Income Inequality and Progressive Income Taxation in China and India, 1986–2015[†]

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This paper evaluates income tax reforms in China and India. The combination of fast income growth and under-indexed tax schedule in China implies the fraction of the Chinese population subject to income tax has increased from less than 0.1 percent in 1986 to about 20 percent in 2008, while it has stagnated around 2–3 percent in India. Chinese income tax revenues, as a share of GDP, increased from less than 0.1 percent in 1986 to about 1.5 percent in 2005 and 2.5 percent in 2008, while the constant adaptation of exemption levels and income brackets in India have caused them to stagnate around 0.5 percent of GDP. (JEL D31, H24, 015, 023, P23, P35)

Current debates about policy reform in least developed countries (LDCs) often focus on improving the delivery of social services, the design of market-friendly economic institutions, the effectiveness of poverty-reduction programs, or the role of trade and market liberalization. Perhaps surprisingly, they rarely deal explicitly with tax reform and the need to develop modern income tax systems in those countries.[1] This is unfortunate for at least three reasons. First, poor countries often rely excessively on highly distortionary tax instruments such as taxes on trade or indirect taxes on specific consumption goods. Next, income taxation can help to increase the tax revenues needed to finance public goods. In countries such as China and India, tax revenues are currently around 10–15 percent of GDP, far below any country in the West that has been able to develop a proper education, health, and infrastructure system. Finally, many LDCs have witnessed a sharp rise in income inequality during the recent period. Progressive taxation is one of the least distortionary policy tools available that controls the rise in inequality by redistributing the gains from growth.

In this paper, we choose to focus on the case of progressive income taxation in China and India. Although a progressive individual income tax system has been in place in China since 1980, it has received very little attention, probably because the fraction of the population with income above the exemption threshold was negligible until the 1990s (less than 1 percent). Using annual tabulations from urban household

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http://www.aeaweb.org/articles.php?doi=10.1257/app.1.2.53.
[1] See, e.g., the list of topics covered in World Development Reports over the past few years.

income surveys collected by China's National Statistical Bureau (NSB), for the period 1986–2003, we compute series on levels and shares of top incomes in China over this period, as well as series on theoretical numbers of taxpayers and total income tax receipts (based on actual tax law), which we compare to actual receipts.[2] We also make projections about the evolution of the number of taxpayers and total receipts for the 2004–2015 period, assuming constant trends for both income levels and income tax schedules.

We were also able to compare our findings for China with similar series for India. The Indian tax administration has been compiling detailed tabulations of income tax returns every year since the creation of a progressive income tax in India (1922). Indian tax return tabulations were recently exploited by Abhijit V. Banerjee and Piketty (2004, 2005) to study the long-run evolution of top income shares in India, and we use and update their results as a comparison point for our Chinese series.

Our main result is simple but powerful. The combination of fast income growth and under-indexed tax schedule in China implies that Chinese income tax revenues grow very fast as a fraction of gross domestic product (GDP), while the constant adaptation of exemption levels and income brackets in India prevents the income tax from playing such a powerful role. According to our estimates, the fraction of the population in China subject to the income tax has increased from less than 0.1 percent in 1986 to about 20 percent in 2008, while it has stagnated at around 2–3 percent in India. Income tax revenues in China have boomed, from less than 0.1 percent of GDP in 1986 to over 1.5 percent in 2005, and 2.5 percent in 2008, while in India, they have stagnated at around 0.5 percent of GDP. Our projections indicate that Chinese income tax revenues could well exceed 5 percent of GDP by 2015.

The rest of the paper is organized as follows. Section I describes the NSB data used in this paper. In Section II, we present our findings for the evolution of the income tax in China and India. Section III offers concluding remarks.

I. Data and Methodology

The Chinese data used in this paper comes from the urban household income surveys collected by China's NSB. These surveys are designed to be representative of urban China. Between 13,000 and 17,000 households were surveyed each year until 2002. The sample rose to 45,000–50,000 households in 2002 and 2003. The individual level data from these surveys are not available for all years, and we asked the NSB to provide us with annual tabulations (for the period of 1986–2003) based on the micro-files. We asked for two series of tabulations: household tabulations and individual tabulations. Household tabulations report the number of households for which total household income falls into that bracket, their average total income

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[2] A number of economists have used NSB household surveys and have documented the rise in income inequality that took place in China during the 1990s (see e.g. Shaohua Chen and Yan Wang 2001, and Martin Ravallion and Chen 2001). However, these works generally focus on poverty. They generally do not deal specifically with the top of the distribution and (most importantly) do not look at the issue of progressive income taxation. Chen and Wang (2001) show that income dispersion has increased at the top of the distribution (which is fully consistent with our findings) but do not mention the issue of income taxation. For more details on the NSB tabulations used in this study (these tabulations were designed explicitly to focus on top income brackets and to facilitate tax simulations) see Section II.

and household size, as well as their average income broken down by income sources (wage, business, capital, and transfer income) for a large number of income brackets (and, in particular, a large number of top income brackets). Individual tabulations report the number of individuals whose individual income falls into that bracket, their average age, years of education, income and household size, as well as their average income broken down by income sources for a large number of income brackets. In practice, some forms of income cannot be properly attributed to a specific individual within the household (this is particularly true for transfer income and capital income). Hence, the total income aggregates reported in household tabulations are larger than in individual tabulations, and various adjustments are necessary when one uses the latter. The important advantage of individual tabulations, however, is that China's income tax applies to individual income (rather than household income).

We used standard Pareto interpolation techniques to approximate the form of the Chinese household and individual distribution of income, and we then used these structural parameters to compute top fractiles' incomes and to make income tax simulations. The Chinese data appears to be very well approximated by a Pareto distribution (for any given year, Pareto coefficients are extremely stable within the top decile), although there is some presumption that top incomes are underestimated in the survey data. For each year of the 1986–2003 period, we computed income thresholds and average incomes for fractiles P0–90, P90–95, P95–99, P99–99.5, P99.5–99.9, and P99.9–100. Projections for the 2004–2015 period were made by assuming nominal income trends by fractile, similar to those observed during the 1996–2003 period.

We did not attempt to use similar tabulations from rural household surveys. According to the 2000 China Population Census, over 97 percent of households in rural areas are agricultural households and are exempt from income tax. Average rural income in 2001 was more than three times smaller than average urban income. So given that our focus is on top incomes and progressive income taxation, the exclusion of rural households should not be too problematic. In fact, our simulated income tax revenues (based solely on urban household surveys) appear to be reasonably close to actual income tax revenues in levels and trends.[3]

All of the Indian data are borrowed from Banerjee and Piketty (2004, 2005), who used Indian income tax return tabulations published in "All-India Income Tax Statistics" brochures (available annually since 1922) to estimate top income levels and national accounts to compute the average income denominator. Top-income share estimates based on income tax returns are likely to be higher than estimates based on survey data (as the latter generally underestimates top incomes), but there is no obvious reason why the trends should not be comparable. The Banerjee-Piketty series provides annual income thresholds and average incomes for all fractiles up until 2001. Projections for the 2002–2015 period were made by assuming nominal income trends by fractile, similar to those observed during the 1996–2001 period.

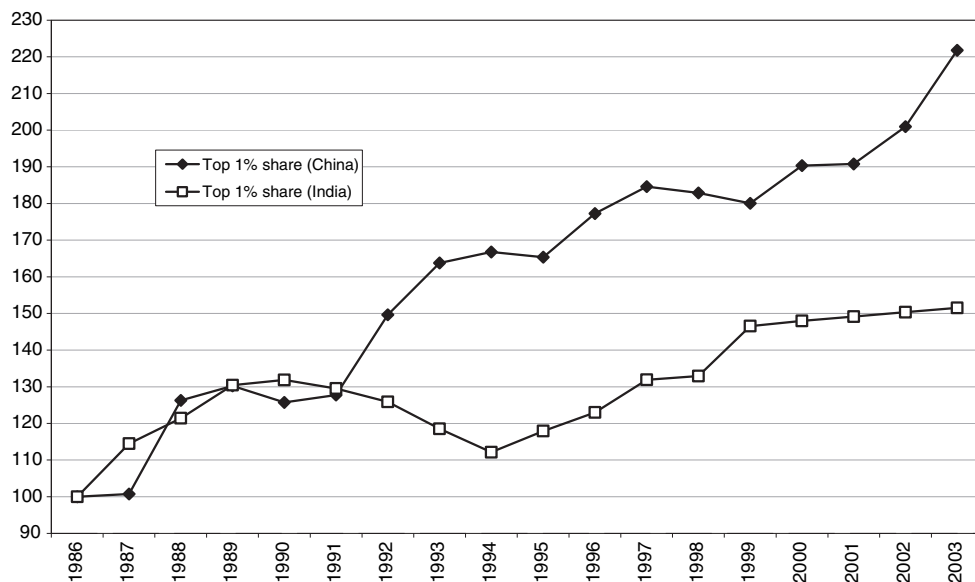[3] See the Appendix on actual versus theoretical tax revenues.

FIGURE 1. THE TOP 1 PERCENT INCOME SHARE IN CHINA AND INDIA, 1986–2003 (1986 = 100)

Source: China: authors' computations using household survey tabulations (Web Data Appendix Table A5, column 4, individual distribution); India: authors' computations using income tax returns data (see Banerjee and Piketty 2004, table A3, column 1).

II. Results

Real per capita GDP increased by almost 200 percent in China between 1986 and 2003 (6.4 percent per year), and by slightly less than 80 percent in India (3.3 percent per year).[4] As we move up in the income hierarchy, the growth trend gets even bigger. Figure 1 shows that, according to our estimates, the top 1 percent income share increased by more than 120 percent in China between 1986 and 2003, and by approximately 50 percent in India.

In the prereform era, all Chinese workers worked for the state and paid an implicit tax from their wages. Expansion of the private sector by the market reforms decreased the government's ability to tax directly. Following other countries, China developed an individual income taxation system, which officially began in 1980. In order to avoid negative public opinion, the deductible amount was set so high that virtually no one had to pay income taxes in 1980. China's income tax law has changed very little since its creation. Nominal income brackets and graduated marginal rates (from 5 percent to 45 percent), applied to both wage and nonwage income, have remained largely unchanged since 1980.[5] The only major change is that the nominal exemption threshold for wage earners (there exists no exemption for nonwage income) was

[4] According to the best available purchasing power parity (PPP) conversion factors, real per capita GDP was virtually identical in China and India in 1986 (less than 20 percent larger in China), and was twice as large in China as in India by 2003. See Web Data Appendix Table A0 in the Web Appendix, available at http://www.aeaweb.org/articles.php?doi=10.1257/app.1.2.53.

[5] For detailed data on Chinese income tax schedules, see Web Data Appendix Table 1.
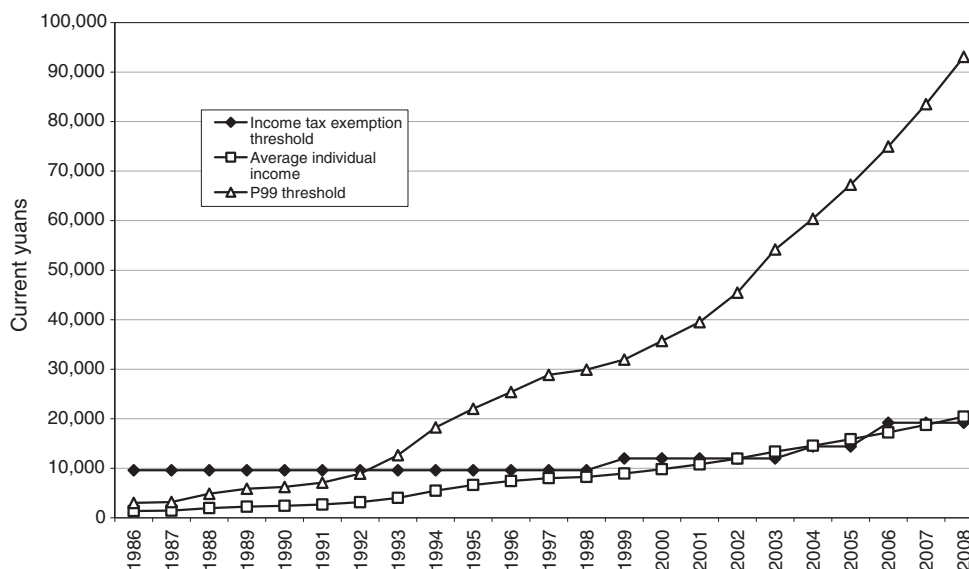
FIGURE 2. INCOME TAX EXEMPTION THRESHOLD, AVERAGE INCOME AND P99 INCOME THRESHOLD IN CHINA, 1986–2008

Source: Exemption threshold: Chinese tax law (Web Data Appendix Table 1); average income and P99 threshold: authors' computations using household survey tabulations (Web Data Appendix Table A1, column 10, and Table A4, column 15).

raised from 9,600 yuans per year in fiscal years 1980–1998 to 12,000 yuans in fiscal years 1999–2003, 14,400 yuans in fiscal years 2004–2005, and 19,200 yuans since fiscal year 2006. This is substantially less than nominal income growth. In 1986, the exemption threshold was about 7 times larger than average individual income (1,400 yuans) and more than 3 times larger than the P99 threshold of the distribution (3,000 yuans). By 2008, the exemption threshold passed below average income (20,400 yuans) and was 4.5 times smaller than the P99 threshold (93,100 yuans). See Figure 2.

In contrast to the Chinese income tax, the Indian income tax is a much older institution, since it was created in 1922 by the British. Moreover, it has always been an integrated system treating all income sources equally. Indian progressive tax schedules apply to total individual income irrespective of where the income comes from. Most importantly, the tax schedule has been changed almost constantly in India during the 1986–2008 period, with a general decline in tax rates and a continuous increase in the exemption threshold and income brackets.[6] In effect, the rise in the exemption threshold (from Rs 15,000 in 1986 to Rs 150,000 in 2008) has been almost as large as the rise in nominal income growth (from Rs 4,400 to Rs 56,300 for average income and from Rs 14,400 to Rs 192,400 for the P99 threshold). See Figure 3.

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[6] For detailed data on Indian income tax schedules, see Web Data Appendix Table 2.
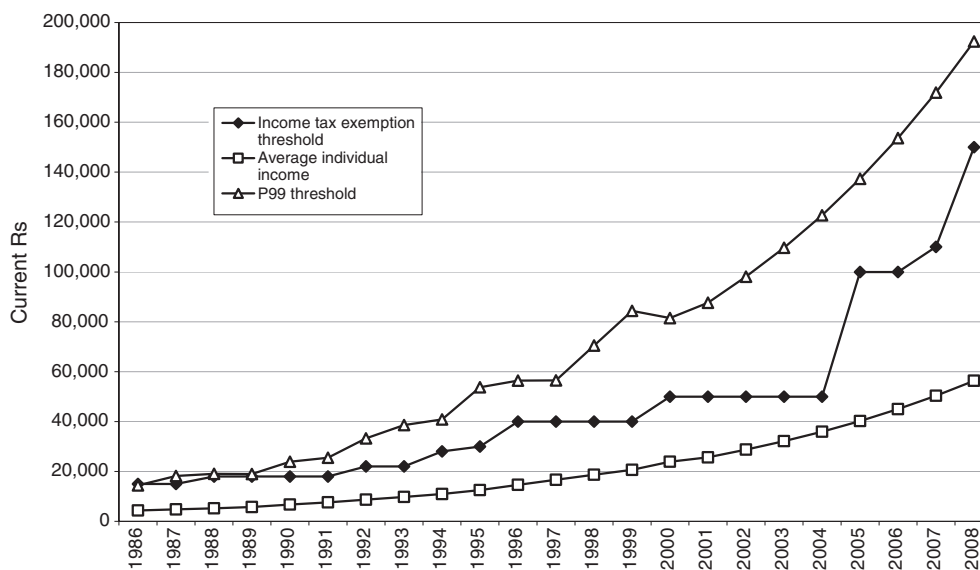
Figure 3. Income Tax Exemption Threshold, Average Income and P99 Income Threshold in India, 1986–2008

Source: Exemption threshold: Indian tax law (Web Data Appendix Table 2); average income and P99 threshold: authors' computations using income tax returns (see Banerjee and Piketty 2004, table A0, column 7 and table A1, column 9).

   The simple but powerful implication of these sharply differing evolutions is that the fraction of the population subject to the income tax has increased enormously in China (from less than 0.1 percent of the population in 1986 to about 15 percent–20 percent by 2003–2008), while it has risen modestly in India (less than 3 percent of the population was subject to the income tax in 2008, versus less than 1 percent in 1986). See Figure 4. The income tax has become a mass tax in China, while it has remained an elite tax in India (see Figure 4). Moreover, effective tax rates paid by the population subject to tax have risen considerably in China, due to the fact that income brackets have remained the same, in nominal terms, since 1980.[7] As a consequence of these two effects, income tax revenues have boomed in China (from less than 0.1 percent of GDP until the early 1990s to over 1.5 percent by 2005 and 2.5 percent by 2008), while they have stagnated around 0.5 percent of GDP in India (see Figure 5).

   We have also made projections for the 2008–2015 period assuming constant trends in income tax law parameters. In India, if the exemption level and income brackets keep being increased at the same pace as in the past decade, then both the proportion of population subject to tax and tax revenues will continue stagnating (around 2–3 percent of population and 0.5 percent of GDP, respectively). For the case of China, we have assumed that the nominal exemption level will be increased during

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   [7] Detailed results on effective tax rates by income fractiles are provided in the Web Data Appendix.
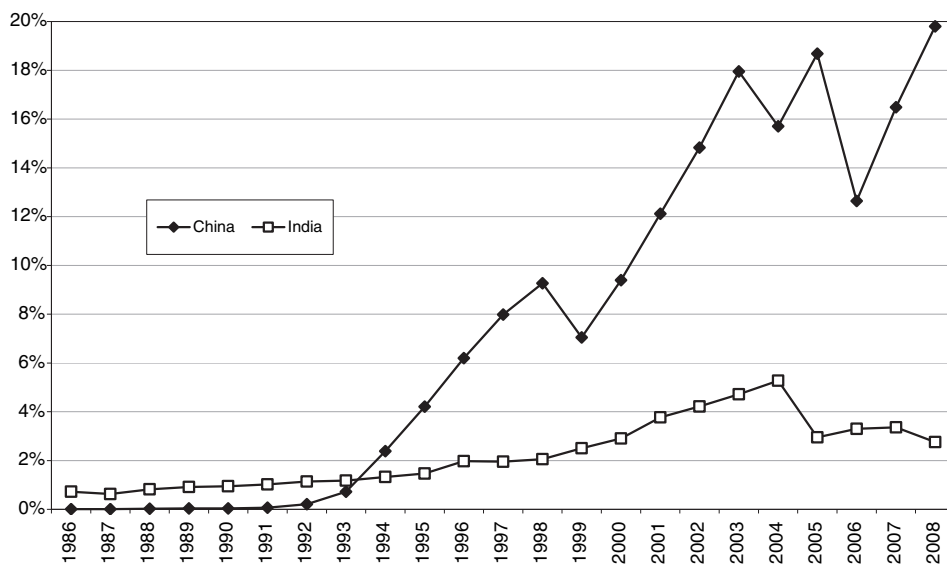
FIGURE 4. THE FRACTION OF POPULATION SUBJECT TO THE INCOME TAX IN CHINA AND INDIA, 1986–2008

Source: China: authors' computations using household survey tabulations (Web Data Appendix Table A7, column 16); India: authors' computations using tax return data (see Banerjee and Piketty 2004, table A0, column 4).
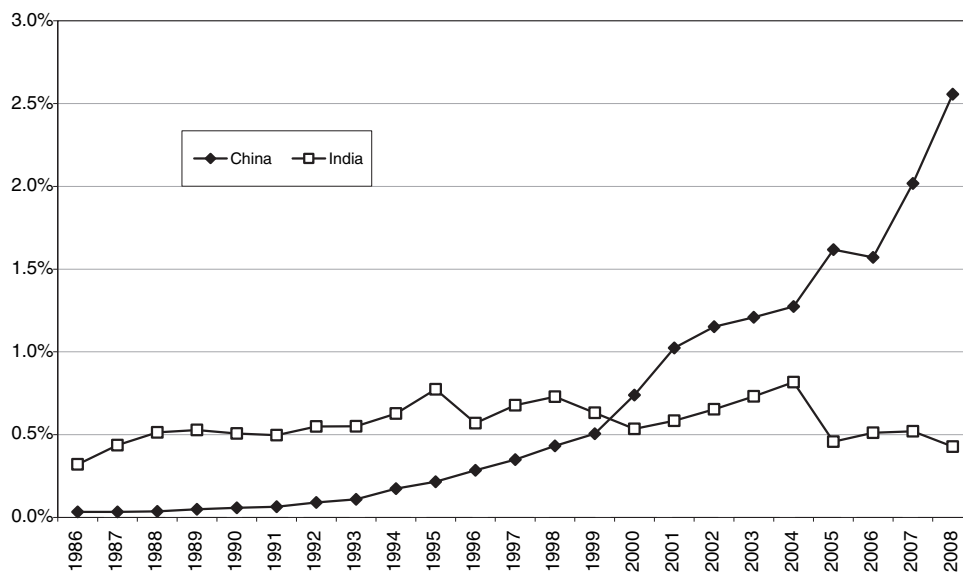

FIGURE 5. INCOME TAX REVENUES AS A FRACTION OF GDP IN CHINA AND INDIA, 1986–2008

Source: China: authors' computations using tax receipt data and household survey tabulations (Web Data Appendix Table A7, column 15); India: authors' computations using income tax return data (Banerjee and Piketty 2004, table A0).
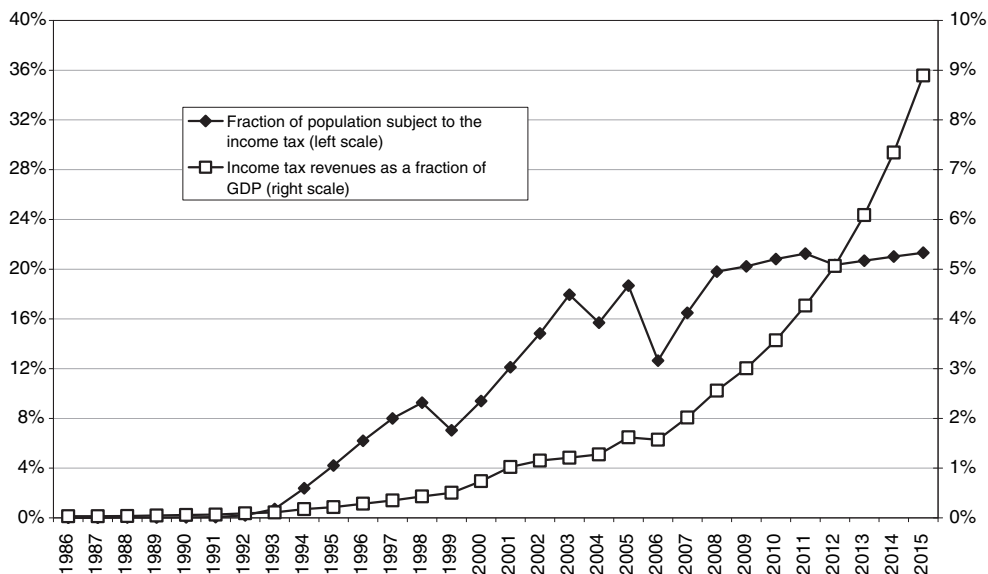
FIGURE 6. PROJECTED FRACTION OF POPULATION SUBJECT TO THE INCOME TAX AND PROJECTED INCOME TAX
REVENUES IN CHINA, 1986–2015

Source: Authors' computations using urban household survey tabulations (Web Data Appendix Table A7, columns 15 and 16).

the 2008–2015 period at the same average annual rate as that observed during the 2003–2008 period, but that income brackets would remain fixed in nominal terms (as they did in the past). The consequences for tax revenues would be spectacular. The proportion of the population subject to tax would stabilize around 20 percent (roughly 30–35 percent of urban wage earners), but income tax revenue would exceed 5 percent of Chinese GDP before 2015 (see Figure 6). In case the exemption threshold was to remain fixed in nominal terms during the 2008–2015 period, then by 2015 the portion of the population subject to tax would reach 50 percent (roughly 75 percent of urban wage earners), and income tax revenue would exceed 10 percent of Chinese GDP.[8]

III. Conclusion

If our projections appear to be correct, then China will have gone through its fiscal revolution. Moving from an elite income tax raising less than 1 percent of GDP to a mass income tax raising around 4–5 percent of GDP is exactly the kind of fiscal modernization process followed by Western countries during the 1914–1950 period (when their income levels were similar to the current Chinese level).[9] Although Indian income tax revenues might increase during the coming years, the prospects for India do not look as good because of lower income growth and higher exemption

[8] See Web Data Appendix Table A6.
[9] See Web Data Appendix Table 4.

and bracket indexation. One reason why India faces more difficulties than China in making its income tax a mass tax might be that the proportion of formal wage earners in the labor force is ridiculously low.

There is much that policy makers and economists can do to improve the functions and implications of progressive income taxation in countries like China and India. Given that income taxation is about to become something big, it is urgent to put income tax reform at the top of the policy agenda. For instance, China's authoritarian government will probably not be able to under index its exemption threshold forever, and the preferential tax treatment of wage earners will need to be addressed at some point. Conversely, the Indian democracy still needs to find its way towards fiscal modernization, which requires convincing the electorate that a mass income tax is a useful policy tool. These are important democratic challenges for the economic development of China and India.

Appendix: Actual versus Theoretical Tax Revenues

This section discusses Chinese tax collection, computes theoretical tax revenues, and compares them to actual tax revenues. The main motivation for doing this comes from the widespread presumption that official Chinese income tax law is not being applied rigorously by tax authorities. In particular, many observers seem to believe that tax authorities make deals with large firms and autonomous regions or cities whereby the latter offer a lump-sum payment to tax authorities and their employees, and residents are not subject to the official income tax schedule. Although at this stage detailed tabulations of income tax returns by income brackets or tax liability in China do not seem to exist (such tabulations exist in most countries with an income tax system), we were able to use aggregate 1996–2003 income tax receipts series (broken down by wage, business, and capital income for 2000–2003) published in China Tax Yearbooks and compare them with our theoretical series. Our findings show some evidence that even though the law is not fully applied, actual receipts and theoretical receipts are reasonably close.

The comparison between actual tax revenues and theoretical tax revenues is summarized in Figure A1. The theoretical tax revenues were computed by applying the relevant tax schedules to the individual distributions of wage, business, and capital income estimated from urban household income survey tabulations.

The first conclusion is that actual income tax revenues are reasonably in line with theoretical tax revenues (as a first-order approximation), thereby suggesting that income tax collection in China is somewhat less chaotic and arbitrary than what many observers tend to assume. If we look at receipts by income source for 2003, we find theoretical receipts on capital income were equal to 40 percent of actual receipts (this reflects the fact that capital income is underreported in surveys), and that the corresponding figure was over 120 percent for business income and wage income.[10] The latter figure could be interpreted as indicating that business income and wage income have an excellent reporting rate in household surveys, and that the tax law is

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[10] For detailed simulation results by income source, see Web Data Appendix Table 3.
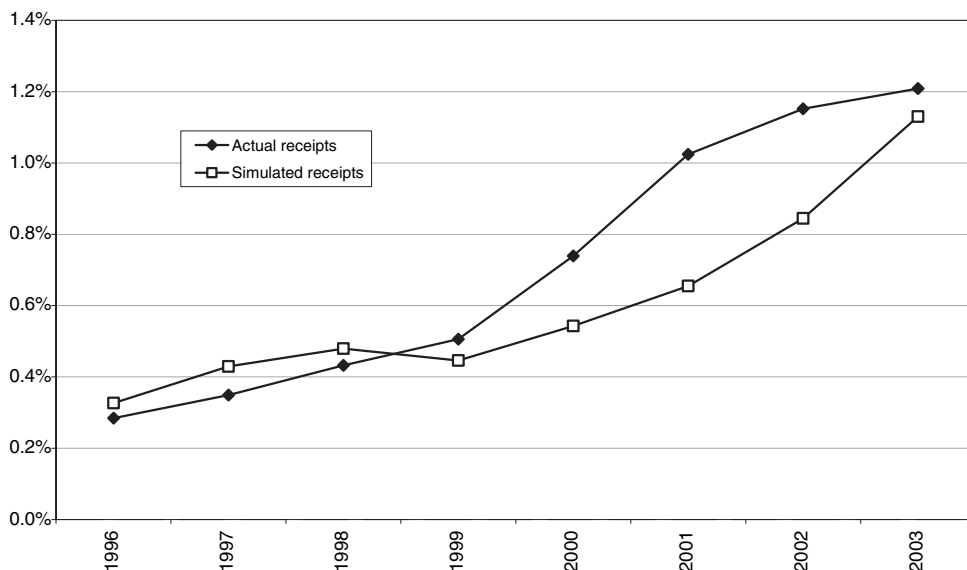
FIGURE A1. SIMULATED VERSUS ACTUAL INCOME TAX REVENUES AS A FRACTION OF GDP IN CHINA, 1996–2003

Source: Actual tax receipts from China Tax Yearbook. Simulated tax receipts were computed by applying income tax schedules to household survey income data (Web Data Appendix Table 3).

reasonably well applied. Almost all business income earners and wage earners who are supposed to pay the income tax pay it and are charged the right rate.

However, there are good reasons to believe that top business incomes and top wages are underreported in NSB household surveys, in which case the fact that theoretical receipts (based upon underreported top business incomes and wages) and actual receipts coincide merely reflects the fact that the collection rate is (possibly much) less than 100 percent. If we adjust top survey wages and business incomes so as to obtain reasonable Pareto coefficients for the distribution, we find that theoretical receipts for wage and business income are equal to 170–180 percent of actual receipts, i.e., the tax collection rate for wage and business income is less than 60 percent. Although the problem is probably less severe than many observers tend to assume, these illustrative (and highly uncertain) computations suggest that there is a tax collection problem in China.

It is also interesting to note that actual receipts have increased at a significantly higher rate than theoretical receipts during the 1996–2001 period. One interpretation could be that tax collection has improved. Another interpretation is that household surveys underestimate not only the levels of top incomes, but also the upward trend in top income shares. In order to get a sense of the likely magnitude of this effect, we computed by how much the upward trend in top income shares needs to be scaled up in order to ensure that the trend in theoretical receipts matches the trend in actual receipts. We find that in 2001, the top 1 percent share should be scaled up by about 35 percent relative to the top 1 percent share in 1996, which is substantial.

In any case, the fact that actual and simulated aggregate tax revenues are reasonably close over the 1996–2003 period makes us feel relatively confident about our projections for the 1986–2015 period.[11]

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[11] Our projected tax revenues series were adjusted so as to match 2003 actual revenues. Note that we did not take into account possible future improvements in tax collection.

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