Studie

Rural-Urban Inequality in China: Spatial or Sectoral?

Carsten Herrmann-Pillath and the China Center for Monitoring Regional Development

Abstract

In recent years Chinese economic policy has re-emphasized agriculture and the rural areas because the gap between rural and urban incomes has widened again. This issue is also at the centre of the "Western development" strategy. However, it is not clear whether spatial factors determine the relative worsening of the rural position or whether there are still policy factors that discriminate against agriculture. This paper attempts to distinguish between sectoral and spatial aspects of inequality by applying decomposition analysis on a new set of prefecture-level data from 1993, 1998 and 2003. The database allows researchers to operate on different levels of aggregation (belts, macro-regions and provinces) and to identify the relative impact of pure spatial factors on total inequality as compared to the impact of the distinction between the rural and the urban sectors. We can show that trends in inequality differ across macro-regions, with individual provinces performing very differently to one another. The data clearly supports the view that there are still strong sectoral factors that drive the trends in total inequality. Hence, regional policies that aim at spatial factors may fail to achieve their goals. (Manuscript received July 3, 2006; accepted for publication October 30, 2006)

Keywords: China, spatial income distribution, rural-urban disparities, decomposition analysis, prefecture-level database

JEL classification: O15, O18, P25, R12

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Studie

Land-Stadt-Ungleichheit in China: Räumlich oder sektoral?

Carsten Herrmann-Pillath und das China Center for Monitoring Regional Development

Abstract

Die chinesische Wirtschaftspolitik hat jüngst wieder die Landwirtschaft und die ländlichen Räume zur Priorität erhoben, weil die Einkommensunterschiede zwischen Stadt und Land wieder zugenommen haben. Dieses Problem ist auch in der „Strategie zur Entwicklung des Westens" sehr zentral. Allerdings ist nicht klar, ob rein räumliche Faktoren die Verschlechterung der ländlichen Position bestimmen, oder weiterhin eine wirtschaftspolitische Diskriminierung zu Lasten der Landwirtschaft wirkt. Das vorliegende Papier versucht, zwischen diesen Faktoren mit Hilfe einer statistischen Dekomposition zu unterscheiden, die auf einen neuen Datensatz für die Präfekturen aus den Jahren 1993, 1998 und 2003 angewendet wird. Der Datensatz ermöglicht es, unterschiedliche Aggregationsebenen zu betrachten (die Gürtel, die Makroregionen und die Provinzen), und den Einfluss rein räumlicher Faktoren relativ zu der Rolle der sektoralen Differenzierung zwischen städtischen und ländlichen Gebieten zu bestimmen. Wir zeigen, dass sich die Trends der Ungleichheit zwischen den Makroregionen unterscheiden, und dass einzelne Provinzen sehr unterschiedliche Entwicklungen aufweisen. Die Daten unterstützen die Auffassung, dass sektorale Faktoren weiterhin eine ausschlaggebende Rolle im Trend allgemeiner Ungleichheit spielen. Daher dürfte eine Regionalpolitik, die sich um räumlichen Ausgleich bemüht, ihr Ziel verfehlen. (Manuskript eingereicht am 3.7.2006; zur Veröffentlichung angenommen am 30.10.2006)

Keywords: China, räumliche Einkommensverteilung, Ungleichheit zwischen Stadt und Land, Dekompositionsanalyse, Präfektur-Datenbank

JEL Klassifikation: O15, O18, P25, R12

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1 How to Reduce a Complex Issue to a Single Figure: The Pitfalls of Aggregate Approaches to Economic Inequality

One of the top priorities of current Chinese economic policy is the increasing disparities in income, which are rightly perceived as stumbling blocks on the path to a 'harmonious society'. There is an almost universal consensus that economic disparities have grown relentlessly since the mid-Nineties, and the issue is also related to big challenges in Chinese nation-building, in particular with respect to the so-called Western development issue (Goodman 2004). At the same time, on passing the helm from Jiang Zemin to the new leadership, the sensitive issue of rural development has arrived at the centre stage of economic policies. In fact, the new leadership has even announced that the time has come for the rural population to be paid back for the forced accumulation in favour of industry (the *gongye fan bu nongye* formula; see Chi Fulin 2005: 13ff.).

What do we really know about disparities in China? Which requirements can we define for being able to assess inequality in China? From an economic point of view, this question is by no means an easy one to tackle because China certainly is a very complex case, given its huge size both in terms of population and territory, and its composition as an economic continent with many highly differentiated sub-regions. It's not enough to turn to the eye-catching data such as the increasing distance between the richest and the poorest province, since this includes extreme cases such as Shanghai, which by any means cannot be a basis for assessing general trends in the country. At the same time, it is a hallmark of Chinese transition policies that political strategy needs to be adapted to the particular circumstances in time and space, which implies that highly aggregate data cannot reflect the relation between policies and performance. It follows from this that highly aggregate data cannot be used for policy design (in a similar vein, see Gustafsson and Li 2002).

This consideration becomes even more challenging if we consider that large spatial divergences in economic development also have theoretical consequences because different regions of China might stay at different stages of the famous Kuznets curve, which assumes that inequality follows an inverted U curve during development (for an application to China, see Wang and Ge 2004). Kuznets' original contribution was related to personal income distribution, but it was extended to regional income distribution by Williamson (1965). However, overall

inequality needs to be to be interpreted as the result of complex interaction between different developmental trajectories in continental spatial units such as China (cf. Wei 1999). Indeed, as we will discuss repeatedly on several occasions in this paper, there is a fundamental problem as to whether the Kuznets relation applies to China as a whole or just to the various regional sub-units. From these considerations, we can draw our first conclusion regarding the requirements of inequality analysis: in the Chinese case, reliable results on inequality presuppose disaggregate analysis, which allows researchers to account for the regional diversity of development patterns.

Assessing inequality in a society is a difficult issue, if only because there is a need to differentiate between objective and subjective factors. For example, a farmer in Henan province might be less concerned about the inequality of income between his village and Shanghai than about income inequality in a large urban area closer to home. Obviously, reference group effects are very important for the political response to perceived inequality, as well as status quo effects in the course of time. Normally, these subjective factors are not the object of statistical research into inequality. Still, it's a straightforward conclusion to say that the analysis of disparities should always allow for a relatively detailed level of disaggregation (which supports our previous conclusion). Boiling everything down to a single number such as a national Gini co-efficient for income distribution results in a very serious loss of information. Thus, a simple approach to get hold of some reference group effects might be based on the assumption that there is a correlation between reference groups and the spatial scope of measures of inequality. This would require a national indicator of inequality to be decomposed into lower-level geographical entities.

Decomposition, if possible in an additive way, further enables us to identify the contribution sub-unit inequality makes to overall inequality. Although this is not a causal analysis, results would help to orientate policy priorities to the most urgent issues if only selective interventions are possible that aim at mitigation on national inequality. Hence our second requirement: indicators of inequality in China should be additively decomposable into smaller aggregates, such that analysis can proceed on different levels of aggregation and with varying spatial scope.

However, spatial inequality needs to be clearly distinguished from personal inequality. Typically, measures of spatial inequality refer to certain basic units (e.g. counties), for which the mean values are taken as the data sources. Thus, spatial data gives no information about personal inequality in the sub-units,

which means that results on spatial inequality cannot be directly compared with data on personal income inequality (such as Khan and Riskin 2005). On the other hand, available data on personal income inequality only refers to national samples, which means that the sub-samples do not allow any inferences to be made regarding sub-national income inequality normally. In other words, existing indicators of personal inequality in China may not be fully valid for assessing regional disparities. Further reasons why spatial and personal inequality analysis may not be fully comparable are that statistical data on income fails to reflect the true relative welfare position perfectly because different regions might have very different levels regarding the provision of public goods, the effects of externalities and simply different costs of living. Some of these effects might be better reflected in GDP data than in data on income. This enables us to reach our third conclusion: spatial inequality analysis needs to rely on methods that reveal how regional differences in living conditions can be reflected in the data.

In China, there is a special problem related to the definition of "spatial", which will remain the focus of this paper, viz. how can sectoral aggregates be neatly distinguished from spatial aggregates? This results from the fact that the administrative definition of basic regional units also refers to the sectoral demarcation between "rural" and "urban" areas. In particular, it still holds true that by definition, "rural" areas only include counties. For research, this implies that any statistical analysis based on county data can only investigate "rural" inequalities (such as Peng 1999 or Gustafsson and Li 2002). However, counties include the county seats, which are urban areas where permanent residents also count as urbanites according to the household registration system. So "rural" data continues to be spoilt by urban components. On the other hand, analyses based on county data cannot help explain rural-urban inequalities because all of the urban units above the county level are excluded.

To complicate this issue even further, the distinction between "rural" and "urban" is not identical to the distinction between agriculture and industry as economic sectors. Speaking of "sectors" may therefore be partly misleading because there is no match between "rural" and "agriculture" and "urban" and "industry". It makes a difference whether someone is relatively poor because she lives at a certain rural location or because she works in agriculture. This problem is of prime importance in China as there is a long history of policy intervention at the agriculture/industry interface and as migration was restricted for decades. The latter implies that spatial and sectoral determinants of inequality overlap to a large degree because for a long time people could not leave their disadvantaged

sectoral position just by changing their location. However, for the analysis of policies it is crucial to disentangle both effects. Consider an interregional fiscal redistribution of income that takes place without a removal of sectoral discrimination against agriculture. That would presumably only favour industry in the target region, with the effect of *increasing* inter-sectoral disparities. In the end, that might even show up as increasing inter-regional disparities if the rural population weighs heavily in the spatial income statistics.

These considerations lead us to fourth conclusion: indicators of inequality in China need to be especially sensitive to the statistical and administrative distinctions between "rural" and "urban", and should use a definition of spatial units which is neutral to sectoral boundaries.

This problem has an additional aspect, which results from the many administrative changes in China, especially those made in the last decade, resulting in a rapid increase in size of the urban population (cf. Chung/Lam 2004). These administrative changes mainly reflect structural changes, i.e. we can accept them as approximately reliable indicators for the urban population in the sociological sense of the term. Still, many of the changes only track structural changes that took place in earlier periods. This means the increase of the urban population is exaggerated in the more recent data sets, which distorts the time-series analysis, but does not affect the analysis of the present state. Still, the shift in the population shares affects inequality estimates because the shift from rural population to urban population almost certainly affects the high-income groups in previously rural statistical units. Furthermore, changing shares affect weighting schemes in disaggregate analysis. Which brings us to our fifth and final conclusion: statistical measures of inequality should be able to accurately reflect demographic and related administrative changes in Chinese society.

As we can see, measuring and assessing regional economic disparities in China is a very tricky task. In this paper we wish to give a non-technical overview to a broad professional audience about some results of long-term research that was conducted in co-operation with the State Information Center, the National Bureau of Statistics and, more recently, with the Graduate School of Engineering and Management of Nanjing University. All these organisations collaborated in setting up the "China Center for Monitoring Regional Development" at Nanjing University. One of the main objectives of this research is to develop a reliable database to assess the medium- and long-term trends in spatial inequality in China and to disentangle these effects from the sectoral effects, with the focus being on the rural/urban dichotomy. Thus, via the analysis of spatial inequality we can

reach conclusions regarding the recent evolution of one of the core elements of the Chinese model of development, namely the forced accumulation in the rural economy in favour of the industrial and urban sectors.

To be more precise, in this paper we wish to distinguish analytically between spatial and sectoral determinants of inequality in China. We define all potential determinants of inequality that are exclusively related to the location of an economic unit in geographical space as "spatial". "Sectoral" refers to determinants of inequality that are specific to either the production environment, the factor endowments, the technology, etc. of a sector or its policy context. We wish to reach a conclusion about the relative strength of spatial versus sectoral determinants of inequality.

In the next section, we describe the database and the methodology and put it into the context of recent research in Chinese economic inequalities. Subsequently, we summarise the main results. Finally, we draw some policy conclusions. The paper does not engage in deeper causal analysis, as we shall see in the next section. Its main task is to set up a descriptive framework that allows researchers to assess trends in inequality on different levels of spatial aggregation and across different sectoral demarcations. The instrument employed is decomposition analysis, which has been applied to China in a number of papers since Tsui's seminal contribution (1993). The major new contributions of this paper are firstly, to make a comprehensive comparison through time possible, and secondly, to offer complete sets of inequality measures for regional aggregates with different scopes, which enables us to draw attention to regional divergence in trends of inequality. As we have previously mentioned, such a high degree of disaggregation is indispensable for designing proper policies against inequalities.

2 Methodology: The Decomposition Approach to Spatial Inequality

2.1 Which Kind of Data?

Dealing with inequality in China is challenging because the database for assessing time trends is difficult to construct. This is particularly true if a high degree of disaggregation is required, as we have already pointed out. However, even if very advanced decomposition approaches are applied, these mostly concentrate on defining national measures of inequality, which are analysed in terms of national sectoral sub-units (e.g. Wu and Perloff 2005). One reason for this serious

limitation is that the underlying data does not allow for further disaggregation. Wu and Perloff, for example, use the National Bureau of Statistics' national sample on income distribution, for which regional data is not published and which has inherent limitations for spatial disaggregation because the statistical criteria for representativeness only hold for the national sample, but not necessarily for the regional sub-units. Although the information that can be distilled from this data is valuable, we neither have an idea of how far regional divergences of trends in inequality exist, nor can we discern structural differences among the regions.

In the current literature, the vast majority of contributions to disaggregate analysis rely on inter-provincial comparisons of inequality and divergent growth (for example, Hare and West 1998; Bao et al. 2002). Clearly, this is not adequate because Chinese provinces are very large units the size of (large!) European nation-states. There is considerable structural variety in space within these units, so intra-provincial inequalities should become a major research issue (Wei 1999). This is particularly true for the agricultural sector, which is mainly focused on the regional economies and is only orientated towards interregional and international trade to a minor degree. So far, work on intra-provincial inequalities has mainly been done on a case-by-case basis as this raises many difficult issues in descriptive statistics if a national scope is to be achieved (cf., for instance, Tsui 1998a, b; Lyons 1999).

The major problem is that intra-provincial data has mainly been collected and published in the provincial statistical yearbooks (for more detail, see Herrmann-Pillath et al. 2002b). The provincial statistical authorities sometimes apply different definitions and approaches to certain data categories. Furthermore, the range of categories being published is not unified across the yearbooks. All this is particularly true for earlier editions, which means that time-series are difficult to construct. For researchers, this implies that they need to build their independent database by processing the published data further. In our project, this is being done by the State Information Center, which receives advice from the National Bureau of Statistics. This includes the deflation by regional price indices, as a lot of data is simply presented in its nominal values. By doing this, we are trying to catch the effect of different regional costs of living in a rudimentary way. Of course, even this is of limited value because the cost of living certainly differs widely between the rural and the urban areas. Still, this is a first attempt at meeting our third requirement. Moreover, we are attempting to fulfil this requirement by collecting, analysing and comparing GDP and income data.

There is also the question of which statistical unit should be the elementary

one. In existing research operating on a disaggregate level, this is mostly the county (see Lee 2000, for example). However, comparisons over time (not to speak of time-series) have rarely been presented so far (Gustafsson and Li 2002 are the major exception) because county data is mostly taken from special national compilations that are produced for single years. Further, county data is very onerous to collect and to assess in comparative terms because of its sheer volume. This is the reason why even the most advanced research in this area, Gustafsson and Li (2002), only relies on samples, in this case actually the CASS household sample, which also underlies the Khan and Riskin (2005) paper and earlier works. This approach raises questions as to whether the lower-level spatial aggregates are representative at all, because the national sample has only been constructed with national-level representativeness in mind (on this caveat, see Khan and Riskin 2005: 358). Finally, as we have said previously, county-level data only allows us to analyse rural inequalities, which are, however, spoilt by the fact that counties include the urban population.

Another problem is that the relation between counties and cities has undergone many changes in the recent decade (for a detailed survey, see Chung and Lam 2004). In particular, in regions where the economic relation between urban areas and their surrounding counties is very close, it can become misleading to assess the economic position of a county just with reference to county data. In our project, we therefore opted for the prefecture (*diqu*), which is a unit encompassing both cities and counties, presumably approaching a kind of natural economic unit (in other words, in a prefecture the externalities of the urban economy on the neighbouring rural counties are internalised; cf. Peng 1999). In Chinese statistics, the "prefecture" has remained a statistical unit quite independent from its administrative status, which has changed a lot since the inauguration of reforms. Today the term "prefecture" includes both the traditional prefectures as well as the large number of cities that emerged from administrative fusions between counties and cities, which were transformed into "prefecture-level cities". This makes a big difference in the administrative status of the cities, but does not affect the basic statistical categories because before and after the merger, the same administrative sub-units were generally aggregated into the prefecture-level data. This eases the task in the case of inter-temporal comparisons as we only need to take the cross-prefecture mergers and the dismemberment of prefectures in the statistical system into account. In our database this implies that we sometimes use artificial prefectures which might not exist today but which allow for a comparison across different years. Still, we will not rely on sample analysis, but

on complete national data sets, which is a major advantage.

Interestingly, these changes did not affect the hukou system. This is important for our analysis since it implies that even if we take the prefecture as the elementary unit, we can still ascertain the intra-prefectural inequalities in an indirect fashion because the prefecture-level data includes income data on the rural and the urban population. As this distinction is based on household registrations, we ultimately also refer to the differentiation among cities and counties, with the latter being rural areas by definition. At the same time, this not only refers to agriculture, but to all other sources of income that can be mobilised by the rural population living in close interaction with neighbouring cities. One great disadvantage of this approach is the undifferentiated treatment of certain provinces (such as Ningxia or Tibet), which have only one dominant economic and political centre surrounded by rural counties, because that can even imply that the province is just treated as one or two prefectures.

In sum, choosing the prefecture as a basic unit meets our fourth prerequisite: the prefecture is a neutral spatial unit whose demarcation is not spoilt by the rural/urban administrative distinction and it serves as a spatial core unit of elementary economic sub-systems of the Chinese economy. Furthermore, it allows for sectoral analysis because prefecture-level statistics include average income data for the rural and the urban population, which indirectly also includes the distinction between counties and cities (albeit not allowing for comparisons between individual counties).

Another issue is migration, which needs to be clearly distinguished from the administrative reassignment of urban and rural places. Migration is only very rudimentarily reflected in the hukou data. The question is whether this affects the interpretation of the data on inequality. Our approach is to exclude the migrants from the urban population in the sociological sense, i.e. keeping them as a statistical part of the rural population. This implies that the growth of the urban population does not seem as strong as the expansion of the urban territory would imply. Rural migrants might live in urban places for a long time, but the income effects (if accounted for at all) still arise in the rural areas, for example, via remittances, housing investments, etc. So the hukou distinction between rural and urban people also makes sense in the context of analysing disparities. On the other hand, when we consider GDP data, migration is of no relevance whatsoever because we are only interested in the economic strength of the regional units, regardless of whether these result from rural or urban labour input. In other words, if GDP increases because of labour inflows, this is just an expression of

locational advantages and hence higher growth potential. This is precisely what we are interested in. All in all, migrants cause statistical ambiguities, but unless migrant data is collected separately and reliably, the problem cannot be resolved in a satisfying way (cf. Khan and Riskin 2005 as a first step towards this aim).

Our database concentrates on about 290 prefectures and the years 1993, 1998 and 2003, with per capita income and GDP being the statistical categories by which to grasp inequality. The specific observation points have no particular meaning: we started our collection of data in 1993 since this was the year when the most complete series are available for prefectures. 2003 is the most recent year that we could process, so 1998 emerged as the natural "median". However, we may say that these observation points are of intrinsic interest because 1993 is the first year of reform take-off after Deng Xiaoping's journey to the south, 1998 is the year after the Asian crisis and one of the early years after the trend of stagnating or even falling rural population set in, and 2003 just remains the most recent observation point.

In a rough approximation we can say that GDP data reflects the economic strength of a region, whereas income reflects the welfare of the population. Due to the limited space here, we shall not discuss the potential limitations of this data (see Bramall 2001; Herrmann-Pillath et al. 2002b). However, we wish to emphasize that the income data follows the same methodology as the NSB national sample surveys on income. This means that if the local statistical units clearly followed the national regulations and practice, they would be directly comparable. However, this cannot be taken for granted, if alone because the quality of local staff and methodology differs widely across China. More importantly, the prefecture-level income data mostly contains sub-samples of the national sample, which means that the Khan and Riskin caveat also applies for it, i.e. it is not statistically representative for the individual prefectures. Unfortunately, there is no way of remedying the situation; we just have to accept the official data as a reflection of the actual situation.

In more detail, we have:

1) GDP Per Capita (GDPPC), calculated for 291 prefectures (excluding Anhui, for which 1993 data is missing).
2) Rural Per Capita Net Income (RPCI), calculated for 295 prefectures (excluding Neimenggu, for which 1993 data is missing).
3) Urban Per Capita Disposable Income (UPCI), calculated for 293 prefectures (excluding Gansu, for which 1993 data is missing).
4) Total Per Capita Income (TPCI), calculated for 281 prefectures (excluding

Neimenggu and Gansu, for which 1993 data is missing). TPCI is calculated as the population-weighted average of RPCI and UPCI.

In our research we aggregate the elementary statistical units into larger units. The basic one is the province, of course. However, in the current debate on inequalities there is also a strong concern for the larger spatial divisions, such as the so-called "belts", which just confront the developments in "the West" with the central and the coastal region. However, this approach conflates very different geographical characteristics, for example crossing climate borders (for an alternative approach, see Lu and Wang 2002). So we are also trying out another common approach, viz. to divide China into macro-regions (for a penetrating conceptual analysis, see Cartier 2002). We can meet our first prerequisite by this approach. We have a unique set of complete elementary spatial divisions of China that can be aggregated according to different schemes.

The result is a rather complex picture:

Belts

1) Coast: Beijing, Tianjin, Liaoning, Hebei, Shanghai, Jiangsu, Zhejiang, Fujian, Shandong, Guangdong, Hainan and Guangxi.
2) Centre: Neimenggu, Shanxi, Jilin, Heilongjiang, Anhui, Jiangxi, Henan, Hubei and Hunan.
3) West: Sichuan, Guizhou, Yunnan, Tibet, Shaanxi, Gansu, Qinghai, Ningxia and Xinjiang.

Macro-regions

1) Beijing, Tianjin and Shanghai (metropolitan).
2) Shandong, Jiangsu, Zhejiang, Fujian, Guangdong and Hainan (coastal).
3) Liaoning, Jilin and Heilongjiang (north-eastern).
4) Anhui, Jiangxi, Hubei and Hunan (central).
5) Neimenggu, Hebei, Shanxi, Henan, Shaanxi, Gansu, Qinghai, Ningxia (northern).
6) Sichuan, Guizhou, Guangxi and Yunnan (south-western).
7) Xinjiang and Tibet (north-western).

It is important to note that the "West" is a very different construct if we either adopt the belts or the macro-region perspective, because in the latter we pay closer attention to the geographical divisions, which implies that "western" provinces do not include some of those bordering on the north-western ones, which are assigned to the "northern" macro-region, but are a part of the "Western" belt. On the other hand, the "centre" belt splits the north-eastern macro-region into two parts, which are commonly treated as one unit. Liaoning belongs to the

coastal belt. All this has direct implications for the calculation of mean values of the respective regions, of course. Finally, we create an artificial macro-region of the metropolitan areas – Shanghai, Beijing and Tianjin – because these are very special cases that distort the regional patterns. Chongqing is included with Sichuan to make the time-series consistent.

2.2 Which Kind of Approach?

The most common analytical approach to income inequality by far is the Gini co-efficient, which turns the shape of the Lorenz curve (depicting the cumulative income distribution) into a single number. However, it is precisely this fact that implies that the Gini is not a reliable indicator when investigating disaggregate data (see Shorrocks and Wan 2004: 7; notwithstanding, there are decomposition approaches on China based on the Gini, e.g. Yang 1999). The reason is that the Lorenz curve depends on a strictly defined order of incomes and objects to which the income data is assigned, such as the segments of the population with the lowest ten per cent of income and so forth. Once researchers wish to compare results of different levels of aggregation, this means that the same group might be assigned to different segments in the various disaggregate Lorenz curves (for example, the poor in Shanghai might be in the same absolute bracket as the lower-middle income people from Guilin). In other words, there can be large overlapping areas when incomes and groups are reshuffled across different disaggregate units. This implies that the resulting Gini values are difficult to interpret in comparative terms.

Mathematically, it can be shown that one of the very few indicators that avoids these troubles is the entropy co-efficient, which measures the degree of disorder in a given distribution of values, viz. the General Entropy Measure GEM (see Tsui 1993 for the first application to China; for more recent examples, see Gustafsson and Li 2002; for our own work, see Herrmann-Pillath et al. 2002a). The more unequal the income distribution, the higher the degree of order and the higher the degree of "energy" that can be released by redistribution. The highest value of entropy is reached in the equal distribution. These General Entropy Measures are a class of different possible measures that distinguish themselves in one important characteristic, namely how strong the tails of the distribution are weighted. The most common and also the simplest GEM is the Theil indicator, in which the relatively poor groups receive a relatively strong weight, which might be a desirable property from a policy point of view. This version of the GEM also has the advantage of being very simple arithmetically:

$$I(x)=\sum_{i=1}^{N} w_i \ln\left(\frac{m}{x_i}\right)$$

where x_i is the parameter value for region i, m is the mean of x over the entire number of regions and w_i is the population weight of region i.

The Theil index has one important property for analytical purposes: because the problem of overlapping does not matter, it can be unequivocally decomposed into its constituent units. This results in the straightforward approach:

$$I(x)=B(x)+W(x)$$

where $I(x)$ is the overall inequality as measured by the GEM and $B(x)$ the inter-unit inequality and $W(x)$ the intra-unit inequality. $B(x)$ is calculated as the GEM of the unit means, $W(x)$ as the sum over the population-weighted GEM values for the units. In other words, total inequality as measured by a single-value GEM can be simply decomposed into the sum of the inter-unit inequality and the intra-unit inequality of all units, which is calculated as the sum of population-weighted single-unit GEMs. Hence, using this indicator meets our second prerequisite formulated in the first section of this paper.

These units and sub-units can be arbitrarily defined, provided that they are constructed using the same database, that they exhaust it entirely and that they do not overlap. In our case, this means that we can decompose the national data set with the prefectures as elementary data along different spatial and sectoral constituents, such as the prefectures and in particular the rural and urban sub-groups of the total population. This can be done on all levels of aggregation. As a result, it can be shown how a higher-level measure of inequality can be decomposed into two dimensions, namely the intra- and the inter-unit disparities. For example, we can analyse how national disparities are influenced by the disparities between the three belts and within the belts respectively. For each belt, we arrive at a specific indicator of inequality, which in turn can be decomposed. The same is true for the rural/urban distinction.

For example, we can analyse how the rural/urban distinction contributes to inter-prefectural inequalities. This can be done in two different ways. First, we can decompose total inequality I_{tot} into the sum of different inter-sectoral inequalities, referring to the respective national means. Our data set allows us to calculate the national rural/urban income inequality, I_{RU}, based on the prefectural-level data. The remaining contribution can be defined as the sum

of total rural-rural I_{RR} and urban-urban I_{UU} inequality, resulting in the first decomposition formula:

$$I_{tot} = I_{RU} + I_{RR} + I_{UU}$$

Another decomposition can take the TPCI as the mean of income of the prefectures and calculate the inter-prefectural GEM I_B. The intra-prefectural inequality is calculated as the rural/urban inequality in all prefectures I_{RU2}, so that the formula is:

$$I_{tot} = I_B + I_{RU2}$$

Clearly, the decomposition approach ends up with a very large number of indicators that are then compared through time, which may be difficult to survey. However, this also permits us to take a closer look at particular provinces or regions that might manifest distinctive characteristics as compared to other regions. Within one unified approach, we can analyse national and regional trends and we can understand how these trends contribute to national development.

In a final remark on methodology, we would like to refer to the effects of changing population shares. As we have discussed previously, rural/urban population shares have changed considerably, with the administrative changes looming very large and migration mostly left out of the statistical picture because of the household registration scheme. This adds a strong dose of "noise" to our interpretation of the data. Decomposition analysis can explicitly distinguish between the pure effects of changing inequality and the demographic effects by applying the so-called "shift-share analysis", which simply means that a difference operator is applied to the values of two different observation points (compare Wu and Perloff 2005, based on seminal papers such as Tsakoglou 1993). As a result, we obtain a decomposition that neatly distinguishes between values that would hold with constant population shares and the values that reflect the effects of changing shares between the rural and the urban population. As we have said, given the peculiar nature of the Chinese statistical system, we cannot take the results at face value. We can, however, get an impression of the tendencies and the relative strength of different factors.

3 Deconstructing Rural-urban Inequality in China: From National-level Indicators to the Comparative Study of Provinces

In the following sections, we will mainly comment on the results of applying

decomposition analysis to the prefectural-level data set. This is a descriptive exercise in the first place because the sheer quantity of data means that it is not easy to discern patterns and trends if we want to compare regions and provinces. As we have emphasized in the introduction, the greatest advantage of our database is that we can make direct comparisons of regions on different levels of aggregation. Specifically, this means:

- We can analyse spatial inequality within individual provinces, based on the comparison between the averages for the different prefectures in the province. This allows us to assess structural trends of provincial regional development, such as divergent growth in Subei and Sunan.
- At the same time, we can analyse rural-urban disparities, based on the income data of the prefectures. This permits us to separate the spatial effects from the sectoral ones, while at the same time we can assume that the rural data has a very close relation with rural spatial units, in particular the counties.
- We can ask what the most appropriate level of policy design and intervention is if we want to achieve the largest effects on overall inequality reduction. Our reply would focus on the relative contribution of single factors in the decomposition analysis. This does not mean that this factor is causally responsible, but it directs our attention towards spatial and sectoral units where ultimate causes for rising inequality might work. That is, decomposition analysis is only the first step towards a deeper understanding of inequality. Given our spatial focus, the results of decomposition will be particularly relevant for the design of regional policies on different administrative levels.
- We can directly and exhaustively compare current states and trends in inequality among Chinese regions on different levels of aggregation. Apart from the fact that this is useful for setting policy priorities, insights are also very important for understanding structural differences between regional economies more fully.
- We can analyse the relation between growth and inequality because our database directly reports the entire set of GDP and income growth data for all Chinese prefectures, provinces, macro-regions and belts. As we shall see in the next section, this alone is a big advantage as the growth patterns differ considerably across Chinese regions.

In sum, decomposition analysis may be difficult to digest because of the large amount of data and observations, but it is the best way of grasping the complexity of regional diversity in China.

3.1 National-level Inequality: The Strong Impact of Inter-sectoral Inequality on Total Inequality

Let's first look at the GEM values at the national level for our three years of observation and for the four different categories of data (table 1). The story of increasing disparities is directly confirmed by the GDP data, with a clear acceleration evident between 1998 and 2003. However, GDP and income do not necessarily correlate. Looking at the Total Per Capita Income (TPCI) values, the picture is different because there is a U movement, with declining disparities in the first five years and sharply increasing differences in the second ones. Consequently, the increase over the decade is smoother. This certainly has a strong impact on subjective perceptions of inequality, which naturally give a strong weight to relative increases in more recent times.

However, we need to take account of the fact that the increase in the urban population was particularly strong in the second period of observation. Consider that in the first period a strong urbanisation process was triggered which caused rural incomes to rise as long as the population in new urban areas was counted as "rural" according to household registration. In the second period these new urban areas have been assigned an urban status in the administrative system. Thus, without any movement of population the "cream" of the rural income distribution would have been skimmed off as their income is now included in the urban statistics. Since we weigh the Rural Per Capita Income (RPCI) and the Urban Per Capita Income (UPCI) with their population shares when constructing the TPCI, the higher urban incomes receive a stronger weight, which means that inequality is further accentuated. However, from a sociological point of view, this cannot be counted as a distortion since we are interested in the rural-urban gap, notwithstanding how many people are counted as rural or urban.

To clarify this point further, we shall now turn to the RPCI and UPCI. The national GEM values also allow for the surprising insight that there was almost no change in intra-sectoral inequalities during the ten-year period in question (though we are talking about the spatial income distribution, not the personal one; Khan and Riskin (2005) arrive at a similar conclusion, which is reassuring). That means the relative positions within the urban and rural sub-groups of the population have not changed substantially across China. There is even a convergence for the rural incomes across prefectures. This seems remarkable, given the perception that some rural areas have leapt ahead because of their

close interaction with booming cities, for example. But again we need to keep in mind that in the second period of observation the more affluent part of the rural population might have been skimmed off the scale of the income distribution, to be counted as urban people, with the result that the rural scale has become more compressed. This clearly shows that the increasing inequality in the TPCI must be explained by inter-sectoral inequalities. Spatial inequalities in the strict sense do not appear to have increased between urban and rural places in different regions. In other words, the rural-urban disparity cannot simply be a result of spatial factors.

Another revealing observation is firstly, that the GEM values for the UPCI are much lower than for the RPCI and that the relative increase in moving from the provincial to the prefectural level is weaker, yet increases for the UPCI. This shows that there is a much more powerful equalising factor for the urban incomes than for the rural incomes, which at the same time works equally strongly on the provincial and the prefectural level. A reasonable explanation for this is that there are nationally homogeneous policies targeted at the urban sector that dampen inter-spatial disparities as regards living conditions. This is very obvious from the fact that the transition between the two levels of disaggregation reveals a changing pattern through time. Regarding GDPPC, there is always a strong effect when moving from the provincial to the prefectural level, with the GEM values doubling. For the UPCI, this relation increases through time, starting on a very low level (0.043/0.030 in 1993). Since the GEM should normally manifest a strong increase once a higher degree of disaggregation is reached, the urban data shows that firstly there has been a strong homogenising force in the past, and secondly that this has been weakening through time, though it has still remained strong. As the results reported by Khan and Riskin indicate, this is related to the fact that urban subsidies have been declined relatively since 1995. We should also add the previous argument here on the effects of administrative reassignments. All in all, the trends seem to be plausible.

In conclusion, even on the highest aggregate level we can already reach some important conclusions regarding our question of how spatial and sectoral determinants of inequality in China interact and relate to each other. Our first guess – which will be substantiated subsequently – is that the sectoral determinants dominate the spatial ones. This confirms early assessments such as those made by the World Bank (1997) concerning the most recent data. There are deep-seated structural forces in China that favour the urban sector and disadvantage the rural sector, which cannot simply be reduced to locational disadvantages in the latter

case.

3.2 Inter- and Intra-regional Inequality: Whither the Kuznets Curve?

Let us turn to the more detailed picture. Due to the limited space in this paper, we can only demonstrate the results with a single table that shows the changes on the different levels of disaggregation between 1993 and 2003. The complete results are accessible on the Institute of Asian Affairs' web site at http://www.giga-hamburg.de/ifa/china-aktuell/data, and are referred to as "web tables" in our article. Table 3 conveys an impression of the large amount of information that can be retrieved from the data on GDPPC by means of the GEM methodology. Structurally identical tables can be produced for the TPCI, RPCI and UPCI, which we have not shown here, but refer to (see web tables 1a-c). Furthermore, we also need to consider the absolute values, because changes might start out from very different points. To illustrate this, in table 2 we show the absolute GDPPC values for the different regions in 1993, again referring to the other values via the web tables.

To begin with, in 1993 the mean GDPPC of the coastal macro-region B was twice that of macro-regions D (central) and E (northern). At the same time, the GEMs across the macro-regions were very similar, with macro-regions B and G being at the top. The north-western macro-region G is always a special case (comparable with Gansu Province) because of the highly centralised economic structure and the almost absent prefectural differentiation in our data pool. We therefore just have to note this as a constant (with respect to subsequent comments, too). Similarly, we will not talk much about macro-region A here, which is an artificial unit joining the exceptional units of Beijing, Shanghai and Tianjin. We have not analysed intra-regional disparities here, but for the purpose of subsequent analysis, we should keep in mind that these metropolitan areas are a major reason for substantial differences in performance between macro-region B and the coastal belt, where these are included. As macro-region A is far too special for us to reach any general conclusions, especially for policy analysis, this also spoils a comparison across the belts.

The relative similarity across all the other macro-regions covers up the fact that the provinces greatly diverge, which reveals the need to assess further trends as well. For example, in 1993 Guangdong was very unequal, with a GEM of 0.324, whereas Zhejiang and Fujian only had 0.060 and 0.069,

respectively, which was in the low range (in comparison with all the other provinces, too). Since we are talking about GDP here, which is an indicator of economic strength, we can say that in 1993, Chinese provinces manifested a relatively equal intra-provincial distribution of economic strength, with Jiangsu, Shandong, Guangdong, Heilongjiang and Yunnan showing clearly above-average intra-provincial disparities. One standard explanation of this phenomenon is the homogenising force of regional policies in the Mao and the early post-Mao era.

Provinces can also differ considerably in their structural relation between GDPPC and the income categories (see web tables 1a-c). For example, in 1993 Guangdong had a GDPPC of 5220, a UPCI of 4277 and an RPCI of 1725, whereas Jiangsu had a GDPPC of 4223, a UPCI of only 2793 and an RPCI of 1282. At the same time, intra-urban inequality in Guangdong was low in absolute terms (GEM = 0.037), but relatively high compared with Jiangsu (GEM = 0.017), for example, whereas intra-rural inequality in Guangdong was high in absolute terms (GEM = 0.163) and relatively high in both Guangdong and Jiangsu (GEM = 0.072). From this kind of observation we can generate several hypotheses for further confirmation, e.g. that Jiangsu Province may have a relatively large government sector that claims a considerable share of GDP, and that Guangdong and Jiangsu differ in the role of spatial determinants in inequality. Even though the homogenising impact of the urban status is clearly recognisable in both cases, in Guangdong there seems to be an additional spatial factor that also makes itself felt in the very high intra-rural inequality. Obviously, the Pearl River delta looms large in determining these observations, together with the strongly discriminatory open-door policy of the first decade of reforms. A spatial factor also seems to be at work in Jiangsu Province, albeit only in the rural areas, whereas in the urban areas homogenising forces seem to prevail. This reflects the well-known Sunan/Subei divide and the fact that rural industries blossomed in the first region right from the beginning of the reforms. As we can see, this example provides a first illustration of how we can use descriptive decomposition results to understand the forces of inequality in China.

There are even provinces where the relation between GDP and income is turned upside down: in 1993 the south-western macro-region F had a GDPPC of 1723, but a UPCI of 2458, which suggests a very strong mechanism of redistribution in favour of the urban population. Actually, the 1993 RPCI was only 717, such that rural-urban inequality springs to the eye. Indeed, the TPCI showed that macro-region F was by far the most unequal in China, with the exception of macro-regions B and G. However, as has been noted, the

north-western macro-region G is a very special case and the performance of the coastal macro-region B is again very strongly influenced by Guangdong and Jiangsu. Thus, these observations suggest that intra-regional inequality might have been driven by external forces, such as urban-biased fiscal redistribution. It is important to note that the "Western" lag in development clearly goes back to earlier periods and cannot simply be explained by the effects of rapid growth in the 1990s. Whereas the more aggregate data on the Western belt seems to suggest that in 1993 the economic strength was not far below the central belt, in fact there was extreme inequality between rural and the urban incomes. In 1993, the UPCI of the western belt was actually higher than in the central belt. Take Jiangxi and Yunnan as an example: in 1993, the Yunnan GDPPC was 1825 and surpassed the Jiangxi GDPPC (1680). Still, the Yunnan RPCI (651) was far below the Jiangxi one (890). As we can see, decomposition analysis allows us to generate hypotheses about policies and their impact. We must bear the observation in mind that the problem of "Western" disparity has deep historical roots and seems to be related to very strong rural-urban inequalities especially in macro-region F.

Furthermore, we can pin down the fact that the levels of inequality differ considerably between the sectors and across regions. Intra-urban and the intra-sectoral inequality was highest in macro-region B, which also translates into high inequality in the coastal belt (because of the high population share, this implies that total inequality was strongly influenced by this). There are some cases where intra-urban inequality was much less pronounced than intra-rural inequality, such as macro-regions B, F and G, so that on average, intra-rural inequality seems to be much higher. These starting points, of course, have very strong effects on the further changes because even relatively slow growth of UPCI would imply that the absolute growth can still be very much in favour of the urban sector.

In sum, we have speculated that inequality in China goes hand in hand with strong regional path dependences resulting from structure and policy. Turning now to the changes up to 2003, we shall look at table 3 for the 93/98 rates of change and table 4 for the respective 98/03 values. These tables can be read as follows, with us adding some observations on the other statistical categories on income. We can see the three levels of disaggregation, with the provinces assigned to the belts and the macro-regions (right and left).

The "mean" column shows information about the growth of the mean value of GDPPC in the two periods of observation. There is an upward trend between the two periods, with the central belt even surpassing the coastal belt, which

is remarkable. The reason is the strong performance of the north-eastern macro-region, C, which balances the more sluggish performance of the central macro-region. In addition, we note the strong acceleration of growth in those northern provinces, which are part of the western belt (Gansu, Qinghai, Ningxia), as well as the much better performance of the north-eastern macro-region, C, which supports the improvement of the performance of the western belt. These observations alone suffice to prove that the higher aggregation schemes hide important information about divergent growth on the macro-regional and provincial level. Indeed, between 1998 and 2003 the top performers in terms of GDPPC were Neimenggu and Heilongjiang!

However, looking at the income data, our picture needs some important qualifications (web tables 2, 3, and 4, a and b respectively). One crucial point is that RPCI growth declined considerably across all macro-regions, with the exception of macro-region G. This decline was very strong in the central macro-region E. Hence, rural income growth is totally decoupled from GDPPC growth, which alone may have created the sense of crisis in recent years. Of course, we have to consider the impact of changing population shares here again, viz. the relative decline of the rural population because of the reassignment of more productive members to the urban share would exert a dampening effect on rural income growth. This effect appears to be further aggravated in the observation that UPCI actually did increase more strongly in the second period in macro-regions B, C, D and E. One should note, therefore, that this is not a phenomenon related to the West/Rest divide in China. Urbanites all over China received the benefits from the increase of economic potential reflected in the GDP data, and at the same time administrative changes further accentuated the shift of economic strength. This effect would be camouflaged if we only looked at the aggregate income data. Here, depending on the weight of the urban population, some regions such as the central macro-region D even manifest an increase of TPCI, and the belts end up with almost similar growth in both periods. This is another clear example of the flaws of high aggregation schemes.

Indeed, the provincial level manifests even higher diversity. It is important to note that Yunnan and Shaanxi lead the low-income pack of provinces in terms of RPCI growth, being remarkably different from downsliding Guizhou and Guangxi, for example. So even the rural picture needs important qualifications. At least we can say that simple locational forces cannot be the crucial ones, because the rural areas in those poor provinces would appear to be structurally similar. The reason, presumably, must be related to policies. In comparison, the

condition ins the urban sector are much more uniform, with Hebei, Yunnan and Sichuan at the far lower end, which requires an explanation, presumably based on factors specific to the provinces.

The "GEM" column provides information about the change in inequality in the respective regions. It is important to observe that strong growth can be accompanied by very different trends in the GEM, which makes generalisations such as the Kuznets curve difficult to apply. However, the caveat needs to be added that we are not talking about personal income distribution directly, but only mediated via the spatial filter. Coastal macro-region B only manifests small changes of inequality, whereas the strong north-eastern performance goes hand in hand with a steep increase in inequality. The development of inequality in the coastal belt is also much smoother than the central belt. Given the different levels of GDPPC, this is an awkward observation from the viewpoint of theory. The central belt especially almost achieved the level of the coastal belt in 1993, while manifesting a very different performance. This proves that the regions of China undergo very different developmental patterns. Furthermore, the observations may explain why there is a widespread perception of a social crisis in the north-eastern macro-region, C, which seems to be rooted in divergent economic potential.

Again, these statements need qualification once we include the income data. It seems remarkable that over the two periods there is no pronounced change in the spatial inequality of urban per capita incomes. In the second period there was only a relatively strong increase in the coastal macro-region B, which may reveal the effects of the marketisation of the urban economy as compared to, for example, the northern macro-region, E, where urban inequality even declined. Again, we also need to note the effects of administrative reassignments during rapid urbanisation. As we saw previously, all this relates to a starting point of low absolute inequality. Regarding RPCI, we note that there were only slow changes over the decade, with opposite trends between the periods of observation sometimes. Strikingly, macro-regions D, E and F even show a relative decline in inequality in spite of both the RPCI and UPCI growing. In coastal macro-region B economic growth was accompanied by a continuous reduction in intra-rural inequalities, whereas in northern macro-region E only the first period saw a relatively strong increase. The summary statement on TPCI further confirms our tentative conclusion about the inapplicability of the Kuznets curve: macro-region B has a total decline in inequality over the decade, macro-region C only a slight increase in the second period of observation and D-G seem to reveal no special

pattern, but just move around a stable state. In sum, on the more disaggregate level spatial inequalities of income do not reflect any systematic relation with growth. This contradicts the Kuznets curve because the main argument is that high productivity workers shift to industry, which would be mainly located in urban areas, so that both personal and spatial inequality would increase. The only argument that might help the Kuznets argument to survive in China is that migration is not really reflected in the prefecture-level data set. This is true, but on the other hand the majority of population movements in China might still be intra-regional, especially on higher levels of aggregation. As long as there are no further statistical advances in dealing with migration in the income statistics, we cannot finally decide on our verdict.

Finally, column W shows how the contribution of the respective region to total inequality in China changed in the two periods. This can be of help to determine priorities in regional policies directed at reducing total inequality in China. There is a clear strengthening of the central belt as compared to the other belts, and we can see that the impact of intra-coastal inequalities is continuously decreasing – on a high level, as is evident from table 2. Things look different for the income dimension, where the impact of the coast has strengthened again after a diminution in the first period. However, this observation needs to be put into perspective by also watching the absolute figures for the more recent relative contribution. In 2003, the coastal belt was still the most influential (W = 0.505) with respect to total inequality in GDPPC. The provinces with a strong contribution include Jiangsu, Guangdong, Heilongjiang, Gansu and Xinjiang, in other words the usual suspects.

This picture is a little different if we consider the income data. Here, the relative impact of the coastal belt on intra-rural inequalities has been strengthening again recently. However, this includes strong-impact provinces such as Liaoning (W = 0.023), whereas other provinces such as Zhejiang show declining impact. The coastal belt also exerts a relatively strong influence on total inequality for the UPCI, which leads to the observation that the coastal belt had also strengthened its impact in terms of TPCI (W = 0.053). This supports the suspicion that inequality-reducing regional policies might be well-advised to concentrate on the costal belt. This directly reflects the fact that the majority of the Chinese population lives in the eastern half of China.

3.3 Some Provincial-level Observations: Diversity Rules

As we have already seen, table 3 allows us to take a closer look at the individual

provinces, too. Every single case can reveal interesting implications of the different data. The following are some observations on different regions of China we have collected:

As far as the GDPPC data is concerned, Jiangsu and Zhejiang manifest different growth dynamics, with Zhejiang showing strong growth without pronounced effects on inequality, and Jiangsu clearly moving from inequality-reducing growth to inequality-increasing growth. This raises the question of how far Zhejiang's private-sector-dominated growth really is more homogenising than Jiangsu's collective sector-based growth, where the growth of inequality in the second period was precisely boosted by the privatisation of collective firms, which might have accentuated existing disparities in the distribution of wealth in the province (i.e. the Subei/Sunan divide).

Some insights regarding this question can be gained by looking at the income data. Zhejiang was one of the very few provinces in which the RPCI shows an increase in the growth rate over the two periods, with declining inequality. This clearly demonstrates that the Zhejiang growth pattern supported the spatial convergence of rural areas. In Jiangsu a much weaker effect on inequality can be observed, albeit with a stark decline in the growth rate. This pattern does not show up in the UPCI data, where there was even stronger growth in the second period of observation. We may conclude from this that the Subei/Sunan divide in Jiangsu is not simply a spatial phenomenon, but is presumably related to sectoral discrimination of the rural sector, too.

At the same time, both cases again fly in the face of the Kuznets hypothesis, especially Zhejiang. Since Zhejiang is praised as a model of rural private entrepreneurship, this raises interesting questions about the interdependence between social structure and developmental patterns. However, the Kuznets anomaly can be generalised to apply to the entire region: Guangdong is of special interest because it was the most unequal province in 1993. However, the trend of TPCI inequality declined steadily until 2003. Only if we include the metropolitan areas in our analysis, i.e. if we look at the coastal belt, does a Kuznets-like relation seem to emerge. Yet it is precisely in these cases that path dependences and policies have had a strong impact.

Coastal macro-region B is very different from north-eastern macro-region C. Liaoning and Jilin consistently show increasing intra-provincial disparities as regards GDPPC, Heilongjiang does a U-turn, with both Jilin and Heilongjiang showing exceptionally strong growth performance in the second period. In the peculiar context of the north-eastern provinces, we may explain this via the

discriminatory effects of the strong support given to SOEs in the region, which puts the private and agricultural sector at a disadvantage. Direct effects on spatial inequality emerge via the location of these different enterprises. Indeed, urban per capita incomes increased at a very strong rate in the second period, with Heilongjiang at the top of the scale for all the provinces and inequality almost unchanged there. The situation looks very different in the rural areas, where incomes even shrank slightly, with increasing intra-rural inequality. In contrast, Jilin was able to achieve modest growth with slightly decreasing inequality. This is an illuminating example of why even macro-regional generalisations might be misleading, as there are clear differences in trends and – presumably – provincial policies in the north-eastern region. Furthermore, the Kuznets relation seems to hold true for these provinces, but the explanation for this is certainly more closely related to policy factors than to structural change. In other words, just merging the trends in both regions to arrive at some "unified" pattern for China seems to be utterly misleading.

As a result, it appears to be very difficult to substantiate claims on spatial determinants of inequality on higher levels of aggregation. At the same time, spatial trends seem to be very closely enmeshed with sectoral trends in the Northeast. Divergent trends in RPCI deserve special attention because they could mostly be explained by locational factors, with policy determinants playing a lesser role, which explains the intra-rural differences.

Poor provinces reveal very diverse interaction between growth and inequality, which may reflect the different dynamics in their agricultural and industrial sectors. Yunnan, for example, shows declining growth dynamics, which at the same time reduces inequality. Rural incomes were even able to improve more strongly in the second period, whereas the growth of urban incomes per capita slowed down. These three observations actually indicate a depression as regards structural change, which needs further explanation. In this case, even demographic effects couldn't counterbalance the trends, which is also bad news for the Kuznets hypothesis. As a counter-observation, Guizhou reveals a similar pattern in the first period, though with increasing growth and also increasing inequality. In the first period the rural population enjoyed a very rapid increase in incomes, which slowed down considerably in the second period. In contrast, urbanites were able to improve their lot much more in the second period, which implies a stark juxtaposition of trends in the urban and the rural sector, thus supporting the Kuznets curve argument. Other cases are more indeterminate, such as Anhui, which reveals declining TPCI inequality with declining UPCI and

almost stable RPCI inequality.

Thus, the relation between growth and inequality seems to be difficult to generalise for the less-developed provinces. Compared to the previous cases, for example, it is just the opposite in Shaanxi, where increasing growth leads to a slower rise in inequality. A similar observation can be made in Jiangxi. In Shaanxi, however, rural incomes even accelerated in the second period. In both provinces, urban income growth far overshadowed rural income growth, which goes hand in hand with a slower increase in inequality in terms of GDPPC.

Summing up, Chinese provinces seem to follow individual developmental patterns that are due to individual differences in structural conditions and policies. This observation matches analytical frameworks on regional development in China (see Chung 1999, for instance), which emphasize the interaction between resources, history and political leadership. Trends in growth and development ultimately reflect regional competitive advantages. With respect to our question as to whether rural/urban inequalities are mainly sectoral or spatial in nature, there is further support for the conclusion that sector-specific determinants dominate locational factors.

3.4 Assessing the Role of Urban/Rural Inequalities

Thus, summarising our observations, we can clearly recognise that rural/urban dualism seems to play a much stronger role than the spatial location of a prefecture for determining regional trends in inequality, and at the same time there seem to be individual factors specific to every province which shape the relative development of the rural sector. Even within a macro-region it's difficult to generalise for all the provinces because trends sometimes differ even with regard to the direction of change.

Final proof of the dominance of the rural/urban divide can be found by decomposing the national GEM into different constituents, following the two formulae presented in section two. The results of this exercise are presented in table 5. We have reached the following conclusions, keeping in mind that this decomposition is again a national one, i.e. we have investigated the total intra-sectoral inequalities based on intra-prefecture income data.

First, the ratio between the rural and the urban mean per capita incomes decreased in the first period and increased in the second period. One should note that given the hukou system, this does not simply refer to the relative position of agriculture, but includes all sources of income of the rural population. What's more, this divergence is further accentuated because of the relative decline of the

rural population.

Second, total rural-urban inequalities are by far the dominating factor in total income inequality. Urban-urban inequalities only contribute a minuscule amount. The role of rural-rural inequalities is of moderate importance, yet it is declining. This demonstrates remarkably clearly that spatial inequalities are not the major issue in China, but inter-sectoral inequalities.

Third, the second decomposition lends further support to this observation. This compares the contribution of intra-prefectural rural-urban inequalities with the total inequality of rural and urban incomes. The impact of intra-prefectural inequalities is clearly increasing relative to the latter, which we can interpret as a strengthening of sectoral determinants relative to spatial ones because prefectures share certain spatial characteristics cross-sectionally as compared with other prefectures.

A final remark on the problem of changing population shares seems appropriate here. As we have sketched in our methodological overview, this can be treated by applying shift-share analysis. We did this for both our periods of observation and the entire decade (the results are treated in detail in a companion paper). Our preliminary results for prefecture-level inequality and the basic set of GDPPC, TPCI, UPCI and RPCI indicators show that the contribution of changing population shares is relatively weak for the GDPPC values, but much stronger for RPCI and UPCI, which we would expect if the change of population shares mainly affected the intra-regional and hence inter-sectoral patterns, and less the inter-regional patterns. However, the effects do not overshadow the general trends. For example, total inequality of RPCI decreased between 1993 and 2003, with the change of population shares working in the same direction in relation to intra-provincial inequality but in the opposite direction with respect to inter-provincial inequality. The latter effect did not counterbalance the general trend. In the case of UPCI, the two forces cancelled each other out with respect to inter-provincial inequality. When analysing the TPCI values, the impact of changing population shares remains relatively weak, even on the provincial level. In sum, including changing population shares in our analysis is a complicated matter because there are also problems with the underlying data and the exactness of the calculations. It seems that the overall results of the analysis are not affected fundamentally.

4 Conclusions: The Need for Proper Targeting of Inequality-reducing Policies

In this paper we have introduced a database and a methodology that allows researchers to fulfil the five prerequisites for the analysis of inequality in China that we defined in the first section. Although in existing research, this database is the most complete one as regards scope and depth, it still leaves much to be desired, in particular with respect to the appropriate inclusion of migration data and the treatment of administrative changes in the assignment of rural and urban places. We have presented a series of observations on trends in inequality on different levels of spatial aggregation. We have concentrated on the specific issue of how spatial and sectoral determinants on inequality may be separated on the descriptive level. The most general and fundamental result of our research is that the lower the level of aggregation, the more the role of individual developmental patterns comes to the fore. Even if national data suggests trends such as the movement along the Kuznets curve, this multiplies into very different patterns – even with opposing directions – if we move to the provincial level, in particular. The reason for this is that China consists of economically integrated regional sub-units, which are relatively complete economic systems in different structural and political settings. In this sense, China can be compared with the European Union, where patterns of inequality are also determined simultaneously by international, intra-European trends, as well as intra-national forces.

According to our final observations, there is strong evidence that the urban/rural discriminatory policy is a foremost determinant of spatial inequalities in China. This confirms earlier research, summarised, for example, in World Bank (1997). However, this alone is remarkable, as more direct instruments of discrimination in favour of the urban sector have been in much less use recently, such as urban subsidies as part of urban income (Khan and Riskin 2005). Furthermore, there seem to be some important exceptions to this trend if we look at the disaggregate data.

The empirical data verified our introductory hypothesis that inter-regional redistribution cannot help China to overcome spatial inequality as long as the rural sector suffers from institutional and financial disadvantages. Any solution needs to include a broad range of policy areas, such as the regulation of the credit sector, where rural enterprises suffer from a lack of access to credit, and the hukou system and the effects on migration, thus reaching much further than

agricultural policy, as epitomised in the abolishment of the agricultural tax. We have known this for a long time, yet our data has revealed the worrying picture that there was even a regress in policies and the resulting conditions for the rural sector in the second period of observation (thus, this report comes to a very different conclusion compared with Herrmann-Pillath 2002a). In this respect, our data allows a certain degree of benchmarking across regions and policies, albeit with some cases such as Zhejiang, Anhui or Shaanxi, where both stronger growth and decreasing inequality has been achieved. In the majority of Chinese regions, however, growth clearly favours the urban population.

Thus, large-scale regional policies such as the "Western development strategy" may fail to hit their targets. Our data clearly shows that there was a reversal of fortunes in the so-called "western" belt if we compare the first period with the second. However, the high level of aggregation covers up the fact that this seems to be mainly the result of the increased performance of northern provinces and of the north-western macro-region, i.e. Gansu, Ningxia, Qinghai, Tibet and Xinjiang, which all speeded up considerably. The picture is not quite as bright for the south-western provinces, which possibly reveals an imbalance in the "Go West" development policies that may result from its geopolitical and strategic determinants. The policy does not yet affect the main disadvantaged groups in the western region in a positive way.

Finally, there is still the problem that inequality looms large on the most disaggregate level, so even the focus on macro-regions might be misleading. Inequalities in the rich areas of China drive national inequalities, if only because they are shared by the majority of the population. Still, from the point of view of welfare theory, this simple fact implies that they deserve a lot of attention. Since the disadvantaged areas in rich provinces are the rural ones, a simple focus on dismantling discrimination against the rural economy would suffice to improve this situation.

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Tables

Tab.1 General Measure of Entropy, Chinese provinces and prefectures 1993/1998/2003

	GEM	
	provinces	prefectures
GDPPC		
1993	0,108	0,221
1998	0,121	0,240
2003	0,139	0,276
Absolute growth,1993/1998	0,013	0,019
Absolute growth,1998/2003	0,018	0,036
Relative growth,1993/1998	0,118	0,084
Relative growth,1998/2003	0,151	0,150
TPCI		
1993	0,060	0,099
1998	0,056	0,089
2003	0,073	0,112
Absolute growth,1993/1998	-0,004	-0,010
Absolute growth,1998/2003	0,018	0,022
Relative growth,1993/1998	-0,062	-0,098
Relative growth,1998/2003	0,314	0,247
RPCI		
1993	0,065	0,098
1998	0,060	0,085
2003	0,063	0,087
Absolute growth,1993/1998	-0,005	-0,013
Absolute growth,1998/2003	0,003	0,002
Relative growth,1993/1998	-0,073	-0,137
Relative growth,1998/2003	0,044	0,029
UPCI		
1993	0,030	0,043
1998	0,031	0,050
2003	0,029	0,046
Absolute growth,1993/1998	0,002	0,007
Absolute growth,1998/2003	-0,002	-0,004
Relative growth,1993/1998	0,064	0,173
Relative growth,1998/2003	-0,064	-0,082

Source: Zhongguo Tongji Nianjian (Ed.) (all) see References, own calculations.

Tab.2 Inequality in GDP per capita income (GDPPC) on different levels of aggregation, 1993

Macro	Mean	GEM	W	Province	Mean	GEM	W	Belts	Mean	GEM	W
				Beijing	8216	0.000	0.000				
A	9013	0.035	0.008	Tianjin	6058	0.000	0.000				
				Shanghai	11682	0.000	0.000				
				Jiangsu	4223	0.191	0.104				
				Zhejiang	4415	0.060	0.021				
B	4085	0.188	0.399	Fujian	3447	0.069	0.017	Coast	4070	0.199	0.552
				Shandong	3200	0.146	0.100				
				Guangdong	5220	0.324	0.171				
				Hainan	3790	0.000	0.000				
				Liaoning	4697	0.098	0.031				
C	3665	0.119	0.084	Jilin	2826	0.024	0.005				
				Heilongjiang	3096	0.138	0.039				
				Anhui	0	0.000	0.000				
D	2032	0.083	0.090	Jiangxi	1680	0.046	0.015				
				Hubei	2496	0.118	0.049	Centre	2189	0.102	0.210
				Hunan	1866	0.044	0.022				
				Hebei*	2493	0.051	0.025				
				Shanxi	2397	0.105	0.025				
				NeiMeng	2274	0.115	0.020				
E	2084	0.104	0.198	Henan	1836	0.082	0.059				
				Shaanxi	1909	0.080	0.022				
				Gansu	1549	0.264	0.049				
				Qinghai	2347	0.000	0.000				
				Ningxia	2114	0.000	0.000				
				Sichuan	1755	0.100	0.088				
F	1732	0.119	0.189	Guizhou	1179	0.124	0.033	West	1781	0.154	0.237
				Yunnan	1825	0.197	0.060				
				Guangxi*	2015	0.033	0.012				
G	2782	0.247	0.031	Tibet	2011	0.000	0.000				
				Xinjiang	2893	0.275	0.035				

Source: Zhongguo Tongji Nianjian (Ed.) (1993) see References, own calculations.

Tab.3 Change in inequality in GDP per capita income (GDPPC) on different levels of aggregation, 1993/1998

Macro	Mean	GEM	W	Province	Mean	GEM	W	Belts	Mean	GEM	W
				Beijing	0,273	0,000	0,000				
A	0,415	0,003	0,000	Tianjin	0,525	0,000	0,000				
				Shanghai	0,464	0,000	0,000				
				Jiangsu	0,520	-0,023	-0,019				
				Zhejiang	0,759	0,006	0,001				
B	0,634	0,007	-0,023	Fujian	1,043	0,032	0,007				
				Shandong	0,608	-0,003	-0,008	Coast	0,570	0,001	-0,012
				Guangdong	0,580	0,025	0,010				
				Hainan	0,074	0,000	0,000				
				Liaoning	0,291	0,065	0,017				
C	0,406	0,009	-0,003	Jilin	0,473	0,025	0,005				
				Heilongjiang	0,565	-0,026	-0,009				
				Anhui	0,000	0,000	0,000				
D	0,538	0,016	0,007	Jiangxi	0,407	0,033	0,009				
				Hubei	0,537	-0,004	-0,005				
				Hunan	0,626	0,015	0,006				
				Hebei*	0,837	-0,006	-0,004				
				Shanxi	0,339	-0,017	-0,005				
				NeiMeng	0,401	-0,028	-0,006				
E	0,523	0,011	0,005	Henan	0,534	-0,018	-0,014	Centre	0,506	-0,002	-0,009
				Shaanxi	0,318	0,034	0,007				
				Gansu	0,274	-0,019	-0,004				
				Qinghai	0,112	0,000	0,000				
				Ningxia	0,254	0,000	0,000				
				Sichuan	0,535	0,007	0,000				
F	0,459	0,022	0,017	Guizhou	0,268	-0,016	-0,004				
				Yunnan	0,510	0,074	0,018				
				Guangxi*	0,361	0,004	0,001	West	0,402	0,016	0,021
G	0,177	-0,012	-0,003	Tibet	0,101	0,000	0,000				
				Xinjiang	0,184	-0,018	-0,002				

Source: Zhongguo Tongji Nianjian (Ed.) (all) see References, own calculations.

Tab.4 Change in inequality in GDP per capita income (GDPPC) on different levels of aggregation, 1998/2003

Macro	Mean	GEM	W	Province	Mean	GEM	W	Belts	Mean	GEM	W
				Beijing	0,646	0,000	0,000				
A	0,638	-0,011	-0,003	Tianjin	0,792	0,000	0,000				
				Shanghai	0,581	0,000	0,000	Coast	0,603	0,019	-0,036
				Jiangsu	0,765	0,054	0,012				
				Zhejiang	0,747	0,003	-0,002				
B	0,613	0,005	-0,026	Fujian	0,383	-0,033	-0,010				
				Shandong	0,658	0,019	-0,002				
				Guangdong	0,477	-0,041	-0,034				
				Hainan	0,424	0,000	0,000				
				Liaoning	0,648	0,026	0,000				
C	0,797	0,078	0,035	Jilin	0,841	0,039	0,005	Centre	0,630	0,061	0,068
				Heilongjiang	0,980	0,182	0,037				
				Anhui	0,000	0,000	0,000				
D	0,478	0,022	0,008	Jiangxi	0,604	0,017	0,001				
				Hubei	0,508	0,021	0,000				
				Hunan	0,390	0,031	0,009				
				Hebei*	0,549	0,009	0,001				
				Shanxi	0,420	-0,011	-0,004				
				NeiMeng	0,878	0,048	0,005				
E	0,575	0,017	0,004	Henan	0,598	0,028	0,010				
				Shaanxi	0,532	0,005	-0,003				
				Gansu	0,545	0,013	-0,004				
				Qinghai	0,565	0,000	0,000	West	0,496	0,004	-0,032
				Ningxia	0,565	0,000	0,000				
				Sichuan	0,504	0,013	-0,003				
F	0,444	-0,001	-0,022	Guizhou	0,480	0,018	0,001				
				Yunnan	0,352	-0,076	-0,028				
				Guangxi*	0,374	0,016	0,003				
G	0,589	0,055	0,005	Tibet	0,754	0,000	0,000				
				Xinjiang	0,577	0,069	0,005				

Source: Zhongguo Tongji Nianjian (Ed.) (all) see References, own calculations.

Tab.5 Decomposition of total inequality into the contributions of inter-prefectural and rural-urban inequality, 1993/1998/2003

	Mean				Share of population	
	TPCI(m)	RPCI(mr)	UPCI(mu)	mr/mu	Rural(r)	Urban(u)
1993	1308	953	2594	2,722	0,783	0,217
1998	1927	1429	3441	2,409	0,752	0,248
2003	2795	1735	5302	3,055	0,703	0,297
Relative growth,1993/1998	0,473	0,499	0,327	-0,115	-0,040	0,145
Relative growth,1998/2003	0,450	0,215	0,541	0,269	-0,065	0,199
Absolute growth,1993/1998	619	476	847	-0,313	-0,031	0,031
Absolute growth,1998/2003	867	307	1861	0,647	-0,049	0,049

First decomposition							
	Itot	IRU		IRR		IUU	
	GEM	GEM	%of total	GEM	%of total	GEM	%of total
1993	0,186	0,100	0,538	0,077	0,414	0,009	0,049
1998	0,156	0,082	0,524	0,062	0,397	0,012	0,080
2003	0,218	0,145	0,663	0,060	0,274	0,014	0,062
Relative growth,1993/1998	-0,163	-0,185	-0,026	-0,197	-0,041	0,366	0,632
Relative growth,1998/2003	0,402	0,775	0,266	-0,030	-0,308	0,098	-0,217
Absolute growth,1993/1998	-0,030	-0,018	-0,014	-0,015	-0,017	0,003	0,031
Absolute growth,1998/2003	0,063	0,063	0,139	-0,002	-0,122	0,001	-0,017

Second decomposition					
	Itot	IRU2		IB	
	GEM	GEM	%of total	GEM	%of total
1993	0,186	0,087	0,467	0,099	0,533
1998	0,156	0,066	0,426	0,089	0,574
2003	0,218	0,107	0,489	0,112	0,511
Relative growth,1993/1998	-0,163	-0,237	-0,088	-0,098	0,077
Relative growth,1998/2003	0,402	0,611	0,149	0,247	-0,111
Absolute growth,1993/1998	-0,030	-0,021	-0,041	-0,010	0,041
Absolute growth,1998/2003	0,063	0,041	0,063	0,022	-0,063

Source: Zhongguo Tongji Nianjian (Ed.) (all) see References, own calculations.