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# FISCAL TRANSFERS AND STRUCTURAL REFORMS IN THE EUROPEAN MONETARY UNION\*

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## **Abstract**

In a monetary union, fiscal transfers are an important policy tool to adjust to asymmetric shocks. However, fiscal transfers cannot substitute structural reforms especially when shocks are permanent. In this way, the design of fiscal transfer systems determine whether structural reforms or non-reforming is preferred by governments. Inter-regional transfers provide the lowest incentive for structural reforms. Inter-temporal transfers might promote structural reforms as long as debt cannot be accumulated. Therefore, I oppose an EU-tax budget, call for a strict application of the Stability and Growth Pact, and explain low reform activity in the EMU by interest rate convergence.

**Keywords:** Fiscal Transfers Systems, Structural reforms, Principal-Agent Model, European Monetary Union, EU Taxation.

**JEL-Codes:** D78, E61, E62, F15, P11

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## 1. Introduction

With national monetary policies transferred to the supranational level, fiscal policies have become an important tool to adjust for country specific shocks in the European Monetary Union (EMU) (EC 1993). Thereby, fiscal transfers are effective to adjust to temporary shocks (De Grauwe 2007). In contrast, permanent shocks desire an adjustment via prices and wages, which implies that labour markets within a monetary union need to be sufficiently flexible (Mudell 1961). In the EMU, however, labour markets are not as flexible as necessary, which for instance shows up in diverging intra-EMU current account balances (EC 2009, Zemanek et al. 2009). Thereby, fiscal transfers could have been used by EMU countries to delay structural reforms. However, the potential to finance non-reforming might depend on the design of a fiscal transfer system, which will be analysed in this paper.

There are two main fiscal transfer options to cushion asymmetric shocks – inter-temporal transfers based on decentralized budgets, and inter-regional transfers based on a centralized budget. Both transfer systems smooth consumption and investment over time by varying public expenditure. Inter-temporal transfers (public deficits or public surpluses) shift resources within one region across the time dimension (De Grauwe 2007). In the case of a recession, a country borrows from future income to stimulate growth. In contrast, an inter-regional transfer system distributes resources at one point in time from one country or region to another. A region which is affected by a recession receives resources from the booming region, for instance via a tax equalisation system at supranational or national level.

Both transfer systems can equilibrate temporary asymmetric shocks in the EMU. In contrast, a permanent regional shock, for instance different stages of economic development such as in Italy (North and South) or Germany (East and West) as well as the structural change during the globalisation process, can destabilise the fiscal transfer systems. Inter-regional transfers will become persistent (De Grauwe 2007) or the stock of public debt will continuously rise, given an inter-temporal transfer system, if the recipient country or region fails to ensure price and wage flexibility by adjusting market based to the permanent shock.

One reason for delayed structural reforms in the case of a permanent shock might be the transfers themselves (Rodrik 1996, Hsieh 2000). In the political economy, structural reforms are linked to reform costs for politicians, which arise from opposition of insiders who will lose their rents or from lobbying (Saint-Paul 2004, Alesina et al. 2006). Given these costs, the

politician might use transfers to alleviate the effects of non-reforming instead of financing reform costs (Rodrik 1996). To analyse such moral hazard effects of fiscal transfers on structural reform incentives, I employ a principal-agent framework. The transfer receiving government decides whether it will use transfers for public investment (structural reforms) or public consumption (no reforms). I will show that the design of the transfer system determines the incentive for structural reforms.

In section 2, I start with an analysis of fiscal transfer systems for shock adjustment in a monetary union and I will give stylized facts on their use in the EMU. Further, I will scrutinize the effect of permanent shocks on transfer systems and introduce the role of transfers for structural reforms. In section 3, I set-up a principal-agent model and analyse the effects of inter-regional transfers without and with co-financing on structural reform incentive. The effect of inter-temporal transfers on structural reform incentives is investigated in section 4. In the last section 5, I conclude the results and give policy implications.

## 2. Fiscal Transfer Systems in the European Monetary Union

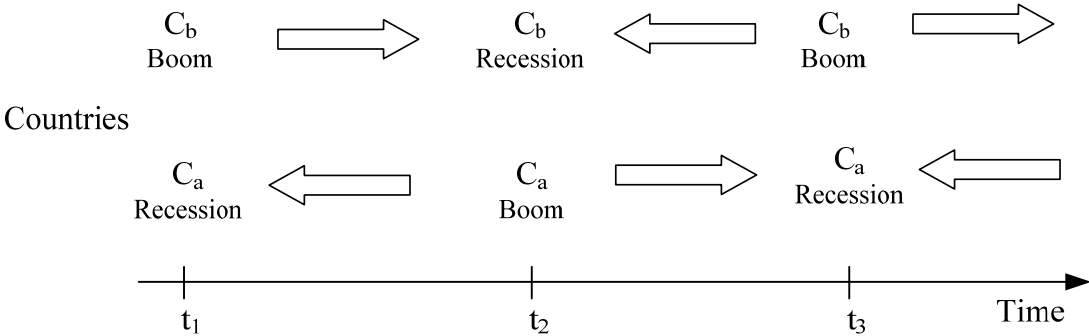
In the EMU, the competence on monetary policy was delegated to the supra-national ECB. Hence, national countries lost autonomous monetary policy as an economic policy tool in the case of economic shocks. That has made fiscal policy nowadays an important national adjustment tool in the EMU. Working as automatic stabilizer, fiscal policy should be expanding if a negative shock affects the economy while it should contract during a boom period. Thereby, fiscal funds compensate shortfalls in private consumption and private investment and smooth overall consumption and investment.

Fiscal transfers, in general, can be classified, depending on their characteristics about the time and regional dimension, into inter-temporal and inter-regional transfers.

### 2.1 Inter-temporal Transfers

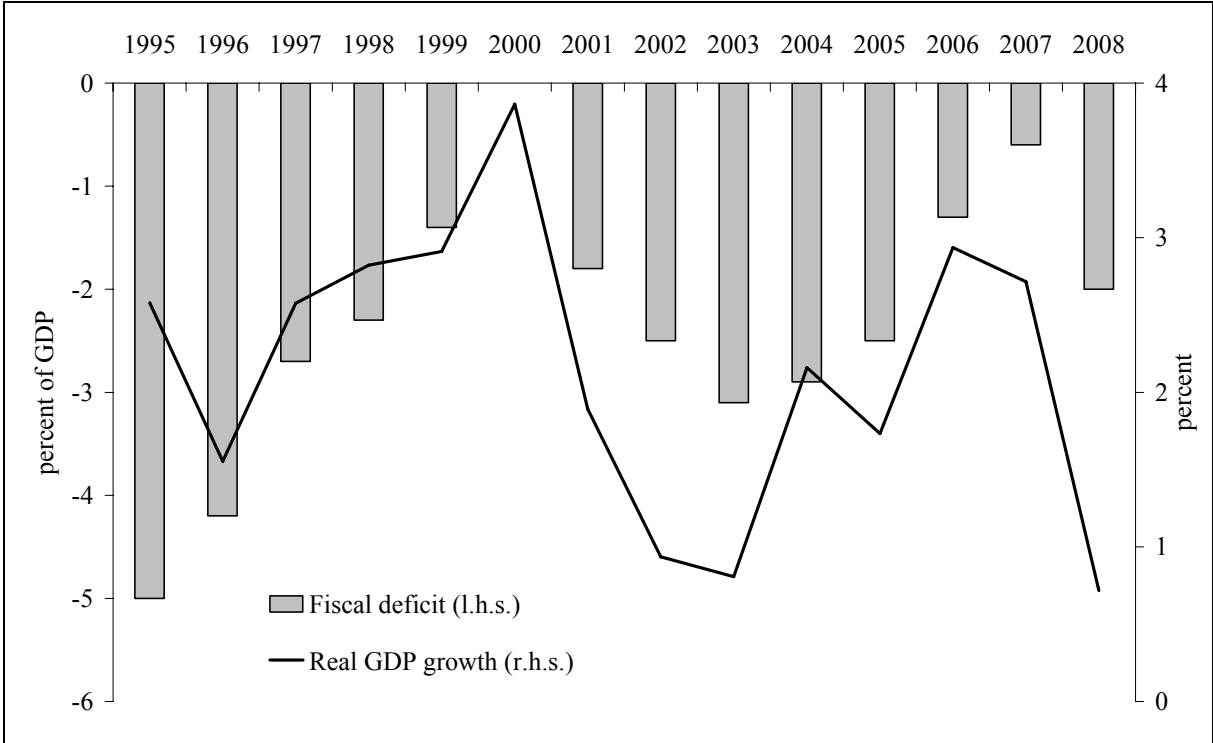
An inter-temporal transfer system shift resources within one region across the time dimension (De Grauwe 2007) by public deficits or public surpluses. In the case of a recession or an asymmetric shock, a country borrows from future income and repays its debt in the boom or saves funds in the boom for use in hard times. In a monetary union, each country uses inter-temporal transfers independently. Figure 1 shows a schematic inter-temporal transfer system for a two-country monetary union with countries  $C_a$  and  $C_b$  over time. Asymmetric shocks or economic cycles are smoothed within each country by saving for and borrowing from the future as indicated by capital flows (block arrows). In a recession, shortfalls in private expenditures are compensated by borrowed funds for public expenditures, which are repaid during a boom as tax revenues soar.

Figure 1: *Functioning of inter-temporal transfers in the case of temporal shocks*



In the EMU, inter-temporal transfers have been, up to now, the preferred fiscal transfer system (EC 1993) and are commonly used on a national and sub-national level. Inter-temporal transfers are closely linked to automatic fiscal stabilizer such as unemployment benefit schemes and other social benefits that smooth household income over time. Figure 2 shows fiscal balances and real GDP growth for the EMU 13. The cyclical component is clearly visible; countries raise public debt in times of low GDP growth. However, on average, EMU countries didn't save funds or repay their debt in the boom years 2000 or 2007, as proposed by the inter-temporal transfer concept. On supranational level, intra-temporal transfers are not common. Only recently, the European Commission issued bonds to raise the balance-of-payments assistance in the face of the current crisis (EU 2009a).

Figure 2: EMU 13 fiscal balances and real GDP growth



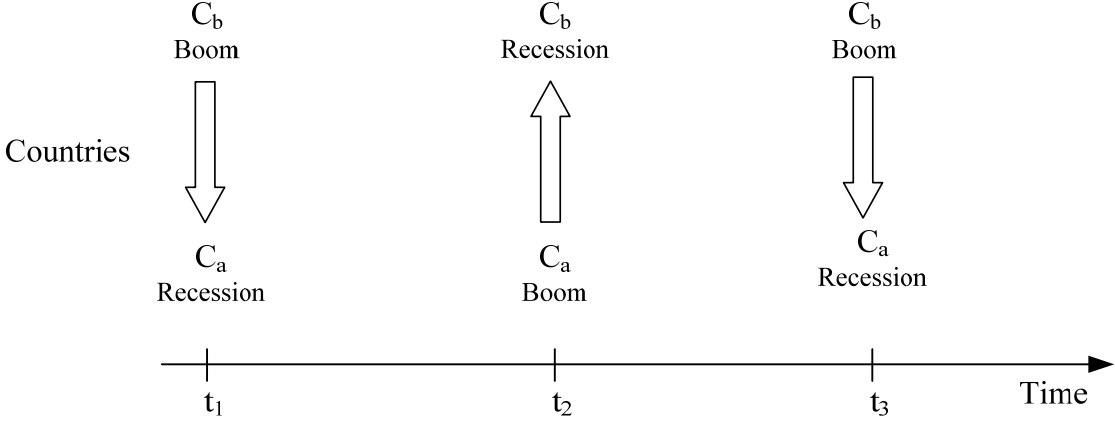
Source: Eurostat and IMF (real GDP growth).

**2.2 Inter-Regional Transfers**

In contrast, an inter-regional transfer system distributes funds between regions or countries at one point in time (de Grauwe 2007, von Hagen/Wyplosz 2008). Thereby, the country or region in a boom transfers funds to the country or region that is in a recession or suffering from a negative asymmetric shock. Again, private consumption and investment will be smoothed in both countries over time. Figure 3 shows the functioning of an inter-regional

transfer system for a model monetary union with two countries  $C_a$  and  $C_b$ . Transfer flows are again indicated by block arrows.

Figure 3: *Functioning of inter-regional transfers in the case of temporal shocks*



In the EMU, inter-regional transfers are mainly used at national level to adjust regional shocks within one country. For example, Germany has the “Länderfinanzausgleich”, a tax equalisation system, which shifts resources from rich federal states (Länder) to poor federal states depending on tax revenue per capita. In 2008, more than 8 billion euros were distributed from Bavaria, Baden-Wurttemberg, Hamburg and Hesse to all other federal states (BMF 2009). Similar systems are in place in Belgium (“Intervention de Solidarité Nationale”) or Italy (to promote the Mezzogiorno region).

On the supra-national level, there are also several inter-regional transfer systems at work. For instance, EU structural funds related to EU cohesion policy will distribute 347 billion euros between 2007 and 2013 (EU 2009b). Overall, major net financing countries for EU expenditures are Germany, Italy and France, while Greece, Spain and Portugal are major net recipient EMU countries. In relation to the EU-GDP, the transfer volume is low. However, the scope is large for single recipient countries, such as Greece. Further, a proposed and just recently discussed EU budget based on an “EU tax” would constitute a supra-national inter-regional redistribution mechanism (von Hagen and Wyplosz 2008, FAZ 2009a).

**2.3 Transfer Systems and Permanent Regional Shocks**

Both transfer systems, inter-temporal and inter-regional, are suitable economic policy tools to adjust to temporary shocks. However, if shocks become permanent, both transfer systems will be destabilized (De Grauwe 2007). In the case of inter-temporal transfers, the stock of public

debt rises continuously (Figure 4a). Alternatively, the direction of inter-regional transfers becomes persistent, leading to a permanent burden for the transfer contributing country or region (Figure 4b).

Figure 4a: *Inter-temporal transfer flows in a permanent shock*

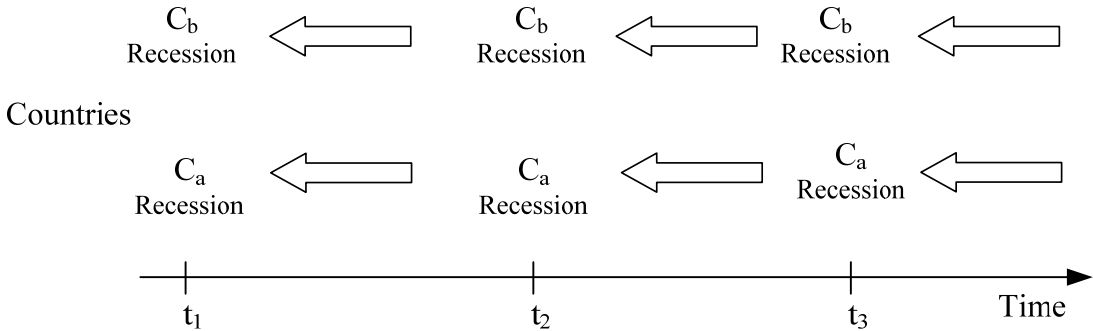
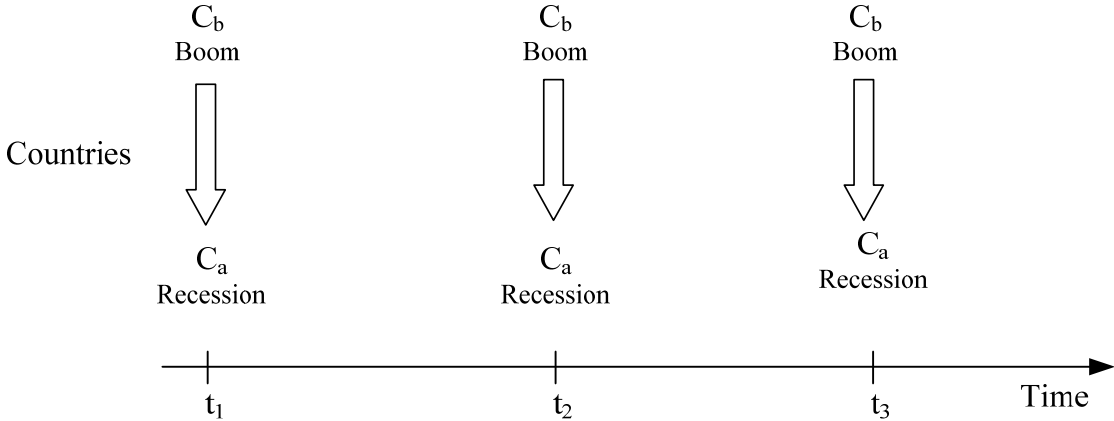


Figure 4b: *Inter-regional transfer flows in a permanent shock*



At this point, the recipient economy as member of a monetary union needs to adjust to the permanent shock, such as globalisation or structural change, not by fiscal transfers but via market adjustment. This implies that prices and wages are sufficiently flexible. This argument relates to the theory of an optimum currency area by Mundell (1961). Mundell argues that in a monetary union labour markets need to be flexible as nominal exchange rates and national monetary policy are not available for shock adjustment. If countries fail to ensure flexible labour markets, the market adjustment process to shocks via real exchange rates, and thus wages and prices, becomes longer and the increase in unemployment may be greater (Blanchard 2007). Therefore, the need for fiscal transfers becomes more pronounced and persistent. Labour market flexibility is therefore complementary to fiscal transfers.



Constant high levels of public debt in the EMU, for single countries even steadily rising<sup>1</sup>, indicate that inter-temporal transfers were at least partly used to compensate for permanent shocks. For instance, the demographic change or the entry of former communist Central and Eastern European countries into the world market and the continuing rise of East Asian economies increased competition pressure on western European countries. They were forced to restructure their markets in the face of globalisation to compete with low cost countries. However, the reluctance against structural reforms in labour institutions and social benefit systems forced governments to finance social benefits via public debt.

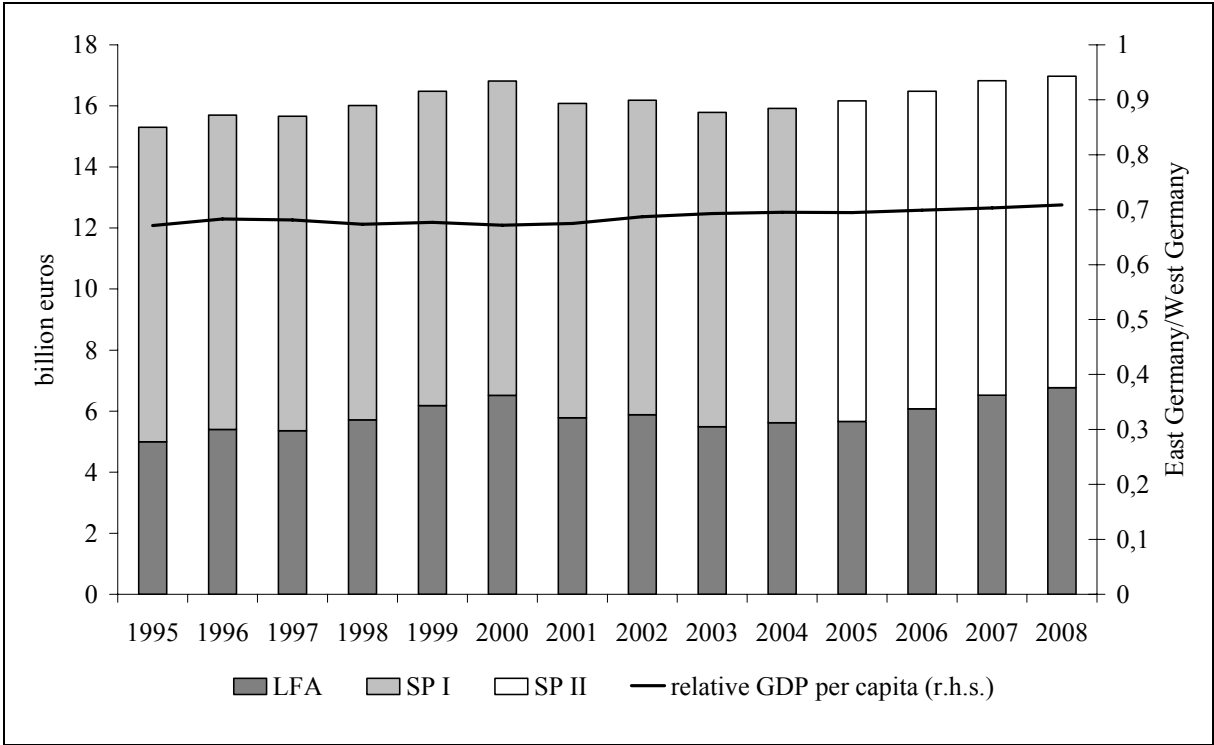
Examples for inter-regional transfer systems suffering from permanent regional shocks can be found in Italy (North-South transfers) or Germany (West-East transfers). For instance in Germany, annual transfers of the “Länderfinanzausgleich” between German Länder reached almost 8.3 billion euros in 2008 whereas almost 7 billions were meant for East Germany. Additionally, East Germany has received a further 10 billion euros annually for extraordinary burden (Solidarpakt I+II) related to the German reunification (Deutscher Bundestag 2001). However, the intended convergence process of East Germany after the negative reunification shock has not noticeably accelerated (Figure 5).

I can conclude that permanent shocks destabilize the fiscal transfer system if the recipient country or region fails to ensure price and wage flexibility. However, the transfers themselves could be a reason for delayed structural reforms.

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<sup>1</sup> Data are until 2008, which do not consider public debt effects of the current crisis.

Figure 5: *Transfers flows from West to East Germany and the relative GDP per capita of East Germany*



Source: BMF 2008, Statistische Ämter des Bundes und der Länder.

Note: LFA-Länderfinanzausgleich, SP I-Solidarpakt I, SP II Solidarpakt II; relative GDP is calculated based on real GDP per capita.

**2.4. Fiscal Transfers and Structural Reforms**

To evaluate the effects of fiscal transfers on structural reforms, I apply the development economics literature on foreign aid. While it is argued that aid (or fiscal transfers) is necessary to compensate for short-term costs of structural reforms, there is also evidence that aid (or fiscal transfers) are responsible for delayed structural reforms (Rodrik 1996, Hsieh 2000). The reason is that transfers reduce the costs of reforms but they also lower the costs of avoiding reforms. Transfers lower the pressure on recipient countries or regions to establish more sound institutions (promote structural reforms) to attract private capital (Devarajan et al. 2001).

Instead of investing foreign aid (or fiscal transfers) or compensating for short-term social reform costs, the recipient government can use aid (or fiscal transfers) to subsidize public sector employment or state owned enterprises which may crowd out private activity (in ‘t Veld 2007). While the role of the government sector relative to the private sector increases

(Friedman 1958), low productive sectors and their employment can be sustained. In addition, unemployment from the private sector could be financed, giving the government a paternal role and reducing incentives of unemployed individuals to find employment. The need for structural reforms is reduced by transfers, at least in the short term. On the other hand, reform costs increase, even if the government would be willing to reform, as relatively more insiders would now be willing to defend their rents.

Fester and Seitz (2005) provide some anecdotic evidence for this hypothesis. They show that East German Länders have a significantly larger public sector relative to their size than West German Länder. Furthermore, around 50 percent of transfers provided for investments to the East German Länder have been used to finance the public sector or public consumption respectively. In a study on foreign aid, Heckelman and Knack (2008) find empirical evidence for a negative impact of aid on reforms and Korean and Taiwan reforms in the 1960s are often credited to the stop of generous US-aid (Rodrik 1996).

Such unintended consequence of fiscal transfers can be attributed to moral hazard. Thereby, moral hazard appears with all parties involved in fiscal transfers (aid) (Pease 2004). For an inter-regional transfer system, von Hagen and Wyplosz (2008) argue, that countries (or regions) have the incentive to under-state their current economic situation to minimize their payments in the system or to maximise received transfers. Thus, they also might reduce reform efforts to maximize transfer income. This is in line with Hindriks et al. (2005) who find a reduction in investments in market-fostering public goods if fiscal revenue sharing is used. As a consequence of moral hazard and delayed reforms, politicians distribute the burden of permanent shocks, for instance structural change within one country or region, to other countries or regions. That is also truth for inter-temporal transfer systems, where burdens of structural adjustment are distributed to future generations and future governments.

In the following sections, I will further analyse the occurrence of moral hazard in the relation between structural reforms and transfers systems. Therefore, I set up principal-agent models for inter-temporal and inter-regional transfer systems.

### **3. Inter-Regional Transfers and the Incentive for Structural Reforms**

The principal-agent framework is part of the contract theory developed by modern institutional economics. The main assumption of the principal-agent framework is an asymmetric distribution of information between two economic players (Arrow 1970, Mirrlees 1974, Mirrlees 1999). The agent has an information advantage against the principal. If the agent rationally uses its information advantage to maximize its utility, the first-best welfare level might not be reached as well as the principal might not reach its maximum utility. However, the principal can use an incentive compatible contract to maximize its own utility by stimulating the agent to behave optimal from the principal's view. In my analysis, I will not focus on incentive compatible contracts. Instead, I compare different model settings, which represent fiscal transfer systems, and scrutinize their incentive to delay structural reforms.

I assume that the transfer payer is the principal and the recipient is the agent who has additional information on how he uses the transfers: for structural reforms or non-reforming. If the agent, the transfer recipient, delays structural reforms, he might be reliant for further transfers, which constitutes a moral hazard situation. The transfer payer (principal), a supra-national institution, another country, or a national government will send fiscal transfers because it cares about the economic situation in the recipient country or region. Hence, the principal's utility rises if output increases in the recipient country due to transfers. In contrast, transfer payments reduce the principal's utility as funds are not available for own use.

In general, the utility of the recipient (agent) depends positively on received transfers and its output but the related structural reforms are costly and therefore state a loss for the agent. In my analysis, I assume that structural reforms are indicated by the use of fiscal transfers for either public consumption or public investment. Public consumption of transfers is linked to non-reforming. In contrast, public investment will be accompanied by structural reforms, for instance to restructure the welfare system, to implement more flexible labour market institutions or to cut public sector expenditures, because fewer funds will be available for public consumption. However, structural reforms affect the uncertain output; the probability of high output rises with structural reforms.

### 3.1 Inter-Regional Transfers and Structural Reforms

In detail, I set up the model for inter-regional transfers as follows. The recipient country (denoted by subscript  $A$ ) respective its government, has a risk-neutral utility function. Expected output ( $E[Y_i]$ ) and fiscal transfers ( $D$ ) enter the utility function positively. Reform effort ( $a$ ) reduces the government's utility.  $\gamma$  is the weight of reform effort and determines reform costs in the utility function.

$$(1) \quad U_A = E[Y_i] + (1 - a_j)D - \gamma a_j \quad i = low, high \quad j = con, inv$$

The output in the recipient country is stochastic, dependent on the economic environment but also on the use of transfers for either public consumption (non-reforming) (denoted by  $con$ ) or public investment (structural reforms) (denoted by  $inv$ ). If the government decides to use transfers for public consumption ( $a_{con}$ ) and not to reform then the country will have a high GDP output ( $Y_{high}$ ) with the probability ( $\pi_1$ ). With probability ( $1 - \pi_1$ ) the GDP will be low ( $Y_{low}$ ). However, if the government invests received transfers and implements structural reforms ( $a_{inv}$ ) the probability for a high GDP ( $Y_{high}$ ) rises to ( $\pi_2$ ). Table 1 shows probabilities for high and low output, given the reform effort. I assume strictly that  $\pi_1 < \pi_2$ ,  $Y_{low} < Y_{high}$  and  $a_{con} < a_{inv}$ .

Table 1: *Output and its probability, conditional to structural reform effort*

Reform effort	Output	
	$Y_{low}$	$Y_{high}$
$a_{con}$ (non-reforming)	$1 - \pi_1$	$\pi_1$
$a_{inv}$ (structural reforms)	$1 - \pi_2$	$\pi_2$

Additionally, transfers  $D$  are weighted by  $(1-a)$  in equation (1). By doing so, I assume that transfers which cannot be used with the lowest effort will have a lower utility for the recipient government. Hence, if the government uses transfers for public investment, then it will not only have a loss from direct reform costs, for instance restructuring the public sector, but also a reduced utility from transfers.

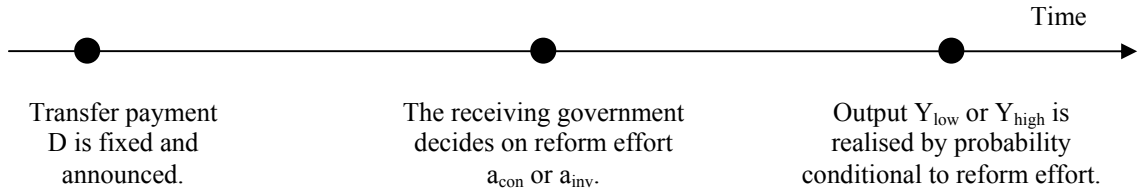
In contrast, the transfer giving country (denoted by subscript  $P$ ) has a utility function that includes positively the expected output ( $E[Y_i]_A$ ) in the receiving country and negatively the fiscal transfer payment ( $D$ ) as contributed transfers cannot be used for own consumption or investment.

$$(2) \quad U_p = E[Y_i]_A - D \quad i = low, high$$

The threat of moral hazard in such a transfer system, as well as in the following, arises from the difference of optimal behaviour between the recipient country and the paying country as only the recipient country decides how it will use the transfers. For the transfer sending country it is clear, given a fixed transfer payment, that its utility would be maximized if the recipient country invests the transfer and implements structural reforms ( $a_{inv}$ ). Then the expected value of output in the receiving country is maximized, as the probability of high output would rise from  $\pi_1$  to  $\pi_2$ . However, whether the recipient government will choose structural reforms is unclear, because it will weight the utility of a larger expected output, the utility of the transfers and the loss arising from structural reform costs  $\gamma a_j$ .

The sequencing of this decision process is the following. First, the amount of transfers to the recipient country ( $D$ ) is fixed ex-ante and not re-negotiable, for instance based on a fiscal equalisation mechanism. Second, the government, which receives the transfer, will decide on its reform effort by using the transfers for public investment or public consumption ( $a_{con}$  or  $a_{inv}$ ). Third, the output will become high or low ( $Y_{high}$  or  $Y_{low}$ ) given the probability ( $\pi_1$  or  $\pi_2$ ) and conditional to the chosen reform effort.

Figure 6: Sequencing of the decision process – inter-regional transfers



To analyse the decision of the recipient government on reform effort in an inter-regional transfer system, I will examine how each variable affects the decision. Therefore, I calculate the utility of the recipient government for both reform efforts  $a_{con}$  and  $a_{inv}$ . If I set both equal,

I can scrutinize when the government is indifferent between non-reforming and structural reforms.<sup>2</sup>

$$(3) \quad U_A(a_{con}) = U_A(a_{inv})$$

$$(4) \quad E[Y_{A,a_{con}}] - (1 - a_{con})D - \gamma a_{con} = E[Y_{A,a_{inv}}] - (1 - a_{inv})D - \gamma a_{inv}$$

$$(5) \quad ((1 - \pi_1)Y_{low} + \pi_1 Y_{high}) - (1 - a_{con})D - \gamma a_{con} = ((1 - \pi_2)Y_{low} + \pi_2 Y_{high}) - (1 - a_{inv})D - \gamma a_{inv}$$

I solve equation (5) for  $a_{inv}$ , which yields the indifference reform level  $a_{inv}^*$ , where the recipient government would be indifferent between public investment (structural reforms) and public consumption (no reforms):

$$(6) \quad a_{inv}^* = \frac{a_{con}(\gamma + D) + (\pi_2 - \pi_1)(Y_{high} - Y_{low})}{\gamma + D}$$

Given the assumptions of  $\pi_1 < \pi_2$ ,  $Y_{low} < Y_{high}$  and  $a_{con} < a_{inv}$ , it can be shown from equation (6) that:

- Given a high weight of reform effort in the utility function  $\gamma$ , the indifference reform effort level  $a_{inv}^*$  needs to be relatively low to assure that the recipient government will use transfers for investment, as  $\frac{\delta a_{inv}^*}{\delta \gamma} < 0$ . Otherwise, the utility from using transfers for public consumption exceeds the utility from public investment despite a lower expected output.
- A large transfer payment  $D$  reduces the incentive for structural reforms, as  $\frac{\delta a_{inv}^*}{\delta D} < 0$ . The utility of large transfers would compensate the government for the reduced utility of a low expected output in the case of using transfers for public consumption (non-reforming).
- A low reform effort level for public consumption requires a low reform effort level for public investment, too. Otherwise, the costs of structural reforms would be too high and would exceed the utility level of no reforming.

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<sup>2</sup> We assume that if the government is indifferent between non-reforming and structural reforms it will choose structural reforms.

- A large difference of probabilities for high output ( $\pi_1 - \pi_2$ ) conditional to reform efforts allows a higher effort level for structural reforms ( $a_{inv}$ ) relative to non-reforming ( $a_{con}$ ). Structural reforms increase the expected output relatively more and, hence, the utility of expected output, which compensates for reform costs.
- The same is true for the difference for high and low output ( $Y_{high} - Y_{low}$ ).

For this model of a basic inter-regional transfer system, the moral hazard might result in delayed structural reforms if (a) the transfer amount is too high relative to expected output and reform costs, if (b) structural reform costs are high, or if (c) the expected output after structural reforms is too low to compensate for reform costs. Because a low output becomes more likely without reforms, transfers might be again necessary in the next period. Then the transfer paying country could be again obligated to pay transfers via a fiscal equalisation system. That might repeat as long as the recipient country has a low output. Hence, transfers and moral hazard might lead to delayed reforms which themselves constitutes the need for transfers – a vicious circle might start.

Such a kind of self-fulfilling prophecy is the threat of an inter-regional transfer system. Especially, transfers without an intended purpose or without strict monitoring run the risk of moral hazard as described in my model. That applies to fiscal equalisation systems in several EMU countries as well as to the proposed EU-tax budget.

### **3.2 Conditional Transfers**

One possibility to avoid or reduce the moral hazard of transfers might be to give transfers only for the purpose of public investment. However, the experience of East Germany, where transfers dedicated for investment were used at least partly for public consumption, shows that monitoring needs to be installed. Monitoring is however costly. A better solution would be to reduce moral hazard by changing incentives of recipients via the transfer mechanism.

Co-financing of transfers is such a way to reduce moral hazard. Thereby, the recipient government has to add a certain percentage to each euro transfer they receive. The co-financing states an own-risk participation of the recipient government on the usage of transfers. That way of co-financing is for instance widely used for EU-Structural Funds. In my model, I can include a co-financing in the utility function of the agent by a contribution ( $S$ ). Thereby, the contribution states a loss for the recipient government, as it cannot use these



funds for other purpose. However, a higher expected output makes the agent's contribution less costly as he earns a value added of its contributed funds. Therefore, I weight contribution by the expected output multiplied with minus one.

$$(7) \quad U_A = E[Y_i] + (1 - a_j)(D) - (-E[Y_i]S) - \gamma a_j$$

I scrutinize the effect of co-financing in the same procedure as done in equations (3) to (6), which yields:

$$(8) \quad a_{inv}^* = \frac{a_{con}(\gamma + D) + (\pi_2 - \pi_1)(Y_{high} - Y_{low})(1 + S)}{\gamma + D}$$

Additionally to an inter-regional transfer system without co-financing, the contribution ( $S$ ) affects positively the indifference reform effort. A large co-financing relative to absolute transfer reduces the utility from transfers. Hence, transfers do not compensate at the same size for lower expected output (given non-reforming).

Compared to the situation with no co-financing in section 3.1, co-financing reduces moral hazard by:

$$(9) \quad \Delta a_{inv}^* = \frac{S(\pi_2 - \pi_1)(Y_{high} - Y_{low})}{(D + \gamma)}, \text{ where } \frac{\delta(\Delta a_{inv}^*)}{\delta S} > 0$$

Hence, co-financing of inter-regional transfers reduces moral hazard at least partly. Nevertheless, there is still the threat that transfers are used to finance the delay of structural reform if transfers are not strictly conditioned to investment which is closely monitored by a neutral institution or if reform costs are prohibitively high.

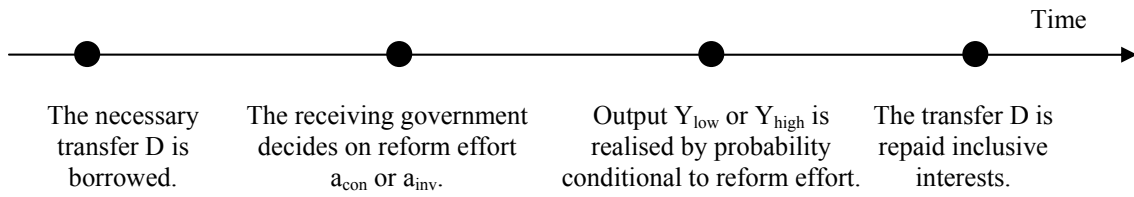
In the next section, I will analyse the incentives of inter-temporal transfers for moral hazard.

## 4. Inter-Temporal Transfers and the Incentive for Structural Reforms

### 4.1 Inter-Temporal Transfers and Structural Reforms

A basic inter-temporal transfer system would be that a government raises debt to compensate for an asymmetric shock, uses the funds for investment or consumption, and need to pay back debt inclusive interest payment. The decision process is displayed in figure 7:

Figure 7: *Sequencing of the decision process – inter-temporal transfers*



Within my model, I can represent such an inter-temporal transfer system by the modified utility function for the transfer receiving government:

$$(10) \quad U_A = E[Y_i] - (-E[Y_i]R) - \gamma a_j$$

The government's utility is positively affected by the expected output and negatively by reform costs to use funds for public investments. Borrowed transfers are not in the utility function, as they have to be paid-back immediately after output was realized. Additionally, the interest payment  $R$  enters the utility function negatively. However, the loss stated by interest payments depends negatively on the expected output. If the expected output is high, then interest payment will hurt relatively less because more income will be potentially available to pay interest. Nevertheless, given a fixed amount of transfers, rising interest rates increase interest payment and thus lower the government's utility.

Again, I analyse the incentive for moral hazard by comparing the utilities in the case of public consumption and public investment of transfers (borrowed funds). The indifference reform effort becomes:

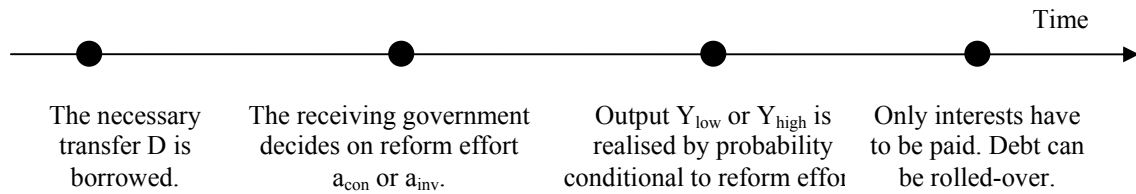
$$(11) \quad a_{inv}^* = \frac{a_{con}\gamma + (\pi_2 - \pi_1)(Y_{high} - Y_{low})(1 + R)}{\gamma}$$

In contrast to inter-regional transfers, the decision, whether to consume or invest the borrowed funds, depends not on the transfers, but on the size of interest payment. The larger the interest payment is the larger is the indifference level for public investment. That means structural reforms are more likely as interest payment reduces the utility of expected output regardless of the use of transfers. The government always has the incentive to reform and to invest the borrowed funds as long as reform costs are not prohibitively large. In this case, interest rates might be a tool to stimulate structural reforms.

#### 4.2 Debt Accumulation and Moral Hazard

In reality, borrowers might be able to rollover debt, hence, to accumulate debt over time. That changes the decision process of the transfer recipient. Similar to Figure 7, the government borrows and decides on its reform effort. Then high or low output will occur. After that, only interest payment has to be paid. Debt of the initially needed transfers can be rolled-over.

Figure 8: *Sequencing of the decision process – inter-temporal transfers with debt accumulation*



Because, transfers have not to be repaid after output has been realized, transfers re-enter the utility function of the recipient government as described in section 3.1.

$$(12) \quad U_A = E[Y_i] - (1 - a_j)D + (-E[Y_i])R - \gamma a_j$$

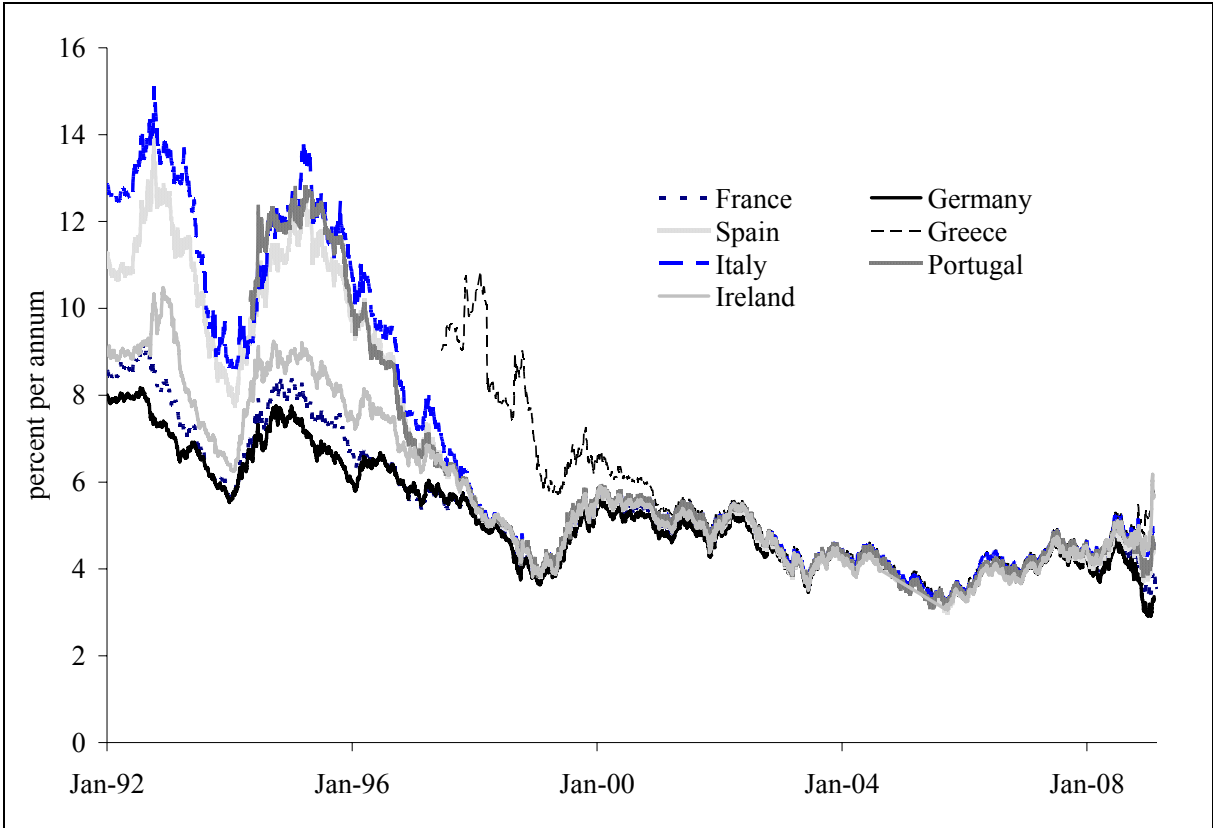
The analysis for the government's incentive for structural reforms yields an indifference reform level that is almost equal to equation (8):

$$(13) \quad a_{inv}^* = \frac{a_{con}(\gamma + D) + (\pi_2 - \pi_1)(Y_{high} - Y_{low})(1 + R)}{\gamma + D}$$

Now the utility of transfers might compensate for low expected output and interest payment. A debt accumulation makes a delay of reforms more likely than in the case of no debt rollover, holding all other variables constant. Non-reforming can be financed by inter-temporal debt, as long as borrowers are willing to provide funds and/or interest rates are at a low level that their disutility does not exceed the utility from transfers.

If I look at government bond yields in the euro area, however, I find a long run convergence process, starting in the early 1990s. With the start of the EMU, virtually any differences in government bond yields diminished (Greece followed later). Only in the light of the current crisis did yields diverge slightly (Figure 9). The implication for structural reforms could be positive or negative in the context of my results.

Figure 9: *Government Bond Yields for EMU countries*



Source: Reuters EcoWin.

The positive interpretation would be that EMU countries do not need structural reforms as they invest all borrowed funds. However, this would be contrary to calls by international organisations and academics for necessary structural reforms and sustainable fiscal policy (e.g. IMF 2007, EC 2009). Therefore, I favour the negative interpretation. The convergence of

government bond yields might display primarily the financial market integration, creating a larger and more liquid bond market, and only to a smaller extent fiscal policies. That would imply an undervaluation of the default risk and domestic factors, which should explain a substantial part of government bond yields (Codogno et al 2003, Barrios et al 2009). Low interest rates relative to a country's fiscal stance made it now easier to finance permanent shocks by public debt instead of reforming. Hence, in the light of my theoretical results, converging government bond yields in the euro area might also be an explanation for low structural reform activity since the start of the EMU, as reported in several empirical studies on this issue (Duval/Elmeskov 2005, Belke et al. 2006, Zemanek et al. 2009).

Nevertheless, the Stability and Growth Pact (SGP) limits de-jure inter-temporal transfer recipient to three percent of GDP in the EMU, thus limits the potential to delay structural reforms. That differentiates inter-temporal transfers with debt accumulation from inter-regional transfers with co-financing, where theoretically much larger transfer flows would be possible. However, the strictness of the SGP is de facto low and depends on political decisions. Several countries of the EMU will not meet the requirements of the SGP in 2009 and the following years. Therefore, I can conclude that inter-temporal transfers with debt accumulation do also impose an important threat for moral hazard and that necessary structural reforms are delayed, as long as transfers are available to finance its consequences.

## 5. Economic Policy Implications

In a monetary union, fiscal transfer systems are an important economic policy tool to adjust to temporary asymmetric shocks, since national monetary policy and nominal exchange rate adjustments are not available. However, fiscal transfers do not substitute for structural reforms. That will especially become evident if shocks are permanent. Then fiscal transfers might be destabilized either by rising stocks of debt or persistent transfers towards one country or region. In this context, the design of a fiscal transfer system might determine whether a government prefers structural reforms or whether it will finance non-reforming by transfers. I analysed and compared different transfer systems on their incentive for structural reforms.

Within a principal-agent framework I have shown, that a transfers receiving government might have the incentive to use transfers for financing the delay of reforms if the utility of transfers exceeds the net utility of structural reforms. That kind of moral hazard is in addition to former analysis by von Hagen and Wyplosz (2008). I find that inter-regional transfers, such as tax equalisations systems, may include the largest potential for moral hazard, as the transfer payment only states a utility for the government. If a transfers system involves co-financing, the utility of transfers is lower. Hence, the incentive to delay necessary structural reforms is lower, too. A similar characteristic can be found by an inter-temporal transfer system, which allows debt accumulation. Transfers are a utility for the government but reduced by interest payment. The lowest threat of moral hazard involves an inter-temporal transfer system without debt accumulation. Transfers have to be paid back after the period in which the shock occurred. Transfers have no utility for the government but interests have to be paid. Hence, the government will increase the expected output by conducting structural reforms as long as reform costs are not prohibitive (See the appendix for a summary).

The main implication of my research is that the design of a transfers system might affect the structural reform activity. Especially, tax equalisation schemes such as in Germany or transfers to promote economic development such as in Italy (Mezzogiorno) or Germany (East Germany) might erode reform incentives in the recipient region or country, hence creating a vicious circle. Transfers finance the delay of reforms, which again makes transfers necessary. Only an independent but costly monitoring of the transfer usage or co-financing might enhance the efficiency of an inter-regional transfer system. In that light, the demanded EU-tax budget needs to be opposed. The current problems found on national level, such as low

reform activity but also envy debates as recently in Germany (FAZ 2009b) would be transferred to the supra-national level.

Our research further calls for a strict application of the Stability and Growth Pact. If countries are able to accumulate debt, the potential to finance temporary shocks and to delay reforms via new debt will arise as long as creditors are willing to borrow funds. A capped debt accumulation and limited new debt increase the incentive for structural reforms. The need for transfers (new debt) would be lower in the following periods. This point is especially important for the EMU where capital market integration has led to converging and low interest rates. However, unrestricted debt accumulation of one country might increase refinancing costs of all countries in the long-term. A sudden stop of transfer flows for one country, in the case of its bankruptcy for example, would certainly destabilize the EMU. A strict application of the Stability and Growth Pact and hence more structural reforms would prevent such worst-case scenario as recently discussed for Greece (FT 2009).

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## Appendix

### I. Transfer systems and incentive for structural reforms at a glance

Transfer system	Indifference reform level for structural reforms	Incentive for structural reform
Inter-regional transfers	$a_{inv}^* = \frac{a_{con}(\gamma + D) - (\pi_1 - \pi_2)(Y_{high} - Y_{low})}{\gamma + D}$	Low
Inter-regional transfers with co-financing	$a_{inv}^* = \frac{a_{con}(\gamma + D) - (\pi_1 - \pi_2)(Y_{high} - Y_{low})(1 + S)}{\gamma + D}$	Middle
Inter-temporal transfers with debt accumulation	$a_{inv}^* = \frac{a_{con}(\gamma + D) - (\pi_1 - \pi_2)(Y_{high} - Y_{low})(1 + R)}{\gamma + D}$	Middle
Inter-temporal transfers	$a_{inv}^* = \frac{a_{con}\gamma - (\pi_1 - \pi_2)(Y_{high} - Y_{low})(1 + R)}{\gamma}$	High