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## **FROM BLIND PURSUIT OF GROWTH TO BALANCED DEVELOPMENT?**

### **- An Analysis of the Political Logic of Fiscal Intergovernmental Transfers in China 1998 - 2003**

#### **Abstract**

This thesis examines the underlying logic of the allocation of fiscal intergovernmental transfers in China and analyzes the changes in allocation policy over time. A theory of the determinants of central-provincial net fiscal transfers is developed and tested using a unique panel data set on Chinese intergovernmental transfers.

Evidence is found that the Chinese fiscal allocation policy changed significantly between 1998 and 2003. Whereas the pattern of allocation of both total net fiscal transfers and discretionary net fiscal transfers favored rich provinces in 1998, the allocation became less regressive over time and some evidence even suggests that the allocation of discretionary net fiscal transfers became slightly equalizing in 2003. Over the same time period, the central policy-makers' concern for social stability increased, as several indicators of social unrest gained influence over the allocation of intergovernmental transfers in 2000 and 2003. Furthermore, the evidence suggests that the net fiscal allocation was characterized by soft budget constraints in 2000 and 2003.

**Key words:** China, Intergovernmental fiscal relations, Fiscal federalism, Equalization, Social unrest.

**Authors:** Petra Persson (18736)  
Anna Eriksson (18802)

**Tutors:** Professor Erik Bergl f, Stockholm Institute of Transition Economics (SITE), SSE  
Professor David Li, Centre for China in the World Economy (CCWE), Tsinghua University

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## LIST OF ABBREVIATIONS

<b>CCP</b>	Chinese Communist Party
<b>DNFT</b>	Discretionary Net Fiscal Transfers
<b>FAS</b>	Final Account Subsidy
<b>FCS</b>	Fiscal Contracting System
<b>FDI</b>	Foreign Direct Investment
<b>GDP</b>	Gross Domestic Product
<b>IMF</b>	International Monetary Fund
<b>MoF</b>	Ministry of Finance
<b>NFT</b>	Net Fiscal Transfers
<b>OLS</b>	Ordinary Least Squares
<b>PPP</b>	Purchasing-Power Parity
<b>PRC</b>	People's Republic of China
<b>PS</b>	Party Secretary
<b>SBC</b>	Soft Budget Constraint
<b>SEZ</b>	Special Economic Zone
<b>SOE</b>	State-Owned Enterprise
<b>SPG</b>	Special Purpose Grant
<b>TSS</b>	Tax Sharing System
<b>TVE</b>	Township- and Village Enterprise
<b>UNDP</b>	United Nations Development Programme

## 1. INTRODUCTION

Thirty years ago, China was one of the poorest countries in the world. However, since 1978, when China opened its doors to the outside world and initiated gradual economic reforms, the number of people living on less than one dollar per day<sup>1</sup> has fallen by more than 400 million. This is a contribution to poverty relief unparalleled in world economic history. Behind it lies a high and sustained economic growth rate, which, together with the sheer size of China's population, also affects the rest of the world and enhances China's global influence.

Yet China faces great challenges. Central among them are the surging inequalities, the social problems engendered by the restructuring of its State-Owned Enterprises (SOEs), an undeveloped pension and welfare system and the unreliability of energy supplies. This gives rise to several questions which are imperative for China going forward; how do central policy-makers respond to the issues of rising inequalities and an increasingly alarming lack of social security nets at the local level? And how about economic, financial and institutional reform; do central policy-makers still provide local governments with incentives that are conducive to a continued rapid economic development process, which has been the case earlier during the reform period?

One way to explore these questions is to analyze how the central government funnels money to the provinces, and how this changes over time. Intergovernmental transfers are often introduced with the stated objective of redistribution. But as fiscal transfers constitute a powerful tool that a central government can use to control and influence local governments in a federal governance structure, intergovernmental transfers tend to be used to promote the central political agenda (Treisman 1996, 1998; Popov 2001 a, b). Whereas official pronouncements can be designed to mislead, central policy-makers' actual priorities will be reflected in the pattern of transfers. In fact, it has been argued that few types of data can offer as objective and revealing a picture of the inner workings of a state as the flows of money through its fiscal institutions (Treisman 1998). Therefore, in this thesis, we attempt to shed light on the changing nature of China's political process by examining the results of central fiscal redistribution at the provincial level. More precisely, we analyze the question: **what enables a province to increase its net fiscal allocation from the central government in China, and how does this change from 1998 to 2003?**

This time period is interesting to analyze for several reasons. First, the internal political situation was characterized by gradually increasing social tensions, epitomized by a drastically rising number of protests, riots or demonstrations, fuelled by inequalities, ethnic conflicts, land disputes,

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<sup>1</sup> Measured at Purchasing-Power Parity (PPP).

unemployment or other perceived injustices (Keidel 2004; Tanner 2004, 2005).<sup>2</sup> Second, in response to this, the central government's rhetoric changed, placing less emphasis on traditional quantitative economic growth targets and stressing the importance of "balanced development" through increased equalization and an "all-around building of a well-off society" (*Xiaokang Shehui*) (Wong 2005). Our empirical examination sheds light on whether the recent emphasis on addressing inequalities has generated an *actual* policy shift or if it merely represents a rhetorical response to increasing social tensions.

We first formulate a general model of equalizing and non-equalizing fiscal allocation. Second, to tailor this general model to the Chinese setting, we develop a theory of the determinants of net fiscal transfers *in China*, drawing upon both economic and political frameworks within the fields of fiscal federalism and political economy. We identify a number of economic and political factors and define hypotheses for how they influence the Chinese fiscal allocation, as well as for how their influence changes over time.

The theory is examined empirically using data collected during a field study, carried out September to December 2005, in Beijing. Net fiscal transfers in 1998, 2000 and 2003 are pooled and regressed on a set of explanatory variables capturing the need-based, political and economic criteria identified in the theoretical discussion. In order to control for provincial inherent characteristics and nation-wide macroeconomic fluctuation, a fixed effect model is specified, which is estimated using Ordinary Least Squares (OLS). The coefficients of the explanatory variables are allowed to vary over time, enabling allocation policy changes to be detected and tested for significance.

### **Delimitations and contribution to the literature**

In addition to the restriction in time, we limit our analysis to the central-provincial level, i.e. to the two top administrative levels in China.<sup>3</sup> Thus, we do not aim to analyze the allocation pattern below the provincial level. Our sole purpose is to shed light on central policy-makers' political and economic priorities and the fiscal incentives facing provincial governments.

Our contribution to the fiscal federalism literature is that we formalize previous empirical evidence on the determinants of fiscal transfers by formulating a general model for equalizing and non-equalizing fiscal allocation. Furthermore, we contribute to the literature on *Chinese* fiscal federalism in two ways. First, this thesis represents the first effort to decipher the political logic of the *total* net fiscal transfer from the central government to the provinces in China.<sup>4</sup> As it is the *total*

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<sup>2</sup> China officially saw no fewer than 74 000 such events, referred to as "mass group incidents" (*quntixing shijian*), in 2003, a figure more than eight times larger than a decade earlier (Kahn 2004; Tanner 2005).

<sup>3</sup> Appendix 1 describes China's structure of government and Appendix 2 illustrates China's administrative geography.

<sup>4</sup> In a previous study, the determinants of separate, smaller aggregates of fiscal transfers have been analyzed (Wang 2005). In consequence, the results of the present study are quite distinct from the results of Wang (2005).

*aggregate allocation* that determines distributional outcomes and shapes the incentive structure facing local governments, this methodology enables an empirical assessment of central policy-makers' actual equalizing effort and overall political and economic priorities. Second, this thesis is the first to analyze empirically the evolution of fiscal allocation policy between 1998 and 2003, a time period during which the internal political situation evolved considerably.<sup>5</sup>

This thesis provides evidence that allocation policy changed noticeably from 1998 to 2003: whereas intergovernmental transfers favored rich provinces in 1998, the allocation became less regressive<sup>6</sup> over time and the central government's concern for social stability increased, as several indicators of social unrest gained influence over the allocation in 2000 and 2003. Moreover, the evidence suggests that the net fiscal allocation was characterized by Soft Budget Constraints (SBCs) in 2000 and 2003.

## **Outline**

The remainder of this thesis is organized as follows. In Chapter two, we formulate a general model for equalizing and non-equalizing fiscal allocation and develop a theory of the determinants of net fiscal transfers in China. In the third chapter, we describe China's fiscal institutional structure. Chapter four specifies the model, describes the data and outlines the estimation method. Chapter five presents the empirical results, which are analyzed in Chapter six. Chapter seven concludes and, finally, the conclusions are discussed in a wider perspective in Chapter eight.

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<sup>5</sup> Wang's study was restricted to the time period from 1997 to 1999.

<sup>6</sup> Throughout this thesis, we use the term "regressive" as an antonym of the word "equalizing". Thus, by a "regressive" fiscal allocation, we refer to an allocation which implies redistribution of resources from "the relatively poor" to "the relatively rich".

## 2. THEORY

In this chapter, we first introduce the field of fiscal federalism. Second, we formulate a simple general model of equalizing and non-equalizing fiscal allocation. Third, to tailor our general model to the Chinese setting, we develop a theory of the determinants of net fiscal transfers in China, departing from Kornai's (1992) *Theory of the Classical Socialist System* and drawing on previous empirical research on fiscal intergovernmental transfers as well as on relevant literature in the broader fields of fiscal federalism and political economy.

### 2.1 AN INTRODUCTION TO FISCAL FEDERALISM

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Fiscal federalism concerns the formation of fiscal relations between the federal center and affiliated sub-units (e.g. provinces, republics, states and regions) in a federal governance structure. The traditional theory of fiscal federalism discusses the optimal division of responsibilities for public goods provision between central and local jurisdictions.<sup>7</sup> However, with an institutional perspective, a federal governance structure is essentially a set of political and fiscal institutions, which influence the ability of a central government to handle commitment and coordination problems. In addition, they provide incentives for local governments. The recent theory of “market-preserving federalism” suggests that a federal governance structure such as the Chinese can play a central role for economic development, which will be discussed further in section 2.4.<sup>8</sup>

One critical instrument of the fiscal arrangement in a federal governance structure is the intergovernmental transfer system, which redistributes funds between regions, often with the aim of fiscal equalization (Oates 1999).

### 2.2 DETERMINANTS OF INTERGOVERNMENTAL TRANSFERS—A SIMPLE MODEL

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A perfectly equalizing fiscal allocation, where “the haves” subsidize “the have-nots”, should take both *fiscal capacity* and *fiscal need* into account (Zhang & Martinez-Vazquez 2003). Fiscal capacity refers to the tax generating potential of a region. Fiscal need refers to the current ability of a local government to provide a certain bundle of publicly provided goods, such as health care and schooling, to the constituency's residents. As the cost for providing the same bundle of goods differs

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<sup>7</sup> Building on the works of Oates (1972) and Musgrave (1959), it contends that the central government should assume control over macroeconomic stabilization, income redistribution policies and public goods provision of nationwide benefits' incidence, based on the assumption that lower level governments face fundamental constraints in all three policy areas. On the other hand, public goods whose consumption is limited to a certain affiliated sub-unit within a federation should be provided by lower levels of government. More recent scholars take the discussion of the trade-offs further and point to the incidence of negative vertical and horizontal externalities in decentralized governance structures (Kollman et al. 1996; Ellingsen 1998; Lohmann 1998).

<sup>8</sup> In addition to referring to the fiscal and political incentives embodied in the Chinese governance structure, which will be emphasized in section 2.4, this argument is rooted in the notion that the governance structure of the state determines the ability of a government to commit to *preserving market incentives* (Williamson 1996). In addition to mechanisms such as democracy, the rule of law and horizontal separation of powers, Qian & Weingast (1997) use the Chinese case to argue that federalism can help provide such credible commitment in weak institutional settings: with decentralization, political durability is built into the jurisdictional arrangements and the diffusion of information encumbers the central government's ability to engage in predatory behavior.

across provinces, due to e.g. differences in resource endowments and population density, the *unit cost of social services* influences a province's fiscal need (Wang 2005).

This implies that with an equalizing fiscal allocation, each province contributes to the federal budget according to its tax potential and receives fiscal assistance in relation to its fiscal need. We formalize this by formulating the following simple model:

$$\text{Net Fiscal Transfer to province } i \text{ at time } t = \alpha \cdot \text{Fiscal Capacity}_{i,t} + \beta \cdot \text{Fiscal Need}_{i,t} \quad (2.1)$$

where  $\alpha < 0, \beta > 0$  and *Fiscal Need* represents a measure of the province's current level of publicly provided goods adjusted for cost-differences at the local level.

If a central government values inter-regional equity in its objective function, it would funnel capital in such a redistributive manner. A government could value inter-regional equity for normative reasons. In addition, in section 2.4 we argue that in the case of China, an (increasingly) equalizing distribution (or a less regressive one) could be attractive for the central government for political reasons if the government values social stability in its objective function.

### Introducing other determinants

If instruments of fiscal federalism are used selectively by the central government to *achieve political or economic objectives* other than inter-regional equity, equity-based criteria cannot fully explain the allocation of net fiscal transfers. As we shall see in the next section, previous empirical research has demonstrated that fiscal transfers can be captured in this manner (Treisman 1996; 1998). In terms of the simple model that we formulated above, this can be formalized in the following manner:

$$\text{Net Fiscal Transfer}_{i,t} = \alpha \cdot \text{Fiscal Capacity}_{i,t} + \beta \cdot \text{Fiscal Need}_{i,t} + \chi \cdot \text{Other Factors}_{i,t} \quad (2.2)$$

where *Other Factors* represent the full set of non-equity-based factors which influence the fiscal allocation in a country. As these Other Factors will be determined by the priorities of the central government at the time of the allocation, they will be both country-specific and time-specific. Deciphering the political logic of fiscal intergovernmental transfers in a country essentially is *to clarify whether or not there are Other Factors affecting fiscal allocation and, if so, unbundle and precisely identify which these Other Factors are*.<sup>9</sup>

As China is a large and administratively decentralized country, and as fiscal transfers are an important tool that a central government can use to control and influence sub-national units, it is plausible that the Chinese fiscal allocation is (partly or entirely) determined by other factors than equity-based criteria. In order to account for such potential *asymmetries* in our examination of the

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<sup>9</sup> As we shall see in the formulation of the final model, each of these Other Factors should have an individual intercept, as they cannot be assumed to affect the net fiscal allocation in the same manner.



determinants of Chinese intergovernmental transfers, we need to develop a theory identifying the Other Factors which plausibly influence the allocation of net fiscal transfers *in the Chinese case*. As these Other Factors are determined by the priorities of the central government at the time of the allocation, we need to start by discussing which the *important priorities* of Chinese central policy-makers are. In such an effort, Kornai's (1992) Theory of the Classical Socialist System is a viable starting point. This theory distinguishes several basic attributes, *system-specific features*, of the classical socialist system, which are deduced from an analysis of the party and the ideology. Departing from the assumption that continued undivided power of the communist party is the overall aim, Kornai (1992) describes a coherent system of priorities and arrangements whose various elements connect and reinforce each other.

For two reasons, we will also complement this theory and draw on other relevant literature on Chinese fiscal federalism and political economy. First, whereas the theory identifies the main common features of the social systems in the "socialist countries" (including China), Kornai (1992) recalls that this does not amount to perfect identity. Each socialist country has numerous individual characteristics. Furthermore, Kornai (1992) asserts that the only two countries where the classical system still prevails are North Korea and Cuba, whereas China has gone beyond the classical system.

Before developing our theory of the determinants of Chinese net fiscal transfers in the above described manner, we will briefly review previous relevant empirical evidence on the determinants of fiscal intergovernmental transfers.

### **2.3 DETERMINANTS OF INTERGOVERNMENTAL TRANSFERS—PREVIOUS RESEARCH**

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Treisman (1996, 1998) made the first comprehensive empirical attempt to systematize the fiscal relations in Russia<sup>10</sup>. He found that keeping the federation together was the key priority in the national agenda of 1992 and 1994: centrifugal tendencies were curbed by large net fiscal transfers to federation objects which were able to credibly threaten to leave the newly founded and vulnerable Russian Federation. Transfers were also used as a tool to overcome political resistance against Yeltsin: regions that voted against Yeltsin in 1991 and against the pro-Yeltsin *Russia's Choice*-bloc in December 1993 received larger net fiscal transfers.

Investigating a later period, Popov (2001b) applied a different methodology<sup>11</sup> and tested net fiscal transfers against political explanatory variables. He demonstrated that the allocation policy had changed notably since the time period investigated by Treisman: the more *compliant* a region was

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<sup>10</sup> In the literature on fiscal federalism, comparisons between the Russian and Chinese federal governance structures are common due to historical, geographical and administrative similarities. Thus, this literature is of relevance in the development of our theory.

<sup>11</sup> The methodological considerations highlighted by Popov will be discussed further in section 4.1.1.

toward the center during the period 1996 to 1998, the more revenues it could retain and the more it received in transfers.

In China, the underlying logic of *parts of* the intergovernmental transfer system has been examined empirically. Wang (2005) analyzes the main determinants of *four different parts of* the total net fiscal transfer during the period 1997 to 1999. Each of these four aggregates is tested against variables measuring central policy-makers' equity-based and political concerns.<sup>12</sup> Wang's main finding is that the allocation of these aggregates of transfers favors provinces that are relatively susceptible to ethnic separatism, i.e. provinces in which the relative proportion of ethnic Han in the population is small.

Another paper, which examines capital mobility in China, highlights an important economic aspect of the Chinese intergovernmental fiscal system (Boyreau-Debray & Wei 2005). The authors demonstrate a lack of positive association between net capital inflows to a province and its capital productivity. When separating the capital flow to a province into different categories, they find that one part of the investments allocated through the government budget<sup>13</sup> exhibits a negative relationship with marginal productivity of capital. When analyzing precisely what determines the allocation of this investment category between 1984 and 2001, the authors find that the share of SOEs in local industrial production, which was negatively correlated with marginal productivity of capital during the time period, was the main determinant of this allocation.

Thus, previous research has analyzed the underlying logic of *parts of* the Chinese intergovernmental transfer system. However, this thesis represents the first effort to decipher the underlying logic of *the total* net fiscal transfer from the central government to the provinces.<sup>14</sup>

## **2.4 THEORY OF THE DETERMINANTS OF INTERGOVERNMENTAL TRANSFERS IN CHINA**

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In his Theory of the Classical Socialist System, Kornai (1992) departs from the notion that the key to understanding the socialist system is to *examine the system's structure of power*. He asserts that the fundamental institution in the power structure is the communist party, *the body of power*, which is inseparably linked to the communist ideology, *the soul of power*.

### **Political power as the ultimate goal**

Thus, the starting point is the undivided political power of the ruling party. Once the party has come to power, it must never renounce it under any circumstances: in the official ideology's system of values, power is no mere means of attaining other primary objectives; it becomes "in its own right a

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<sup>12</sup> Wang's variables and results are outlined in Appendix 3.

<sup>13</sup> More precisely, the investment category that Boyreau-Debray & Wei (2005) analyzed in the above described manner was investments earmarked for capital construction and projects.

<sup>14</sup> We will describe how we calculate the total net fiscal transfer in Chapter 4.

primary good of intrinsic, ultimate value”. Kornai (1992) asserts that this has important implications for the relationship between the ruling elite and the rest of society, foremost concerning the role of punishment and coercion as tools for upholding social stability and for preventing deviations from the party line.

Although China gradually has gone beyond the classical socialist system as defined by Kornai (1992) after the initiation of reforms in 1978, maintaining the political power has remained the overriding goal of the Chinese Communist Party (CCP) (*The Economist* (2005); Tanner 2005). However, recalling Deng Xiaoping’s dictum “stability overrides everything”, Tanner (2004, 2005) notes that the *means* through which social stability should be maintained is the subject of intense discussion amongst the current guardians of the state in China, in particular *the role of coercion in sustaining social stability*.

The root of this debate is the fact that social unrest has risen vividly over the past decade, particularly since 1998, and now constitutes a daily phenomenon in China (Tanner 2005). China’s party leaders and security officials face sharp dilemmas as they search for an effective strategy to cope with this challenge (Tanner 2005). Hu Jintao and China’s security officials seem to recognize that the post-Tiananmen strategy of trying to prevent or quickly repeal all protests is now less effective although evidence indicates these are still the rules of engagement to deter ethnic unrest in Muslim and Tibetan areas (Tanner 2005). Some officials and analysts argue that a successful strategy for controlling social unrest in China cannot and should not rely exclusively on repression (Tanner 2005). In his analysis of the determinants of different aggregates of fiscal transfers in China, Wang (1999) argues that *fiscal transfers* are used as a tool to promote social stability, particularly in regions with relatively large non-Han populations. Given that promotion of social stability is a key priority to the central government, as it is closely linked to political stability, an increased redistribution to provinces characterized by a large degree of social unrest could be expected over the time period analyzed in this thesis, as the level of social unrest dramatically rose over this time period.

### **Economic growth as an essential priority**

Kornai (1992) asserts that one essential part of the ideology, i.e. of the soul of power in the classical socialist system, is the basic promises made to the population by the party at its seizure of power (Kornai 1992). The first central promise is *to catch up with the capitalist economy*.<sup>15</sup> This promise inclines the socialist system toward *forced growth*, another system-specific characteristic which implies that the purpose of policy-making is not maximization of social welfare in the broad sense, but maximization

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<sup>15</sup> Although this promise is expressed in different terms in different socialist systems, Kornai (1992) states that the goal to catch up with, and surpass, the capitalist countries is a central promise in all socialist systems, as it constitutes one of the ideas that brings broad strata in society over to the communist parties in the first place.

of the growth rate of aggregate output (Kornai 1992). Using China's *Great Leap Forward* as an illustration of forced growth, Kornai (1992) argues that it generates an expenditure bias toward investment (away from consumption).

More recent literature suggests that promotion of economic growth has remained a key priority of the Chinese central policy-makers although China has gone beyond the socialist system as defined by Kornai (1992). Wong (2005) argues that “achieving economic growth has been assigned top priority” by the Chinese government since the initiation of economic reforms in 1978, when Deng Xiaoping encouraged the Chinese people to “let some people (provinces) grow rich first”. In fact, Wong (2000) argues that the high and rising inequalities in China are due to the fact that economic growth has been prioritized at the expense of equity. She argues that over the past two decades, high local fiscal autonomy gave strong incentives for economic growth at the local level, and thereby contributed to China's remarkable economic performance. However, these fiscal institutions also implied a highly limited redistribution between rich and poor provinces, which—when combined with a lack of an efficient interregional equalization system—resulted in one of the most rapid increases in economic inequality in human history (Wong 2000). Qiao, Martinez-Vazquez & Xu (2002) also describe a trade-off between equity and growth and conclude that China has emphasized growth over equalization in the last 25 years.<sup>16</sup>

The recently proclaimed goal to quadruple the GDP level in 2000 by 2020 suggests that achievement of economic growth continues to be an essential goal of the Chinese central government. Tanner (2004) also ties the drive for economic growth to the concern for social stability, and argues that an “economic theory of unrest” currently dominates in Beijing, which contends that regime survival and social stability hinge on the CCP's ability to deliver economic growth and to save jobs. Thus, the government has staked its claims to legitimacy on economic growth and Beijing hopes that it can “grow its way out of social unrest before it threatens the regime's survival” (Tanner 2004).<sup>17</sup>

Given China's extensive natural resource needs to sustain a continued high rate of economic growth, this implies that *securing the provision of natural resources* should be another important priority of the central policy-makers (*The Economist* 2005; Interview Widman). Furthermore, the priority to sustain high economic growth has other interesting implications for our study, as previous literature on Chinese fiscal federalism has demonstrated that the fiscal system has been used as a tool to actively promote economic growth, as briefly referred to above. Qian et al. (2004) have closely

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<sup>16</sup> As will be discussed later, this trade-off is questionable going forward, especially in the longer run. However, what is important here is the referred authors' view that promotion of economic growth is a central aim of the Chinese government.

<sup>17</sup> Tanner (2005) illustrates this by citing the former premier Zhu in his March 2003 valedictory, where he stated the following: “Development is the fundamental principle, and the key to resolving all problems China is facing. We must maintain a comparatively high growth rate in our national economy.”

investigated the fiscal mechanism through which promotion of economic growth has been instrumented at the provincial government level.<sup>18</sup> Central policy-makers designed the fiscal institutions so that provinces had a high local fiscal autonomy, which gave local governments strong fiscal incentives to promote market-oriented reform and thereby economic development.<sup>19</sup>

As the Chinese fiscal institutions previously have been used as a tool to create incentives conducive to institutional reform and economic growth at the local level, it is possible that the Chinese intergovernmental transfer system currently is utilized to encourage efforts at the local level to adopt more business-friendly policies, given that the Chinese central policy-makers wish to promote economic growth and institutional reform. If this is the case, an incentive structure rewarding policies which are favorable to economic development and reform should be in place. Such reforms include e.g. development of well-functioning legal institutions and enforcement of these, reduction of corruption and limitation of trade barriers (Rubin 1994; Fan, Wang and Zhang 2000).

### **The choice between investment and consumption**

Thus, Kornai (1992) argues that the first promise to the people, i.e. to catch up with the capitalist economy, inclines the system toward forced growth, which in turn skews central policy-makers' priorities toward investment. The *degree* to which consumption is compromised in favor of investment (in order to promote economic growth) in a socialist system will depend on the political situation, primarily *the system's degree of repression*. Kornai (1992) argues that consumption cannot be cut below some "tolerance limits" indefinitely: as published political programs emphasize the public's material welfare, central policymakers are obliged to show some material results, so as to legitimize the system and ensure it retains power. These tolerance limits, in turn, depend on the degree of repression (Kornai 1992).

Acemoglu and Robinson (2003) shed more light on the relationship between the ruling elite and the people it governs. They argue that increasing inequalities cause social unrest to rise, which in turn can threaten the political stability if not curbed through either repression or increased redistribution. Treisman (1996, 1998) also argues that political stability can be promoted through the mechanisms of intergovernmental transfers: in his analysis of Russian fiscal federalism, he shows that fiscal

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<sup>18</sup> They demonstrate how high *marginal tax retention rates*, specified in fiscal contracts between the central and provincial governments prior to 1994, constituted strong *ex ante* fiscal incentives for local governments to choose policies favorable to economic development. *As a provincial government knew that it could keep a considerable portion of any increased tax revenue that resulted from their policy decisions, it faced strong incentives to pursue policies that increased the tax revenue.* (We return to these contracts in section 3.1.1.) This, in turn, encouraged the pursuit of institutional reforms to improve the business climate in China's provinces, as capital liberalization (although restricted) implied inter-provincial competition to attract mobile capital.

<sup>19</sup> This can be compared to the problematic role of the local governments in Russia's reform process. For example, Shleifer & Vishny (1998) and Shleifer (1997) provide evidence that local governments in Russia rather have been playing the role of "grabbing hands" that retard private business development. Zhuravskaya (2000) shows that this can be traced to weak *ex ante* fiscal incentives.

transfers can be used as a tool to promote social, and thereby political, stability. This has interesting implications for our study, as many Chinese experts emphasize the role of China's *increasingly unequal income distribution* in provoking social disorder (Tanner 2004). Some experts even appeal to comparative development studies and claim that the widening inequalities place China in a "zone of genuine danger" of instability (Tanner 2004). Given the notions put forward by Acemoglu & Robinson (2003) and Treisman (1996, 1998), the fact that social tensions are closely associated with inequalities in China imply that it is plausible that the Chinese central government's redistribution policy changes over the time period analyzed in this thesis: in response to the sharply increasing social tensions, an increased redistribution to less well-off provinces could be expected. This theoretical proposition is consistent with the recently proclaimed change in allocation policy discussed in the introduction: parallel to the increases in mass group incidents, central policy-makers' rhetoric has gradually shifted, emphasizing the importance of addressing inequalities and placing less weight on quantitative economic growth targets (Wong 2005).<sup>20</sup>

### **Social Obligations to the citizens**

The second group of promises concerns *the socialist system's obligations to the citizens*. The paternalistic<sup>21</sup> nature of power obliges the classical socialist system not only to provide jobs, but also to assure a wide range of social services. In the classical system, such provision is conducted through SOEs, the dominant sector which nominally is the property of "the whole of the people" or "the whole of society". (Although private property exists under the classical socialist system, it is extremely restricted.) These obligations of the socialist system, together with the fact that the SOE sector is the channel through which these obligations are fulfilled, bring about another system-specific characteristic: SBCs<sup>22</sup>.

Over the reform period, the proportion of non-state owned enterprises has increased considerably (Qian et al. 2004). Also, SOEs have been intensively restructuring, particularly during the last couple of years, resulting in increasing unemployment: by 2004, more than 30 million people had lost their jobs in the SOE and collective sectors (Keidel 2004). As the SOE sector's handing over of responsibilities of social services to local governments is far from being a straightforward or

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<sup>20</sup> In January 2000, the "great development of the West" policy was launched to promote development in the poor, and strategically important, Western provinces. Other programs have been designed to address the difficulties of the north-eastern provinces. The shift in rhetoric has been especially distinct since Hu Jintao became the general secretary of the CCP Central Committee in 2002 (Wong 2005).

<sup>21</sup> The notion of paternalism, which is closely tied to the self-legitimization of the socialist system, implies that the party is the vanguard of the people and looks after the people as a father looks after his children.

<sup>22</sup> According to Kornai's (1992) definition, a SBC is in place in the following situation: when a (state-owned) firm exceeds its budget constraint, not only temporarily but repeatedly, and its budget constraint is adjusted in accordance with this over-spending. Hence, in short, a firm facing a SBC is bailed out when in financial difficulty. Kornai (1992) was the first to suggest a theoretical explanation for the existence of SBCs, related to the communist ideology and, in particular, to the notion of paternalism. More recently, the persistence of SBCs has been traced to a failure to apply a long-term horizon when deciding to extend a new loan to a defaulting firm facing bankruptcy (Qian & Roland 1998). With a short-term horizon, the sunk cost of the previously extended loan spuriously makes the extension of a new loan seem optimal.

rapid process, SOEs are still deeply involved in welfare services (Wong 2000). Therefore, in addition to unemployment, the restructuring of the SOE sector results in deteriorating social services and increased reliance on out-of-pocket expenses for funding of e.g. education and health care (Tanner 2005).

Tanner (2004) interprets this as a transition from cradle-to-grave benefits unrelated to productivity to a system in which compensation is tied to productivity. This implies that the central government is starting to reevaluate its obligations to the citizens. Nevertheless, recent literature suggests that SBCs, the system-specific characteristic which Kornai (1992) ties to the central government's far-reaching social promises to the people, still prevail in China. As discussed in section 2.3, Boyreau-Debray & Wei (2005) showed that from 1984 to 2001, one part of the investments allocated through the government budget<sup>23</sup> was, on average, allocated to provinces with a higher share of SOEs in industrial production (and lower capital productivity). Given this, it is possible that this pattern holds for our total net fiscal transfer aggregate as well, during the time period analyzed in this thesis. If so, the total allocation of net fiscal transfers is characterized by SBCs. Previous research on intergovernmental transfers in Russia has suggested that a central government's wish to systematically support a certain "key sector" of the economy partly can explain an asymmetric total fiscal allocation (Treisman 1996). The ideological and economic explanations for SBCs previously referred to could be one explanation for why the Chinese central government could treat the SOE sector as key.<sup>24</sup> Also, as the SOE sector still employs a considerable share of the population, particularly in poor areas, and as the restructuring of SOEs gives rise to social tensions, systematic privileging of provinces with large SOE sectors could be motivated by concerns for employment and social stability.

### **Personnel management under the socialist system—bureaucratic coordination**

In the classical socialist system, the politically centralized structure, official ideology and dominant role of state ownership induce a reliance on various *coordination mechanisms*. The most important one, *bureaucratic coordination*, essentially is a mechanism of bureaucratic control. Kornai (1992) asserts that no other social system has such centralized and close control over personnel affairs, i.e. appointment, transfer, and dismissal of cadres, as socialism. Huang (1999) sheds more light on this bureaucratic coordination mechanism in China, and demonstrates how the personnel policies are used to promote the aims of the central government. He introduces the notion of *loyalty* and argues that the career

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<sup>23</sup> Precisely, they analyzed transfers earmarked for capital construction.

<sup>24</sup> As the Chinese central planning before 1978 systematically discriminated against the agricultural and other primary sectors in favor of industries, and as the rhetoric has been to extend more assistance to peasants and fishermen in the countryside since the reform started in 1978, this could potentially be another "key sector". However, Boyreau-Debray & Wei (2005) demonstrated that this rhetoric was not reflected in the actual policy; capital allocation in China neither favored nor discriminated against the primary sector from 1984 to 2001.

background of the provincial Party Secretary (PS) determines the “closeness” of the top provincial official with the central government. A higher level of “closeness”, Huang states, implies that the top provincial official is likely to have better central governmental connections and to be more loyal to the central government’s objectives.<sup>25</sup> Given that central governments tend to funnel transfers to regions in a manner promoting its own objectives, a province in which the PS is more loyal to the central government’s objectives potentially could obtain a higher net fiscal transfer.

Having developed a theory identifying the possible economic and political determinants of net fiscal transfers in China, we now proceed to describing the Chinese institutional aspects of fiscal federalism. This is imperative to understand the method through which we evaluate the determinants of the net fiscal allocation in China.

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<sup>25</sup> For example, if the PS holds a post in the central government in tandem or if she previously has served in the central government, the PS is more closely connected to the central government than if she was promoted PS after a career in the province in which she serves.



### 3. INSTITUTIONAL ASPECTS OF FISCAL FEDERALISM IN CHINA

This chapter describes the current fiscal system in China, the Tax Sharing System (TSS) (*Fenshuiizhi*), which was implemented in 1994. This is necessary to clearly explain the calculation of our dependent variables, which is presented in the next chapter.

#### 3.1 EXPENDITURE ASSIGNMENT

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Perhaps the most striking feature of the current Chinese fiscal system is its highly decentralized character. In terms of expenditure shares, China is the most decentralized country in the world: the central government accounts for circa 30 per cent of total budgetary expenditures while the remaining 70 per cent are distributed across the four levels of sub-national governments (Wong 2005).<sup>26</sup> The main reason for this expenditure decentralization is that the provision of goods such as education, unemployment insurance and social welfare programs is the responsibility of sub-national governments in China.<sup>27</sup> This division of expenditures is an inheritance of the planned economy of the pre-reform era, during which SOEs shouldered much of the responsibility for the provision of these goods.

#### 3.2 REVENUE SHARING

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Whereas the current division of expenditure responsibilities has been relatively constant during the reform period, the revenue-sharing arrangements have been altered more frequently. As there are strong links between the revenue sharing and intergovernmental transfers in the TSS and the preceding Fiscal Contracting System (FCS) (*Caizheng Chengbao Zhi*), we briefly present the FCS before describing the revenue sharing and intergovernmental transfers in the TSS.

##### 3.2.1 The Fiscal Contracting System

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In the FCS, introduced in 1988, fiscal revenue was shared according to long term (typically five-year) contracts *negotiated* on the central-provincial level (Wong 1997; Bahl 1999). These contracts specified a rate at which each province's local revenue should be shared with the central government. Tax sharing in accordance with this sharing rate should be implemented up to a certain, specified amount of revenue, over which a different, incremental tax revenue sharing rate was negotiated.<sup>28</sup> In addition

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<sup>26</sup> While sub-national expenditure in China was 70 per cent in 2003 it was only 14 per cent in other developing countries, 26 per cent in transition economies and 32 per cent in the OECD countries in the 1990's (Wong 2005).

<sup>27</sup> The current expenditure division, described in Appendix 4, has been in place informally since the initiation of reforms in 1978 and it was formalized in the Tax Sharing System reform in 1994.

<sup>28</sup> In practice, many provinces were allowed to keep close to 100 per cent of this incremental revenue (Zhang & Martinez-Vazquez 2003). As was discussed in section 2.4, these high marginal tax retention rates constituted strong *ex ante* fiscal incentives for local governments to pursue market-promoting policies.

to these revenue sharing rules, the contract also specified a fixed amount which the province was to remit to the central government or receive as a fixed grant.<sup>29</sup>

As these fiscal contracts were results of political negotiation between the central government and each province, *provinces with the same fiscal need and capacity were dealt with differently*: richer, East Coast provinces were able to obtain better revenue sharing agreements, both because of the central policy-makers' development strategies and because of the provinces' irrelative political power (Zhang & Martinez-Vazquez 2003). Hence, the FCS led to greater fiscal disparities between the provinces.

### 3.2.2 The Tax Sharing System reform

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In 1994, the TSS replaced the FCS. The main purpose of this reform was to recentralize revenue by increasing "the two ratios"; the *central government's share in total revenues* and the *share of public revenue in GDP*, which both had been declining during the FCS.<sup>30</sup> The TSS reform was very successful in raising these two ratios and this recentralization of resources was obtained through a fundamental reform of central-local fiscal relations. The provinces' different fiscal contracts were replaced by one single, unified tax sharing system, applicable to all provinces (Zhang & Martinez-Vazquez 2003). Thus, the variations of the revenue sharing rules in the FCS were eliminated (Qian et al. 2004). Taxes were reclassified into three categories: central, local (i.e. provincial) and shared, which left the provinces with considerably lower budgetary fiscal revenue (see Appendix 5 for current revenue assignments). In contrast to the dramatic decrease of the provincial fiscal revenue, the TSS reform did not notably change the assignment of expenditure responsibilities that by law and practice existed before 1994. This resulted in an imbalance between revenues and expenditures at the provincial level.<sup>31</sup> However, this picture does not take all *de facto* revenue sharing with the provinces into account.

#### **A new mode of revenue sharing: continuation of asymmetries**

The fact that all provinces' individual revenue sharing arrangements were harmonized in the TSS reform did not *de facto* remove the asymmetric nature of the FCS (World Bank 2002). To make the provinces accept the TSS reform, the central government adhered to a "hold harmless-principle", where they committed to annually transfer back to each province the amount of value-added tax

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<sup>29</sup> These fixed grants or remittances were calculated on the basis of fiscal need and were equalizing (Zhang & Martinez-Vazquez 2003).

<sup>30</sup> The main reason for the central government's share in total revenues' decline was that the reform of SOEs eroded the main source of tax revenue of the central government prior to 1994. The share of public revenue of GDP decreased as local governments negotiated tax relieves at will with enterprises in the competition to attract mobile capital (Zhang & Martinez-Vazquez 2003).

<sup>31</sup> Knowing the stress this growing mismatch between revenues and expenditure responsibilities for sub-national governments imposed on local budgets, the central government tolerated, and often encouraged, local governments to seek "self-reliant" solutions outside of the budget, referred to as *extra-budgetary funds*. This resulted in non-equitable taxation, particularly in poor regions where "fees" have been imposed on certain groups, e.g. farmers, to provide adequate revenues for local governments (Wong 1997). Currently, reforms converting extra-budgetary funds to budgetary funds are in process and the central government gradually imposes restrictions on localities as for which fees they are allowed to impose (World Bank 2002). This process, however, requires the (budgetary) fiscal system to respond to the revenue needs of these localities. Recent increases of intergovernmental transfers (discussed in the next section) have been referred to as part of the solution.

(VAT) and excise taxes that the province would have been assigned before the new fiscal institutions were implemented (Zhang & Martinez-Vazquez 2003). This compensation, the *VAT Tax Rebate*, essentially represented a continuation of the old revenue-sharing system as it *preserved the political bias inherent in the FCS* (World Bank 2002). As the richer provinces had better revenue sharing arrangements in the FCS and lost more from the TSS-reform, the buyout to richer provinces had to be larger. Thus, the allocation of the VAT Tax Rebate favored rich provinces. However, the VAT Tax Rebate was designed so that its importance would decrease over time: it is calculated by a dynamic formula which allows for increased centralization of *future* increases in VAT and excise tax revenue.<sup>32</sup>

In addition to the VAT Tax Rebate introduced in 1994, an additional *Income Tax Rebate* was added in 2002 to make the provinces accept a new tax sharing rule for income and business tax revenue. This Income Tax Rebate was also introduced according to a “hold harmless-principle”. Hence, its allocation is regressive (Zhang & Martinez-Vazquez 2003).

### 3.3 INTERGOVERNMENTAL TRANSFERS

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In the Chinese fiscal system, the *actual* fiscal allocation differs from the allocation specified in the (*ex ante*) universal fiscal agreements between the central government and the provinces due to *ex post redistribution* (Qian et al. 2004). Such *ex post* redistribution is realized through a multitude of intergovernmental fiscal *transfers* (from the central to the provincial governments) and *remittances* (from the provincial to the central government). These transfers and remittances are outlined in this section.

#### 3.3.1 Transfers from the central government to the provinces

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**Quota Subsidies:** a relic from the FCS. In the TSS-reform, poorer provinces were allowed to keep the fixed subsidies allocated to them in the FCS (Zhang & Martinez-Vazquez 2003).

**Transition Transfers:** a multitude of grants allocated in accordance with explicit formulas incorporating different need-based criteria. The Transition Transfers were introduced in 1994 to offset the regressive effect of the Tax Rebates (Wang 2005). However, the scheme has remained grossly under-funded, so that each province receives only a fraction of its fiscal needs as determined by the formulas. Although introduced in 1994, 2001 was the first year that the Transition Transfers were explicitly budgeted. Previously, the amount set aside for this transfer was determined only after the fiscal year was over, based on the availability of funding (World Bank 2002).

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<sup>32</sup> The tax rebate of a province grows at a rate equal to the provincial growth rate of VAT and excise taxes in a proportion of 3 to 10. For example, if the provincial growth rate of VAT and excise taxes is 1 per cent, the tax rebate of this province grows at a rate of 0.3 per cent (from the previous year). For the precise formula, see Appendix 6.

**Specific Purpose Grants and Final Account Subsidies:** *Special Purpose Grants* (SPGs) are earmarked for certain purposes. In later years, SPGs have primarily been used as ad hoc responses to high priority emergencies; e.g. bail-outs of local social protection programs and partial payments for increases in pension benefits and civil service pay (World Bank 2002). Often, local governments are required to match the central government's contribution. *Final Account Subsidies* (FASs) represent bail-outs of provinces in financial difficulty and ad hoc compensations for policy changes that affect the provinces' budgetary status (World Bank 2002). Both categories are discretionary in the sense that there is ample scope for arbitrariness in the allocation, as grant types and allocation rules are altered frequently.

### 3.3.2 Remittances from the provinces to the central government

**Quota Remittances:** also a relic from the FCS. The TSS-reform specified that richer provinces should keep remitting to the central government the fixed amounts negotiated in the FCS (Zhang & Martinez-Vazquez 2003).

**Special Remittances:** includes various types of funds flowing from the provinces to the central government due to the implementation of specific government activities. In the TSS, these special remittances *are negotiated separately for each province* on a year to year basis (Qian, Nov. 1<sup>st</sup> 2005).

### 3.3.3 Evolution of tax rebates and intergovernmental transfers from 1998 to 2003

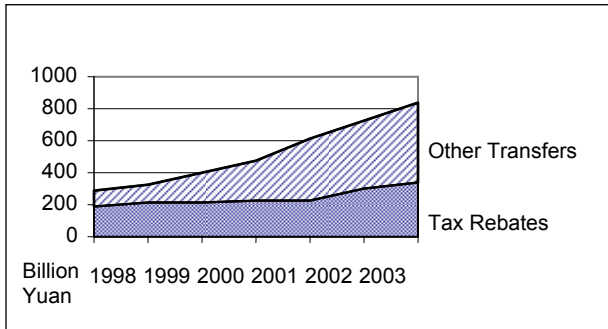
In accordance with the aim of this thesis, it is interesting to show how the sizes of the different intergovernmental transfers and remittances evolve over the time period analyzed. Even though the Tax Rebates represent a special form of tax sharing, we choose to include them in this overview for two reasons. First, the Tax Rebates are classified as intergovernmental transfers by the Ministry of Finance (MoF). Second, they have important implications for both fiscal outcomes and central policy-makers' possibilities to implement equalization policies in China. (This will be discussed further in section 4.1.1.) Table 1, Figure 1 and Figure 2 below illustrate the evolution of the transfers from the central to the provincial governments from 1998 to 2003.

**Table 1: Central transfers by type**

	1998	%	1999	%	2000	%	2001	%	2002	%	2003	%
Total (Billion Yuan)	332	100	399	100	475	100	612	100	728	100	834	100
Tax Rebates	208	63	212	53	221	46	231	38	301	41	343	41
Quota Subsidies	11	3	11	3	12	3	12	2	12	2	13	2
Transition Transfers	6	2	8	2	9	2	14	2	28	4	38	5
SPGs & FASs	107	32	168	42	233	49	355	58	387	53	441	53

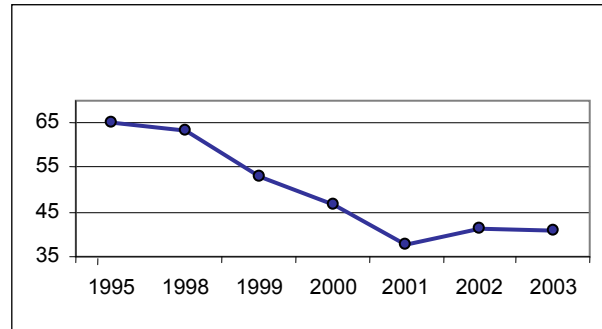
Source.: Ministry of Finance (a) and (b)

**Figure 1: Increasing fiscal transfers**



Source: Ministry of Finance (a) and (b)

**Figure 2: Tax Rebates as percentage of total transfers**



Source: Ministry of Finance (a) and (b)

As is shown above, the relative importance of the regressive Tax Rebates declines over time, even though they still account for a considerable part of the transfers from the central government to the provinces in 2003. As the Tax Rebates are fixed and cannot be affected by the central government, this development implies that the possibility to use the intergovernmental transfer system as a tool for equalization of fiscal resources has increased. Quota Subsidies and Transition Transfers, which are intended to be equalizing, only account for a few per cent of the total transfers and although the Transition Transfers increase over time, the importance of this transfer group remains marginal. On the contrary, SPGs and FASs are of considerable relative importance and increase noticeably over time. From 2000 and onwards, they even exceed the Tax Rebates. In the light of the recent emphasis on equalization on the part of the central government, the minor increase in the explicitly redistributive Transition Transfers, parallel to the dramatic increase in the relatively discretionary and non-transparently allocated SPGs and FASs, is noticeable. From the table and figures above, it is clear that the allocation of SPGs and FASs is of considerable importance for the overall distributive outcomes in China.

As shown in Table 2 below, remittances from the provinces mainly consist of the fixed Quota Remittances, even though Special Remittances increase over the time period analyzed (from low initial amounts).

**Table 2: Provincial remittances by type**

	1998	%	1999	%	2000	%	2001	%	2002	%	2003	%
Total (Billion Yuan)	56	100	56	100	63	100	64	100	68	100	69	100
Quota Remittances	54	96	54	96	54	86	54	84	54	79	54	78
Special Remittances	2	4	2	4	7	14	10	16	14	21	15	22

Sources: Ministry of Finance (a) and (b)

In sum, during the period 1998 to 2003, the equalizing potential of the intergovernmental transfer system increases substantially, especially due to the sharp rise in SPGs and FASs and the decline in the 'Tax Rebates' relative share of the transfers. However, an increased equalization *potential* does not necessarily imply an increased equalization *effort*. Which implications the evolution illustrated in this section has had on equalization, is not clear (World Bank 2002). Whether or not the overall *actual* equalization effort has improved noticeably will be illuminated in the empirical examination that we undertake in the following chapters.

## 4. EMPIRICAL METHODOLOGY

In this chapter, we first specify the model and deduce our hypotheses from the theory we formulated in Chapter 2. Second, we present the data and discuss its reliability. Third, the estimation method is outlined and the necessary assumptions are discussed.

### 4.1 MODEL SPECIFICATION

#### 4.1.1 Dependent variables

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The previous chapter described the revenue sharing arrangements in the Chinese fiscal system and its various categories of central-provincial fiscal transfers and remittances, some allocated by rule-based criteria and others given on a discretionary basis. The result of this is a highly non-transparent allocation system: first, discretionary grants can be allocated in accordance with any logic. Second, as for the grants allocated on the basis of rule-based criteria, it cannot be ruled out *ex ante* that these formulas are in place to conceal an allocation in accordance with some other logic.<sup>33</sup> In any case, *it is the total aggregate allocation that will determine distributional outcomes and the incentives facing local governments.* Therefore, to be able to say something about these issues, the determinants of the *total net fiscal allocation* should be analyzed, rather than the determinants of individual transfer categories. This holistic methodology is the only way to decipher the actual logic of fiscal intergovernmental transfers in China.<sup>34</sup>

We therefore define the dependent variable as the total net fiscal transfer from the central government to the provinces. We calculate this variable along the lines of Popov (2001b): he argued that in addition to asymmetries in the allocation of actual grants and transfers, asymmetries can be created by differences in revenue sharing arrangements, which are left undetected if such differences are not taken into account. Therefore, our dependent variable, *Net Fiscal Transfer* (NFT), incorporates all actual transfers from the central government to the provinces and all actual remittances from the provinces to the central government. Furthermore, the Tax Rebates, which in essence represent a special form of revenue sharing, are included in NFT and treated as transfers from the central government to the provinces. We treat the Tax Rebates in this manner because they preserve the asymmetric nature of the FCS's different revenue sharing rules, even though all revenue sharing rules are harmonized in the current fiscal system. By including the Tax Rebates and all transfers in the two

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<sup>33</sup> This has been found to occur in Russia (Treisman 1996, 1998) and could take place in China as well, particularly as the government easily can affect the formulas for all transfers but the tax rebates, and continuously introduces new grant types and allocation rules.

<sup>34</sup> As was discussed in section 2.3, deciphering the logic of total net fiscal transfers in Russia revealed an allocation determined by political factors rather than need-based criteria. This could be the case in China as well. Another possibility could be that the non-transparent allocation is in place to *conceal* an allocation *favoring poor* provinces, as such an equalizing effort on the part of the central government would be likely to meet fierce resistance from richer provinces (Hofman Oct. 5<sup>th</sup> 2005). By choosing to use the total net fiscal transfer as a dependent variable, we will be able to shed light on this.

directions outside of the harmonized revenue sharing rules, *we capture all the asymmetric elements of the current Chinese fiscal system in the dependent variable*.<sup>35</sup> Thus, we define the dependent variable:<sup>36</sup>

$$\begin{aligned} \text{Total Net Fiscal Transfer}_{i,t} \text{ (NFT)} &= \text{Tax Rebates}_{i,t} \\ &+ (\text{Quota Subsidies}_{i,t} + \text{Transition Transfers}_{i,t} + \text{Special Purpose Grants}_{i,t} + \text{Final Account Subsidies}_{i,t}) \\ &- (\text{Quota Remittances}_{i,t} + \text{Special Remittances}_{i,t}) \end{aligned} \quad (4.1)$$

For several reasons, it is also appropriate to analyze the fiscal allocation *excluding* the Tax Rebates. First, the Tax Rebates were introduced as buyouts and are not intended to be equalizing. Second, the Tax Rebates are subject to no, or very little, influence by the central government, which implies that their inclusion in the dependent variable could obscure an assessment of the central government's redistribution effort. In contrast, the remaining part of the fiscal transfers is more easily influenced by the central government.<sup>37</sup> Third, in NFT, the tax rebates represent a considerable part of the total transfer from the center to the provinces. Thus, we define the second dependent variable<sup>38</sup>:

$$\text{Discretionary Net Fiscal Transfer}_{i,t} \text{ (DNFT)} = \text{NFT}_{i,t} - \text{Tax Rebates}_{i,t} \quad (4.2)$$

Comparing NFT and DNFT, NFT gives the best overall picture of the incentives facing local governments, whereas DNFT sheds the most light on the central government's priorities (as DNFT can be fully influenced).

The difference between the two dependent variables decreases over time as the Tax Rebates' relative share in NFT declines. Therefore, it could be expected that the allocations of NFT and DNFT become more similar over time (as the central government's discretion over the allocation of NFT increases when the Tax Rebate declines in relative terms).

#### 4.1.2 Independent variables

In this section, we discuss which regressors to include in our model. These regressors should capture equity-based allocation criteria, as well as the specific economic and political factors that were identified in our theory of the determinants of the Chinese fiscal intergovernmental allocation.<sup>39</sup> For each of the chosen regressors, we define hypotheses *for how it influences the allocation of NFT and DNFT*, as well as for *how the regressor's influence changes over time*.

<sup>35</sup> In comparison to the analysis made by Wang (2005), our dependent variable enables an examination of the results of the Chinese fiscal intergovernmental transfer system *as a whole*, rather than the determinants of certain transfers in isolation.

<sup>36</sup> As provinces vary in population size, the transfers, remittances and Tax Rebates are adjusted on per capita basis. Thus, the variable NFT captures the net fiscal transfer per capita from the central government to the provinces.

<sup>37</sup> As was discussed above, all transfers, apart from the Tax Rebates, are relatively discretionary in that the government easily can influence their allocation rules. To illustrate the fact that the allocation of these transfers is at the discretion of central policy-makers, we choose this name for the second dependent variable.

<sup>38</sup> DNFT also is defined in per capita terms.

<sup>39</sup> Given our theory of the determinants of fiscal allocation in China, expert judgment and data constraints also have been considered in the choice of regressors, as is conventional (Stock & Watson 2003). This will be discussed in detail in this, and the proceeding, sections.



## Equity-based Allocation Criteria

### Regressor 1: Poverty

The (provincial) *Poverty Rate*, defined as the *percentage of the population that cannot attain a certain pre-determined consumption level*, is one of the most decisive and commonly used variables indicating *fiscal need* (Chen and Ravallion 2005). As relative fiscal need also is dependent upon provincial cost differences, we choose to include an income-based measure of poverty that takes such differences into account in our model.<sup>40</sup>

If differences in fiscal need are a major concern for the central government, the regression coefficient of this cost-adjusted measure of fiscal need should be positive. This is not expected for the first dependent variable in 1998, as the regressive tax rebate has a considerable weight in NFT. However, the relationship between DNFT and the Poverty Rate (henceforth referred to as Poverty) in 1998 is expected to be positive as the central government has discretion over the allocation of these transfers, and as many of the transfers included in DNFT are publicly stated to be used for equalizing purposes.

If the central government's redistributive efforts increase over time, a positive *change* in the Poverty coefficient in 2000 and 2003 should be expected (i.e. the Poverty coefficient in the NFT regression should become less negative and the Poverty coefficient in the DNFT regression should become more positive). This is expected for both dependent variables, given the increased social instability over time in China and given the central government's parallel rhetorical emphasis on equalization from 2000 and onwards.

### Regressor 2: GDP/Capita

*Provincial GDP per Capita* (henceforth GDP/Capita) is included in the model as it is a widely used measure of *fiscal capacity*.<sup>41</sup> If the central government wishes to reduce the differences in fiscal capacity, the regression coefficient of this variable should be negative. In accordance with the hypotheses for the Poverty variable, a positive coefficient is expected in the NFT regression in 1998, whereas a negative coefficient is expected in the DNFT regression.

If the central government's redistributive effort increases over time, a negative *change* in the coefficient of the GDP/Capita variable in 2000 and in 2003 should be expected. In analogy with the hypotheses for the Poverty variable, this is expected for the GDP/Capita variable in both the NFT and DNFT regressions.

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<sup>40</sup> Using data from the National Statistical Bureau Urban Household Income and Expenditure Survey (UHIES), Meng, Gregory and Wong (2005) develop this provincial poverty rate by conducting a headcount under province-specific poverty lines, which are calculated according to a cost-of-basic-needs method and, hence, adapted to provincial differences in food and non-food prices.

<sup>41</sup> This measure was previously included as a proxy for fiscal potential in a study of local-level fiscal expenditures in Indonesia (Lewis 2005) and the variable has been included as a determinant of both Russian and Chinese intergovernmental transfers (Jaroscinska 2003; Wang 2005).

### Expenditure on Civil Servants—discussion

Other potential variables reflecting fiscal need or fiscal capacity could be viable. One variable, which has not been used in previous literature but which could be relevant to include when modeling Chinese fiscal federalism, is *Expenditure on Civil Servants per Capita*. Due to insufficient funds at the local level, many provinces have been unable to comply with the central government's minimum wage requirements for civil servants.<sup>42</sup> The main reason why this variable could be interesting to include is the fact that the central government itself claims to use expenditure on civil servants as a measure of fiscal need (Shih et al. 2005). In fact, one of the SPGs is explicitly used to cover a share of the provinces' expenditure on civil servants.

However, when examining this variable, we see that it is highly *positively* correlated with GDP/Capita and *negatively* correlated with Poverty (Appendix 7 presents correlation coefficients). Thus, relatively richer provinces, on average, have a relatively higher expenditure on civil servants per capita than relatively poorer ones. In the light of this, it is noteworthy that the central government allocates a SPG to the provinces as *a share of this expenditure item*; this should favor provinces with a high GDP/Capita. As this variable is not a good proxy for social need, it is not included in the model.<sup>43</sup>

### **Economic Allocation Criteria**

#### Regressor 3: Institutional Reform

To test if the intergovernmental transfer system embraces an incentive structure encouraging efforts to adopt institutional reform bringing more business-friendly policies, we should include a variable capturing the speed of the provinces' market-oriented institutional reform. We choose to use the *Marketization Index for China's Provinces*, which was developed by Fan, Wang and Zhang (various years). This index assigns each province an index value between 0 and 10, which signifies its *position in the progress toward market economy relative to other provinces*. A province with a high index value has progressed further toward market economy than a province with a low index value. The index comprises 19 components in 5 major areas: the size of government, economic structure, trade barriers, factor market development and legal framework. (See Appendix 8 for a complete component description).

By including the first difference of this index as a variable in our model, we obtain a measure of *the change* in the progress toward market economy for each province, i.e. a measure of provincial

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<sup>42</sup> Wages to local officials and school teachers are sometimes paid with a delay of several months, if at all (Shih et al. 2005).

<sup>43</sup> It could be suspected that this variable would be a significant determinant of the Chinese fiscal allocation although it is not a proxy for fiscal need, as it is used as an allocation criterion by the Chinese central government. This, in turn, would motivate its inclusion in the model anyway. However, this is not the case. If included in the regressions, this variable is, in fact, highly insignificant (e.g. in 1998: t-statistic = (-0.16) in the NFT regression and t-statistic = (-0.07) in the DNFT regression). This also implies that the exclusion of this variable does not give rise to any omitted variable bias (Stock & Watson 2003).

market-promoting institutional *reform* (this first difference variable is henceforth referred to as the Institutional Reform variable).<sup>44</sup> If the central government uses the intergovernmental transfer system to reward market-oriented reform at the provincial level, the coefficient of this variable should be positive. This is expected for both dependent variables, in all years, given the strong Chinese *ex ante* fiscal federalist incentives demonstrated in previous literature (Qian et al. 2004). A positive *change* in the coefficient over time would represent a strengthening incentive structure encouraging such reform. As other considerations, notably preservation of social cohesion, are expected to gain importance over the time period analyzed, the Institutional Reform coefficient is not expected to rise over this time period, but to remain positive.

#### Regressor 4: SOE Share of Output

To investigate if the allocations of NFT and/or DNFT are characterized by SBCs, we include the variable *SOE share of Provincial Output* (henceforth SOE Share of Output) in the model.

If the government systematically allocates transfers to provinces with a relatively high share of SOE output to support the SOE sector, a positive regression coefficient should be expected. Given the result of the prior empirical examination of a smaller aggregate of transfers, suggesting the existence of SBCs<sup>45</sup>, and given the practical and political importance of the SOE sector in today's China, a positive coefficient is expected for all years, both in the NFT and DNFT regression. A positive *change* in the coefficient would suggest that the SBC problem is exacerbated over time. As the size of the SOE sector decreased over the time period analyzed, due to restructuring, this is not expected.

### **Political Allocation Criteria**

#### Regressor 5: Gini Coefficient

Central policy-makers, as well as scholars and political analysts, have pointed out that the high, and continuously rising, inequalities in China are a central driver of social unrest (Wong 2005; Wei 1999; Keidel 2005; Murray Tanner 2004, 2005). This makes the surging inequalities one of the major concerns facing the Chinese government (Wei et al. 1999).

Thus, as inequality is an apposite measure of social unrest, the *intra-provincial Gini Coefficient* (henceforth Gini Coefficient) is included in the model. The Gini Coefficient is the most commonly

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<sup>44</sup> Whereas the Marketization Index is positively correlated with GDP/Capita, the Institutional Reform variable does not exhibit a high correlation with GDP/Capita (correlation tables are presented in Appendix 7).

<sup>45</sup> As was discussed in section 2.3, Boyreau-Debray & Wei (2005) found that the allocation of transfers earmarked for capital construction was characterized by SBCs. These transfers constitute *one part of* our two dependent variables. Boyreau-Debray & Wei (2005) also found that bank loans, which they treat as a separate investment category, were characterized by SBCs. As the banks are *provincial*, the transfers from the banks are intra-provincial rather than central-provincial (Hofman Oct. 5<sup>th</sup> 2005). Therefore, they should not be included in the dependent variables, given the delimitations of our purpose.

used measure of inequality and it takes a value between 0, which reflects complete equality, and 1, which indicates complete inequality (World Bank 2005). The *national* Gini Coefficient has increased considerably during the reform period. Some calculations indicate that it has increased from a level of 0.29 in 1985 to a level of 0.44 in 2000, suggesting that the national inequalities have increased considerably as the country has evolved economically. (Ravallion & Chen 2004)

If concerns for social cohesion influence the fiscal allocation, the regression coefficient of this variable should be positive. This is not expected in 1998 as the government did not express any concern or will to address the inequalities prior to the rhetorical shift starting in 2000. However, the coefficient is expected to be positive in 2000 and 2003, due to this rhetorical shift. An *increase* in the coefficient of this variable over time would suggest that the central policy-makers' concerns for social cohesion rise. Such an increase in the coefficient is expected in 2000 and 2003, as the rising inequalities cause social tensions to increase.

#### Regressor 6: Minority

The predominant ethnic group in China is the Han, representing circa 90 per cent of the population. Provinces with a relatively low share of ethnic Han in the population are typically resource-rich, holding plenty of coal, oil, and gas, and having a high hydroelectric potential (Ministry of Finance (a)). Often situated close to the borders, minority provinces in many cases also represent gate-ways to neighboring, resource rich countries. Therefore, inclusion of the variable *percentage of non-Han population* (henceforth referred to as Minority) in our model captures the central government's strategic interest in securing natural resources. Inclusion of this variable is also interesting as the main finding of Wang (2005) is a strong and positive relationship between different aggregates of fiscal transfers and the provincial share of non-Han in the population. In addition, provinces with a relatively low share of ethnic Han have, historically, been characterized by social unrest to a greater extent than other provinces, and in some cases they have even made requests for independence (*The Economist* 2005).<sup>46</sup> Even though the Minority provinces<sup>47</sup> may not be able to credibly threaten to leave the Chinese federal governance structure, their higher degree of social unrest could be another factor inciting special treatment.

If minority regions are privileged in the fiscal allocation, the coefficient of this variable should be positive. This is expected in both regressions, given the results of Wang (2005) and given the fact that this variable captures both of the above discussed political priorities of central policy-makers. A positive *change* in the coefficient over time would suggest that the discrimination of minority

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<sup>46</sup> Tibet is the foremost example, but separatist claims have also been expressed by other provinces. For example, as recent as in 1997, separatist riots were launched in Xinjiang, China's westernmost province in which the majority is Muslim.

<sup>47</sup> By Minority province, we refer to a province with a relatively low share of ethnic Han in the population.

provinces increases. This is expected in 2000 as well as in 2003, for NFT and DNFT, as our theory suggests that the central government is concerned with social instability, which increases over the time period analyzed.

#### Loyalty: Bureaucratic Integration Index—discussion

We also considered including a variable reflecting the loyalty between the central and provincial governments in our model. An appropriate variable to capture this would be the *Bureaucratic Integration Index*, developed by Huang (1999). This index attaches a discrete value between 1 and 4 to each province reflecting the career history of its provincial Party Secretary (PS), where a high value represents a high “closeness” of the provincial PS to the central government.<sup>48</sup>

If the closeness of a provincial PS is a factor enabling a province to increase its fiscal allocation from the central government, the coefficient of this variable would be positive. A negative relationship would imply the opposite, and a non-significant relationship would imply that the closeness of a provincial PS to the central government does not matter for the fiscal allocation.

However, even though this variable seems to be of theoretical relevance, it is not included in the final model. This is because of a lack of sufficiently reliable data on the Bureaucratic Integration Index in 2002.<sup>49</sup>

#### **4.1.3 Controlling for fixed effects—a fixed effect model specification**

After having outlined our choice of variables, we now proceed to introducing characteristics for which we must control. As we have a panel data set, which will be described in depth in the next section, we use a fixed effect model in which we control for inherent province-specific characteristics, which are assumed to be constant for each province. Including such fixed effects, capturing factors such as e.g. distance to China’s borders, is common in panel data analysis of China’s provinces.<sup>50</sup>

A fixed effect model specification is appropriate as several province-specific effects are significant in the estimation (the model estimation is dealt with in section 4.3). This implies that the unbiasedness of the estimators would have been violated if these province-specific characteristics

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<sup>48</sup> The following scale was used: 4: PS holds a post in the central government in tandem, 3: PS has previously served in the central government, 2: PS was promoted after a career in another province, 1: PS was promoted after a career within the province in which she serves.

<sup>49</sup> Although we have reliable data for the years 1997 and 1999, obtained from Professor Chong-En Bai, this variable cannot be included as we estimate a fixed effect model, which requires the independent variables to vary in each time unit. Thus, we need data for 2002 as well. (The reasons for why a fixed effect model is the most appropriate specification are outlined in section 4.1.3.) The fact that we are forced to exclude this variable will give rise to an omitted variable bias if two conditions are fulfilled (Stock & Watson 2003): first, the omitted variable is correlated with at least one of the other regressors. This condition is fulfilled as the excluded variable is highly and significantly correlated with GDP/Capita. The second condition for omitted variable bias to arise is that the excluded variable is a determinant of the dependent variable. However, this condition seems *not* to be fulfilled: when running separate OLS regressions for 1998 and 2000, the Bureaucratic Integration variable is highly insignificant in both regressions. Thus, the other estimates should remain unbiased when this variable is excluded. This implies that this variable is not, in fact, of theoretical relevance.

<sup>50</sup> For example, Qian et al (2004) control for constant province-specific characteristics in their analyses of central-provincial fiscal relations.

had not been controlled for.<sup>51</sup> We therefore include the province-specific effects,  $a_i$ , in our model to overcome this serial correlation problem in the composite errors. The fixed effect model implies that any correlations between NFT (or DNFT) and the regressors cannot be attributed to inherent provincial characteristics.

Furthermore, to control for nationwide macroeconomic fluctuation, year dummies for 2000 and 2003 are added to the model (as the sample consists of intergovernmental transfers in 1998, 2000 and 2003). Previous empirical research has demonstrated that it is essential to control for such economy-wide cyclic effects in the Chinese context.<sup>52</sup>

Thus, to identify the de facto determinants of the allocation of NFT and DNFT in China in 1998, 2000 and 2003, and to detect any changes in the allocation policy between 1998 and 2003, two fixed effects models are specified in which NFT and DNFT (respectively) are pooled and regressed on the explanatory variables specified in the preceding section. Interaction variables between each of the regressors and year dummies for 2000 and 2003 are included to detect allocation policy changes over time. This enables an analysis both of the determinants of NFT and DNFT in 1998, 2000 and 2003 and an identification of the *changes in allocation policy* from 1998 until 2000 and from 1998 until 2003. This makes the model highly appropriate for testing our hypotheses.

For NFT, our (linear) fixed effect model can be written:

$$\begin{aligned}
 NFT_{i,t} = & \beta_0 + \delta_0 \cdot Y_{2000} + \delta_1 \cdot Y_{2003} + \\
 & \beta_1 \cdot Poverty_{i,t} + \beta_2 \cdot GDP / Cap_{i,t} + \beta_3 \cdot Institutional\_reform_{i,t} + \beta_4 \cdot SOE_{i,t} + \beta_5 \cdot Gini_{i,t} + \beta_6 \cdot Minority_{i,t} \\
 & + \delta_2 \cdot Y_{2000} \cdot Poverty_{i,t} + \delta_3 \cdot Y_{2000} \cdot GDP / Cap_{i,t} + \delta_4 \cdot Y_{2000} \cdot Institutional\_reform_{i,t} + \delta_5 \cdot Y_{2000} \cdot SOE_{i,t} \\
 & + \delta_6 \cdot Y_{2000} \cdot Gini_{i,t} + \delta_7 \cdot Y_{2000} \cdot Minority_{i,t} \\
 & + \delta_8 \cdot Y_{2003} \cdot Poverty_{i,t} + \delta_9 \cdot Y_{2003} \cdot GDP / Cap_{i,t} + \delta_{10} \cdot Y_{2003} \cdot Institutional\_reform_{i,t} + \delta_{11} \cdot Y_{2003} \cdot SOE_{i,t} \\
 & + \delta_{12} \cdot Y_{2003} \cdot Gini_{i,t} + \delta_{13} \cdot Y_{2003} \cdot Minority_{i,t} \\
 & + a_i + u_{i,t}
 \end{aligned} \tag{4.3}$$

For DNFT, our (linear) fixed effect model can be written:

$$\begin{aligned}
 DNFT_{i,t} = & \beta_0 + \delta_0 \cdot Y_{2000} + \delta_1 \cdot Y_{2003} + \\
 & \beta_1 \cdot Poverty_{i,t} + \beta_2 \cdot GDP / Cap_{i,t} + \beta_3 \cdot Institutional\_reform_{i,t} + \beta_4 \cdot SOE_{i,t} + \beta_5 \cdot Gini_{i,t} + \beta_6 \cdot Minority_{i,t} \\
 & + \delta_2 \cdot Y_{2000} \cdot Poverty_{i,t} + \delta_3 \cdot Y_{2000} \cdot GDP / Cap_{i,t} + \delta_4 \cdot Y_{2000} \cdot Institutional\_reform_{i,t} + \delta_5 \cdot Y_{2000} \cdot SOE_{i,t} \\
 & + \delta_6 \cdot Y_{2000} \cdot Gini_{i,t} + \delta_7 \cdot Y_{2000} \cdot Minority_{i,t} \\
 & + \delta_8 \cdot Y_{2003} \cdot Poverty_{i,t} + \delta_9 \cdot Y_{2003} \cdot GDP / Cap_{i,t} + \delta_{10} \cdot Y_{2003} \cdot Institutional\_reform_{i,t} + \delta_{11} \cdot Y_{2003} \cdot SOE_{i,t} \\
 & + \delta_{12} \cdot Y_{2003} \cdot Gini_{i,t} + \delta_{13} \cdot Y_{2003} \cdot Minority_{i,t} \\
 & + a_i + u_{i,t}
 \end{aligned} \tag{4.4}$$

<sup>51</sup> This is the reason why it is not appropriate to run three separate regressions, one for each of the three years included in the sample: such a methodology would not have enabled us to control for province-specific effects, which, in turn, would have resulted in biased estimates.

<sup>52</sup> Qian et al. (2004) show that the results obtained by Zhang & Zou (1998) in their analysis of the effect of fiscal decentralization on provincial GDP growth are *reversed* if economy-wide cyclic effects are filtered out from their regressions. This, we deem, well illustrates the importance of controlling for such effects. Furthermore, the coefficients of these two control variables are significant in the regressions.

In equations 4.3 and 4.4,  $Poverty_{i,t}$  denotes the (provincial) poverty rate,  $GDP/Cap_{i,t}$  denotes GDP per capita,  $Institutional\_reform_{i,t}$  denotes the first difference of the Marketization Index,  $SOE_{i,t}$  denotes the SOE share of output,  $Gini_{i,t}$  denotes the intra-provincial Gini coefficient and  $Minority_{i,t}$  denotes the percentage of non-Han population.

In equation 4.4,  $\beta_1$  denotes the effect of Poverty on the allocation of DNFT in 1998,  $\delta_2$  denotes the *change* in the effect of Poverty on the allocation of DNFT between 1998 and 2000 and  $(\beta_1 + \delta_2)$  denotes the effect of Poverty on the allocation of DNFT in 2000. This is analogous for all years and variables. A significant  $\delta_2$  indicates a possible policy change in the effect of Poverty on DNFT between 1998 and 2000. Henceforth, the coefficients of the interaction variables, denoting changes in the effect of one regressor on the regressand, are referred to as the *policy change coefficients*. The  $u_{i,t}$  are the disturbance terms. The interpretation of the coefficients in the NFT model (equation 4.3) is analogous. We discuss the estimation method in section 4.3, after having discussed the data.

#### 4.1.4 Summary of hypotheses

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In this section, the expectations formulated in section 4.1.2 above are formalized. For each explanatory variable, the hypotheses are formulated in terms of the two fixed effect models.

##### Poverty

NFT: We do not expect the allocation to be equalizing in 1998 (i.e. we expect  $\beta_{1,NFT} < 0$ ).

To test this, we formulate the following hypothesis:

**Hypothesis A:**  $H_{0A}: \beta_{1,NFT} \geq 0$   $H_{1A}: \beta_{1,NFT} < 0$

DNFT: We expect the allocation to be equalizing in 1998 ( $\beta_{1,DNFT} > 0$ ). Thus, we test:

**Hypothesis B:**  $H_{0B}: \beta_{1,DNFT} \leq 0$   $H_{1B}: \beta_{1,DNFT} > 0$

NFT & DNFT: We expect the allocation to become less regressive/more equalizing, both until 2000 and until 2003 ( $\delta_2 > 0$ ,  $\delta_8 > 0$ ). Thus, we test (in individual t-tests):

**Hypotheses C and D:**  $H_{0C}: \delta_2 \leq 0$   $H_{1C}: \delta_2 > 0$ ,  $H_{0D}: \delta_8 \leq 0$   $H_{1D}: \delta_8 > 0$

DNFT: Hypotheses B, C and D imply that we expect the allocation to be equalizing in 2000 and 2003 ( $(\beta_{1,DNFT} + \delta_{2,DNFT}) > 0$ ,  $(\beta_{1,DNFT} + \delta_{8,DNFT}) > 0$ ). Thus, we test:

**Hypothesis E:**  $H_{0E}: (\beta_{1,DNFT} + \delta_{2,DNFT}) \leq 0$   $H_{1E}: (\beta_{1,DNFT} + \delta_{2,DNFT}) > 0$

**Hypothesis F:**  $H_{0F}: (\beta_{1,DNFT} + \delta_{8,DNFT}) \leq 0$   $H_{1F}: (\beta_{1,DNFT} + \delta_{8,DNFT}) > 0$

##### GDP/Capita

NFT: We do not expect the allocation to be equalizing in 1998 ( $\beta_{2,NFT} > 0$ ). Thus, we test:

**Hypothesis G:**  $H_{0G}: \beta_{2,NFT} \leq 0$   $H_{1G}: \beta_{2,NFT} > 0$

DNFT: We expect the allocation to be equalizing in 1998 ( $\beta_{2,DNFT} < 0$ ). Thus, we test:

**Hypothesis H:**  $H_{0H}: \beta_{2,DNFT} \geq 0$   $H_{1H}: \beta_{2,DNFT} < 0$

NFT & DNFT: We expect the allocation to become less regressive/more equalizing, both until 2000 and until 2003 ( $\delta_3 < 0$ ,  $\delta_9 < 0$ ). Thus, we test (in individual t-tests):

**Hypotheses I & J:**  $H_{0I}: \delta_3 \geq 0$   $H_{1I}: \delta_3 < 0$ ,  $H_{0J}: \delta_9 \geq 0$   $H_{1J}: \delta_9 < 0$

DNFT: We expect the allocation to be equalizing in 2000 and 2003 ( $(\beta_{2,DNFT} + \delta_{3,DNFT}) < 0$ ,  $(\beta_{2,DNFT} + \delta_{9,DNFT}) < 0$ ). Thus, we test:

**Hypothesis K:**  $H_{0K}: (\beta_{2,DNFT} + \delta_{3,DNFT}) \geq 0$   $H_{1K}: (\beta_{2,DNFT} + \delta_{3,DNFT}) < 0$

**Hypothesis L:**  $H_{0L}: (\beta_{2,DNFT} + \delta_{9,DNFT}) \geq 0$   $H_{1L}: (\beta_{2,DNFT} + \delta_{9,DNFT}) < 0$



### Institutional Reform

NFT and DNFT: We expect a fiscal incentive rewarding market-promoting reform to be in place in 1998, 2000 and 2003 ( $\beta_3 > 0$ ,  $(\beta_3 + \delta_4) > 0$ ,  $(\beta_3 + \delta_{10}) > 0$ ). Thus, we test:

**Hypothesis M:**  $H_{0M}: \beta_3 \leq 0$   $H_{1M}: \beta_3 > 0$

**Hypothesis N:**  $H_{0N}: (\beta_3 + \delta_4) \leq 0$   $H_{1N}: (\beta_3 + \delta_4) > 0$

**Hypothesis O:**  $H_{0O}: (\beta_3 + \delta_{10}) \leq 0$   $H_{1O}: (\beta_3 + \delta_{10}) > 0$

### SOE Share of Output

NFT and DNFT: We expect the allocation to be characterized by SBCs in 1998, 2000 and 2003 ( $\beta_4 > 0$ ,  $(\beta_4 + \delta_5) > 0$ ,  $(\beta_4 + \delta_{11}) > 0$ ). Thus, we test:

**Hypothesis P:**  $H_{0P}: \beta_4 \leq 0$   $H_{1P}: \beta_4 > 0$

**Hypothesis Q:**  $H_{0Q}: (\beta_4 + \delta_5) \leq 0$   $H_{1Q}: (\beta_4 + \delta_5) > 0$

**Hypothesis R:**  $H_{0R}: (\beta_4 + \delta_{11}) \leq 0$   $H_{1R}: (\beta_4 + \delta_{11}) > 0$

### Gini Coefficient

NFT and DNFT: We do not expect inequality to influence the allocation in 1998 ( $\beta_5 \neq 0$ ).

Thus, we test:

**Hypothesis S:**  $H_{0S}: \beta_5 = 0$   $H_{1S}: \beta_5 \neq 0$

NFT and DNFT: We expect inequality to influence the allocation positively in 2000 and 2003 ( $(\beta_5 + \delta_6) > 0$ ,  $(\beta_5 + \delta_{12}) > 0$ ). Thus, we test:

**Hypothesis T:**  $H_{0T}: (\beta_5 + \delta_6) \leq 0$   $H_{1T}: (\beta_5 + \delta_6) > 0$

**Hypothesis U:**  $H_{0U}: (\beta_5 + \delta_{12}) \leq 0$   $H_{1U}: (\beta_5 + \delta_{12}) > 0$

NFT and DNFT: We expect the favoring of provinces with a relatively high level of inequality to increase, both until 2000 and until 2003 ( $\delta_6 > 0$ ,  $\delta_{12} > 0$ ). Thus, we test:

**Hypotheses V & X:**  $H_{0V}: \delta_6 \leq 0$   $H_{1V}: \delta_6 > 0$ ,  $H_{0X}: \delta_{12} \leq 0$   $H_{1X}: \delta_{12} > 0$

### Minority

NFT and DNFT: We expect provinces with a high Minority variable value to be favored in 1998, 2000 and 2003 ( $\beta_6 > 0$ ,  $(\beta_6 + \delta_7) > 0$ ,  $(\beta_6 + \delta_{13}) > 0$ ). Thus, we test:

**Hypothesis Y:**  $H_{0Y}: \beta_6 \leq 0$   $H_{1Y}: \beta_6 > 0$

**Hypothesis Z:**  $H_{0Z}: (\beta_6 + \delta_7) \leq 0$   $H_{1Z}: (\beta_6 + \delta_7) > 0$

**Hypothesis AA:**  $H_{0AA}: (\beta_6 + \delta_{13}) \leq 0$   $H_{1AA}: (\beta_6 + \delta_{13}) > 0$

NFT & DNFT: We expect the favoring of provinces with a high Minority variable value to increase, both until 2000 and until 2003 ( $\delta_7 > 0$ ,  $\delta_{13} > 0$ ). Thus, we test:

**Hypothesis AB:**  $H_{0AB}: \delta_7 \leq 0$   $H_{1AB}: \delta_7 > 0$

**Hypothesis AC:**  $H_{0AC}: \delta_{13} \leq 0$   $H_{1AC}: \delta_{13} > 0$

## 4.2 DATA

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### 4.2.1 Sources, sample and basic facts

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For the calculation of the dependent variables, we use a unique panel data set over all central-provincial intergovernmental transfers from 1998 until 2003, developed in collaboration with the World Bank in Beijing. Data for all years, except 2003, has been collected from publicly available sources (Ministry of Finance (a) and (b)). Not yet publicly available data on the different transfer categories from the central government to the provinces in 2003 was obtained directly from the MoF. The panel is unbalanced in that some observations for Tibet and Chongqing are missing.

The sample used in this thesis consists of the years 1998, 2000 and 2003. The years 1998 and 2003 were chosen as the aim of this thesis is to analyze changes over time in fiscal allocation policy. The inclusion of the year 2000 permits a close examination of the evolution, allowing detection of gradual changes. Tibet and Chongqing are excluded for data availability reasons. Thus, the sample consists of 87 observations (excluding Tibet and Chongqing, there are 29 provincial-level jurisdictions, which are analyzed during three years). Further, the data for Sichuan has been corrected for Chongqing, which became a self-governed municipality in 1997.

For the explanatory variables, we have attempted to collect data for the years 1997, 1999 and 2002, to enable the central government to react on the levels of these variables in its allocation decisions. Hence, when possible, the independent variables are lagged one year to the dependent variables.<sup>53</sup> Data sets on GDP per capita and SOE Share of Output were obtained from the China Statistical Yearbook (Ministry of Finance (a)). Data sets on the provincial poverty rates and Gini coefficients were obtained directly from Meng Xin. Data on the percentage of non-Han in the population in 1998 was obtained from Wang (2005) and in 2000 from the China Statistical Yearbook.<sup>54</sup> Finally, data on the Marketization Index was obtained directly from Xiaolu Wang.

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<sup>53</sup> This was not possible for the variable Institutional Change, for which observations are only available for the years 1999-2002. The variables GDP/Capita and SOE Share of Output are lagged one year for all three observations (1998, 2000 and 2003) of the dependent variables. The variables Gini Coefficient and Poverty are lagged one year to the dependent variables for the first two observations and lagged three years for the final year analyzed. The variable Minority is not lagged.

<sup>54</sup> As there is no data available for 2003, and as the fixed effects model requires the independent variables to vary over time, we use the changes in the minority rates in 1998 and 2000 to approximate the minority rates in 2003. The changes, however, are small because of the short time span of the study.

NFT and DNFT are adjusted on per capita basis and, together with GDP/Capita, deflated and expressed in constant 1997 prices. No variables are transformed. The explanatory variables are summarized in Box 8 in Appendix 7. Box 9 in this appendix presents the pair-wise correlation coefficients. As can be inferred from this box, few correlation coefficients exceed an absolute value of 0.3 and there is only one pair-wise correlation coefficient higher than 0.5 for the variables. This suggests that we do not have a problem of autocorrelation in the model.<sup>55</sup>

All explanatory variables change over time and there are no perfect linear relationships among the explanatory variables, two assumptions which are essential for the fixed effects estimator to be unbiased. (Additional assumptions are discussed in section 4.3.)

#### **4.2.2 Data reliability**

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There is however one issue with the data which should be methodically commented upon: its reliability.

As discussed above, the data on the dependent variables and on some of the independent variables were collected from official sources (Ministry of Finance (a) and (b)). Therefore, its accurateness could be questioned on the basis of the critique that intentional falsification of data is commonplace at every administrative level of government in China (Rawski 2001). Additionally, all data on inter-budgetary finances are collected by the MoF, the same body which is responsible for determining the fiscal allocation to the provinces. As such, this problem is unavoidable for any scholar wishing to implement a study on Chinese fiscal federalism that relies on official data. However, the regression results do in fact detect asymmetries in the Chinese fiscal relations and point to a selective use of the instruments of fiscal federalism by the central government. If data tampering occurs, it can be assumed to be in the MoF's best interest to *understate* this political bias, rather than to overstate it. This suggests that if the data is unreliable, the real asymmetries in the Chinese fiscal intergovernmental transfer system probably would be graver, rather than milder, than the ones detected in this thesis.

Furthermore, to minimize the extent of this problem in our study, we have taken a number of measures. First, the data set we use to calculate the dependent variables was developed in collaboration with the World Bank in Beijing, a recognized, official entity with highly relevant expertise at its disposition. We have also carefully discussed the accurateness of the data on the independent variables with fiscal experts at the International Monetary Fund (IMF) in Beijing and at Tsinghua University. In addition, we have compared different sources of data to verify the dependent variables and to further evaluate the accurateness of the data on the independent

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<sup>55</sup> Any correlation above 0.8, or many correlations above 0.5, indicates autocorrelation (Edlund 1997).

variables. In sum, we have approached this problem as thoroughly as possible in order to minimize the data reliability constraint. Nevertheless, this constraint should be kept in mind when interpreting the results of this study.

### **4.3 MODEL ESTIMATION**

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The fixed effects models presented in section 4.1.3 are estimated using OLS. The fixed effects estimator is unbiased if the idiosyncratic errors  $u_{it}$  are uncorrelated with each explanatory variable across all time periods. Additional assumptions are that the errors  $u_{it}$  are serially uncorrelated and, for valid standard errors and t-statistics, that the errors  $u_{it}$  are homoskedastic (Wooldridge 2003a). Finally, the idiosyncratic errors are assumed to be independent and normally distributed. In the following, these assumptions will be discussed.

White's general test for heteroskedasticity was conducted and the null hypothesis that the error term is homoskedastic was rejected at the five per cent level, both in the NFT and DNFT regression. (See Appendix 9 for the test equations.) There are different possible solutions to this problem of heteroskedasticity. The use of a White heteroskedasticity consistent covariance estimator with OLS estimation in fixed effects models can yield standard errors robust to unequal variance along the predicted line (Wooldridge 2002; Greene 2003). Also, if there is autocorrelation in the model, a Newey-West estimator can handle both the heteroskedasticity and the autocorrelation (Wooldridge 2003b). The Durbin Watson test for first-order autocorrelation in the residuals is not performed as we only have a time series of three years, which affects the strength of the test negatively. Therefore, to be certain to obtain valid standard errors and t-statistics, all results reported employ Newey-West standard errors. In the Newey-West estimation procedure, the error structure is assumed to be heteroskedastic and possibly autocorrelated up to some lag, which we have set to two in order to be sure to present valid results. Finally, the assumption of an independent and normally distributed idiosyncratic error term can be fulfilled by relying on asymptotic approximation, as we have a small  $T$  (the number of time periods) and a fairly large  $N$  (the number of provinces) (Wooldridge 2003a).

## 5. EMPIRICAL EVIDENCE

### 5.1 DETERMINANTS OF INTERGOVERNMENTAL TRANSFERS

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Tables 3 and 4 present the determinants of NFT and DNFT in 1998, 2000 and 2003.<sup>56</sup> Also, the changes in allocation policy from 1998 until 2000 and from 1998 until 2003 are presented, denoted “*Change until 2000*” and “*Change until 2003*” (i.e. the coefficients of the interaction variables between each regressor and year dummies for 2000 and 2003, respectively).

What do the results indicate about the process of allocation in 1998, 2000 and 2003? In the next chapter, each determinant of the transfers will be analyzed. First, however, we will comment on two findings that are immediately striking when comparing the two tables.

First, a highly unexpected finding is that DNFT is allocated according to the *exact same logic* as NFT: for all explanatory variables and years, the signs of the coefficients are identical and the sizes of the coefficients are roughly the same in most cases. This was *not* expected for the variables reflecting equity-based allocation criteria, which will be commented upon further in Chapter 6. In essence, this result implies that although the central government can allocate DNFT relatively more at its own discretion, these transfers are allocated *according to the same logic as NFT*, of which the central government is forced to allocate a large share to richer provinces via the Tax Rebates.

The second striking finding, which however is in line with our expectations, is the *large changes in NFT and DNFT allocation policy from 1998 to 2003*. The coefficients of all variables change considerably over this time period and many of them even switch signs. These policy changes will be explored thoroughly in the following analysis.<sup>57</sup>

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<sup>56</sup> These coefficients, estimating the influence of each particular regressor on the allocation of NFT and DNFT in 1998, 2000 and 2003, are presented graphically in connection with the analysis of the results for each of the regressors. The coefficient reflecting the effect of a regressor on the fiscal allocation in 2000 is obtained through addition of the coefficient of the regressor in 1998 and the coefficient of the interaction variable between that particular regressor and the dummy variable for the year 2000. For the sake of clarity, we provide an example in terms of the model, using the first regressor: in the estimated model,  $\hat{\beta}_1$  is the estimate of the effect of Poverty on the allocation of NFT (DNFT) in 1998,  $\hat{\delta}_2$  is the estimate of the coefficient of the interaction term between the Poverty variable and the year dummy for 2000 and  $\hat{\delta}_8$  is the estimate of the coefficient of the interaction term between the Poverty variable and the year dummy for 2003. Thus, the estimate of the effect of Poverty on the allocation of NFT (DNFT) in 2000 corresponds to  $(\hat{\beta}_1 + \hat{\delta}_2)$  and, in 2003, to  $(\hat{\beta}_1 + \hat{\delta}_8)$  in the estimated model.

<sup>57</sup> The changes in the NFT allocation could be due both to a *changing logic of allocation of NFT* and to an *increased discretion of the NFT allocation as the Tax Rebates declines*. However, the changes in the DNFT allocation are not related to the declining Tax Rebates (as DNFT excludes the Tax Rebates). Thus, the changes in the DNFT allocation reflect a changing logic of allocation. In the light of this, the fact that the allocation of NFT and DNFT change *in the same manner* over the time period implies that changes detected in the NFT allocation are *not* mainly due to a declining tax rebate, but to a change in the NFT allocation policy. If the changes in the NFT allocation would have been due to the declining Tax Rebates, and thereby to the increased discretion over the NFT allocation on the part of the central government, the allocation of NFT and DNFT would have become *more similar* over the time period analyzed, which was not the case.

**Table 3: Determinants of NFT and allocation policy changes over time**

Variable	Estimate	t-stat.
Constant	-588.16	-1.07
<b>Poverty 1998</b>	-17.34(**)	-2.17
<i>Change until 2000</i>	12.85(*)	1.31
Poverty 2000	-4.48	-0.39
<i>Change until 2003</i>	17.75(**)	1.97
Poverty 2003	0.41	0.07
<b>GDP/Capita 1998</b>	0.118(***)	2.45
<i>Change until 2000</i>	-0.017(**)	-1.69
GDP/Capita 2000	0.102(**)	2.56
<i>Change until 2003</i>	-0.020(*)	-1.35
GDP/Capita 2003	0.098(***)	2.88
<b>Institutional Reform 1998</b>	-393.73(**)	-2.43
<i>Change until 2000</i>	328.66	0.81
Institutional Reform 2000	-65.08	-0.20
<i>Change until 2003</i>	613.28	0.97
Institutional Reform 2003	219.54	0.41
<b>SOE Share of Output 1998</b>	-1.42	-0.61
<i>Change until 2000</i>	2.24	1.59
SOE Share of Output 2000	0.82	0.43
<i>Change until 2003</i>	6.27(***)	4.14
SOE Share of Output 2003	4.85(**)	1.95
<b>GINI Coeff. 1998</b>	-1477.65	-1.62
<i>Change until 2000</i>	1628.23(**)	1.82
GINI Coeff. 2000	150.59	0.15
<i>Change until 2003</i>	1877.59(***)	2.52
GINI Coeff. 2003	399.94	0.46
<b>Minority 1998</b>	7.39	0.65
<i>Change until 2000</i>	-1.66	-1.20
Minority 2000	5.73	0.48
<i>Change until 2003</i>	2.67	1.57
Minority 2003	10.06	0.83
$R^2$	0.98	

**Table 4: Determinants of DNFT and allocation policy changes over time**

Variable	Estimate	t-stat.
Constant	-1278.66(**)	-2.44
<b>Poverty 1998</b>	-16.17(**)	-2.01
<i>Change until 2000</i>	13.96(*)	1.53
Poverty 2000	-2.21	-0.19
<i>Change until 2003</i>	21.41(***)	2.52
Poverty 2003	5.24	0.97
<b>GDP/Capita 1998</b>	0.150(***)	3.12
<i>Change until 2000</i>	-0.016(*)	-1.64
GDP/Capita 2000	0.134(***)	3.43
<i>Change until 2003</i>	-0.050(***)	-3.30
GDP/Capita 2003	0.100(***)	2.98
<b>Institutional Reform 1998</b>	-400.97(**)	-2.55
<i>Change until 2000</i>	198.78	0.48
Institutional Reform 2000	-202.20	-0.61
<i>Change until 2003</i>	780.57	1.24
Institutional Reform 2003	379.60	0.72
<b>SOE Share of Output 1998</b>	-1.26	-0.53
<i>Change until 2000</i>	2.78(**)	2.11
SOE Share of Output 2000	1.51	0.86
<i>Change until 2003</i>	6.67(***)	4.78
SOE Share of Output 2003	5.40(**)	2.098
<b>GINI Coeff. 1998</b>	-1149.00	-1.35
<i>Change until 2000</i>	1691.56(**)	2.16
GINI Coeff. 2000	542.56	0.58
<i>Change until 2003</i>	1812.93(***)	2.64
GINI Coeff. 2003	663.93	0.84
<b>Minority 1998</b>	4.55	0.40
<i>Change until 2000</i>	-1.58	-1.17
Minority 2000	2.96	0.25
<i>Change until 2003</i>	2.48(*)	1.40
Minority 2003	7.02	0.58
$R^2$	0.98	

\*, \*\* and \*\*\* denote significance at 10, 5 and 1% levels, respectively. (One-sided tests when one-sided hypotheses and vice versa.)

All t-statistics are calculated with Newey-West standard errors. The error structure is assumed to be heteroskedastic and possibly autocorrelated up to a lag of 2.

The estimates of the influence of a regressor on the allocations on NFT and DNFT in 1998 (e.g.  $\hat{\beta}_1$  in the estimated model) and the estimates for the interaction terms between each regressor and year dummies for 2000 and 2003 (e.g.  $\hat{\delta}_2$  and  $\hat{\delta}_8$  in the estimated model) are obtained when estimating the fixed effect model. The other coefficients presented above (e.g.  $(\hat{\beta}_1 + \hat{\delta}_2)$  and  $(\hat{\beta}_1 + \hat{\delta}_8)$ ) and their t-values are calculated manually using the estimates, Newey West standard errors and covariances obtained in the estimation procedure.

Each regression includes a full set of provincial and year dummies.

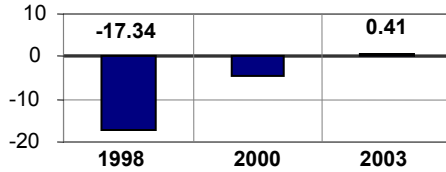
n=87

## 6. ANALYSIS

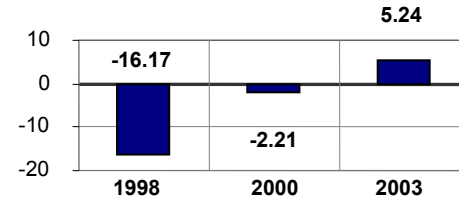
### 6.1 EQUITY-BASED DETERMINANTS OF INTERGOVERNMENTAL TRANSFERS

#### Poverty

**Figure 3: NFT - Poverty Coefficient Estimates**



**Figure 4: DNFT - Poverty Coefficient Estimates**



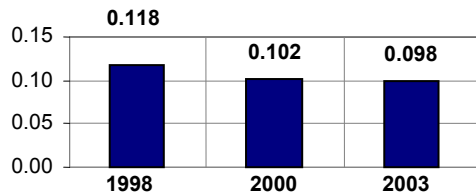
For both NFT and DNFT, the coefficient of the Poverty variable in 1998 is negative and significant. This implies that provinces with a low poverty rate, and thus a low level of fiscal need, are favored relative to provinces with higher poverty rates. The regressive allocation of NFT in 1998 is in line with our expectations as the Tax Rebates constitute a large part of this dependent variable. However, a positive coefficient was expected for DNFT in 1998, as this variable comprises grants allocated through formulas incorporating need-based criteria. In contrast, the negative coefficient shows that when analyzing the *total effect* of the discretionary fiscal allocation, it favors richer provinces. A possible interpretation of this result is that the formulas for the allocation of DNFT function as mechanisms aimed at concealing an allocation of DNFT in accordance with some other logic than equalization.

In 2000, the policy change coefficients are positive and significant in both estimated models. This policy change implies that richer provinces are less favored in 2000 than in 1998. However, the allocations of NFT and DNFT still favor rich provinces in 2000, as can be seen in Figures 3 and 4. From 1998 until 2003, the allocation policy changes are even larger and highly significant. Figure 3 shows that in 2003, the large change in allocation policy results in a Poverty coefficient close to zero for NFT, which indicates that Poverty no longer explains the allocation of NFT in 2003. The fact that the coefficient of the Poverty variable in 2003 is insignificant in the NFT regression is in line with this interpretation. The positive and significant change in DNFT allocation policy until 2003 does not only rule out the previously regressive pattern of allocation, but suggests that the DNFT allocation becomes slightly equalizing: the coefficient of the Poverty variable in 2003 is small and positive. However, as this coefficient is insignificant in 2003, the result that the allocation actually becomes equalizing in 2003 should be interpreted cautiously.

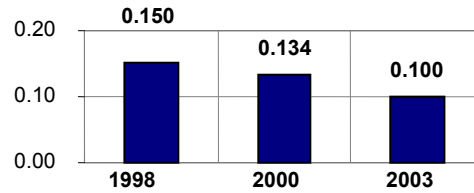
On the contrary, the evidence on the NFT and DNFT allocation policy *changes*, from highly regressive to less regressive allocations, are firm. Over time, rich provinces are less favored relative to poor provinces. This is in line with our expectations. However, the *result* of these changes is neither that the NFT allocation, nor the DNFT allocation (to a noticeable degree) is equalizing. Rather, starting from a highly regressive allocation in 1998, the policy changes make the distribution of NFT and DNFT *less regressive over time*. This is in line with our expectations for NFT, whereas our theory suggested that DNFT would be equalizing in all three years analyzed.

## GDP/Capita

**Figure 5: NFT - GDP/Capita Coefficient Estimates**



**Figure 6: DNFT - GDP/Capita Coefficient Estimates**



The results for the second variable reflecting equity-based allocation criteria, GDP/Capita, are analogous with the results for the Poverty variable, thus yielding corresponding interpretations. In 1998, the GDP/Capita variable's coefficients in both the NFT and the DNFT regressions are positive and significant, implying that a province with a higher fiscal capacity is favored relative to a province with a lower fiscal capacity, which represents a regressive allocation pattern. The empirical evidence for the GDP/Capita variable suggests that DNFT is even more regressive than NFT in 1998, although the difference is small. This is not in line with the expectations for DNFT, as the GDP/Capita coefficient was expected to be negative in 1998 (i.e., DNFT was expected to be equalizing).

In 2000, the allocation patterns of NFT and DNFT become less regressive, and the negative policy change coefficients, as well as the resulting, lower coefficients of the GDP/Capita variable shown in Figures 5 and 6<sup>58</sup>, are significant. The regressive allocation pattern of NFT and DNFT is further weakened in 2003 and the lower GDP/Capita coefficients are significant in both regressions. Contrary to the results for Poverty, the GDP/Capita variable does *not* suggest that DNFT becomes equalizing in 2003, but only that the allocation of DNFT becomes less regressive. The policy change coefficients of GDP/Capita were expected to be negative for both NFT and DNFT in 2000 and 2003, and our results are in line with these expectations.

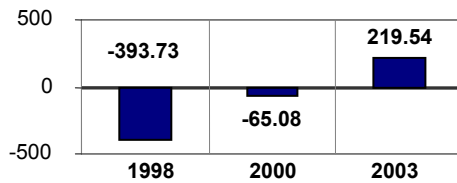
<sup>58</sup> Note: the scale of the Y-axis in Figure 5 differs from the scale of the Y-axis in Figure 6.



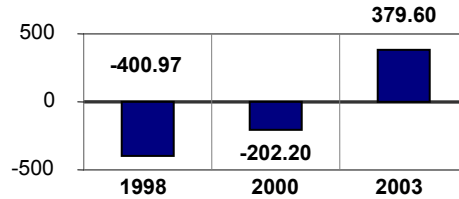
## 6.2 ECONOMIC DETERMINANTS OF INTERGOVERNMENTAL TRANSFERS

### Institutional Reform

**Figure 7: NFT - Institutional Reform Coefficient Estimates**



**Figure 8: DNFT - Institutional Reform Coefficient Estimates**

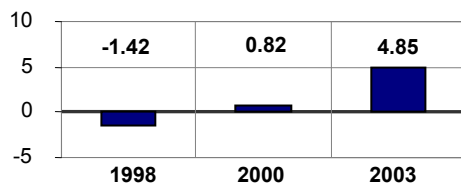


Contrary to our expectations, the significant coefficients of the Institutional Reform variable in 1998 are large and *negative*. This result implies that NFT and DNFT are channeled in a manner not rewarding institutional reform, but in fact punishing it. Thus, we find no evidence that fiscal incentives encouraging market-promoting institutional reform are in place *ex post* during the period 1998 to 2003, as was the case *ex ante* in the FCS (Qian et al. 2004).<sup>59</sup>

In 2000, neither the positive policy change coefficients nor the coefficients of the Institutional Reform variable are significant. In 2003, the policy change coefficients remain positive in both regressions. As is shown in Figures 7 and 8, this brings the coefficients of the Institutional Reform variable to high positive values in the two regressions in 2003. If looking at the sizes and signs of the policy change coefficients in 2000 and 2003, they could indicate an actual policy shift: a gradual implementation of an incentive structure promoting market-oriented reform. However, as these coefficients are insignificant, no actual conclusions can be drawn.

### SOE Share of Output

**Figure 9: NFT - SOE Share of Output Coefficient Estimates**



**Figure 10: DNFT - SOE Share of Output Coefficient Estimates**



In 1998, the coefficients of the SOE Share of Output variable are small, slightly negative and insignificant in both regressions. This suggests that the share of SOEs in a province did not affect its

<sup>59</sup> This could possibly be explained by a strong and negative correlation between institutional reform and GDP/Capita, as provinces with a lower GDP/Capita on average has a lower Marketization Index value, which might enable these provinces to make institutional progress more easily, starting from a lower relative position. However, as discussed in section 4.1.2, this is not the case.

fiscal allocation in 1998. However, this changes over time: in 2000, the policy change coefficients are positive. As the policy change coefficients are larger (in absolute terms) than the (negative) coefficients of the SOE Share of Output variable in 1998, the coefficients of the SOE Share of Output variable turn positive in 2000, although close to zero and insignificant in the NFT regression. In 2003, the policy change coefficients remain positive, increase and become highly significant. As is shown in Figures 9 and 10, the resulting significant coefficients of the SOE variable become positive in 2003.

Our theory suggests that a positive coefficient implies SBCs, and that a positive change coefficient indicates that the SBC problem is exacerbated over time. Given this, the fact that SBCs are detected in 2000 and 2003 but not in 1998 is interesting as the size of the SOE sector in all provinces decreases from 1998 and onwards, due to restructuring. A possible explanation of the positive discrimination of the SOE sector in 2000 and the increasing positive discrimination in of this sector in 2003, could be that this empirical evidence in fact is related to *the reform process* of the SOE sector: restructuring of the SOE sector generates unemployment and, at least during a transitory period, weakening social safety nets at the local level (Bai et al. 2000). As many of the mass incidents reported are related to unemployment, the increased funneling of resources to provinces with relatively large SOE sectors could be a reflection of central policy-makers' concern for social stability. Such a concern could motivate support of restructuring SOEs, e.g. by paying unemployment schemes, or induce support to non-restructuring SOEs so that they can continue their operations, thus lessening the problem of increased unemployment. With either interpretation, the results of the SOE Share of Output variable imply an increasing concern for social instability on the part of the government.

### 6.3 POLITICAL DETERMINANTS OF INTERGOVERNMENTAL TRANSFERS

#### Gini Coefficient

Figure 11: NFT - Gini Coefficient Estimates

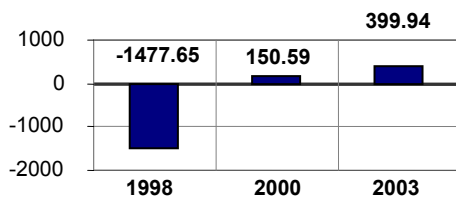
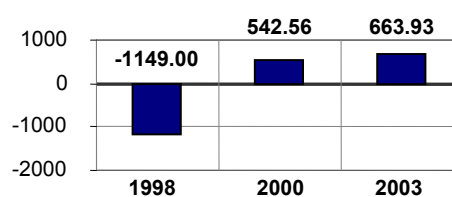


Figure 12: DNFT - Gini Coefficient Estimates



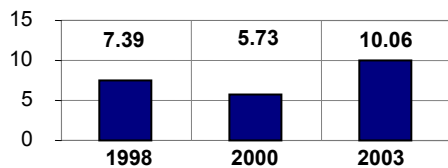
The negative signs and the large absolute values of the estimates of the Gini Coefficient variable in 1998 indicate that a province with a higher level of intra-provincial inequality, and thus, a higher level of social unrest, are penalized by lower NFT and DNFT, on average. However, as these coefficients

are insignificant, it cannot be ruled out that the Gini Coefficient variable has no explanatory power on the fiscal allocation in 1998. This is in line with our expectations, as the government did not express much official concern for inter-regional equity or any firm will to address the inequalities prior to the rhetorical shift initiated in 2000.

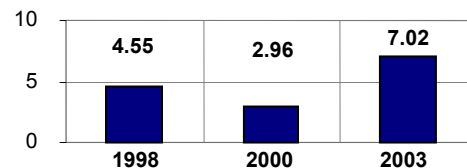
In 2000 and 2003, the policy change coefficients of the Gini Coefficient variable are large, positive and significant for both NFT and DNFT. As the changes are larger than the initial negative coefficients (in absolute numbers), these policy changes result in shifting signs of the Gini Coefficient variable estimates in 2000, which is illustrated in Figures 11 and 12. Both coefficients become positive, indicating that a province with a higher level of intra-provincial inequality, and thus, a higher level of social unrest, receives a higher NFT and a higher DNFT. These findings suggest that the central government becomes increasingly concerned with social instability over time, which is in line with our theory.

## Minority

**Figure 13: NFT - Minority Coefficient Estimates**



**Figure 14: DNFT - Minority Coefficient Estimates**



In 1998, the coefficients of the second variable reflecting political considerations of central policy-makers, Minority, are positive but highly insignificant for both NFT and DNFT. This suggests that the Minority variable does not have any explanatory power on a province's fiscal allocation. In 2000, the policy change coefficients in the NFT and DNFT regressions are negative and insignificant. The resulting Minority coefficients in 2000, illustrated in Figures 13 and 14<sup>60</sup>, are also insignificant. This implies that Minority has no effect on NFT or DNFT in 2000 either. As for 2003, the policy change coefficients are positive but small and only (barely) significant in the DNFT regression. The resulting Minority coefficients in 2003 also are insignificant. In sum, the variable Minority seems not to have any explanatory power on NFT or DNFT between 1998 and 2003.

This is an unexpected result, both given our theory and given the fact that Wang (2005) finds a strong relationship between different aggregates of fiscal transfers and the provincial proportion of minorities in the population. There are two possible explanations for why our result differs from Wang's (2005). First, Wang (2005) uses other dependent variables. Rather than attempting to identify

<sup>60</sup> Note: the scale of the Y-axis in Figure 13 differs from the scale of the Y-axis in Figure 14.

the determinants of the *total* net intergovernmental allocation, he uses four different, smaller aggregates of transfers as dependent variables. It is highly possible that the percentage of non-Han in the population has a strong explanatory power on the allocation of some of these aggregates. For example, one of the dependent variables that Wang (2005) analyzes comprises the Transition Transfers. As can be inferred from Table 1 in Chapter 3, this transfer category only accounted for two per cent of the total transfer from the central government to the provinces in 1998. In addition, one of the many Transition Transfers is a grant especially directed to minority regions. Thus, the transfers included in Wang's (2005) dependent variables could perhaps explain why he finds that the Minority variable has a significant and positive effect on fiscal transfers. A second reason for our differing results could be that the effect of minority on fiscal transfers disappears when controlling for variables such as SOE Share of Output and Institutional Reform, variables which Wang (2005) does not include in his regressions.

Although this closer examination of Wang's (2005) methodology offers feasible explanations as for why our results differ, we still deem it surprising that Minority does not have any effect on NFT and DNFT, as minority regions historically have been characterized by a higher level of social unrest and as they are strategically important given their typical richness in natural resources and their locations close to borders. According to our theory, these results imply that the central government is not particularly concerned with the social tensions related to minority provinces. The positive and significant change in the policy coefficient in 2003 in the DNFT regression is however in line with the results of the Gini Coefficient variable, which suggest that the central government becomes increasingly concerned with social instability over time. However, when interpreting the results of the minority variable, the empirical evidence is weak.

## 7. ROBUSTNESS CHECKS

In this chapter we discuss the robustness of the results presented in this thesis by re-running the regressions, excluding different groups of potentially influential observations.

As Shanghai and Beijing are considerably richer than the other provinces in terms of GDP per capita (only Tianjin comes close to Beijing), these observations are taken out of the sample to examine if the results are robust to their exclusion. The results of these regressions are presented in Appendix 10. As can be inferred from this appendix, the results for the main regression are robust to the exclusion of Shanghai and Beijing: the sizes of the coefficients do not change considerably and the signs of all coefficients, except for the non-significant coefficients of the change in Institutional Reform in 2000, remain the same. In general, the coefficients in the NFT regression change slightly more than the coefficients in the DNFT regression. This is straightforward as Shanghai and Beijing obtain very large Tax Rebates. The singular noteworthy change is that the coefficients of the GDP/Capita variable become insignificant in both regressions in 2000 and in the DNFT regression in 2003. However, the regressive pattern of allocation of NFT and DNFT suggested in the two main regressions is robust to the exclusion of Shanghai and Beijing if looking at the Poverty variable. This implies that the insignificant coefficient of GDP/Capita when Shanghai and Beijing are excluded should *not* be interpreted as if the equity-based criteria do *not* determine the fiscal allocation when these two observations are omitted. Rather, the insignificance of the GDP/Capita variable should be interpreted as a consequence of the fact that two outliers in terms of GDP/Capita are excluded from the regression, which naturally makes the estimate of the effect of GDP/Capita on the allocation of NFT and DNFT more uncertain (as the standard error increases).

In conclusion, the results of the main regression are found to be robust to the exclusion of the two richest provinces, Shanghai and Beijing.

It could also be argued that the two poorest provinces, Guizhou and Gansu, should be excluded to detect if these observations influence the results in a noteworthy manner. Therefore, the regressions are re-run, excluding these two provinces as well. The results of the regressions excluding Shanghai, Beijing, Guizhou and Gansu are presented in Appendix 11. As can be inferred from this appendix, all significant results of the main regression remain robust to the exclusion of these four observations except the results of the Minority variable. The sizes of the coefficients of the Minority variable in 1998 increase dramatically from 7.39 to 35.32 in the NFT regression and from 4.55 to 31.90 in the DNFT regression. Furthermore, these coefficients, as well as the positive Minority coefficients in 2003, are significant. This is a noteworthy change as all Minority coefficients for all years were insignificant in the main regressions. As the main regressions' results for the Minority

variable remained robust to the exclusion of Shanghai and Beijing, this change in the results of the Minority variable is caused by the exclusion of Gansu and Guizhou.<sup>61</sup> A closer examination of these two observations yield some understanding of why they are so influential on the results of the Minority variable: Guizhou is a province with a relatively high value on the Minority variable (in comparison to other provinces), whereas it obtains a relatively low NFT and DNFT. Gansu, on the other hand, has a relatively low Minority variable value but the province obtains a relatively high NFT and DNFT. Thus, if only looking at these two observations, the implied relationship between Minority and NFT and DNFT, respectively, would be negative: a high share of non-Han population would imply a lower NFT and DNFT, and vice versa. This sheds some light on why the result of the Minority variable is not robust to the exclusion of Guizhou and Gansu: the negative relationship between Minority and NFT and DNFT implied by the observations Guizhou and Gansu makes the positive relationship between minority and NFT and DNFT, which is valid for the rest of the observations, insignificant.

In sum, the robustness checks show that all of the results presented in the main regression are robust except for the result of the Minority variable, for which the relationship with NFT and DNFT is positive and significant if the two poorest provinces are excluded from the sample. This, in fact, is consistent with our theory.

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<sup>61</sup> If only excluding these two provinces from the regression, the corresponding coefficients in 1998 are 31.46 in the NFT regression and 27.79 in the DNFT regression, and they remain highly significant.

## 8. CONCLUSION

The purpose of this thesis was to decipher the underlying logic of the allocation of Chinese fiscal intergovernmental transfers by identifying the determinants of Net Fiscal Transfers (NFT) and Discretionary Net Fiscal Transfers (DNFT) in 1998, 2000 and 2003. In doing this, allocation policy changes over time were analyzed.

The main finding is that the Chinese fiscal allocation policy radically changed between 1998 and 2003. Whereas the pattern of allocation of both NFT and DNFT exhibited a perceptible logic favoring rich provinces in 1998, the allocation became less regressive over time. Some evidence, although inconclusive, even suggest that the allocation of DNFT turned slightly equalizing in 2003.

Moreover, the thesis provides evidence that between 1998 and 2003, as protests and social tensions were on the rise in China, the central policy-makers' concern for social stability increased. Several indicators of social unrest gained influence over the allocation of intergovernmental transfers in 2000 and 2003: the government attempted to ease ethically motivated social tensions, as well as social unrest arising from inequalities. In addition, SBCs were emphasized over the time period, which could indicate that central policy-makers became increasingly concerned with unemployment.

## 9. CLOSING DISCUSSION: FROM BLIND PURSUIT OF GROWTH TO BALANCED DEVELOPMENT?

In this chapter, allowing ourselves to elaborate on our empirical findings and discuss their wider implications, we make some tentative remarks on their relation to China's great challenges going forward.

On the 5<sup>th</sup> of March 2004, *People's Daily* published an article with the head-line "China Says Goodbye to Blind Pursuit of GDP Growth". This was an outright expression of the gradual shift in the rhetoric of central policy-makers, initiated in January 2000, when the "great development of the West" policy was launched, and reinforced in 2002, when Hu Jintao became the general secretary of the CPC Central Committee. The article depicts the new development paradigm, referred to as *balanced development*, in which a narrow focus on GDP growth is replaced by a concern for social development and an "all-around building of a well-off society" (Wong 2005).

In the light of this, the empirical evidence presented in this thesis supports *a change* in the officially proclaimed direction. Over time, rich provinces are less favored relative to poor provinces. However, *the result* of these changes, until 2003, is neither that the allocation of NFT nor, to a noticeable degree, that the allocation of DNFT is equalizing. Rather, starting from a highly regressive allocation in 1998, the policy changes detected in this thesis make the distribution of NFT and

DNFT less regressive over time. As for the wider implications, these main findings can be discussed from two different lines of reasoning.

First, the results could indicate that the official emphasis on balanced development and increased equalization is entirely rhetoric: even though the systematic favoring of richer provinces decreased over the time period, the allocation remained regressive. Thus, the *allocation may remain regressive, as was the case in 2003, going forward*.

However, if recognizing that *institutional change takes time*, a second interpretation becomes feasible: although the allocation did not become equalizing in 2003, the *changes* in allocation policy identified in this thesis are supported by firm empirical evidence, especially given the short time period analyzed. Thus, the alternative interpretation, which is yielded *if focusing on the policy changes* identified until 2000 and 2003, is that the results presented in this thesis indicate *an initial phase of a gradual transition from a highly regressive allocation of fiscal intergovernmental transfers to an equalizing one*. This will be the case if *the trend in policy changes remains* after 2003 as well.

The next question, then, is if such an allocation policy change—if it were to be sustained going forward—implies that China is abandoning its growth-focus for the benefit of increased equalization and social development? We argue that this is not necessarily the case. In fact, this interpretation requires the notion of a trade-off between economic growth and equity to be valid, an assumption which is debatable, particularly in the longer run. In addition to social tensions, the insufficient provision of goods such as schooling and health care at the local level, and the general inadequacy of social safety nets, generate ample uncertainty. This, in turn, discourages people to spend or invest their resources, which is reflected in an unusually high domestic savings rate (given China's income level).<sup>62</sup> This implies that if increased equalization would advance the development of social safety nets and thereby reduce social uncertainty; such a policy change could boost domestic private consumption and contribute to a gradual shift in spending and growth generation in China. This would make the Chinese economy more domestically driven and less dependent on exports for sustained economic growth.

Thus, even if the policy changes identified in this thesis were to be sustained going forward, this would not necessarily imply that China is abandoning its focus on high and sustained economic growth. Rather, it is possible that central policy-makers recently have started to consider “balanced development” as a superior strategy to sustain high levels of economic growth *in the longer run*, while simultaneously being favorable to social, and political, stability.

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<sup>62</sup> In fact, China is one of very few countries in the world in which the propensity to save is inversely related to wealth. Thus, in China, the poor save a larger proportion of their income than the rich (Lau 2005).



## 9.1 SUGGESTIONS FOR FURTHER RESEARCH

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The purpose of this thesis was to shed light on central policy-makers' political and economic priorities and the fiscal incentives facing provincial governments. This delimitation of our aim indicates interesting avenues for further research.

First, for increased fiscal redistribution to poor provinces to have a noteworthy effect on redistributive outcomes, the provincial governments, in turn, must funnel these fiscal means to less well-off sub-provincial localities. Second, local governments must face incentives to use increased transfers from central- or provincial-level governments to boost spending on local public services such as health care and education (rather than using these funds for other, non-intended, purposes).

Therefore, for a close evaluation of *the results at the sub-provincial levels* of the changes in allocation policy at the central-provincial level identified in this thesis, the allocation of fiscal transfers from the provinces to sub-provincial governments needs to be examined. Furthermore, the degree to which increases in fiscal transfers from a higher-level government actually filter down to increased spending on the intended activities at the local levels needs to be analyzed. Such research would shed light on the *actual* effects on distributional outcomes and economic growth of the central policy-makers' significant allocation policy change identified in this thesis.

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3. Brooks, Ray (Nov 1<sup>st</sup> 2005 and continuous contact), Senior Resident Representative IMF Resident Representative Office in China, Beijing, China.
4. Chelan Li, Linda (Oct 26<sup>th</sup> 2004), Professor, City University of Hong Kong, Hong Kong SAR.
5. Chen, Shixin (Nov 15<sup>th</sup> 2005), Chinese Ministry of Finance, Beijing, China.
6. Chen, Xing Dong (Oct 19<sup>th</sup> 2005), Chief Economist, BNP Paribas Beijing, Beijing, China.
7. Cho, Frédéric (Sept 14<sup>th</sup> 2005), Manager, Chinese equities, Hagströmer & Qviberg, Stockholm, Sweden.
8. Edlund, Per-Olov (Sept 14<sup>th</sup> 2005 and continuous contact), Associate Professor, Department of Economic Statistics and Decision Support, Stockholm School of Economics, Stockholm, Sweden.
9. Hart, Tom (Sept 6<sup>th</sup> 2005), Visiting Professor, European Institute of Japanese Studies, Stockholm School of Economics, Stockholm, Sweden.
10. Fransson, Martin (Sept 12<sup>th</sup> 2005), Department secretary, Swedish Ministry of Foreign Affairs, Stockholm, Sweden.
11. Hofman, Bert (Oct 5<sup>th</sup> 2005, Nov 19<sup>th</sup> 2005 and continuous contact), Chief Economist, World Bank China, Beijing, China.
12. Lagerqvist, Thomas (Oct 25<sup>th</sup> 2005), Swedish Attorney of Law, Head China Practice Group, Hong Kong SAR.
13. Liu, Lingling (Nov 1<sup>st</sup> 2005 and continuous contact), Associate Professor, Economics Department, Tsinghua University, Beijing, China.
14. Ljungren, Börje Dr. (Aug 7<sup>th</sup> 2005), Ambassador of Sweden to China, Sweden.
15. Ljungwall, Christer Dr. (Oct 3<sup>rd</sup> 2005 and continuous contact), Associate Professor, Beijing University China Center for Economic Research, Beijing, China.
16. Lodén, Torbjörn Professor of Chinese Language and Culture (Aug 29<sup>th</sup> 2005), Department of Chinese Studies, Stockholm University, Telephone Interview.
17. Lok, Anthony (Sept 28<sup>th</sup> 2005), Managing Director, Bank of China International, Beijing, China.
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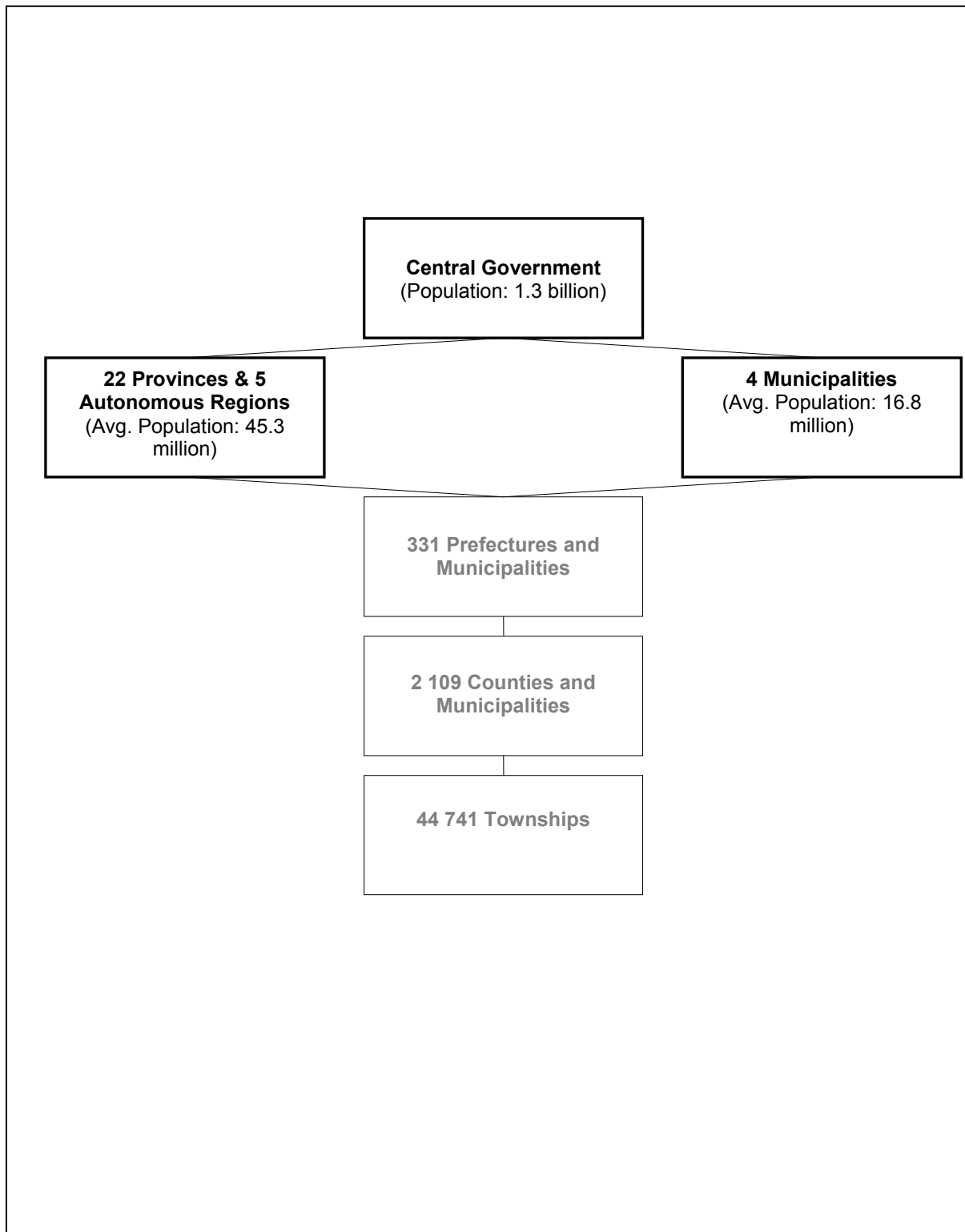
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## 12. APPENDICES

### APPENDIX 1: China's structure of government (2003)



Source: Wong (2005)



## APPENDIX 2: China's administrative geography including Taiwan



No.	Name		Type	No.	Name		Type
1	Beijing	北京	Municipality	18	Hubei	湖北	Province
2	Tianjin	天津	Municipality	19	Guangdong	广东	Province
3	Hebei	河北	Province	20	Guangxi	广西	Autonomous Region
4	Shanxi	山西	Province	21	Hainan	海南	Province
5	Liaoning	辽宁	Province	22	Sichuan	四川	Province
6	Jilin	吉林	Province	23	Guizhou	贵州	Province
7	Shanghai	上海	Municipality	24	Yunnan	云南	Province
8	Jiangsu	江苏	Province	25	Xizang (Tibet)	西藏	Autonomous Region
9	Zhejiang	浙江	Province	26	Shaanxi	陕西	Province
10	Anhui	安徽	Province	27	Gansu	甘肃	Province
11	Fujian	福建	Province	28	Qinghai	青海	Province
12	Jiangxi	江西	Province	29	Ningxia	宁夏	Autonomous Region
13	Shandong	山东	Province	30	Xinjiang	新疆	Autonomous Region
14	Henan	河南	Province	31	Taiwan	新疆	Administered by the Republic of China
15	Neimenggu (Inner Mongolia)	内蒙古自治区	Autonomous Region	32	Chongqing	重庆	Municipality
16	Heilongjiang	黑龙江省	Province	33	Hong Kong	香港	Special Administrative Region (SAR) (not included in study)
17	Hunan	湖南	Province	34	Aomen (Macao)	澳門	SAR (not included in study)

### APPENDIX 3: Wang (2005)

Wang investigated the allocation of transfers by running four separate OLS regressions. As dependent variables he used *Old subsidies and remittances*, *Tax rebates*, *New subsidies and remittances*, and *Transitional transfers* from the central government to the provinces 1997-1999. These aggregates were tested against variables measuring the central allocators' equity-based and political concerns.

#### Box 1: Variables, Wang (2005)

Dependent Variables	Independent Variables measuring Equity concern	Independent Variables measuring Political concerns
Old subsidies and remittances (OLD)	Three year average per capita urban income	The proportion of minorities in the population
Tax rebates (RETURN)	Three year average per capita cost of natural disasters	The instances of labor disputes
New subsidies and remittances (NEW)	Dependency ratio	Three year average provincial gross domestic product
Transitional transfers (TRANSITIONAL)	Population density	Provincial Representation in Central Decision Making

#### Box 2: Results, Wang (2005)

Variables	1 OLD	2 RETURN	3 NEW	4 TRANSITIONAL
<b>Central Leaders' Concern Over Equity</b>				
URBANINCOME	-0.149 (-2.123)**	0.335 (3.334)***	-0.243 (-2.046)*	-0.395 (-2.386)**
DISASTER	0.064 (1.439)	-0.069 (-1.080)	0.076 (1.008)	0.050 (0.476)
DEPENDENCY	0.130 (2.508)**	-0.231 (-3.123)***	-0.224 (-2.563)**	0.019 (0.159)
DENSITY	-0.404 (5.483)***	0.591 (5.612)***	0.231 (1.860)*	0.053 (0.305)
<b>Central Leaders' Political Concerns</b>				
MINORITY	0.170 (2.365)**	0.114 (1.112)	0.282 (2.329)**	0.401 (2.370)**
INSTABILITY	-0.237 (-3.484)***	0.138 (1.421)	0.093 (0.816)	0.124 (0.777)
<b>Provincial Bargaining Power</b>				
GDP	0.292 (4.987)***	-0.317 (-3.785)***	0.002 (0.021)	0.114 (0.826)
<b>Provincial Representation</b>				
POSITION	0.533 (5.631)***	-0.112 (-0.828)	0.871 (5.458)***	0.737 (3.309)***
BIRTHPLACE	0.023 (0.353)	-0.017 (-0.180)	-0.043 (-0.391)	-0.186(-1.221)
R <sup>2</sup>	0.968	0.934	0.909	0.822
Adjusted R <sup>2</sup>	0.954	0.906	0.870	0.746
Number of Observations	31	31	31	31

Note: t-ratios in parentheses: \*p ≤ 0.1; \*\*p ≤ 0.05; \*\*\*p ≤ 0.01 (all two-sided).

## APPENDIX 4: Expenditure assignments (2003)

### Box 3: The assignment of expenditure responsibilities between central and sub-national governments

#### Main expenditure responsibilities of the central government

- Defense
- Foreign Affairs
- Operation of the central government
- Operational expenses for cultural, educational, scientific and public health undertakings at the central level
- Key capital construction
- Technical renovation and new product development in centrally owned enterprises
- Agriculture
- Subsidies
- Macro-economic control and regional coordination of economic development
- Social security
- Debt

#### Main expenditure responsibilities of sub-national governments

- Operation of local governments
- Operational expenses for cultural, educational, scientific and public health undertakings at the local level
- Local capital construction
- Fund for technical renovation and new product development in locally owned enterprises
- Agriculture
- Urban maintenance
- Social Security
- Subsidies

Source: Zhang & Martínez-Vázquez (2003)

## APPENDIX 5: Revenue assignments (2003)

### Box 4: Assignment of Revenues at the Central level

#### Central revenues

- Customs duties
- VAT on imports
- Excise tax
- Enterprise income tax (From: rail transportation, state post, 4 state-owned commercial banks and 3 state-owned policy banks, and enterprises of offshore oil and natural gas)
- Business tax, urban maintenance and construction tax. (From: the headquarters of banks, and insurance corporations, and the Ministry of Railroad)
- Profit remittances by all centrally owned enterprises
- Export rebates of enterprises engaged in foreign trade

### Box 5: Shared Revenues between the Central and Sub-national Governments

#### Central: Sub-national Shares

- VAT 75:25
- Stamp tax on security transactions (97:3)
- Personal income tax (50:50 in 2002 and 60:40 from 2003)
- Enterprise income tax excluding special items (50:50 in 2002 and 60:40 in 2003)
- Resource tax (offshore 100% central and on land 100% local)

### Box 6: Assignment of Revenue at Sub-national level

#### Sub-national Revenues

- Business tax (other than from the headquarters of banks, and insurance corporations and the Ministry of Railroad).
- Urban and township land use tax
- Urban maintenance and construction tax (other than from the headquarters of banks, and insurance corporations and the Ministry of Railroad).
- Property tax
- Vehicle and Vessel utilization tax
- VAT on land
- Stamp tax
- Agricultural and Animal husbandry tax
- Tax on special products
- Contract tax
- Tax on the occupation of arable land
- Profit remittances by all locally owned enterprises
- Revenue from compensation for use of state-owned land
- Gift and bequest tax
- Slaughter tax
- Reorientation tax on capital construction
- Other Revenue

*Source: Zhang & Martínez-Vázquez (2003)*

## APPENDIX 6: Calculation of the VAT Tax Rebate

### Box 7: The 2-step calculation of the VAT tax rebate

#### Step 1. Calculation of the base year VAT tax rebate

The base year of the tax rebate is 1993.

The central government committed to transferring back to the provinces the amount of value-added tax (VAT) and excise taxes that would have gone to the sub-national governments in 1994 with the institutions prevailing in 1993, i.e. before the TSS-reform. This amount was specified as *the base amount of the tax rebate*.

#### Step 2. Calculation of the growth of the VAT tax rebate

For years after 1993, the formula for the VAT tax rebate for one province one year ( $TR_{it}$ ) is given by:

$$TR_{it} = TR_{i, t-1} \cdot (1 + 0.3 \cdot R_{it})$$

where  $R_i$  is the growth rate of VAT and excise tax collection in region  $i$  in year  $t$ .

## APPENDIX 7: Variable Summary and Pair-wise correlation coefficients

Box 8: Summary of explanatory variables

	N	Mean	Std. Deviation	Range
Poverty	87	4.79	0.31	11.79
GDP/Capita	87	8084.18	585.15	30452.79
SOE Share of Output	87	57.92	2.12	76.27
Institutional Reform	87	0.053	0.011	0.72
GINI Coefficient	87	0.26	0.0031	0.15
Minority	87	12.63	1.75	62.42

Box 9: Pair-wise correlation coefficients of explanatory variables

	Poverty	GDP/Capita	SOE Share of Output	Institutional Reform	GINI Coefficient	Minority
Poverty	1					
GDP/Capita	-.485(**)	1				
SOE Share of Output	0.347(**)	-.476(**)	1			
Institutional Reform	0.023	0.052	.237(*)	1		
GINI Coefficient	.259(*)	-0.099	0.084	0.013	1	
Minority	.266(*)	-.338(**)	.567(**)	.290(**)	0.08	1

## APPENDIX 8: Specification of the Marketization index

### Box 10: Components and their weights in the Marketization Index

#### 1. The role of government [0.231]

- 1a The proportion of resource allocation by market (0.344)
- 1b Extra-financial burden on farmers (0.271)
- 1c Business costs of dealing with government control (0.385)

#### 2. Economic Structure [0.282]

- 2a Non-state sectors in GDP (0.328)
- 2b Non-state sectors in total fixed investment (0.343)
- 2c Non-state sectors in urban employment (0.329)

#### 3. Free inter-regional trade [0.148]

- 3a Government price control (0.500)
  - (3a1) Price control on retail goods 0.400
  - (3a2) Price control on production goods 0.400
  - (3a3) Price control on agricultural goods 0.200
- 3b Non-price trade barriers (0.500)

#### 4. Development of factor market [0.242]

- 4a Banking sector structure (0.187)
- 4b Allocation of financial resource in state vs. non-state sectors (0.376)
- 4c Environment for foreign direct investment (0.173)
- 4d Labor mobility (0.264)
  - (4d1). Immigrating workers as percentage of total employment 0.500
  - (4d2). Ratio of Immigrating workers over provincial GDP 0.500

#### 5. Legal framework [0.097]

- 5a Development of intermediate institutions (0.429)
- 5b Legal protection of trade marks (0.157)
- 5c Legal protection of intellectual property rights (0.414)
  - (5c1) Ratio of patent application over GDP 0.500
  - (5c2) Ratio of patent registration over GDP 0.500

**Note:** The numbers in brackets are the weights of area-components in the Index; the numbers in parentheses are weights of the components in the areas; the numbers without either bracket or parentheses are weights of a sub-component in the components at above level. The sum of the weights of the Index, the sum of the weights of an area-component, and the sum of the weights of a component are all equal to unit. These weights are derived by principal component analysis.

## APPENDIX 9: White test for heteroskedasticity

The two estimated equations are:

$$\begin{aligned}\hat{u}_{i,t,NFT}^2 = & \alpha_1 + \alpha_2 \cdot Y_{2000} + \alpha_3 \cdot Y_{2003} + \alpha_4 \cdot Poverty_{i,t} + \alpha_5 \cdot GDP / Cap_{i,t} + \alpha_6 \cdot GINI_{i,t} \\ & + \alpha_7 \cdot Minority_{i,t} + \alpha_8 \cdot Institutional\_reform_{i,t} + \alpha_9 \cdot SOE\_share_{i,t} + \alpha_{10} \cdot Poverty_{i,t}^2 \\ & + \alpha_{11} \cdot GDP / Cap_{i,t}^2 + \alpha_{12} \cdot GINI_{i,t}^2 + \alpha_{13} \cdot Minority_{i,t}^2 + \alpha_{14} \cdot Institutional\_reform_{i,t}^2 \\ & + \alpha_{15} \cdot SOE\_share_{i,t}^2 + \alpha_{16} \cdot Poverty_{i,t} \cdot GDP / Cap_{i,t} + \alpha_{17} \cdot Poverty_{i,t} \cdot GINI_{i,t} \\ & + \alpha_{18} \cdot Poverty_{i,t} \cdot Minority_{i,t} + \alpha_{19} \cdot Poverty_{i,t} \cdot Institutional\_reform_{i,t} + \alpha_{20} \cdot Poverty_{i,t} \cdot SOE\_share_{i,t} \\ & + \alpha_{21} \cdot GDP / Cap_{i,t} \cdot GINI_{i,t} + \alpha_{22} \cdot GDP / Cap_{i,t} \cdot Minority_{i,t} + \alpha_{23} \cdot GDP / Cap_{i,t} \cdot Institutional\_reform_{i,t} \\ & + \alpha_{24} \cdot GDP / Cap_{i,t} \cdot SOE\_share_{i,t} + \alpha_{25} \cdot GINI_{i,t} \cdot Minority_{i,t} + \alpha_{26} \cdot GINI_{i,t} \cdot Institutional\_reform_{i,t} \\ & + \alpha_{27} \cdot GINI_{i,t} \cdot SOE\_share_{i,t} + \alpha_{28} \cdot Minority_{i,t} \cdot Institutional\_reform_{i,t} + \alpha_{29} \cdot Minority_{i,t} \cdot SOE\_share_{i,t} \\ & + \alpha_{30} \cdot Institutional\_reform_{i,t} \cdot SOE\_share_{i,t} + v_{i,t}\end{aligned}$$

$$\begin{aligned}\hat{u}_{i,DNFT}^2 = & \alpha_1 + \alpha_2 \cdot Y_{2000} + \alpha_3 \cdot Y_{2003} + \alpha_4 \cdot Poverty_{i,t} + \alpha_5 \cdot GDP / Cap_{i,t} + \alpha_6 \cdot GINI_{i,t} \\ & + \alpha_7 \cdot Minority_{i,t} + \alpha_8 \cdot Institutional\_reform_{i,t} + \alpha_9 \cdot SOE\_share_{i,t} + \alpha_{10} \cdot Poverty_{i,t}^2 \\ & + \alpha_{11} \cdot GDP / Cap_{i,t}^2 + \alpha_{12} \cdot GINI_{i,t}^2 + \alpha_{13} \cdot Minority_{i,t}^2 + \alpha_{14} \cdot Institutional\_reform_{i,t}^2 \\ & + \alpha_{15} \cdot SOE\_share_{i,t}^2 + \alpha_{16} \cdot Poverty_{i,t} \cdot GDP / Cap_{i,t} + \alpha_{17} \cdot Poverty_{i,t} \cdot GINI_{i,t} \\ & + \alpha_{18} \cdot Poverty_{i,t} \cdot Minority_{i,t} + \alpha_{19} \cdot Poverty_{i,t} \cdot Institutional\_reform_{i,t} + \alpha_{20} \cdot Poverty_{i,t} \cdot SOE\_share_{i,t} \\ & + \alpha_{21} \cdot GDP / Cap_{i,t} \cdot GINI_{i,t} + \alpha_{22} \cdot GDP / Cap_{i,t} \cdot Minority_{i,t} + \alpha_{23} \cdot GDP / Cap_{i,t} \cdot Institutional\_reform_{i,t} \\ & + \alpha_{24} \cdot GDP / Cap_{i,t} \cdot SOE\_share_{i,t} + \alpha_{25} \cdot GINI_{i,t} \cdot Minority_{i,t} + \alpha_{26} \cdot GINI_{i,t} \cdot Institutional\_reform_{i,t} \\ & + \alpha_{27} \cdot GINI_{i,t} \cdot SOE\_share_{i,t} + \alpha_{28} \cdot Minority_{i,t} \cdot Institutional\_reform_{i,t} + \alpha_{29} \cdot Minority_{i,t} \cdot SOE\_share_{i,t} \\ & + \alpha_{30} \cdot Institutional\_reform_{i,t} \cdot SOE\_share_{i,t} + v_{i,t}\end{aligned}$$

The null hypothesis of homoskedasticity is:

$$H_0 : \alpha_2 = \alpha_3 \dots \alpha_{30} = 0, H_1 : \alpha_i \neq 0, i=2, 3, \dots, 30.$$

The LM statistic for heteroskedasticity is  $n \cdot R^2$ . Under the null hypothesis, LM is distributed asymptotically as  $\chi_k^2$  where  $k$  = number of estimated parameters. The null hypothesis is rejected if  $n \cdot R^2 \geq \chi_{crit}^2$  with 29 degrees of freedom as  $k = 29$ .

$\chi_{crit}^2 = 42.557$  at the five per cent level. From these two regressions, we obtain:

$$R^2_{\hat{u}^2_{NFT}} = 0.527, R^2_{\hat{u}^2_{DNFT}} = 0.516$$

$$\chi_{obs,NFT}^2 = 87 \cdot 0.527 = 45.849, \chi_{obs,DNFT}^2 = 87 \cdot 0.516 = 44.892$$

Thus, in both the NFT and the DNFT regressions, we must reject the null hypothesis that the error term is homoskedastic at the 5 per cent level. However as the null hypothesis of homoskedasticity was *just* rejected at the 5 per cent level, this implies that the problem of heteroskedasticity may not be large. We use Newey White standard errors in order to solve the problem of heteroskedasticity, although this problem seems to be quite small.



## APPENDIX 10: Robustness Check 1

Table 5: Determinants of NFT and allocation policy changes over time, excluding Shanghai and Beijing			Table 6: Determinants of DNFT and allocation policy changes over time, excluding Shanghai and Beijing		
Variable	Estimate	T-stat.	Variable	Estimate	T-stat.
Constant	−246.33	−0.31	Constant	−451.52	−0.63
<b>Poverty 1998</b>	−15.88(**)	−1.98	<b>Poverty 1998</b>	−14.45(**)	−1.78
<i>Change until 2000</i>	13.98(*)	1.46	<i>Change until 2000</i>	15.11(*)	1.65
Poverty 2000	−1.91	−0.17	Poverty 2000	0.66	0.06
<i>Change until 2003</i>	16.63(**)	1.76	<i>Change until 2003</i>	20.60(**)	2.35
Poverty 2003	0.75	0.11	Poverty 2003	6.15	1.06
<b>GDP/Capita 1998</b>	0.08	1.20	<b>GDP/Capita 1998</b>	0.08	1.16
<i>Change until 2000</i>	0.00	−0.04	<i>Change until 2000</i>	0.00	−0.11
GDP/Capita 2000	0.08	1.40	GDP/Capita 2000	0.07	1.34
<i>Change until 2003</i>	0.00	0.08	<i>Change until 2003</i>	−0.01	−0.49
GDP/Capita 2003	0.09(*)	1.91	GDP/Capita 2003	0.06(*)	1.50
<b>Institutional Reform 1998</b>	−345.60(**)	−2.07	<b>Institutional Reform 1998</b>	−378.48(**)	−2.35
<i>Change until 2000</i>	−39.17	−0.09	<i>Change until 2000</i>	−61.02	−0.14
Institutional Reform 2000	−384.77	0.95	Institutional Reform 2000	−439.50	1.10
<i>Change until 2003</i>	640.57	1.03	<i>Change until 2003</i>	894.39	1.48
Institutional Reform 2003	294.97	0.56	Institutional Reform 2003	515.90	1.01
<b>SOE Share of Output 1998</b>	−1.87	−0.69	<b>SOE Share of Output 1998</b>	−1.96	−0.72
<i>Change until 2000</i>	3.50(**)	2.18	<i>Change until 2000</i>	3.20(**)	2.18
SOE Share of Output 2000	1.62	0.71	SOE Share of Output 2000	1.24	0.57
<i>Change until 2003</i>	8.04(***)	4.39	<i>Change until 2003</i>	8.59(***)	5.20
SOE Share of Output 2003	6.17(**)	2.33	SOE Share of Output 2003	6.63(***)	2.55
<b>GINI Coeff. 1998</b>	−1433.49	−1.40	<b>GINI Coeff. 1998</b>	−1304.46	−1.40
<i>Change until 2000</i>	1680.03(*)	1.54	<i>Change until 2000</i>	1839.65(**)	1.94
GINI Coeff. 2000	246.54	0.21	GINI Coeff. 2000	535.19	0.48
<i>Change until 2003</i>	1642.94(**)	2.07	<i>Change until 2003</i>	1511.24(**)	2.09
GINI Coeff. 2003	209.45	0.20	GINI Coeff. 2003	206.79	0.21
<b>Minority 1998</b>	10.17	0.89	<b>Minority 1998</b>	8.05	0.74
<i>Change until 2000</i>	−1.27	−0.90	<i>Change until 2000</i>	−1.27	−0.98
Minority 2000	8.90	0.74	Minority 2000	6.78	0.59
<i>Change until 2003</i>	2.51(*)	1.56	<i>Change until 2003</i>	2.01	1.30
Minority 2003	12.69	1.04	Minority 2003	515.90	0.87
$R^2$	0.98		$R^2$	0.98	
<p>*, ** and *** denote significance at 10, 5 and 1% levels, respectively. (One-sided tests when one-sided hypotheses and vice versa.)</p> <p>All t-statistics are calculated with Newey-West standard errors. The error structure is assumed to be heteroskedastic and possibly autocorrelated up to a lag of 2.</p> <p>The estimates of the influence of a regressor on the allocations on NFT and DNFT in 1998 (e.g. <math>\hat{\beta}_1</math> in the estimated model) and the estimates for the interaction terms between each regressor and year dummies for 2000 and 2003 (e.g. <math>\hat{\delta}_2</math> and <math>\hat{\delta}_8</math> in the estimated model) are obtained when estimating the fixed effect model. The other coefficients presented above (e.g. <math>(\hat{\beta}_1 + \hat{\delta}_2)</math> and <math>(\hat{\beta}_1 + \hat{\delta}_8)</math>) and their t-values are calculated manually using the estimates, Newey West standard errors and covariances obtained in the estimation procedure.</p> <p>Each regression includes a full set of provincial and year dummies.</p> <p>n=81</p>					

## APPENDIX 11: Robustness Check 2

**Table 7: Determinants of NFT and allocation policy changes over time, excluding Shanghai, Beijing, Gansu and Guizhou**

Variable	Estimate	T-stat.
Constant	-475.02	-0.64
<b>Poverty 1998</b>	-11.26(*)	-1.63
<i>Change until 2000</i>	11.75(*)	1.45
Poverty 2000	0.49	0.05
<i>Change until 2003</i>	16.04(**)	2.00
Poverty 2003	4.78	0.79
<b>GDP/Capita 1998</b>	0.11(**)	1.71
<i>Change until 2000</i>	0.00	-0.01
GDP/Capita 2000	0.11(**)	2.05
<i>Change until 2003</i>	0.00	-0.18
GDP/Capita 2003	0.10(**)	2.51
<b>Institutional Reform 1998</b>	-156.86	-0.98
<i>Change until 2000</i>	-205.47	-0.45
Institutional Reform 2000	-362.34	-0.96
<i>Change until 2003</i>	119.87	0.27
Institutional Reform 2003	-37.00	-0.09
<b>SOE Share of Output 1998</b>	-2.22	-0.74
<i>Change until 2000</i>	4.56(***)	2.75
SOE Share of Output 2000	2.34	1.00
<i>Change until 2003</i>	8.97(***)	4.99
SOE Share of Output 2003	6.75(***)	2.78
<b>GINI Coeff. 1998</b>	-1467.65	-1.45
<i>Change until 2000</i>	1554.69	1.60
GINI Coeff. 2000	87.05	0.08
<i>Change until 2003</i>	2041.06(***)	2.99
GINI Coeff. 2003	573.41	0.67
<b>Minority 1998</b>	35.32(***)	3.20
<i>Change until 2000</i>	-0.12	-0.08
Minority 2000	35.21(***)	2.98
<i>Change until 2003</i>	4.32(***)	2.77
Minority 2003	39.65(***)	3.35
$R^2$	0.99	

**Table 8: Determinants of DNFT and allocation policy changes over time, excluding Shanghai, Beijing, Gansu and Guizhou**

Variable	Estimate	T-stat.
Constant	-652.45	-1.02
<b>Poverty 1998</b>	-9.95(*)	-1.38
<i>Change until 2000</i>	13.09(**)	1.69
Poverty 2000	3.14	0.32
<i>Change until 2003</i>	19.98(***)	2.58
Poverty 2003	10.03(**)	1.74
<b>GDP/Capita 1998</b>	0.10(**)	1.70
<i>Change until 2000</i>	0.00	-0.05
GDP/Capita 2000	0.09(*)	2.02
<i>Change until 2003</i>	-0.02	-0.87
GDP/Capita 2003	0.08(**)	2.08
<b>Institutional Reform 1998</b>	-198.25	-1.32
<i>Change until 2000</i>	-216.44	-0.48
Institutional Reform 2000	-414.69	-1.13
<i>Change until 2003</i>	370.07	0.80
Institutional Reform 2003	171.82	0.40
<b>SOE Share of Output 1998</b>	-2.26	-0.76
<i>Change until 2000</i>	4.19(***)	2.81
SOE Share of Output 2000	1.92	0.87
<i>Change until 2003</i>	9.44(***)	5.54
SOE Share of Output 2003	7.18(***)	2.95
<b>GINI Coeff. 1998</b>	-1351.39	-1.43
<i>Change until 2000</i>	1723.79(**)	2.09
GINI Coeff. 2000	372.41	0.37
<i>Change until 2003</i>	1851.35(***)	2.91
GINI Coeff. 2003	499.96	0.60
<b>Minority 1998</b>	31.90(***)	3.05
<i>Change until 2000</i>	-0.16	-0.12
Minority 2000	31.74(***)	2.83
<i>Change until 2003</i>	3.71(**)	2.52
Minority 2003	35.61(***)	3.19
$R^2$	0.99	

\*, \*\* and \*\*\* denote significance at 10, 5 and 1% levels, respectively. (One-sided tests when one-sided hypotheses and vice versa.)

All t-statistics are calculated with Newey-West standard errors. The error structure is assumed to be heteroskedastic and possibly autocorrelated up to a lag of 2.

The estimates of the influence of a regressor on the allocations on NFT and DNFT in 1998 (e.g.  $\hat{\beta}_1$  in the estimated model) and the estimates for the interaction terms between each regressor and year dummies for 2000 and 2003 (e.g.  $\hat{\delta}_2$  and  $\hat{\delta}_8$  in the estimated model) are obtained when estimating the fixed effect model. The other coefficients presented above (e.g.  $(\hat{\beta}_1 + \hat{\delta}_2)$  and  $(\hat{\beta}_1 + \hat{\delta}_8)$ ) and their t-values are calculated manually using the estimates, Newey West standard errors and covariances obtained in the estimation procedure.

Each regression includes a full set of provincial and year dummies.

n=75

