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Globalization and Regional Income Inequality

Evidence from within China

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Abstract

China's recent accession to the WTO is expected to accelerate its integration into the world economy, which aggravates concerns over the impact of globalization on the already rising inter-region income inequality in China. This paper discusses China's globalization process and estimates an income generating function, incorporating trade and FDI variables. It then applies the newly developed Shapley value decomposition technique to quantify the contributions of globalization, along with other variables, to regional inequality. It is found that (a) globalization constitutes a positive and substantial share to regional inequality and the share rises over time; (b) capital is one of the largest and increasingly important contributor to regional inequality; (c) economic reform characterized by privatization exerts a significant impact on regional inequality; and (d) the relative contributions of education, location, urbanization and dependency ratio to regional inequality have been declining.

Keywords: globalization, inequality, decomposition, Shapley value, China

JEL classification: C31, F02, R12

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> The debate over globalization is lively, often passionate, and has sometimes been violent. — Stanley Fischer (2003: 2)

1 Introduction

How globalization affects inequality is under heated debate (Fischer 2003: 5). Stiglitz (1998) and Hurrell and Woods (2000), among others, argue that globalization leads to increases in inequality as trade increases differentials in returns to education and skills, globalization marginalizes certain groups of people or geographic regions, and opening-up lags behind development of adequate institutions and governance. This view is supported by evidence from China and other transitional economies that are experiencing significant increases in inequality after their opening up to the outside world (Mazur 2000; Birdsall 1999). In developed countries, rising inequalities are being linked to trade growth or international specialization as well (Atkinson 1999). On the contrary, Ben-David (1993) and Srinivasan and Bhagwati (1999) conclude that globalization helps to reduce inequality. This is also supported by evidence from a number of countries where inequality decreased when they opened up their economies (Wade 2001). In between these two opposing views, Sala-i-Martin (2002a, 2002b) and Lindert and Williamson (2001) find that a significant globalization-inequality relationship does not exist.

A number of factors can explain these mixed findings. First, inequality is measured differently, not only by employing alternative indices. While some consider inequality among individuals, others focus on inequality between countries. Some explore inequality of a country or few countries others discuss inequality of the globe. Second, there exist differences in the analytical techniques. Most studies use cross-country regressions. Some rely on partial correlations between inequality and globalization defined in various ways.[1] Correlation analysis cannot control for other causal variables and cross-country regressions may produce different results when different control variables or different model specifications are used. Finally, sample coverage (selection of countries and time periods) differs from study to study.

This paper contributes to the literature by examining the impact of globalization on regional income inequality in China. Focusing on China requires little justification, especially given China's importance in determining the global inequality trend. In addition, it can help alleviate the heterogeneity and data comparability problems often encountered in cross-country studies (Atkinson and Brandolini 2001; Srinivasan and Bhagwati 1999). To enhance the robustness of our empirical results, we first characterize the underlying income generating process by the flexible Box-Cox model and then quantify the globalization impact under all conventional measures of inequality. In decomposing total inequality into components associated with relevant determinants, the Shapley value framework of Shorrocks (1999) is combined with the estimated income

[1] The concept of globalization has many dimensions, ranging from interdependence of economic activities in different countries to flows of ideas across national borders. In this paper, we focus on economic globalization through exchanges of goods and services, and flows of foreign capital. Flows of labour, information, ideology, culture and living styles are not considered as relevant data are unavailable or incomplete.

generating function. The framework is based on the cooperative game theory and is being recently used by Kolenikov and Shorrocks (forthcoming), and Wan (2004).

To elaborate further, we seek to answer two questions in this paper: how globalization and regional income inequality are related in China? And how much does globalization contribute to regional inequality in China? The first question has received some attention. Kanbur and Zhang (forthcoming) obtain a positive relationship between openness (measured by effective tariff rate and the trade/GDP ratio) and interregional inequality. Xing and Zhang (forthcoming) find the same using FDI as a measure of openness. However, Wei and Wu (2003) conclude with a negative relationship between urban-rural disparity and the trade/GDP ratio. With respect to the second question, little has been published with the exception of Zhang and Zhang (2003). Zhang and Zhang (2003) estimate a labour productivity (GDP/labour ratio) function and decompose inequality (measured by the log variance) in labour productivity into a number of components, including those associated with openness. However, the log variance measure violates the crucial principle of transfers and the GDP/labour ratio does not necessarily relate to personal income in China (Lin and Liu 2003). Bourguignon and Morrisson (2002) appeal for the use of income rather than GDP data in analyzing inequality.

The remainder of this paper is organized as follows. Section 2 presents a background description of China's journey to globalization. Income generating functions are specified and estimated in Section 3, where inequality decomposition results are also discussed. Finally, policy implications are explored in Section 4.

2 China's journey to globalization and regional inequality

As an active participant of the third globalization process, China is fast integrating into the world economy at a pace as remarkable as her economic growth. After over 20 years of opening up, China has become the largest recipient of foreign direct investment (FDI) and the fifth largest trader in the world since 2002.

2.1 Growing international trade

Before 1979, international trade was under the plan of the central government, which controlled more than 90 per cent of trade by monopolizing the imports and exports of over 3000 kinds of commodities. These commodities can be classified into two categories: plan-commanded goods (both value and volume of trade are strictly controlled) and plan-guided goods (only the value of trade is controlled). In 1985, the number of goods under these categories was cut to about 100 each. By 1991, almost all exports were deregulated, with only 15 per cent controlled by specially appointed trading companies. Imports have also been deregulated. The proportion of plan-commanded imports in the total import volume was reduced from 40 per cent in 1985 to 18.5 per cent in 1991. By 1994, almost all planning on imports and exports were abolished with a few exceptions where extremely important goods were traded by specially appointed trading companies.

In pre-reform China, tariff was high and represented the only form of protection. When China initiated significant trade reforms in 1992, the rates of tariff were still high, averaged at 44.05 per cent. Since 1992, China has cut its tariff rates substantially every

year. The average tariff rate fell to 17.1 per cent in 1998 (Yin 1998: 126). On the other hand, non-tariff barriers were introduced in the early 1980s. Subsequently, an increasing number of goods were placed under licensed trading and quota. In 1992, some 25 per cent of imports and 15 per cent of exports were managed under licenses. However, the scope of license and quota management has been narrowed down since 1992. By 1997, only 384 categories of imports, a mere 5 per cent of the total, were managed under quota and licenses (Yin 1998: 129).

Both exports and imports have experienced remarkable growth. The growth trend was maintained even during the Asian financial crisis. In 1978, China ranked 32nd in the world in terms of international trade. The ranking improved to 15th in 1989, 10th in 1997 and 6th in 2001. The ratio of international trade to GDP also rose from 9.85 per cent in 1978 to as high as 42.78 per cent in 2001. In 2002, total trade exceeded US$600 billion, accounting for more than 50 per cent of China's GDP.[2] This places China as the 5th largest trader in the world. In passing, it is noted that export of manufactured goods has accounted for a larger and larger share since the mid-1980s, while the corresponding import has declined though at a slow rate. Clearly, China has been industrializing and is becoming a major exporter of manufactured goods.

Increasing foreign capital inflow

In 1979, three Special Economic Zones (SEZs) were set up in Guangdong for attracting FDI.[3] However, not until 1984 did FDI start to pour in. In the same year, twenty-four additional SEZs were opened. Since that time, more and more SEZs are developed to attract FDI and technology transfer, and to enhance exports. The second wave of FDI inflow occurred in 1992 when Deng Xiaoping made the well-known tour of South China.

For many years China was the largest recipient of FDI among developing countries, and the second largest in the world since 1993, next to the United States. In 2002, China attracted US$52.743 billion of FDI and became the number one in the world. The ratio of FDI to GDP was as high as approximately 4 per cent in 2001. Meanwhile, a large amount of foreign loans has been utilized in various areas of development.[4] Also, China has seen an impressive growth of capital outflows in recent years, owing to the rapid growth of domestic enterprises. China's investment abroad nearly tripled from US$2562.49 million in 1997 to US$6885.398 million in 2001.

2.2 Further opening up after WTO accession

Since becoming a member of the WTO, China has taken several steps to promote trade. On 1 January 2002, China cut import tariffs for more than 5000 goods. The average tariff rate was reduced to 12 per cent from a level of 15.3 per cent in 2001. The rate for manufacturing goods was reduced from 14.7 per cent to 11.3 per cent, while that for agricultural goods, except aquatic products, from 18.8 per cent to 15.8 per cent. At the same time, China abolished quota and license arrangement for grains, wool, cotton,

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2 Unless indicated otherwise, data quoted in this section are all from the National Bureau of Statistics.

3 See Table 3 in Démurger *et al.* (2002) for the timeline of policy initiatives.

4 Stock market represents another avenue for attracting foreign capital.

chemical fertilizers, and so on. In addition, China modified or abolished those laws and regulations that are inconsistent with WTO rules. New laws on anti-dumping and anti-subsidy have been implemented since 1 January 2002. Looking into the future, the average tariff rate will be cut from 12 per cent in 2002 to 9.3 per cent in 2005. Non-tariff barriers will be removed for most manufacturing goods by the end of 2004. Small- and medium-sized enterprises and foreign invested companies will be entitled to participate directly in international trade.

Around China's entry into the WTO, China issued new laws and regulations concerning service trade, covering legal service, telecommunication, financial institution, insurance, audio and video products, and tourism, etc. Laws regarding entry of foreign sales companies and joint ventures of stock exchange are being drawn up. Also, measures have been taken to ensure compliance with rules of the WTO on intellectual property, foreign investment, and information transmission.

2.3 Globalization and regional inequality

Clearly, China as a whole has gone a long way in globalization. However, there exist significant differences in the pace and extent of globalization across regions. This is particularly true when China is divided into three areas: the east, central and west. Figures 1 and 2 display the average FDI and trade/GDP ratio for each region (selected years). It is clear that east China attracts much more FDI and trade than the central and the west. And the inter-area gaps grew over time although convergences appear to have taken place, particularly within each area. Therefore, disparity in globalization is largely an inter-area issue. This finding also applies to other variables such as income, capital and degree of privatization. Therefore, it is justified to include area dummies in the income generating functions.

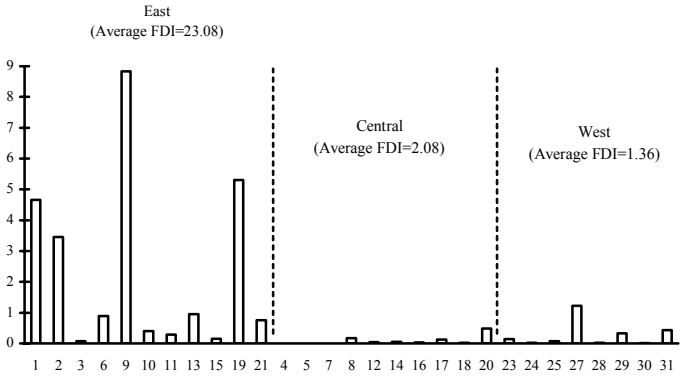
Such differences in globalization may arise through a number of mechanisms and are expected to play a significant role in raising regional inequality. First, some regions have location advantages thus can better exploit benefits of trade (close to ports, Hong Kong, Macau, Russia, and Vietnam). Second, some regions possess more family ties to overseas investors thus would attract more FDI and associated spill-over effects. Third, some regions are endowed with more or better resources (infrastructure, human capital, market potential) thus can better attract FDI and develop trade. Finally, local culture, customs and traditions differ from region to region. These differences are embedded in the leadership styles of the regional and local governments thus make regional economies more or less receptive to foreign capitals and technologies. All the above differences lead to different paces of globalization in different regions, despite the uniform national policy of opening up and the appeals of the central government for local governments to actively embrace globalization.

Needless to say, globalization comes with both benefits and costs, which are not evenly distributed among regions or individuals. Thus, it is imperative to analyze the impact of globalization on income inequality before policy measures can be designed and implemented to curb the fast rising regional income inequality in China.

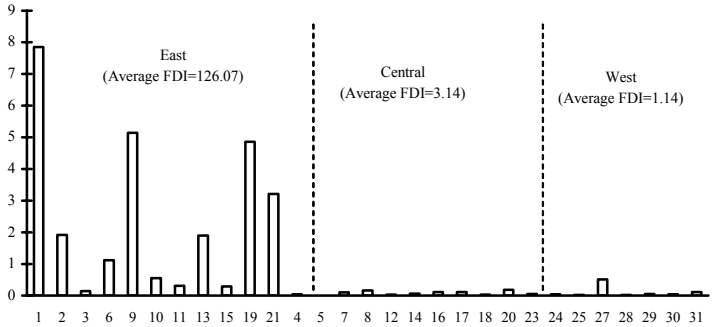
3 Accounting for China's inter-regional income disparity

To assess the relationship between inequality and globalization, the first step is to estimate an income generating function and then apply inequality operators on both

Figure 1: Ratio of regional per capita FDI to the national average



1987



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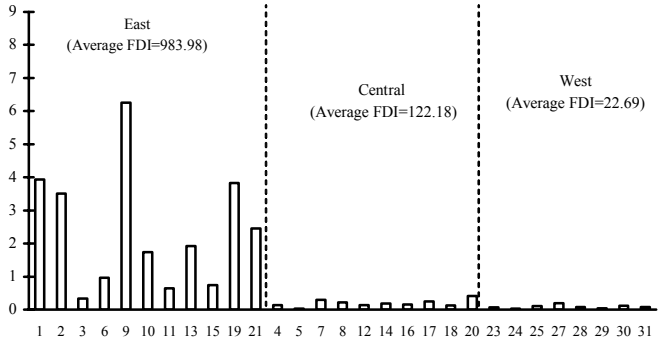
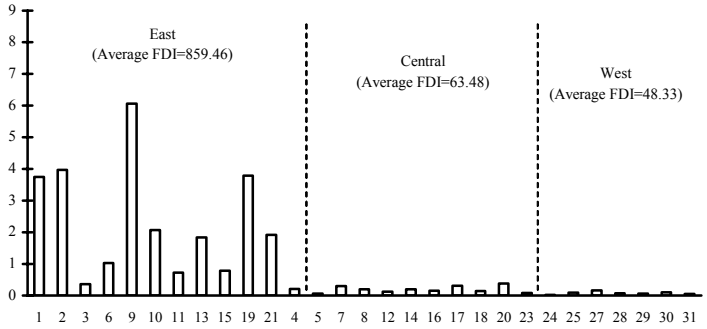


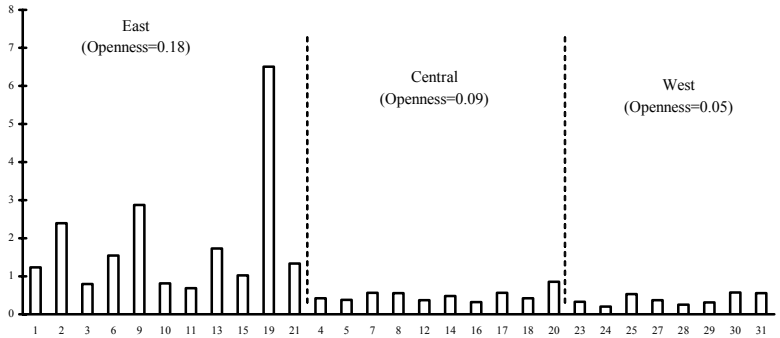
1997



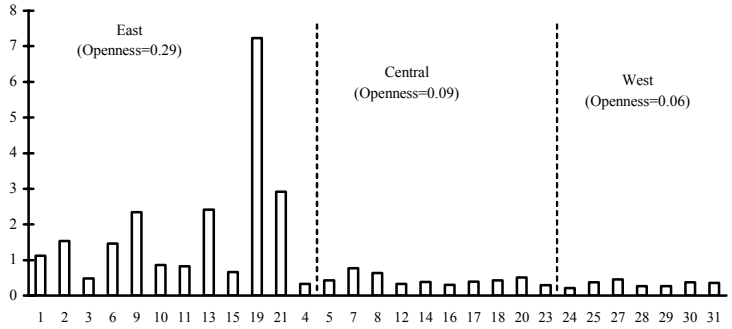
2001

Notes: Eastern: 1 = Beijing, 2 = Tianjin, 3 = Hebei, 6 = Liaoning, 9 = Shanghai, 10 = Jiangsu, 11 = Zhejiang, 13 = Fujian, 19 = Guangdong, 21 = Hainan;
Central: 4 = Shanxi, 5 = Inner Mongolia, 7 = Jilin, 8 = Heilongjiang, 12 = Anhui, 14 = Jiangxi, 15 = Shandong, 16 = Henan, 17 = Hubei, 18 = Hunan; 20 = Guangxi;
Western: 23 = Sichuan, 24 = Guizhou, 25 = Yunnan, 27 = Shaanxi, 28 = Gansu, 29 = Qinghai, 30 = Ningxia; 31 = Xinjiang.

Figure 2: Ratio of regional openness to the national average (openness = trade/GDP)



1987



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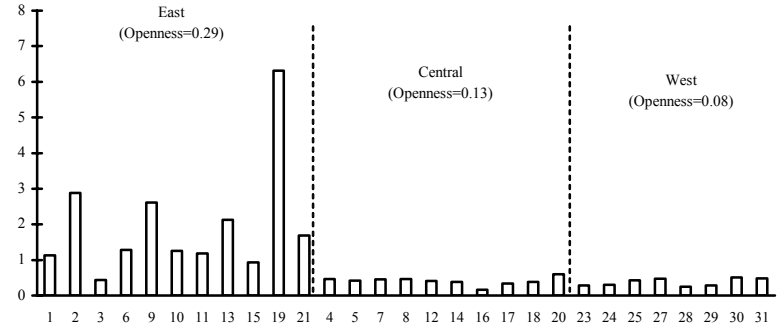

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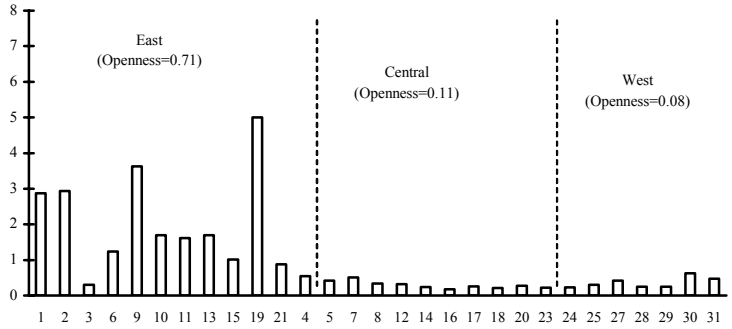

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sides of the equation (see later discussions). In specifying the function, it is necessary to control for other factors. Many argue that policy biases are important in enlarging interregional income gap, including those in investment (Yang 1994), taxation and fiscal support (Raiser 1998; Ma and Yu 2003) and deregulation (Démurger *et al.* 2002). Investment will be represented by the per capita capital variable, fiscal support by fiscal expenditure for economic development, and deregulation by privatization index defined as proportion of non-SOE employees in total labour force. On the other hand, geography is important in affecting economic development. Thus dummy variables for east, central and west China will be included to control for geography and infrastructure (Démurger 2001). Further, urbanization differs from region to region and such differences affect regional per capita income and thus inequality. This can be controlled by an urbanization index, defined as the proportion of non-agricultural population. Finally, the conventional variables of capital, labour and education must be considered. Given labour surplus in China and the linear relationship between the variables of labour and dependency ratio, we chose to include the latter. The converging trend in the dependency ratio implies a declining contribution of this variable to inequality.

The necessary regional or provincial data for 1987-2001 are compiled from *Comprehensive Statistical Data and Materials for 50 Years of New China*, as well as various issues of *China Statistics Yearbook*, both published by the National Bureau of Statistics (NBS). With Taiwan, Hong Kong and Macao excluded, there are 31 provinces or regions in China with comparable data, including four autonomous municipal cities. Chongqin – the youngest region in China – was created in 1997 and is merged with Sichuan. Tibet is not included due to lack of complete data. Therefore, a total of 29 regions will be considered in this study.

The observations on capital stock are taken from Zhang, Wu and Zhang (2004, ZWZ hereafter). ZWZ do not include inventory as capital stock while Zhang and Zhang (2003, ZZ hereafter) do although both studies use the same data estimation technique. Also, ZWZ construct the time series of capital stock as from 1952 rather than 1978 as in ZZ. Since inventory represents only potential not effective production input and biases in the estimate decrease as time interval expands between the initial year and the current year, data from ZWZ will be used in this paper. See the Appendix and ZWZ for more details.

In short, the following variables are included in the underlying income generating function: per capita income (*Y*), per capita capital input (*K*), dependency ratio as an alternative of labour (*Dep*)[5], average years of schooling (*Edu*), per capita FDI (*FDI*), trade-GDP ratio (*Trade*), reform or privatization defined as proportion of labour force working in the non-state-owned entities (*Reform*), urbanization defined as the proportion of non-agricultural population (*Urb*) that also serves as a proxy for industrialization, location dummies (*Central* and *West*),[6] and dummies for the period 1992 onwards (*D92*) and 1996 onwards (*D96*). The first is used to capture the effects of Deng Xiaoping's South-China tour and the second to capture a number of significant

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5 We tried to add per capita labour or household size, but neither of them is significant.

6 Consistent with most studies, central provinces refer to Shanxi, Guangxi, Inner Mongolia, Jilin, Heilongjiang, Anhui, Jiangxi, Henan, Hubei and Hunan, and western provinces include Sichuan, Guizhou, Yunnan, Shaanxi, Gansu, Qinghai, Ningxia, and Xinjiang.

reforms initiated in 1996, especially the labour market reform by separating redundent workers in public enterprises through reemployment centers.

To minimize misspecification errors, we adopt the combined Box-Cox and Box-Tidwell model:

$$Y^{(\lambda)} = a_0 + a_1 X_1^{(\theta)} + a_2 X_2^{(\theta)} + ... + a_K X_K^{(\theta)} + dummies + u, \qquad (1)$$

where λ and θ are transformation parameters and other notations are self-explanatory. In this specification, $Y^{(\lambda)} = \frac{Y^{\lambda} - 1}{\lambda}$ and $X_k^{(\theta)} = \frac{X_k^{\theta} - 1}{\theta}$. As λ approaches 0, the limit of $\frac{Y^{\lambda} - 1}{\lambda}$ is *Ln Y* by L'Hopital's rule. Hence, $Y^{(\lambda)} = Ln\ Y$ when $\lambda = 0$ (Judge *et al*., 1988). The same arguments apply to $X_k^{(\theta)}$. Model (1) encompasses many functional forms, including the semilog income-generating function of Fields and Yoo (2000) if $\lambda = 0$ and $\theta = 1$, and the standard linear function of Morduch and Sicular (2002) if $\lambda = \theta = 1$. In the case that $\lambda = \theta = 0$, a double-log equation, as used by Zhang and Zhang (2003) is obtained. When λ = -1 or θ = -1, the relevant variable becomes its reciprocal. Clearly, one can restrict each of the two transformation parameters to be 0, 1, -1 or unrestricted. The 4 by 4 combinations produce 16 different functional forms. Moreover, one can impose $\lambda = \theta$ although they are not restricted to a particular numerical value. Thus, at least 17 different models can be derived based on (1).

These 17 models are fitted to the Chinese data. Model selection can be easily undertaken using the conventional χ^2 test where the test statistic is twice the difference in the loglikelihood values of model (1) and its restricted versions. As reported in Table A1 of the Appendix, the test results indicate rejections of all models with two exceptions. The first case involves imposing $\lambda = 0$ while θ remaining being a free parameter. This amounts to a semilog model. The second case involves restricting $\lambda = \theta$. Statistically speaking, these two models are equivalent to (1) and either of them can be used for inequality decomposition. We choose to use the semilog model largely because it is consistent with the human capital theory where almost all empirical studies apply logarithm transformation to the dependent variable in modeling the income generating process.

Table 1 reports estimation results for the semilog model. No t-ratio is reported for the θ coefficient as it is obtained by grid search. Earlier rejection of the double-log model implies that θ is significantly different from zero. It is clear that the model fits the data quite well as indicated by the high R^2. All parameters are different from 0 at the 1 per cent or 5 per cent level of significance. Further, the signs of all parameter estimates are consistent with expectations. In particular, the coefficient estimates for the location dummies match the fact that western regions are poorer than central regions, which, in turn, are poorer than eastern regions. In terms of elasticity estimates, income growth is quite responsive to reform, education, government support, urbanization and domestic capital. The low elasticity of FDI is acceptable given its small sample mean value (517 *yuan*) relative to domestic capital (4403 *yuan*). Since per capita domestic capital is 8.5 times that of per capita FDI, the marginal impact of FDI on income is 45 per cent larger than that of domestic capital, which corroborates well with conventional wisdoms.

Table 1
Estimated income generating functions

Variable	Coefficient estimate	t-ratio	p-value	Elasticity at means	Loglikelihood value	Adj-R^2
Capital	0.034	4.615	0.000	0.105		
Dependency	-0.064	-4.296	0.000	-0.118		
Education	0.150	2.536	0.012	0.193		
Expenditure	0.054	4.976	0.000	0.110		
FDI	0.008	2.407	0.017	0.018		
Trade	0.038	4.349	0.000	0.058		
Reform	0.123	9.024	0.000	0.188	-2533.25	0.936
Urbanization	0.083	4.946	0.000	0.129		
Central	-0.072	-3.295	0.001	-0.025		
West	-0.168	-6.999	0.000	-0.046		
Year 92	0.083	4.818	0.000	0.056		
Year 96	0.170	9.524	0.000	0.068		
Constant	4.797	32.970	0.000	4.797		
θ	0.133					

To analyze inequality of income rather than inequality of logarithm of income, it is necessary to solve the estimated semilog income generating function for the income variable *Y*:

$$Y = \exp(\hat{a}_0)\cdot\exp(\hat{a}_1 X_1^{(\theta)} + \hat{a}_2 X_2^{(\theta)} + \ldots + \hat{a}_K X_K^{(\theta)})\cdot\exp(\text{dummies})\ \exp(\hat{u}) \qquad (2)$$

The term $\exp(\hat{a}_0)$ becomes a scalar in (2) and can be removed from the equation without any consequence when relative measures of inequality are used as in this paper. By the same token, year dummy terms can be removed since inequality will be measured and decomposed on a year-by-year basis.

To decompose total inequality in *Y* using (2), the first step is to identify the contribution of the residual term û. This can be achieved by adopting the before-after principle of Cancian and Reed (1998). In other words, it can be calculated as the difference between inequality of the original income *Y* and that of income given by (2) when assuming $\hat{u} = 0$. Denote this income by $\tilde{Y}$ and an inequality index by *I*, the residual contribution is simply equal to $I(\mathrm{Y}) - I(\tilde{Y})$, where:

$$\tilde{Y} = \exp(\hat{a}_0)\ \exp(\hat{a}_1 X_1^{(\theta)} + \hat{a}_2 X_2^{(\theta)} + \ldots + \hat{a}_K X_K^{(\theta)})\cdot\exp(\text{dummies}) \qquad (3)$$

Again, the year dummy terms and exp($\hat{a}_0$) can be removed from (3) without affecting the analytical results. In passing, it is noted that $\tilde{Y}$ differs from the usual predicted Y of a semilog econometric model by a factor of exp($0.5\hat{\sigma}^2$), where $\hat{\sigma}^2$ is the estimated variance of the error term (see Wan 1996).

Using the Gini index as an example measure, total income inequality and the residual contribution for China are tabulated in Table 2 (for results using other measures, see Tables A2-A6 in the Appendix). The total inequality displays a clear upward trend, increased over 24 per cent from 1987 to 2001. This increase is also evident when other inequality indices are used. The values of Gini may appear smaller than some would expect. This is because they represent the between component – inequality between regions only, excluding the within component. To calculate the latter requires data at the individual or household level.

Table 2
Total inequality and explained proportion

		Contribution by		Proportion explained*
Year	Total Gini	Independent variables	Residual	= 100× (1-|Residual|/Total)
1987	0.172	0.159	0.013	92.4
1988	0.176	0.163	0.012	93.2
1989	0.183	0.167	0.016	91.3
1990	0.174	0.173	0.001	99.4
1991	0.182	0.172	0.011	94.0
1992	0.187	0.172	0.014	92.5
1993	0.201	0.178	0.022	89.1
1994	0.206	0.187	0.019	90.8
1995	0.210	0.198	0.012	94.3
1996	0.206	0.202	0.004	98.1
1997	0.203	0.206	-0.003	98.5
1998	0.199	0.204	-0.004	98.0
1999	0.206	0.209	-0.003	98.5
2000	0.208	0.211	-0.003	98.6
2001	0.214	0.210	0.003	98.6

* Ideally, the residual should make nil contribution so that exactly 100 per cent of total inequality is explained. A negative (positive) residual contribution implies that variables not considered are (dis-)equalizing forces. In both cases, total equality is not perfectly explained by the deterministic part of the model. Thus, the ratio of the absolute value of residual contribution to the total inequality indicates the proportion of inequality not explained and 1 minus this proportion can be defined as the explained proportion.

The difference between the total inequality and the residual contribution equals the contributions of those independent variables included in the income generating function. Therefore, the residual contribution can be interpreted as that part of inequality not accounted for by the included variables. In other words, the residual contribution represents the effect on inequality of excluded variables. In an ideal situation, the residual should make nil contribution so that exactly 100 per cent of total inequality is explained. This usually requires a perfect fit of the income generating function. Generally speaking, it is a rule rather than exception that the residual contribution is non-zero. Both negative and positive residual contributions indicate lack of explanatory power of the estimated function with respect to total inequality. A positive (negative) contribution implies that the effects of excluded variables are more beneficial to the rich (poor). It is thus reasonable to use the ratio of the absolute value of the residual contribution over total inequality to indicate the proportion of inequality not explained. It follows that one minus this proportion can be defined as the explained proportion, which reflects the quality of the modeling work. When the model fits the data poorly, this proportion would be low and the corresponding research findings would be of little value as policy initiatives based on these findings would be ineffective.[7] From this perspective, our modeling exercise is quite successful as we can explain up to 99.4 per cent of total inequality (last column of Table 2). Even in the worst case of 1993, almost 90 per cent of total inequality is explained.

Attention is now turned to contributions of individual variables, which can be obtained using the Shapley value procedure of Shorrocks (1999).[8] The full decomposition results are presented in the Appendix as Tables A2-A6, with inequality measured respectively by the Gini coefficient, the generalized entropy measures (GE_0 and GE_1), the Atkinson index, and the squared coefficient of variation (CV). As expected, the decomposition results differ depending on the indicator of inequality used. This is not surprising because different indicators are associated with different social welfare functions and presume different aversions to inequality. They also place different weights to different segments of the underlying Lorenz curve. It is noted, however, that the squared CV violates the principle of transfer and the Atkinson index is ordinally equivalent to the GE measures as its entire family can be expressed as a monotonic transformation of the latter (Shorrocks and Slottje 2002). Consequently, we only use results under the Gini, the Theil Index (GE_1) and the mean logarithmic deviation (GE_0) in the following discussions.

Although pointing to a similar increasing trend in total inequality, different indicators rank variables differently (Table 3). Nevertheless, they are largely consistent in ranking the less important contributors. For example, all three indices show that dependency rate is the least important variable and they are broadly consistent in ranking FDI and education as the second and third least important factors. Further, some agreement is seen with respect to capital and urbanization as the most important factors. In the early years, consistent ranking is evident for reform and trade, even government support. In

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[7] It can be shown that when $R^2 = 1$ or 0, the explained proportion is 1 or 0. When CV^2 is used as the measure of inequality, the explained proportion is always identical to the R^2.

[8] For this purpose, a Java programme is developed by the World Institute for Development Economics Research of the United Nations University (UNU-WIDER). This programme allows decomposition of inequality of a dependent variable into components associated with any number of independent variables and under any functional form.

later years, differences in the ranking emerge regarding contributions of important variables such as location and government fiscal support for economic development.

Table 3
Rank of relative contribution by alternative inequality measures

Year	K	Dep	Edu	Gov	FDI	Trade	Reform	Urb	Location
1987	3	9	7,7,6	4	8	5	6,6,7	1	2
1988	3	9	7,7,6	4	8	5	6,6,7	2,1,1	1,2,2
1989	3,3,2	9	7,7,6	4	8	5	6,6,7	2,1,1	1,2,3
1990	3,3,2	9	7,7,6	5,5,4	8	4,4,5	6,6,7	2,1,1	1,2,3
1991	3,3,2	9	7	5,5,4	8	4,4,5	6	2,1,1	1,2,3
1992	3,1,1	9	7,8,8	5,4,4	8,7,7	4,5,5	6	2,3,2	1,2,3
1993	2,1,1	9	7	6,4,4	8	5	4,6,6	3,3,2	1,2,3
1994	2,1,1	9	8	5,4,4	7	6,6,5	4,5,6	3	1,2,2
1995	1	9	8	4,3,2	7	6	3,5,5	5,4,4	2,2,3
1996	1	9	8	4,3,2	7	6	3,5,5	5,4,4	2,2,3
1997	1	9	8	3,2,2	7	6	4,4,5	5,5,4	2,3,3
1998	1	9	8	3,2,2	7	6,5,5	4,6,6	5,4,4	2,3,3
1999	1	9	8	5,2,2	7	4,3,3	3,5,5	6	2,4,4
2000	1	9	8	4,2,2	7	5,3,3	2,4,4	6	3,5,5
2001	1	9	8	5,3,2	7	4,2,3	3,4,4	6	2,5,5

Note: One number indicates consistent ranking. Three numbers indicate ranks by Gini, GE_0 and GE_1, respectively.

Faced with the inconsistency, one either chooses a particular measure or takes the average across different indicators (only applicable to the relative contributions) and proceeds to interpretation and discussions. Table 4 presents relative contributions associated with each causing variable, averaged across the three measures. The contributions are calculated using the total explained portion as the denominator thus they sum to 100 per cent. The right panel of Table 4 contains ranking of variables based on the average contributions. Not surprisingly, the least important variable is still the dependency rate. This is attributable to the converging trend in this variable, partly driven by the nation-wide policy of birth control. The result also reflects the fact of surplus labour in China, thus differences in dependency rate across regions is of little significance in income generation. It must be noted that this is only true at the highly aggregate level. Labour input and dependency rate are still important at the household level in terms of income generation.

It is clear that physical capital has always been important. Its importance increased over time and it now constitutes almost 20 per cent of total inequality, making it the largest

contributor. On the other hand, urbanization was the number one factor but its role quickly declined. It ranked the first in the 1980s, dropped to the third or fourth position and finally settled at the sixth position. This reflects well the converging trend in urbanization across China. Despite so, urbanization still contributes almost 12 per cent to total inequality. Sharing a similar trend with urbanization, location has become much less important with its ranking dropped from the second (even first in 1992) to third and finally fifth. The declining contribution does not necessarily mean narrowing gaps in factors associated with location (natural resources, weather, proximity to markets and ports). It means that other factors become more unequally distributed across China. Meanwhile, advances in transport and communication technologies are bound to help moderate the effects of location on growth.

It is clear that FDI ranks the second or third least important determinant of regional inequality in China till the early 1990s. However, it has gained importance in recent years. Trade also gained importance over time although its individual influence has been moderate. If one combines trade and FDI as an overall indicator of globalization, the contribution is quite substantial, particularly in the later years. The combined contribution was around 17 per cent earlier but now over 22 per cent, surpassing the capital variable. It is important to note that this finding is robust to inequality measures. Therefore, globalization does deserve serious consideration owing to its large and increasing effects on regional inequality, which has implications for poverty and poverty reduction in China. The increasing contribution of globalization is a result of increased trade and FDI inflow.

Over time, a number of factors gained prominence. Reform or privatization was in sixth position but moved up to third position, highlighting the unequal pace in privatizing state-owned entities and the importance of privatization on income growth. It is interesting to observe that government support for economic development is diverging. The positive contribution implies less (more) developed areas provide less (more) support. The diverging trend may have to do with the taxation reform initiated in 1994 which significantly enhances the budgeting and spending power of local governments thus allows rich regions to collect more taxes and fees to finance economic activities. This finding is in line with Wan, Huang and Wang (forthcoming) and Raiser (1998) that government transfer is inequality-increasing.

The small and stable contribution of education is likely due to the many years of public provision of basic education in China, particularly in the urban areas. A surprising result is that the contribution of education only ranks the second or third from the last, a finding not inconsistent with ZZ. However, the impacts of reform and urbanization on inequality are expected to decline in the long run because slow reformers or late comers are bound to catch up. After all, these two variables have a maximum value of 100. The role of location will diminish as technology development in transportation and communications are helping to downplay the importance of physical isolation or distance. This diminishing role is reinforced by the historical campaign of western development characterized with huge amounts of infrastructure investment in the location-disadvantageous regions. As known, the effects of infrastructural investment on development are typically lagged.

Table 4
Averaged relative contribution

	Relative contribution (%)										Rank								
Year	K	Dep	Edu	Gov	FDI	Trade	Reform	Urb	Location	Globali-zation	K	Dep	Edu	Gov	FDI	Trade	Reform	Urb	Location
1987	14.62	4.38	6.88	14.12	4.75	11.67	8.22	18.58	16.78	16.42	3	9	7	4	8	5	6	1	2
1988	15.23	4.15	6.76	13.75	5.40	12.14	7.83	17.95	16.79	17.54	3	9	7	4	8	5	6	1	2
1989	15.75	3.70	6.66	13.27	5.81	12.36	8.09	17.60	16.76	18.17	3	9	7	5	8	4	6	1	2
1990	15.96	3.48	7.66	12.54	5.91	12.58	8.41	16.97	16.48	18.49	3	9	7	5	8	4	6	1	2
1991	16.35	3.40	6.48	12.44	6.32	12.53	8.82	16.86	16.80	18.85	3	9	7	5	8	4	6	1	2
1992	16.77	3.60	6.45	12.01	6.58	12.03	9.30	16.36	16.90	18.61	2	9	8	5	7	4	6	3	1
1993	16.80	3.58	7.04	11.71	6.49	11.67	10.72	15.61	16.38	18.17	1	9	7	4	8	5	6	3	2
1994	16.88	3.75	5.81	13.32	6.81	11.47	11.88	14.19	15.90	18.28	1	9	8	4	7	6	5	3	2
1995	17.40	3.47	5.86	14.38	6.85	10.90	12.71	13.39	15.05	17.76	1	9	8	3	7	6	5	4	2
1996	17.93	3.24	5.47	14.50	6.83	11.26	12.82	13.01	14.93	18.10	1	9	8	3	7	6	5	4	2
1997	18.05	2.97	5.32	15.21	6.94	11.59	12.77	12.45	14.69	18.54	1	9	8	2	7	6	4	5	3
1998	18.74	2.73	5.24	15.41	7.21	11.80	11.47	12.56	14.84	19.00	1	9	8	2	7	5	6	4	3
1999	18.82	0.54	5.23	14.62	7.08	13.98	13.38	12.19	14.17	21.06	1	9	8	2	7	4	5	6	3
2000	18.60	0.05	4.49	15.13	7.02	14.41	14.51	11.70	14.09	21.43	1	9	8	2	7	4	3	6	5
2001	19.11	0.52	4.81	14.07	7.14	14.52	14.26	11.58	13.99	21.66	1	9	8	4	7	2	3	6	5

It is worth noting that a declining relative contribution does not necessarily mean a decreasing absolute contribution. A careful examination of Tables A2-A6 reveals that apart from the dependency rate and urbanization, all other variables contribute more and more to total inequality. Dependency rate is the only variable with declining contribution in both relative and absolute terms. Urbanization more or less maintained its absolute contribution but displayed a declining relative contribution because of the increasing trend in the total inequality.

It is tempting to discuss our findings in relation to ZZ. However, this is not appropriate for a number of reasons. First, we focus on income inequality while ZZ on partial labour productivity. Second, ZZ employ a double log model which is rejected in this paper. Third, ZZ relies on the logarithmic variance as the only measure of inequality. Our results are robust to inequality measures and based on a flexible modeling strategy. An indication of inadequacy of ZZ lies in that domestic capital is more productive than FDI, which is difficult to accept.

4 Concluding remarks

This paper provides an accounting for China's regional income inequality, with a special emphasis on the impact of globalization. Using a carefully constructed panel data set, a Box-Cox modeling strategy is adopted to minimize specification errors. A semilog income generating function is selected from among many alternative models. The empirical model is estimated quite successfully and the decomposition results are reasonable. It is found that (a) globalization constitutes a positive and substantial share to regional inequality and the share rises over time; (b) capital is one of the largest and increasingly important contributor to regional inequality; (c) economic reform characterized by privatization exerts a significant impact on regional inequality; and (d) the relative contributions of education, location, urbanization and dependency ratio to regional inequality have been declining.

The policy implications are quite straightforward. Further globalization will lead to higher regional inequality in China unless concerted efforts are devoted to promote trade in and FDI flows to the west and central China. Policy biases which prompted trade and FDI but gradually phasing out in coastal China should be implemented in other parts. Market size and market potential place the poor regions in a disadvantageous position in attracting FDI but a converging trend in FDI and trade is encouraging. More important is the domestic capital; equalization of which will cut regional inequality by 20 per cent. This calls for development of capital market in China, especially in poor rural areas. To narrow down the gap in capital possession, it is necessary though difficult to break the vicious circle existing in capital formation. Again, policy concessions for investment in the poor regions are needed in terms of taxation and bank lending. In particular, continued financial reforms are useful in eliminating discrimination in lending for SOEs and non-farming activities. Finally, there is a case for dramatic turns in the fiscal policy which so far had favoured the developed regions. An equalization in fiscal support would cause an almost 15 per cent drop in regional inequality and a reverse in fiscal support would lead to a much larger impact. In all, these three variables contribute over half of the total regional inequality.

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Data Appendix

(1) The data during 1987-1998, if not otherwise indicated, are all from *Comprehensive Statistical Data and Materials for 50 Years of New China* (Beijing: China Statistical Publishing House, 1999). The data during 1999-2001, unless otherwise indicated, are from *China Statistical Yearbook, 2000, 2001 and 2002* (Beijing: China Statistical Publishing House, 1999, 2001 and 2002).

(2) *Income*: The provincial income is the urban-rural average per capita income weighted by non-agricultural and agricultural population. The data of urban and rural per capita income has been deflated by urban and rural CPIs in various provinces in various years. In the three largest provincial-level cities, urban and rural CPIs are the same.

(3) *Capital*: Per capita capital is computed from the provincial capital stock estimation in 1952 price by perpetual stock method in Zhang *et al*. (2004). The paper provides capital data during 1952-2000, and the authors helped extend it to 2001. Compared with the capital data used in ZZ, the data we use excludes inventory and gets a lower estimation of capital stock. Further more, the data we use starts from 1952, and with a long time series, the effects of errors in estimation in early years have been minimized. To get a capital stock in 1952, Zhang *et al.* (2004) used a widely used method to estimate the capital stock in the beginning year. The formula is:

$$K_0 = \frac{I_0}{\delta + r}$$

where K_0 is the capital stock in the starting year, I_0 the investment in the same year, δ the depreciation rate, and r the average growth rate of real investment before the starting year. This method is used in Hall and Jones (1999), Young (2000) and also ZZ. Zhang *et al.* (2004) has used a similar denominator in the formula in Young (2000) to estimate the capital stock in 1952. Please refer to Zhang *et al.* (2004) for more details of the estimation.

(4) *Dependency*: Dependency ratio is computed as:

$$Dependency = \frac{total\ \ population - employment}{employment} \times 100\%$$

(5) *Education* (*edu*): *China Population Yearbooks* have reports of the population structure by education since 1987. Unfortunately, data were not published in 1989, 1991 and 1992. Data in 1987 and 1988 did not report illiteracy numbers. And data in 1994 did not include population below 15-year old, thus not comparable with data in other years. In this study, we use the available data to predict the missing values in above-mentioned years via an equation with regional fixed effects and time trend controlled for. The estimation method is GLS for panel data with heteroskedasticity among panels. The dependent variables are taken log in case of any negative predicted value. So the equation is written as:

$$\ln(edu) = f(\cdot) + \mu$$

where $\ln(edu)$ is the logarithm of the per capita years of schooling, $f(\cdot)$ the linear combination of the regional dummies and time trend, μ the error term. The value of R^2 of the equation for per capita years of schooling is 0.966. According to the equation, and denote the predicted value by ^, we have:

$$\hat{edu} = \exp[\ln(\hat{edu})]$$

where $\ln(\hat{edu})$ denotes the predicted values of $\ln(edu)$ from the estimation for the missing years.

(6) *FDI*: *FDI* is defined as per capita FDI. The data of FDI in Sichuan during 1987–1989 are from *China Statistical Yearbook* of corresponding years. The data of FDI in Qinghai in 1988 and 2000 are the average of the neighbouring two years. The data of FDI has been transformed into RMB using the medium exchange rate in corresponding years that are from *China Statistical Yearbook* of corresponding years.

(7) *Trade*: *Trade* is computed as the trade/GDP ratio. The data of international trade has been transformed into RMB before divided by GDP.

(8) *Reform*: *Reform* is computed as the proportion of workers and staff in non-state-owned units.

(9) *Urbanization*: Urbanization is defined as the proportion of non-agricultural population in the total. Except for Hebei, Heilongjiang and Gansu, data of agricultural and non-agricultural population during 1999-2001 are from provincial statistical yearbooks. Population data of Hebei, Heilongjiang and Gansu in 2000 are from *China Statistical Yearbook, 2001*, the data in 1999 are the average of the neighbouring two years, and the data in 2001 are forecast based on the data in 2000 and the growth rate during 1999-2000.

Table A1
Results of χ^2 Test with H_0: Model 1 = Each of Models 2-17

Model	Restriction		Loglikelihood		Test
	λ	θ	value	χ^2-value	result*
1	unrestricted	unrestricted	-2531.95		
2	1	1	-2597.99	132.12	Reject H_0
3	0	1	-2549.76	35.66	Reject H_0
4	-1	1	-2626.95	190.04	Reject H_0
5	unrestricted	1	-2548.57	33.28	Reject H_0
6	1	0	-2736.63	409.4	Reject H_0
7	0	0	-2538.46	13.06	Reject H_0
8	-1	0	-2639.75	215.64	Reject H_0
9	unrestricted	0	-2538.01	12.16	Reject H_0
10	1	-1	-2881.68	699.5	Reject H_0
11	0	-1	-2623.76	183.66	Reject H_0
12	-1	-1	-2616.76	169.66	Reject H_0
13	unrestricted	-1	-2585.45	107.04	Reject H_0
14	1	unrestricted	-2590.63	117.4	Reject H_0
15	0	unrestricted	-2533.25	2.64	**Accept H_0**
16	-1	unrestricted	-2626.9	189.94	Reject H_0
17	$\lambda = \theta$		-2532.74	1.62	**Accept H_0**

Note: *level of significance = 1 per cent.

Table A2
Inequality decomposition results, Gini index

	Relative contribution (%)									Absolute contribution								
Year	K	Dep	Edu	Gov	FDI	Trade	Reform	Urb	Location	K	Dep	Edu	Gov	FDI	Trade	Reform	Urb	Location
1987	13.49	3.85	6.56	13.35	4.45	11.66	11.03	17.92	17.69	0.021	0.006	0.010	0.021	0.007	0.019	0.018	0.029	0.028
1988	14.16	3.73	6.47	13.06	5.08	12.11	10.38	17.36	17.63	0.023	0.006	0.011	0.021	0.008	0.020	0.017	0.028	0.029
1989	14.67	3.34	6.38	12.59	5.49	12.42	10.43	17.05	17.62	0.024	0.006	0.011	0.021	0.009	0.021	0.017	0.028	0.029
1990	14.92	3.16	7.40	11.97	5.60	12.70	10.45	16.46	17.34	0.026	0.005	0.013	0.021	0.010	0.022	0.018	0.028	0.030
1991	15.39	3.10	6.24	11.91	6.04	12.67	10.64	16.40	17.61	0.026	0.005	0.011	0.020	0.010	0.022	0.018	0.028	0.030
1992	15.90	3.29	6.25	11.44	6.32	12.19	10.91	15.97	17.74	0.027	0.006	0.011	0.020	0.011	0.021	0.019	0.027	0.031
1993	16.04	3.23	6.96	11.29	6.30	11.81	11.87	15.26	17.23	0.029	0.006	0.012	0.020	0.011	0.021	0.021	0.027	0.031
1994	16.19	3.37	5.74	12.57	6.66	11.51	13.07	13.92	16.98	0.030	0.006	0.011	0.024	0.012	0.022	0.024	0.026	0.032
1995	16.72	3.05	5.80	13.51	6.75	10.96	13.85	13.12	16.23	0.033	0.006	0.011	0.027	0.013	0.022	0.027	0.026	0.032
1996	17.18	2.93	5.39	13.59	6.71	11.33	13.98	12.75	16.13	0.035	0.006	0.011	0.027	0.014	0.023	0.028	0.026	0.033
1997	17.30	2.69	5.32	14.20	6.81	11.66	13.94	12.20	15.88	0.036	0.006	0.011	0.029	0.014	0.024	0.029	0.025	0.033
1998	17.95	2.55	5.26	14.43	7.07	11.89	12.54	12.28	16.04	0.037	0.005	0.011	0.029	0.014	0.024	0.026	0.025	0.033
1999	18.08	0.81	5.10	13.72	6.94	13.77	14.28	11.92	15.38	0.038	0.002	0.011	0.029	0.015	0.029	0.030	0.025	0.032
2000	17.82	0.49	4.38	14.37	6.85	14.17	15.27	11.44	15.20	0.038	0.001	0.009	0.030	0.014	0.030	0.032	0.024	0.032
2001	18.37	0.90	4.77	13.32	6.98	14.34	14.77	11.44	15.12	0.039	0.002	0.010	0.028	0.015	0.030	0.031	0.024	0.032

Table A3
Inequality decomposition results, GE index (a = 0)

	Relative contribution (%)									Absolute cContribution								
Year	K	Dep	Edu	Gov	FDI	Trade	Reform	Urb	Location	K	Dep	Edu	Gov	FDI	Trade	Reform	Urb	Location
1987	14.94	4.38	7.05	14.27	4.80	11.73	7.35	18.82	16.65	0.006	0.002	0.003	0.006	0.002	0.005	0.003	0.008	0.007
1988	15.53	4.14	6.91	13.85	5.47	12.20	7.06	18.15	16.69	0.007	0.002	0.003	0.006	0.002	0.005	0.003	0.008	0.007
1989	16.06	3.67	6.79	13.36	5.88	12.40	7.39	17.79	16.66	0.007	0.002	0.003	0.006	0.003	0.005	0.003	0.008	0.007
1990	16.24	3.42	7.79	12.60	6.01	12.62	7.82	17.12	16.37	0.008	0.002	0.004	0.006	0.003	0.006	0.004	0.008	0.008
1991	16.59	3.35	6.58	12.50	6.41	12.57	8.31	16.98	16.70	0.008	0.002	0.003	0.006	0.003	0.006	0.004	0.008	0.008
1992	16.99	3.55	6.53	12.09	6.66	12.07	8.86	16.46	16.79	0.008	0.002	0.003	0.006	0.003	0.006	0.004	0.008	0.008
1993	16.99	3.51	7.10	11.73	6.56	11.71	10.42	15.68	16.29	0.009	0.002	0.004	0.006	0.003	0.006	0.005	0.008	0.008
1994	17.06	3.71	5.85	13.45	6.87	11.52	11.60	14.21	15.73	0.010	0.002	0.003	0.008	0.004	0.006	0.006	0.008	0.009
1995	17.58	3.43	5.88	14.56	6.90	10.94	12.45	13.41	14.85	0.011	0.002	0.004	0.009	0.004	0.007	0.008	0.008	0.009
1996	18.13	3.17	5.49	14.69	6.90	11.30	12.56	13.01	14.75	0.012	0.002	0.004	0.009	0.004	0.007	0.008	0.008	0.010
1997	18.24	2.90	5.32	15.42	7.02	11.63	12.50	12.44	14.52	0.012	0.002	0.004	0.010	0.005	0.008	0.008	0.008	0.010
1998	18.94	2.62	5.27	15.61	7.29	11.83	11.19	12.57	14.68	0.012	0.002	0.003	0.010	0.005	0.008	0.007	0.008	0.010
1999	19.04	0.33	5.26	14.80	7.16	14.11	13.15	12.20	13.96	0.013	0.000	0.004	0.010	0.005	0.010	0.009	0.008	0.010
2000	18.81	-0.24	4.52	15.27	7.11	14.57	14.32	11.71	13.94	0.013	0.000	0.003	0.011	0.005	0.010	0.010	0.008	0.010
2001	19.34	0.25	4.84	14.17	7.24	14.65	14.16	11.55	13.80	0.014	0.000	0.003	0.010	0.005	0.010	0.010	0.008	0.010

Table A4
Inequality decomposition results, GE index (a = 1)

	Relative contribution (%)									Absolute contribution								
Year	K	Dep	Edu	Gov	FDI	Trade	Reform	Urb	Location	K	Dep	Edu	Gov	FDI	Trade	Reform	Urb	Location
1987	15.42	4.91	7.04	14.74	4.99	11.62	6.28	19.01	16.00	0.007	0.002	0.003	0.007	0.002	0.005	0.003	0.008	0.007
1988	16.01	4.57	6.90	14.33	5.64	12.11	6.05	18.34	16.06	0.007	0.002	0.003	0.007	0.003	0.006	0.003	0.008	0.007
1989	16.52	4.10	6.80	13.85	6.05	12.26	6.45	17.96	16.01	0.008	0.002	0.003	0.007	0.003	0.006	0.003	0.009	0.008
1990	16.73	3.87	7.78	13.06	6.13	12.42	6.95	17.33	15.73	0.008	0.002	0.004	0.007	0.003	0.006	0.004	0.009	0.008
1991	17.06	3.76	6.62	12.91	6.52	12.34	7.51	17.19	16.09	0.008	0.002	0.003	0.006	0.003	0.006	0.004	0.009	0.008
1992	17.42	3.96	6.56	12.51	6.75	11.84	8.13	16.66	16.17	0.009	0.002	0.003	0.006	0.003	0.006	0.004	0.008	0.008
1993	17.36	4.00	7.05	12.10	6.62	11.50	9.86	15.88	15.62	0.009	0.002	0.004	0.007	0.004	0.006	0.005	0.009	0.008
1994	17.39	4.16	5.85	13.93	6.90	11.38	10.97	14.44	14.98	0.010	0.003	0.004	0.008	0.004	0.007	0.007	0.009	0.009
1995	17.89	3.92	5.89	15.06	6.91	10.81	11.82	13.64	14.06	0.012	0.003	0.004	0.010	0.005	0.007	0.008	0.009	0.010
1996	18.47	3.61	5.54	15.22	6.89	11.16	11.92	13.26	13.92	0.013	0.003	0.004	0.011	0.005	0.008	0.008	0.009	0.010
1997	18.61	3.32	5.31	16.01	7.00	11.49	11.87	12.71	13.67	0.014	0.002	0.004	0.012	0.005	0.008	0.009	0.009	0.010
1998	19.33	3.02	5.20	16.20	7.26	11.67	10.68	12.84	13.80	0.014	0.002	0.004	0.012	0.005	0.008	0.008	0.009	0.010
1999	19.35	0.48	5.33	15.34	7.13	14.06	12.71	12.45	13.16	0.015	0.000	0.004	0.012	0.005	0.011	0.010	0.009	0.010
2000	19.16	-0.09	4.56	15.74	7.09	14.50	13.95	11.95	13.14	0.015	0.000	0.004	0.012	0.005	0.011	0.011	0.009	0.010
2001	19.63	0.41	4.83	14.71	7.21	14.56	13.85	11.74	13.05	0.015	0.000	0.004	0.011	0.006	0.011	0.011	0.009	0.010

Table A5
Inequality decomposition results, Atkinson index (e = 0)

	Relative contribution (%)									Absolute contribution								
Year	K	Dep	Edu	Gov	FDI	Trade	Reform	Urb	Location	K	Dep	Edu	Gov	FDI	Trade	Reform	Urb	Location
1987	14.93	4.38	7.04	14.27	4.79	11.73	7.37	18.83	16.66	0.006	0.002	0.003	0.006	0.002	0.005	0.003	0.008	0.007
1988	15.53	4.13	6.89	13.84	5.46	12.20	7.08	18.16	16.70	0.007	0.002	0.003	0.006	0.002	0.005	0.003	0.008	0.007
1989	16.06	3.66	6.78	13.36	5.87	12.39	7.41	17.79	16.67	0.007	0.002	0.003	0.006	0.003	0.005	0.003	0.008	0.007
1990	16.24	3.42	7.78	12.60	5.99	12.62	7.84	17.13	16.39	0.007	0.002	0.004	0.006	0.003	0.006	0.004	0.008	0.008
1991	16.60	3.34	6.57	12.50	6.40	12.57	8.32	16.99	16.71	0.008	0.002	0.003	0.006	0.003	0.006	0.004	0.008	0.008
1992	17.00	3.54	6.51	12.08	6.65	12.06	8.87	16.46	16.81	0.008	0.002	0.003	0.006	0.003	0.006	0.004	0.008	0.008
1993	17.01	3.51	7.09	11.72	6.54	11.71	10.43	15.69	16.31	0.008	0.002	0.003	0.006	0.003	0.006	0.005	0.008	0.008
1994	17.08	3.70	5.84	13.45	6.85	11.51	11.62	14.21	15.74	0.009	0.002	0.003	0.007	0.004	0.006	0.006	0.008	0.009
1995	17.60	3.42	5.86	14.56	6.88	10.93	12.46	13.41	14.86	0.011	0.002	0.004	0.009	0.004	0.007	0.008	0.008	0.009
1996	18.16	3.16	5.47	14.69	6.89	11.29	12.58	13.01	14.76	0.011	0.002	0.003	0.009	0.004	0.007	0.008	0.008	0.009
1997	18.27	2.89	5.31	15.43	7.01	11.62	12.51	12.44	14.53	0.012	0.002	0.003	0.010	0.005	0.008	0.008	0.008	0.009
1998	18.96	2.62	5.25	15.62	7.27	11.82	11.20	12.56	14.70	0.012	0.002	0.003	0.010	0.005	0.008	0.007	0.008	0.009
1999	19.07	0.34	5.24	14.79	7.14	14.11	13.16	12.19	13.97	0.013	0.000	0.004	0.010	0.005	0.009	0.009	0.008	0.009
2000	18.83	-0.23	4.50	15.27	7.09	14.56	14.33	11.70	13.95	0.013	0.000	0.003	0.010	0.005	0.010	0.010	0.008	0.009
2001	19.37	0.25	4.82	14.17	7.22	14.65	14.17	11.54	13.81	0.013	0.000	0.003	0.010	0.005	0.010	0.010	0.008	0.009

Table A6
Inequality decomposition results, CV

Relative contribution (%)										Absolute contribution								
Year	K	Dep	Edu	Gov	FDI	Trade	Reform	Urb	Location	K	Dep	Edu	Gov	FDI	Trade	Reform	Urb	Location
1987	15.90	5.47	7.06	15.20	5.18	11.52	5.12	19.19	15.36	0.016	0.005	0.007	0.015	0.005	0.011	0.005	0.019	0.015
1988	16.49	5.02	6.94	14.83	5.82	12.02	4.93	18.53	15.42	0.017	0.005	0.007	0.015	0.006	0.012	0.005	0.019	0.016
1989	16.99	4.55	6.85	14.35	6.23	12.11	5.41	18.15	15.36	0.018	0.005	0.007	0.015	0.007	0.013	0.006	0.019	0.016
1990	17.22	4.33	7.81	13.54	6.28	12.19	6.00	17.55	15.08	0.019	0.005	0.009	0.015	0.007	0.014	0.007	0.020	0.017
1991	17.54	4.19	6.70	13.33	6.63	12.08	6.63	17.42	15.47	0.019	0.005	0.007	0.015	0.007	0.013	0.007	0.019	0.017
1992	17.85	4.38	6.63	12.95	6.85	11.59	7.31	16.89	15.54	0.020	0.005	0.007	0.014	0.008	0.013	0.008	0.019	0.017
1993	17.73	4.52	7.06	12.49	6.69	11.26	9.23	16.10	14.91	0.021	0.005	0.008	0.015	0.008	0.014	0.011	0.019	0.018
1994	17.70	4.65	5.89	14.44	6.94	11.21	10.26	14.71	14.19	0.024	0.006	0.008	0.020	0.009	0.015	0.014	0.020	0.019
1995	18.18	4.43	5.95	15.57	6.92	10.65	11.12	13.92	13.25	0.028	0.007	0.009	0.024	0.011	0.016	0.017	0.021	0.020
1996	18.78	4.10	5.65	15.78	6.89	10.99	11.20	13.56	13.05	0.030	0.007	0.009	0.025	0.011	0.018	0.018	0.022	0.021
1997	18.95	3.79	5.34	16.63	7.00	11.29	11.18	13.04	12.78	0.032	0.006	0.009	0.028	0.012	0.019	0.019	0.022	0.022
1998	19.67	3.46	5.18	16.81	7.24	11.46	10.13	13.17	12.88	0.032	0.006	0.009	0.028	0.012	0.019	0.017	0.022	0.021
1999	19.65	0.60	5.46	15.91	7.12	13.94	12.18	12.78	12.36	0.035	0.001	0.010	0.028	0.013	0.024	0.021	0.022	0.022
2000	19.48	0.04	4.66	16.25	7.09	14.38	13.48	12.29	12.33	0.035	0.000	0.008	0.029	0.013	0.026	0.024	0.022	0.022
2001	19.90	0.54	4.88	15.28	7.21	14.42	13.45	12.04	12.28	0.035	0.001	0.009	0.027	0.013	0.025	0.024	0.021	0.022