May free capital mobility before accession be unfavorable for admission to the EU ?

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May free capital mobility before accession be unfavorable for admission to the EU?*

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Abstract

We examine the dynamics that may compensate the cost of redistribution policy in the European Union (EU), which is one of the obstacles for a candidate member country, namely Turkey to be admitted. We adress two main issues: i) may a total factor productivity (TFP) increase in the candidate country due to the positive effect of accession on institutional development compensate the cost of redistribution policy and ii) may free capital mobility before accession decrease EU's incentive for admitting the candidate country. In a two-country model we assume that after Turkish accession, the European household gives a transfer to the Turkish household whereas an upward TFP shift arises in Turkey due to the positive effect of accession on institutional development. We first find that a TFP increase in Turkey compensates the cost of transfer. Second, allowing for free capital mobility before accession turns out to be unfavorable for admission to the EU.

Keywords: EU accession, Turkey, capital mobility.

JEL Classification: F15,F36.

1 Introduction

The European Union (EU) has recently opened membership negotiations with Turkey. However, it is not certain that these negotiations will lead to Turkey's accession. 2015 will be the closest date of membership mentioned on both sides, even if Turkey is admitted to the Union in the end. Among many political, as well as economic obstacles to Turkey's accession, one obstacle is the necessity of redistribution policy that implies transferring incumbent members' income to the poorer candidate member Turkey.

Our purpose in this paper is to explore the possibility of compensating the cost of the redistribution policy, which might form an incentive for the incumbent members of the EU to admit the candidate member country.[1] More specifically, we address two questions: 1) May a total factor productivity (TFP) increase in the candidate country due to the positive effect of accession on institutional progress compensate the cost of redistribution policy? 2) May free capital mobility before accession decrease EU's incentive for admitting the candidate country?

In the literature Lejour and de Mooij (2005) and Flam (2004) studied the economic implications of the possible Turkish accession to the EU. Nonetheless none of these papers raised our questions. Lejour and de Mooij (2005) simulated the accession of Turkey to the EU by using a computable general equilibrium model. However they abstracted the transfers from their analysis. Flam (2004) estimated the budgetary effects of accepting candidate countries including Turkey to the EU and found that it would be costly for the incumbent members since some of countries which are the net receipients of transfers might become net contributors.

In exploring our questions we set forth a two-country model, in which one of the countries is the EU as a single EU-country and the other is Turkey. Each of the countries produces a heterogeneous good with its own technology. Since there is already a customs union between Turkey and the EU, we assume free trade between countries, which enables both countries' households to consume both goods without any additional cost. After Turkish accession, the European household gives a transfer to the Turkish household for redistribution policy whereas an upward TFP shift arises in Turkey due to the positive effect of accession on institutional development. Here, we also consider the experiences of Spain and Portugal whose TFP growth rates surpassed those of incumbent members after their membership.[2] Thereafter, we compare the utility of the European household before and after accession. To this end, we search for the maximum level of transfer, where she is indifferent between these two utility levels. First, we do this exercise when there is no capital in the production function. We next introduce capital into the model to see the implications of capital mobility on the maximum level of transfer. We compare the case, in which there is already a capital mobility before accession versus the case where capital is allowed to move freely only after accession.

We find that a TFP increase in Turkey enhances the utility of the household in the EU, enabling the European household to compensate the cost of transfer given to the Turkish household. We also find that allowing for free capital mobility before accession is unfavorable for admission to the EU.

The paper is structured as follows. In Section 2, we first describe a model with two countries that produce different goods using only labor. In Section 3, we introduce capital into the model and discuss the role of capital mobility. In section 4, we draw some policy implications for Turkey. Section 6 summarizes the basic findings and concludes.

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[1] In the paper we represent the admission of Turkey to the EU as a problem of the European household.

[2] See for instance Caselli and Tenreyro (2006) for a comparison of TFP in Spain and Portugal with that in France, which is taken as a benchmark throughout the paper for the "average" European experience.

2 The Model without Capital

This section allows us to see the effect of the candidate member's accession on the utility of the incumbent members' representative household and to compare the negative effect of transfer payment with the positive effect of a TFP increase that occurs in the candidate member country, when there is no capital in the production function.

2.1 The Benchmark Model

We consider two countries, one of which is the EU as a single EU-country and Turkey as the candidate member country. Variables associated with each country will be subscripted as E for the EU and T for Turkey. Each country i produces one good by the following production function:

$$Y_i = A_i N_i (1 - l_i) \qquad i = E, T, \tag{1}$$

where $A_i > 0$ is the TFP and N_i is the number of households in country i. Since time endowment is normalized to unity l_i is leisure and 1-l_i is the number of hours devoted to working. Price of the good that is produced in the EU is chosen as the numéraire, i.e.; p_E=1. Since there is free trade between these two countries, the households in each country can consume both of the goods without incurring any costs. The representative household in each country has the same utility function of the form:

$$U_i = \ln c_i^E + \beta \ln c_i^T + \ln l_i, \tag{2}$$

where c_i^E denotes the consumption of the good produced in the EU, c_i^T denotes the consumption of the good produced in Turkey, and $\beta > 0$ is the preference term for the Turkish good. The European household maximizes (2) subject to:

$$w_E (1 - l_E) = c_E^E + p\, c_E^T$$

whereas the Turkish household maximizes (2) subject to:

$$p\, w_T (1 - l_T) = c_T^E + p\, c_T^T$$

where w_E and w_T denote wages in the EU and Turkey, respectively. p denotes the price of the Turkish good.

The first order conditions yield:

$$
\begin{aligned}
c_E^E &= \frac{w_E}{2 + \beta}, \\
c_E^T &= \frac{\beta w_E}{p(2 + \beta)}, \\
c_T^E &= \frac{p w_T}{2 + \beta},
\end{aligned}
$$

$$c_T^T = \frac{\beta w_T}{2 + \beta},$$

$$l_i = \frac{1}{2 + \beta}.$$

The firm in each country maximizes profits subject to equation (1). Marginal productivity of labor is thus equal to its factor price, which writes as

$$w_i = A_i.$$

Equilibrium requires the clearance of goods' markets. For any country i, her total production is consumed at home and in the other country:

$$Y_i = N_E c_E^i + N_T c_T^i. \tag{3}$$

Solving equation (3) for price yields

$$p = \frac{\beta A_E N_E}{A_T N_T}.$$

We observe that an increase in A_T will reduce the price of the Turkish good whereas an increase in β and A_E will increase it.

Now we can express equation (2) as follows:

$$U_E = \ln A_E + \beta \ln A_T N_T - \ln N_E + (2 + \beta) \ln (2 + \beta). \tag{4}$$

As equation (4) demonstrates clearly, both TFP levels affect the utility of the European household positively. This is a result of free trade between countries.

2.2   After Accession

Membership to the EU is conditioned on the rules that are defined by Copenhagen Criteria, which require the development of political, economic and legal institutions.[3] Hence, accession to the EU ensures a certain level of institutional development in the candidate member country. On the other hand, there is a widespread belief that institutional development is an important determinant of economic growth and development (North and Thomas 1973, North 1990). In the empirical literature, a number of studies highlight the importance of this relationship through different channels of economic growth. Dawson (1998), Ayal and Karras (1998), and

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[3]According to Copenhagen Presidency conclusions: "Membership requires that candidate country has achieved stability of institutions guaranteeing democracy, the rule of law, human rights and respect for and, protection of minorities, the existence of a functioning market economy as well as the capacity to cope with competitive pressure and market forces within the Union. Membership presupposes the candidate's ability to take on the obligations of membership including adherence to the aims of political, economic and monetary union."

Klein and Luu (2003) focus on institutions-productivity link and find that institutions have a positive and significant effect on productivity.[4]

In our model, enhancement in institutions after Turkish accession is assumed to affect her economic performance by an improvement in TFP. We also consider the TFP growth experiences of Spain and Portugal after their accession to the EU. Thus, after Turkish accession, while the European household gives a lump-sump transfer to Turkey for redistribution, a positive TFP shift occurs in Turkey. The new TFP parameter of Turkey becomes $\hat{A}_T$, which writes as

$$\hat{A}_T = \mu A_T$$

where $\mu > 1$ refers to the TFP shift in Turkey due to her accession to the EU. The representative European household maximizes her utility, which is equation (2) subject to the new budget constraint:

$$w_E(1 - l_E) - \theta = c_E^E + p \, c_E^T$$

where θ represents the lump-sum transfer given by the European household to the representative Turkish household. The representative Turkish household maximizes equation (2) subject to her new budget constraint:

$$pw_T(1 - l_T) + \frac{N_E}{N_T} \, \theta = c_T^E + pc_T^T.$$

The first order conditions for the maximization problems yield:

$$
\begin{aligned}
c_E^E &= \frac{A_E - \theta}{2 + \beta}, \\
c_E^T &= \frac{\beta(A_E - \theta)}{p\,(2 + \beta)}, \\
l_E &= \frac{A_E - \theta}{A_E(2 + \beta)}, \\
c_T^E &= \frac{p\hat{A}_T + \theta N_E/N_T}{2 + \beta}, \\
c_T^T &= \frac{\beta(p\hat{A}_T + \theta N_E/N_T)}{p\,(2 + \beta)}, \\
l_T &= \frac{p\hat{A}_T + \theta N_E/N_T}{p\,(2 + \beta)\hat{A}_T}.
\end{aligned}
$$

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[4]Dawson (1998), Ayal and Karras (1998) employed economic freedom index (1995) as an indicator of institutional quality. This index was published in James Gwartney, Robert Lawson and Walter Block, Economic Freedom of the World 1975-1995. Klein and Luu (2003), on the other hand, use "Legal Structure and Property Rights" index, which is the sub-component of the composite economic freedom index (2001).

When goods market clear according to equation (3), p reads as

$$p = \frac{N_E(\beta A_E + \theta)}{\hat{A}_T N_T}.$$

Utility of the European household after accession reads

$$\hat{U}_E = (2 + \beta)\ln(A_E - \theta) + \beta\ln\mu A_T N_T - \beta\ln N_E(\beta A_E + \theta) - \ln A_E - (2 + \beta)\ln(2 + \beta) \quad (5)$$

The European household will be willing to give a lump-sum transfer to the candidate member country Turkey, if her utility level before Turkey's accession is equal or higher than her utility level before accession. We represent this problem for the maximum level of transfer when the European household is indifferent between two utility levels, which writes as

$$\hat{U}_E = U_E \quad (6)$$

where $\hat{U}_E$ is the utility of the European household after accession. The proposition below summarizes the results that are drawn by solving equation (6).

Proposition 1. *There exists a unique positive θ_x, which is the solution to problem (6) if and only if $\mu > 1$. The higher μ, the higher the level of transfer that the European household is willing to give.*

Proof: See Appendix A.1.

Proposition 1 states that there is no positive level of transfer as a solution to equation (6), when there is no TFP increase in Turkey, namely when μ=1. In other words, the European household will be worse off upon Turkish accession unless she is compensated by a TFP increase in Turkey. In fact, the representative European household consumes less European good and has less leisure after she gives away transfer. Thus, only a utility gain due to an increase in the consumption of the Turkish good through a decline in its price can offset this utility loss. Obviously, an increase in μ will lower the price of the Turkish good, and therefore will correct for the utility loss of the European household.

3 The Model with Capital

In the previous section, we have considered the implications of a TFP increase in Turkey on the level of transfer, when there is no capital in the model. In this section, we introduce capital into the production function. We will compare the case, in which there is capital mobility only after accession versus the case where capital is mobile already before accession.

3.1 The Benchmark Model

In this section, we introduce capital so that production is made through a Cobb-Douglas constant returns to scale technology:

$$Y_i = A_i K_i^\alpha N_i^{1-\alpha} \qquad i = E, T,$$

where K is capital, N is population size which is equal to labor supply and α is a constant with $0 < \alpha < 1$. Capital and population of the EU are assumed to be larger than those of Turkey (i.e. $N_E > N_T$ and $K_E > K_T$). The representative household in each country has the identical utility function, which reads

$$U_i = \ln c_i^E + \beta \ln c_i^T. \tag{7}$$

Notice that there is no leisure term in the new utility function for the sake of analytic tractability. The representative European household maximizes equation (7) subject to

$$w_E + \frac{R_E K_E}{N_E} = c_E^E + p c_E^T$$

where R_E is the interest factor in the EU. The representative Turkish household maximizes equation (7) subject to

$$p w_T + \frac{p R_T K_T}{N_T} = c_T^E + p c_T^T$$

where R_T is the interest factor in Turkey. The first order conditions give:

$$
\begin{aligned}
c_E^E &= \frac{w_E + R_E K_E / N_E}{1 + \beta}, \\
c_E^T &= \frac{\beta(w_E + R_E K_E / N_E)}{p(1 + \beta)}, \\
c_T^E &= \frac{p(w_T + R_T K_T / N_T)}{1 + \beta}, \\
c_T^T &= \frac{\beta(w_T + R_T K_T / N_T)}{1 + \beta}.
\end{aligned}
$$

Prices result from the competitive behavior of firms, which leads to equalization of marginal costs and productivities:

$$
\begin{aligned}
R_i &= \alpha A_i K_i^{\alpha-1} N_i^{1-\alpha}, \\
w_i &= (1 - \alpha) A_i K_i^{\alpha} N_i^{-\alpha}.
\end{aligned}
$$

When goods market clear subject to equation (3) p reads as

$$p = \beta \frac{A_E K_E^{\alpha} N_E^{1-\alpha}}{A_T K_T^{\alpha} N_T^{1-\alpha}}.$$

It is obvious that an increase in the TFP of Turkey will reduce p. We can write the utility level of the representative European household as follows

$$U_E = \ln \frac{A_E K_E^{\alpha} N_E^{-\alpha}}{1 + \beta} + \beta \ln \frac{A_T K_T^{\alpha} N_T^{1-\alpha}}{(1 + \beta) N_E}. \tag{8}$$

3.2   After Accession

After accession, a lump-sum transfer is given to Turkish households whereas a TFP shift occurs in Turkey. Moreover, capital is allowed to move freely between countries. Thus, the representative household in the EU maximizes her utility function, which is equation (7) subject to the new budget constraint:

$$w_E + \frac{R_E K'_E}{N_E} - \theta = c^E_E + p\, c^E_T,$$

whereas the Turkish household maximizes the same function subject to

$$pw_T + \frac{p\, R_T K'_T}{N_T} + \frac{N_E \theta}{N_T} = c^E_T + p\, c^T_T$$

Notice that capital level of each country is different from the initial capital. K'_E and K'_T stand for capital stock in the EU and Turkey upon capital markets integration. A positive difference between K_E and K'_E corresponds to an outflow of the EU capital to Turkey, indicating an inflow of capital to Turkey, and conversely a negative difference between K_E and K'_E corresponds to an inflow of the Turkish capital to the EU, meaning an outflow of capital from Turkey.

First order conditions for the maximization problems give:

$$
\begin{aligned}
c^E_E &= \frac{w_E + R_E K'_E / N_E - \theta}{1 + \beta}, \\
c^T_E &= \frac{\beta(w_E + R_E K'_E / N_E - \theta)}{p(1 + \beta)}, \\
c^E_T &= \frac{p(w_T + R_T K'_T) + \theta N_E / N_T}{1 + \beta}, \\
c^T_T &= \frac{\beta(pw_T + pR_T K'_T / N_T + \theta N_E / N_T)}{p(1 + \beta)}.
\end{aligned}
$$

Production functions of Turkey and the EU after accession are represented as

$$Y_i \;=\; A_i K'_i N_i^{1-\alpha}. \tag{9}$$

Factor prices resulting from profit maximization of the representative firm in the EU and Turkey are

$$
\begin{aligned}
R_i &= \alpha A_i K_i'^{(\alpha-1)} N_i^{1-\alpha}, \\
w_i &= (1-\alpha) A_i K_i'^{\;\alpha} N_i^{-\alpha}.
\end{aligned}
$$

When goods market clears p reads as

$$p = \beta \frac{A_E K_E'^\alpha N_E^{1-\alpha}}{\hat{A}_T K_T'^\alpha N_T^{1-\alpha}}.$$

8

Equilibrium in capital markets requires that real interest factors should be equal:

$$pR_T = R_E.$$

Hence, equalization of interest rates yields

$$\frac{K'_T}{K'_E} = \beta.$$

Since sum of capital levels before and after capital mobility should be equal, capital levels upon capital markets integration in terms of initial capital levels read as

$$K'_E = \frac{K_E + K_T}{1 + \beta},$$
$$K'_T = \frac{\beta(K_E + K_T)}{1 + \beta}.$$

Now that we have found new capital levels in terms of initial capital levels, we can write the utility of the European household for the cases where there is capital mobility.

$$\bar{U}_E = \ln \frac{A_E(K_E + K_T)^\alpha N_E^{-\alpha}}{(1 + \beta)^{1+\alpha}} + \beta \ln \frac{\beta^\alpha A_T(K_E + K_T)^\alpha N_T^{1-\alpha}}{(1 + \beta)^{1+\alpha} N_E}. \tag{10}$$

where $\bar{U}_E$ denotes the utility of the European household when there is free capital mobility before accession.

$$\hat{U}_E = \ln \frac{A_E \left(\frac{K_E + K_T}{1+\beta}\right)^\alpha N_E^{-\alpha} - \theta}{1 + \beta} + \beta \ln \frac{\beta \left(A_E \left(\frac{K_E + K_T}{1+\beta}\right)^\alpha N_E^{-\alpha} - \theta\right)}{1 + \beta} \frac{1}{p} \tag{11}$$

where p stands for the new price of the Turkish good after accession when there is free capital mobility, which writes as

$$p = \frac{\beta^{1-\alpha} A_E N_E^{1-\alpha}}{\mu A_T N_T^{1-\alpha}}.$$

Now we will compare two different cases. In the first case, capital is mobile only after Turkey's accession; in the second case, capital is mobile both before and after accession. Solving equation (6) for θ for equations (8) and (11) for the first case and equations (10) and (11) for the second case gives:

$$\tilde{\theta} = A_E N_E^{-\alpha} \left[\left(\frac{K_E + K_T}{1 + \beta}\right)^\alpha - \left(K_E \left(\frac{\frac{K_T}{K_E}}{\beta \mu^{1/\alpha}}\right)^{\beta/(1+\beta)}\right)^\alpha \right], \tag{12}$$

$$\bar{\theta} = A_E N_E^{-\alpha} \left(\frac{K_E + K_T}{1 + \beta}\right)^\alpha \left(\frac{\mu^{\beta/(1+\beta)} - 1}{\mu^{\beta/(1+\beta)}}\right), \tag{13}$$

where $\tilde{\theta}$ is the level of transfer when there is no capital mobility before accession and there is capital mobility after accession and $\bar{\theta}$ is the level of transfer when there is already capital mobility prior to accession.

Proposition 2. *Assuming capital mobility before accession, there exists a unique positive $\bar{\theta}$ given by equation (13), which is the solution to equation (6) if and only if $\mu > 1$.*

Proposition 2 is clear from equation (13) and it suggests that the utility loss of the European household due to the lump-sum transfer can only be compensated by an increase in μ, which reaffirms the discussion of Proposition 1. Hence, if capital markets have already been integrated prior to Turkey's accession, the result derived in the previous section is the same as the one derived in this section. A value of μ higher than 1 leads to a decline in the price of the Turkish good, and thus improves the utility of the European household, offsetting her utility loss due to the transfer. Not surprisingly, the higher μ, the higher the drop in the price of the Turkish good, and accordingly, the higher the level of transfer ($\bar{\theta}$) that the European household is willing to give.

Proposition 3. *Assuming no capital mobility before accession, there exists a unique positive $\tilde{\theta}$ given by equation (12), which is the solution to equation (6) if and only if $\mu \geq 1$. $\tilde{\theta}$ is higher than $\bar{\theta}$ for any $\mu \geq 1$.*

Proof: See Appendix A.2.

Proposition 3 implies that capital markets integration upon Turkish accession enables the European household to improve her utility even if TFP shift does not arise in Turkey. Moreover, a TFP increase in Turkey accompanied by free capital mobility further increases her utility, thereby raising the level of transfer. Since a TFP increase in Turkey is required for $\bar{\theta}$ to exist, $\tilde{\theta}$ is higher than $\bar{\theta}$ for any value of μ, which is equal or bigger than 1. Also notice that capital mobility is favorable for the EU, irrespective of which direction capital flows, either to Turkey or to the EU. This result follows from free trade between Turkey and the EU. Since each good is consumed by each country's households, an increase in any of the country's stock of capital, and therefore in that country's production level raises the utility level of both countries' households. However, if capital markets were already integrated before accession, the benefits of the capital mobility would be reaped prior to the membership of Turkey and thus capital mobility would have no effect on the level of transfer. In fact, Buch and Piazolo (2001) found that EU membership has an insignificant impact on capital flows for Spain wheras it has a positive and significant effect for the old members of the EU. This result follows from the fact that Spain allowed free mobility of capital before its accession.

To abolish capital controls until accession reduces representative European household's willingness to give a transfer to the new member's representative household. As a result, allowing for free capital mobility before accession appears to be unfavorable for admission. [5]

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[5]However the candidate member country may have some international commitments that it can not choose to control capital flows. Moreover the candidate may benefit from free capital mobility in other arenas so that it may choose to abolish capital controls. We do not consider these issues in our analysis.

3.3 Illustration

For illustrative purposes Figure 1 presents the distance between $\tilde{\theta}$ and $\bar{\theta}$, which is expressed as the percentage of $\bar{\theta}$ for varying levels of the TFP increase in Turkey (μ). The parameters which have been chosen to be consistent with the properties of the model and the data are: $\beta = 0.05, K_E = 0.933, K_T = 0.066$ and $\alpha = 0.33$. We observe that the distance between $\tilde{\theta}$ and $\bar{\theta}$ is positive for all levels of μ. However the distance between two transfer levels decreases with increasing levels of μ. In other words, the difference between two transfers resulting from the positive effect of the capital markets integration after accession diminishes as TFP growth is higher in Turkey.

Figure 1: The Distance between Transfers ($\tilde{\theta}$ and $\bar{\theta}$) as a Function of TFP increase
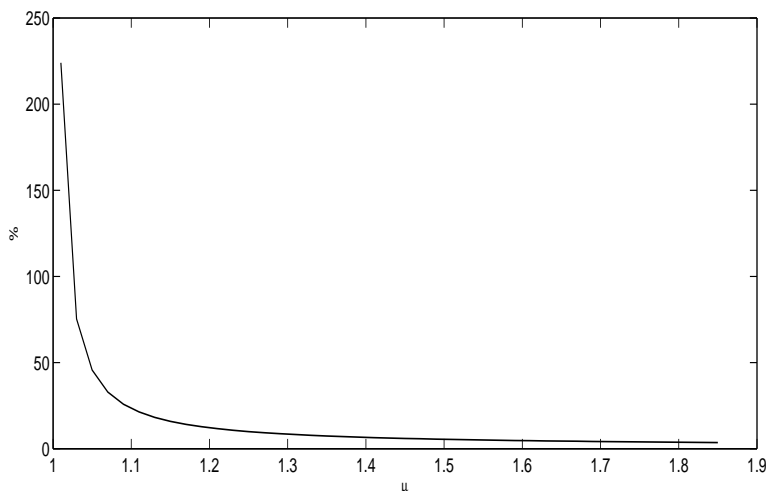

4   Policy Implications for Turkey

Turkey liberalized its capital account in 1989. As Turkish nationals were permitted to purchase foreign securities and to borrow abroad without government permission, foreigners could buy Turkish securities and could open Turkish Lira accounts convertible into foreign exchange. After capital account liberalization, capital inflows to Turkey increased steadily after 1990, with net capital inflows reaching more than three percent of GDP in 1996 and 1997, and more than five percent of GDP in 2004 and 2005 (See Figure 2).

While portfolio investments, deposits, loans and trade credits constitute the bulk of capital inflows, Foreign Direct Investment (FDI) performance never reached 1 percent of GDP apart from the exceptional year of 2001[6]. According to policy makers the Foreign Investment Law No: 6224, which was enacted in 1954 was insufficient to induce the inflows of FDI. To this

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[6]The reason for this year's high performance compared to that of average is due to the sales revenue of third GSM license, sale of a Savings Deposit and Insurance Fund bank to a foreign bank and finally the sale of equity ownership of domestic automotive producer to the foreign partner.

Figure 2: Net Capital Flows and FDI as percentage of GDP
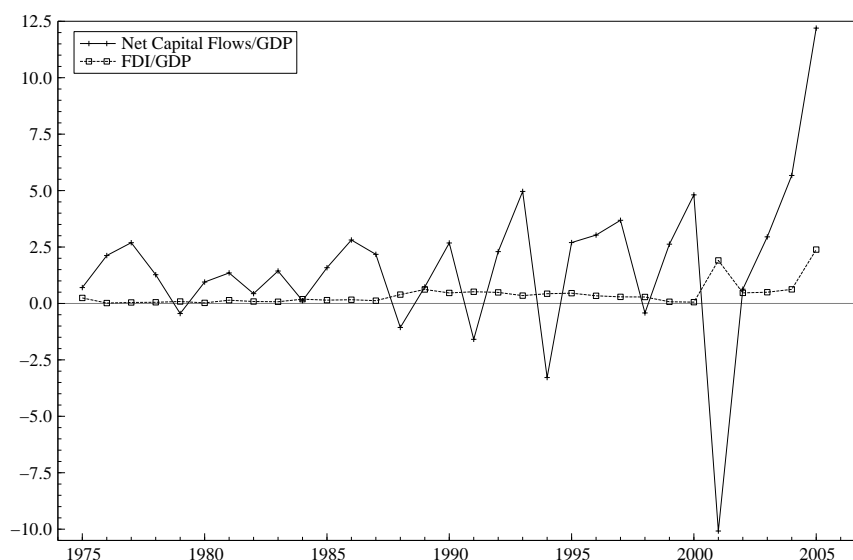
Source: T.R Prime Ministry State Planning Organization and World Bank.

end, in 2003 New Foreign Capital Law was introduced in order to make the investment environment more efficient and suitable for potential foreign investors by guaranteeing the transfer of capital gains, fees, royalties and dividends. Moreover, sectors that foreign capital operates were enlarged and free trade zones were created where foreign capital were allowed to operate without restrictions (Dutz, Us, and Yilmaz, 2005). After the law went into effect, a discernible progress has been observed in FDI performance. Indeed, net FDI flows reached 2,4 percent of GDP in 2005.

By capital account liberalization and New Foreign Capital Law, Turkey seemed to lay down the regulations required for free capital mobility before its accession into the EU. Furthermore, repercussions of these regulations on capital flows have been remarkable.[7]

Our model envisages that capital markets integration adds to the utility of the European household irrespective of the direction of capital flows. Nevertheless, if capital markets integration takes place before candidate country's admission into the Union, the European household would benefit from the utility enhancing effect of free capital mobility prior to the accession of the candidate member country and would have no incentive to give a transfer. Since Turkey has abolished all capital controls first by capital account liberalization and second by Foreign Capital Law, the incentive of the EU to give a transfer to Turkey for redistribution policy turns out to diminish according to our model.

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[7]The premature opening of the capital account without sound monetary and exchange rate policies led to the 1994 currency crisis in Turkey. See Ertugrul and Selcuk (2001), Ozatay (2000), Celasun (1998) for an extensive discussion.

5 Conclusion

Our aim in this paper was to show first whether a TFP increase in Turkey after her accession compensates the cost of redistribution policy in the EU and second whether free capital mobility before accession is unfavorable for admission to the Union.

Bearing in mind the TFP growth experiences of Portugal and Spain after their membership to the EU, we have assumed that the European household gives a lump-sump transfer to the Turkish household for redistribution in the EU, whereas an upward shift arises in Turkey due to the positive effect of accession on institutional development. Thereafter, we have considered the utility of the European household and searched for the maximum level of transfer when she is indifferent between her utility before and after accession. There is a direct positive link between the production, and thus a TFP increase in Turkey and the utility of the European household under the assumption of free trade between countries, which makes available the consumption of the Turkish good in the EU without any additional cost. In this regard, an increase in the TFP of Turkey lowers the price of the Turkish good, which leads to an improvement in the utility of the European household, and accordingly compensates the cost of transfer. Thus, we have shown that a TFP increase in Turkey after her accession may compensate the cost of the redistribution policy in the EU, thereby eliminating one of the economic obstacles to Turkish admission into the Union.

To give an answer to the second question, we have analyzed the effects of capital markets integration on the level of transfer. Capital mobility after accession, which accompanies the TFP increase, further improves the utility of the European household, leading to an increase in the transfer level. In fact, capital markets integration increases the European household's utility irrespective of the direction of capital flows. This result again follows from the positive relationship between Turkey's production and the utility of the European household. Nevertheless, capital mobility has no effect on the level of transfer, if it is allowed before accession. In this case, European households would already profit from capital mobility through an increase in their utility before Turkey's accession.

Our analysis suggests that a TFP growth in Turkey after accession may compensate the cost of redistribution policy through its positive impact on the utility of incumbent members' households. On the other hand, capital markets integration may have no effect on the redistribution policy since Turkey has already laid down the regulations required for free capital mobility before accession.

Several extensions may undoubtedly enrich the model. It would for example be interesting to introduce free labor mobility in the model. Besides, endogenizing TFP would improve the quality of the model. These issues are left for future research.

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A Appendix

A.1 Proof of Proposition 1

When equation (6) holds, we have

$$\underbrace{(\beta A_E + \theta)A_E^{2/\beta}}_{f(x)} = \underbrace{\beta\mu(A_E - \theta)^{(2+\beta)/\beta}}_{f(y)}$$

$$
\begin{aligned}
f'(x) &= A_E^{2/\beta} > 0 \\
f'(y) &= -(2+\beta)\mu(A_E - \theta)^{2/\beta} < 0
\end{aligned}
$$

When $\theta = 0$,

$$
\begin{aligned}
f(x) &= \beta A_E^{(2+\beta)/\beta} \\
f(y) &= \beta\mu A_E^{(2+\beta)/\beta}
\end{aligned}
$$

There is an intersection point between these two functions, and hence a unique solution to equation (6) if $f(y) > f(x)$ when $\theta = 0$. Thus, μ should be higher than 1 ($\mu > 1$).

A.2 Proof of Proposition 2

It is easy to see that there exists a positive $\tilde{\theta}$ when $\mu = 1$, if and only if the following inequality holds:

$$\frac{K_E + K_T}{1 + \beta} > K_E \left(\frac{\frac{K_T}{K_E}}{\beta}\right)^{\beta/(1+\beta)}. \tag{14}$$

To prove this inequality, we must show that these two functions have only one intersection point and the function on the right hand side is concave. Since $\beta = \frac{K_T}{K_E}$ is the only intersection point, the next step is to prove the concavity of the right hand side function.

A continuous and differentiable function is concave in a variable, if its second derivative with respect to this variable is smaller than 0. Let us say that $\frac{K_T}{K_E} = x$. Hence, the function becomes

$$f(x) = \left(\frac{x}{\beta}\right)^{\beta/1+\beta}.$$

The second derivative yields

$$f''(x) = -\frac{\beta^{1/(1+\beta)}}{(1+\beta)^2} x^{(-2-\beta)/(1+\beta)} < 0,$$

which gives the result.

To show that $\tilde{\theta}$ is higher than $\bar{\theta}$, we can arrange equation (13) in the form:

$$\bar{\theta} = A_E N_E^{-\alpha} \left[\left(\frac{K_E + K_T}{1 + \beta} \right)^{\alpha} - \left(\left(\frac{K_E + K_T}{1 + \beta} \left(\frac{1}{\mu^{1/\alpha}} \right)^{\beta/(1+\beta)} \right)^{\alpha} \right) \right].$$

Now, it is easier to notice that $\tilde{\theta}$ is higher than $\bar{\theta}$ when $\mu = 1$ as long as condition (14) holds. Since we have proved this condition above, $\tilde{\theta}$ is higher than $\bar{\theta}$ for any value of μ, which is equal or higher than 1.