benefits much larger than social costs.

### 7.2. Administrative costs

The second benefit-cost category is the change in administrative costs between the two alternatives. Figure 8 shows the change in administration costs of BK. The area under the curve should be interpreted as social cost.

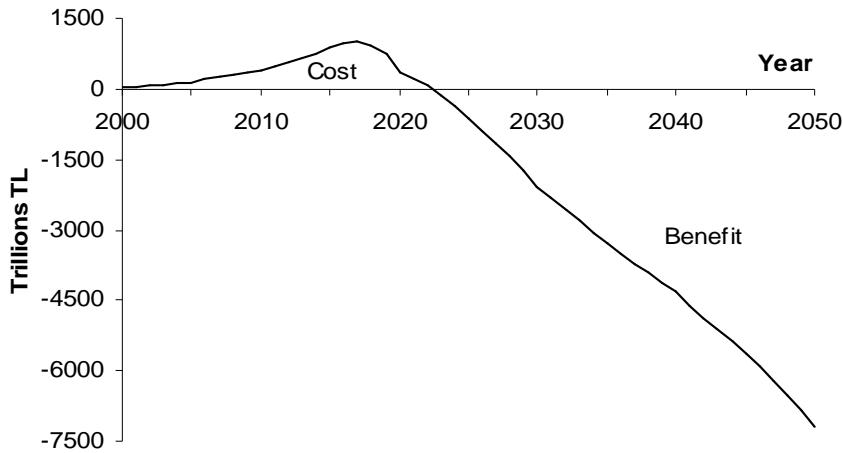
Although it generates only social cost, it is relatively small if we compare this cost, for instance, with the marginal welfare cost of taxation. While the cumulative change in administration cost would be TL 789 Trillion, it only constitutes nearly 89 percent of the social benefit that would be generated in year 2026, alone, from the decline in the contribution rate.

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<sup>27</sup> In this section, the results of the benefit-cost analysis described in the previous section will be presented. It should be noted that the results are to be evaluated based on the assumptions of the study.



**Figure 7**  
Change in Marginal Cost of Taxation from Privatizing BK

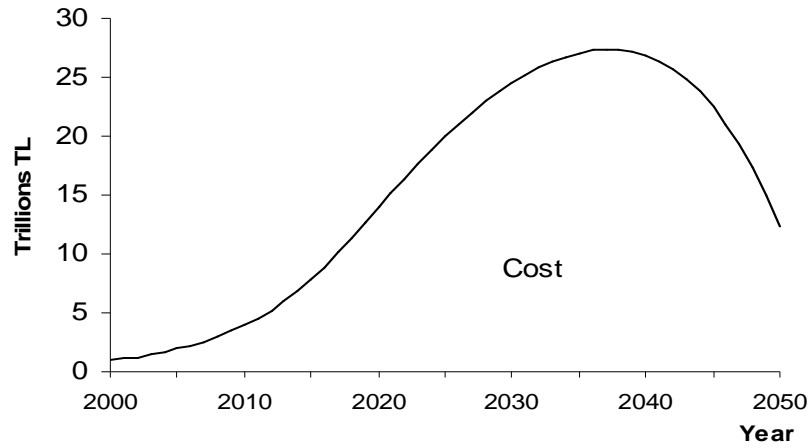


### 7.3. Government saving

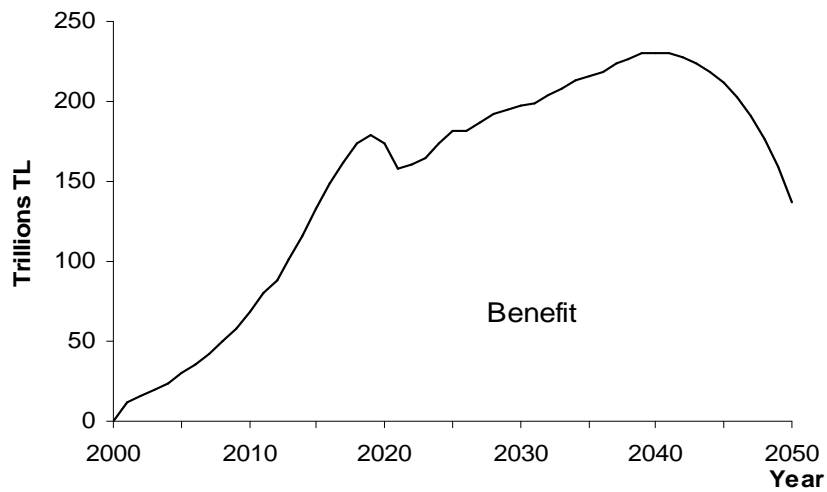
The third benefit-cost category for BK is the change in GDP due to changes in government saving as a result of the change in the way the BK is financed. The social security budget is generally kept separately in Turkey. However, it is considered part of the government budget (consolidated) and it is, therefore, used for political purposes. While social security surpluses can be used to finance various governmental programs, they can also be used to retire government debt; that is, they can be “saved”. Changes in “government saving” would lead to changes in investment that, in turn, change GDP.

As we stated in the previous section, contribution compliance is a real issue for this institution. This stems from the fact that the participants in this institution are self-employed. Thus, contribution compliance along with higher contributions may make it harder to generate enough revenue to pay necessary benefits. As a result, the treasury may have to transfer extra general revenue to this institution to pay benefits. This problem diminishes as privatization progresses. Ignoring compliance problems, the change in GDP due to the change in government saving would be positive as depicted in figure 9.

**Figure 8**  
Changes in Administrative Costs from Privatizing BK



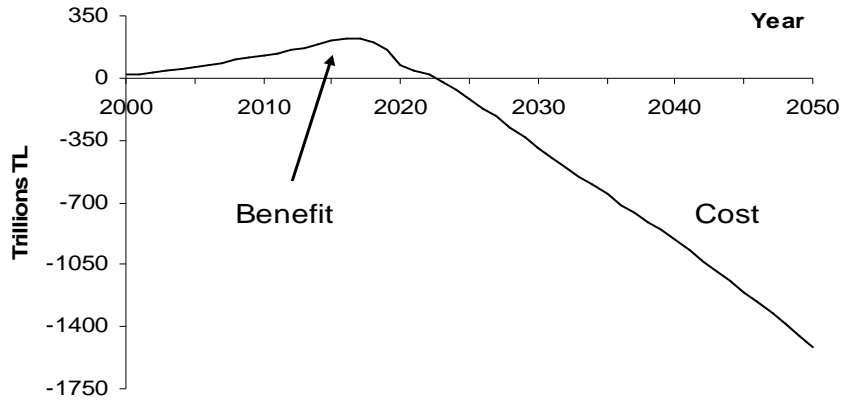
**Figure 9**  
Change in GDP Due to Change in Government Saving from Privatizing BK



#### 7.4. Private saving

Figure 10 illustrates the change in GDP due to the change in private saving from privatizing BK. The change in GDP due to change in private saving has two periods. The change in GDP during the first period is positive for about 23 years; it is negative, and much larger, for last 28 years. Net benefit for the entire period is negative.

**Figure 10**  
Change in GDP Due to Change in Private Saving from Privatizing BK



#### *7.5. Net benefits and present values of net benefits from privatizing BK*

We presented the results for the four benefit-cost categories above. However, for benefit-cost analysis, it is the present values of the change in net benefit that matters. The changes in net benefit and present value of net benefit are illustrated in figure 11. During the first 22-year period both the change in net benefit and present value of net benefit are negative, indicating that social cost is higher than social benefit. For the last 29 year-period, however, the reverse is true. For the whole period, the change in present value of net benefit for BK is TL 22,448 Trillion (in 1995 TL values). Hence, privatization of BK would be a potential Pareto improvement.

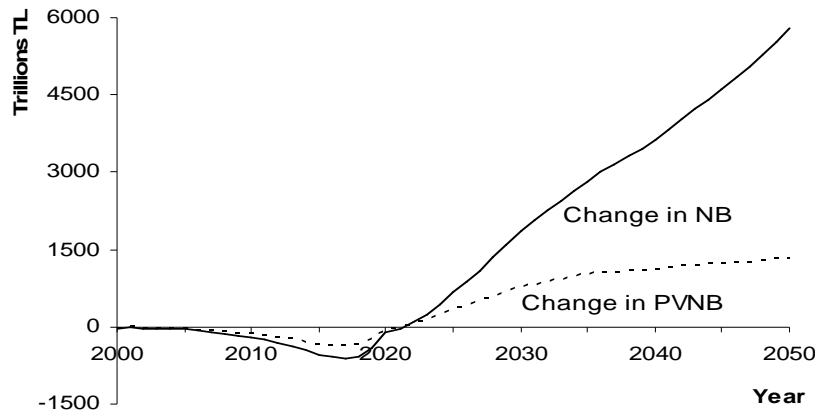
#### *7.6. Summary of benefit-cost results*

We have summarized the changes in present values of social benefits ( $\Delta PVB$ ), social costs ( $\Delta PVC$ ), and social net benefits ( $\Delta PVNB$ ) according to source, for BK in table 2. Changes in the marginal welfare cost of taxation ( $\Delta MWC$ ) due to the changes in social security contribution rates are reported in the first column. It is apparent in the table that the changes in the social security tax rates yield both costs and benefits, in present value equivalents. The present values of social costs result from additional higher contribution rates due to privatization (first 23 years), and the present values of social benefits result from the lower contribution rates that prevail under privatization for the remaining years. The change in net social benefit

( $\Delta PVNB = \Delta PVB - \Delta PVC$ ) due to  $\Delta MWC$  is positive. It is TL 24,023 Trillion. In fact, the marginal welfare cost of taxation due to privatization yields positive present values of net social benefit that constitute 107 percent of the total present value of net benefit.

**Figure 11**

Changes in Net Benefits and in Present Values of Net Benefits for BK



Changes in administrative costs have an unambiguous impact as expected. However, they have small impacts on the present values of net social benefit. They contribute only 2.5 percent of the present value of the change in social cost. The changes in administrative costs ( $\Delta AC$ ) are presented in the second column in table 2.

The changes in GDP due to the changes in government saving are reported in the third column in table 2. The impact on the present value of net social benefits from the changes in GDP due to government saving is significantly larger than the impact of administrative costs. The net effect of the change in private saving on GDP was negative. As Feldstein (1996b) states, upon privatization, additional taxes (or higher social security taxes) are necessary in the transition period. This reduces public retirement wealth, leading people to consume less and save more of their income. Hence, an increase in taxes causes a higher level of private saving. After the transition, however, taxes decline, causing public retirement wealth to increase. As a result, private saving declines. By looking at the column for  $\Delta GDP_p$  in table 2, we see the same pattern. The overall effect, in present value terms, however, is negative.

Of the four benefit-cost categories,  $\Delta AC$  and  $\Delta GDP_p$  have negative net present values. In fact, the latter has greater negative

present values of net benefit than the former. The present value of net benefit due to the change in administrative cost ( $\Delta AC$ ) is approximately 7 percent of the  $\Delta PVNB$  due to the change in GDP ( $\Delta GDP_p$ ).

In terms of benefits, the change in taxes ( $\Delta MWC$ ) is the largest component. In particular, 86 percent of the change in present value of benefit comes from  $\Delta MWC$ .

In table 2, the last column gives the horizontal summation.  $\Delta PVNB$  is TL 22,448 Trillion. Thus, it has huge significantly positive  $\Delta PVNB$ . Therefore, based on this result, alone, privatizing the BK would produce a potential Pareto improvement for Turkey.<sup>28</sup>

**Table 2**  
Summary of Benefit-Cost Results for BK (In Trillion TL)

Type	Benefit-Cost Sources				Total
	$\Delta MWC$	$\Delta AC$	$\Delta GDP_g$	$\Delta GDP_p$	
$\Delta PVB$	30,393	0	3,256	1,737	35,385
$\Delta PVC$	-6,369	-317	0	-6,251	-12,937
$\Delta PVNB$	24,023	-317	3,256	-4,514	22,448

$\Delta PVB$  represents present value of change in benefit,  $\Delta PVC$  represents present value of change in cost, and  $\Delta PVNB$  represents present value of change in net benefit.

Note: Negative figures indicate costs.

### 7.7. Sensitivity analysis

The benefit-cost results are based on a number of assumptions that were stated in section 4. In this section, we make changes in key parameters that appear to be most likely to affect  $\Delta PVNB$ , and provide estimates of the effects of these changes.

#### 7.7.1. Discount rate adjustment

We have used a real discount rate of 3 percent as a proxy for a high-end estimate of the social rate of time preference. For sensitivity analysis, we apply rates of 2 and 4 percent. While we expect an increase in  $\Delta PVNB$  when substituting 2 percent for 3 percent, the reverse is expected if 4 percent used instead of 3. Table 3 shows the results. It should be noted that even though the rate of decrease and increase in the real discount rate is the same ( $\pm 0.01$  or  $\pm 33.3$  percent), the changes in the results are not same. Although the effect of

<sup>28</sup> We calculated the internal rate of return (IRR) based on the data underlying table 2. It is 11.86 percent. This estimate is significantly greater than zero. Whether it is greater than the best alternative rate is unknown.

changing the real discount rate to 4 percent causes one of the largest declines in the  $\Delta PVNB$ , the resultant  $\Delta PVNB$  is still significantly greater than zero. This is not a surprising result. In fact, the IRR reported earlier indicates that  $PVdNB$  will remain positive for real rates up to the range of 11-12 percent. These are well out of the range of reasonable adjustment.

### *7.7.2. Risk adjustment*

We have assumed and used a 9 percent real rate of return (ROR) on the balances in the privatization trust funds. Given the dynamic nature of the Turkish economy this rate may be justified. In fact, TUSIAD (1997) used this rate in its privatization study. However, this method does not account for variations in returns.

We use two methods to account for such variation. One reduces the 9 percent ROR by risk premia. The other is a rise in the contribution rate.

Two risk premia are used: 2 percent and 4 percent. The 2 percent premium reduces the ROR to 7 percent, or about half of the 14.06 percent ROR earned on Turkish equities from 1990-1999.<sup>29</sup> The 4 percent premium reduces the ROR to approximately the level considered by Feldstein and Samwick (1999) as a certainty equivalent for a U.S. 9 percent ROR.

Table 3 summarizes sensitivity results that are obtained by the risk premium adjustments. Using a 7 percent real rate of return reduces  $\Delta PVNB$  by 27 percent. While the substitution of 7 percent for the 9 percent used in the original calculations reduces the  $\Delta PVNB$  as we expected, it still has large positive  $\Delta PVNB$ .

When the 5 percent real rate of return is substituted for 9 percent, the resultant  $\Delta PVNB$  is still positive. It is TL 9,164 Trillion. The reduction from the original  $\Delta PVNB$  is 59 percent.

### *7.7.3. Adjustment for labor supply elasticity*

We followed Browning's (1987) partial equilibrium model of the welfare cost of taxation. In his study, Browning gives the range of labor supply elasticity to be between 0.2 and 0.4. We used a labor supply elasticity of 0.2, from Sayan and Kenc (2001), in original

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<sup>29</sup> Real interest rate in the 1990s are as follows (%): 1990, 14.2, 1991, 9.1, 1992, 10.3, 1993, 16.3, 1994, 16.7, 1995, 13.2, 1996, 17.3, 1997, 2.6, 1998, 15.7, and 1999, 25.2. These rates are taken from IMF Staff Country Report No: 00/14, February 2000, page 14. See report for details.

calculation. We changed it  $\pm 0.1$  to see how results would change, however. Using 0.3 for the labor supply elasticity, the  $\Delta PVNB$  increased by TL 12,011 Trillion, as shown in table 3. By substituting 0.1 for 0.2, almost exactly the same amount of change in  $\Delta PVNB$  occurred in the opposite direction. The change in the elasticity of labor supply has significant effect, about a 53.5 percent change in PVdNB. This may be attributed to the high contribution rate necessitated with this institution. These rates make individuals under this institution highly sensitive to changes in supply elasticity.

**Table 3**  
Sensitivity Results: Change From Reference Level  
(In Trillion TL, Percent)

Measure	Value	$\Delta PVNB$	$\Delta(\Delta PVNB)$	IRR	$\Delta IRR$
Reference	9%	22,449		11.86	
Risk Adj.	7%	16,377	-6,072	8.84	-3.02
Risk Adj. (2)	5%	9,164	-13,285	6.06	-5.80
Disc. Adj.	2%	34,022	11,573	12.04	0.18
Disc. Adj.	4%	14,737	-7,712	11.71	-0.15
L. Sply. Elasticity	0.3	34,460	12,011	10.83	-1.03
L. Sply. Elasticity	0.1	10,437	-12,012	239.12	227.26
Admin. Costs	2%	18,743	-3,706	10.11	-1.75

$\Delta PVNB$  represents present value of change in net benefit, and  $\Delta IRR$  represents change in IRR.

#### 7.7.4. Adjustment for administrative costs

We assumed administrative costs equal to one percent of gross assets for the privatization trust fund in our original calculations. We increased this rate by 100 percent in the sensitivity analysis. As can be seen in the last row of table 3, it reduces the  $\Delta PVNB$  by 16.5 percent. Overall, the  $\Delta PVNB$  is highly dependent upon the real rate of return, the real discount rate, and administration costs.

#### 7.7.5. Tax rate increase

In his article, Feldstein (1997) indicates that a 50 percent increase in the contribution rate (from 2 to 3 percent) to a U.S. privatization trust fund (coupled with the continuation of the present system during a phase-in period) would “virtually rule out the

possibility –less than one chance in 1,000 – of not being able to fund”<sup>30</sup> benefits.

Assuming that such an increase for Turkey would virtually eliminate risk as well, we increased the contribution rate for BK.

The results are presented in table 4. The original values of  $\Delta PVNB$  are reported in the first row. The middle row shows the result of the  $\Delta PVNB$  after introducing 50 percent ISA tax increase. The last row shows the change in the  $\Delta PVNB$  between the original values and values after the increase in the ISA tax rate by 50 percent. Overall, the increase in the ISA tax rate causes  $\Delta PVNB$  to fall from TL 22,448 Trillion to TL 11,420 Trillion, a 49 percent reduction.

**Table 4**  
Sensitivity Results: ISA Tax Rate Increase  
By 50 Percent (Trillion TL)

Values	$\Delta MWC$	$\Delta AC$	$\Delta GDP_g$	$\Delta GDP_p$	Total $\Delta PVNB$
A	24,023	-317	3,256	-4,514	22,448
B	1,670	-816	10,196	370	11,420
C	-22,353	-499	6,940	4,884	-11,028

A: Original values, B: ISA tax increase by 50 percent, C: Differences between A and B.

### 7.8. Privatization impact on representative individuals

Up till now, we have analyzed benefits and costs from a social perspective. The positive net present values of social benefits that we obtained cover the period, 2000 to 2050. However, not everyone will gain from privatization. Results of a similar analysis for the U.S. by Feldstein and Samvick (1998) suggest that many current Turkish workers would experience reductions in the wealth they get under the current restructured pay-as-you-go system. This is because they will pay higher taxes, but receive the same level of benefits that they would have received without privatization.

To see if this is also the case for Turkey, we calculated the change in wealth expected from privatizing BK for representative individuals born between 1945 and 1985. Each representative individual is assumed to earn the monthly average wage reported in ILO (1996b), to be in the labor force every year from age 25 to 60, and get retirement benefits until age 75.<sup>31</sup> The amount of the average

<sup>30</sup> Feldstein (1997, p. 38)

<sup>31</sup> This age is inline with the life expectancy in Turkey.



yearly benefits assumed to be same one in ILO (1995b) that was converted to annual data<sup>32</sup>.

For each representative individual four measures were calculated: the present value of benefits with privatization (PVPB), the present value of benefits with the current restructured law pay-as-you-go system (PVCLB), the present value of contributions with privatization (PVPC), and the present value of contributions with the current restructured law pay-as-you-go system (PVCLC). The change in wealth for each representative individual is equal to (PVPB-PVCLB) minus (PVPC-PVCLC).

Table 5 presents a summary of the changes in public retirement wealth for representative individuals born between 1945 and 1985. The results are presented with and without a risk adjustment on privatization tax rates. With risk adjustment, tax rates under privatization must be higher to maintain trust fund solvency.

The results show that all representative individuals born between 1945 and 1975 suffer a reduction in wealth. All representative individuals born between 1980 and 1985 would gain net wealth in the non-risk adjustment case. No individuals gain wealth in the risk-adjustment case.

By looking the trend in the table, we can presumably conclude that all representative individuals born after 1985 would experience net gains from privatizing in the non-risk adjustment case. There are no data available, however, to support the calculations necessary to determine when individuals start to gain wealth in the risk-adjustment case.

**Table 5**  
Change in Wealth for Representative Individuals, By  
Year of Birth, Million TL

Year of Birth	W/O Risk Adjustment	Risk Adjusted
1945	-356	-589
1950	-964	-1574
1955	-1781	-2914
1960	-2435	-4239
1965	-2359	-4968
1970	-1724	-5166
1975	-654	-4856
1980	914	-3827
1985	2895	-2191

<sup>32</sup> See Gümüş, E. (2001, 25-26) for details on data conversion method.

## 8. Conclusions

The main objective of this paper was to investigate, by applying a benefit-cost model, whether privatizing the Turkish BK institution would be economically superior to the restructured pay-as-you-go system, given a set of relevant assumptions.

As shown in section 3, the restructured pay-as-you-go system would require much higher effective social security contribution rates until year 2050 in order to pay promised benefits. With the restructured system, the deficit (the difference between statutory and effective contribution rates) would not disappear during the study period, 2000-2050. The higher taxes required to finance the deficit would probably distort the labor market equilibrium so severely that a substantial welfare cost of such taxes would occur along with a lower level of national saving, resulting in a smaller GDP for each year.

We have identified the sources of benefits and costs associated with privatizing BK. By applying the conventional benefit-cost model, we obtained results that indicate a long-run economic gain from privatizing this institution. A number of sensitivity analyses were conducted to check the robustness of our findings. Even in the case combining parameters most likely to negatively affect present values the most, the present value of net benefit still remain positive. Therefore, our analysis indicates, from a social point of view, that privatizing BK would quite likely produce a net economic gain in the long run. This would be achieved for future generations, however, at the expense of the current working population. Thus, from an individual standpoint, privatization would be a mixed blessing. As our analysis shows, the impact of privatization of BK on representative individuals is negative for those who were born before 1980. Our finding shows that older workers would be losers from privatization, while younger employees and their children would be net gainers. Specifically, those who will be working between 2000 and 2025 would be net losers since they would pay very high contribution rates to BK. Those who would enter the labor force after 2025 would pay relatively low taxes and therefore be better off, *ceteris paribus*.

Our results indicate that the privatization of BK should be seriously and immediately considered. This institution requires significantly higher effective tax rates (rates required to avoid a deficit) for the whole period, 2000-2050, under restructured law. Specifically, the effective tax rate under restructured law would increase rapidly and it would be 100 percent higher than the statutory

tax rate, and it would not decrease. Given the self-employed, and therefore self-contributed characteristics of the scheme, it probably cannot function at this high contribution rate. Our calculation shows that the effective tax rate under privatization would be higher than the effective rate under restructured current law for the first 22 years. It will be smaller, however, for the rest of the period. In fact, at the end of the period, the effective privatization rate would be less than the statutory rate. As a result, the present value of net benefits from privatizing BK is huge. Our analysis shows that the net benefit of BK from privatizing, in year 2050 alone, is 9.05 percent of GDP. This fact, alone, is sufficient to attract immediate attention to privatization or other reform options for this institution. It is hard to escape the conclusion, therefore, that the privatization of BK is matter for urgent consideration.

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## Özet

### Kendi adına çalışanlar Sosyal Sigortalar Kurumu (Bağ-Kur) reformunun fayda-maliyet analizi

Bu çalışmanın amacı kendi adına çalışanlar sosyal sigortalar kurumunun (Bağ-Kur) Feldstein tipi aşamalı özelleştirilmesi ile ortaya çıkması muhtemel sosyal fayda ve maliyetleri hesaplamaktır. Özelleştirme ile ilgili fayda ve maliyet modelinin uygulanması için İLO'nun sağladığı veriler ile kurumun geleceye dönük finansal projeksiyonları yapılarak geliştirildi. Net sosyal faydada oluşan değişimin bugünkü değeri hesaplandı. Öngörülen özelleştirmenin temsili şahıslar üzerindeki etkiler de hesaplandı. Elde edilen sonuçlar özelleştirme durumunda sosyal faydaların sosyal maliyetlerden fazla olacağını ortaya koymaktadır. Bu durum yapılan bazı anahtar varsayımları net sosyal faydayı azaltıcı yönde değiştirdiğimizde dahi geçerliliğini korumaktadır. Lakin, önerilen özelleştirme modeli mevcut temsili kuşağı oldukça olumsuz etkilediğinden iyi bir siyasi bahane oluşturmakta, ve bu durum özelleştirmenin seçilmesinden ziyade aleyhinde bir sonuç oluşturabilmektedir.