FOREIGN DIRECT INVESTMENT AND THE URBAN-RURAL INEQUALITY IN CHINA

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Abstract

One key liberalization measure that China implemented during economic reform was its preferential treatment of foreign direct investment, which made the country one of the top recipients of FDI in the world. Many inside and outside China have argued, however, that FDI enlarged the country's income inequality and that the preferential FDI regime needs to be rejected or revised. This paper questions such conclusions based on national-level research of FDI's impact on income inequality, as the research suffers from multiple endogeneity problems due to confounding factors at the national level. Instead, we use the best available subnational datasets in China and develop a two-stage, instrumental variable (IV) model to test the impact of FDI on inequality. The findings are robust and demonstrate that across the period 1987 to 2008 FDI had a negative impact on China's income inequality. We conclude by pondering on policy lessons for China and other developing countries in the world.

Keywords: Asia, China, FDI, Inequality, instrumental variables, globalization

Deng Xiaoping quotes: (1) Poverty is not socialism. To be rich is glorious.
(2) If reform leads to income polarity [liangji fenhua], reform has failed. (*gaige shi zhongguo fazhan shengchanli de biyou zilu*, 1985, p.139)

1. INTRODUCTION

The two quotes by Deng Xiaoping, the leader of reform-era China (1979-1997), present a paradox for policymakers in the developing world: how can decisionmakers promote economic growth while creating equitable societies? China's economic reform and open door policy [gaige kaifang], launched by Deng Xiaoping, has been remarkably successful and produced the world's fastest growth rates for decades. Yet income inequality in the country has also worsened to an unprecedented level as China is presently among the world's most unequal societies. Of China's chief reform policies was its preferential treatment of foreign direct investment, which made the country one of the top recipients of FDI in the world. Meanwhile, in all kinds of income inequalities, the urban-rural divide has grown most rapidly and is politically the most unstable in China. The possible connection between FDI inflows and the urban-rural household income gap has made China's preferential policies toward FDI untenable.

In 2003, MIT business professor Yasheng Huang published *Selling China* as a strong critique against FDI. This was followed by another book in 2008—*Capitalism with Chinese Characteristics.* Huang argued that FDI disadvantaged domestic private companies and thwarted the latter's growth. He believes that local entrepreneurs are better at equitable growth in the country than foreign investors who repatriate profits outside the host economy. In Huang (2008), he directly linked FDI inflows with household income and suggested that the increase in

household disposable income was less evident in FDI-abundant Jiangsu province than in Zhejiang, a province with far less FDI.

In summary, Huang's books conclude that China's enthusiastic pursuit of FDI was misplaced and that FDI has exacerbated income inequalities in the country. Other Chinese scholars have taken issues with FDI since the 1990s. Hu Angang, for example, published an influential policy piece in 1995, "How can Special Economic Zones Continue to be Special?" His criticism of FDI rallied the advocacy for a stronger central government that reigns in pro-FDI policies at the local level. In 1998, Hu painted grim pictures of the widening urban-rural divide and argued that urban-rural inequality plants the roots for major social upheaval in China. The concerns with urban-rural inequality and criticism of FDI began to influence China's economic policies in the recent decade. Starting in 2003, the central government clearly showed more emphasis on improving rural household income and tried (with partial success) to reign in local governments' preferential policies toward FDI.

The debate surrounding China's FDI and inequality is an integral part of the larger debate on globalization and its impact on inequality in the world. Empirical evidence in this body of literature is divided between positive and negative associations of FDI and inequalities. Additionally, various scholars have used China's experience with FDI to support their policy positions regarding globalization. Indeed, as the world's largest nation and one of the top recipients of FDI, findings on its FDI's impact on distribution has strong relevance for the global understanding of the relationship. Thus far, most observations of China's FDI and its impact on inequality are problematic, however, as numerous confounding factors at the national and subnational levels are unaccounted in the simple association between FDI and inequality.

The chief goal of this paper is to provide a more precise estimation of FDI's impact on inequalities in China so as to offer better policy lessons regarding the future of FDI liberalization in China and in the world. In contrast to analyses at the national level, we compile a cross-time, subnational panel data to test the relationship between FDI and inequality. Subnational models help to control for the political and policy environment in the nation. Further, we use two-stage, instrumental variable (IV) estimation to control for subnational factors that likely generate endogeneity problems at this level of analysis. Our findings reveal that FDI has significantly reduced the inequality between the two most unequal groups in China: the urban and rural households.

2. INTELLECTUAL BACKGROUND: GLOBALIZATION AND INEQUALITY

Globalization has been a fact of life, but how has it influenced inequality in the world? The literature and empirical evidence are deeply divided. The well-cited Stolper and Samuelson model (1941) suggests that globalization of trade raises the income of workers in developing countries, because globalization benefits abundant factors of production versus scarce factors. Developing countries typically have abundant labor and scarce capital. With higher levels of globalization, labor in developing countries are expected to gain more than owners of capital, thereby contributing to a more equitable income distribution in the country. There is some preliminary support for such liberal accounts. More open economies are more prosperous, and economies that liberalize more have experienced faster rates of growth (Gowan 1999, Panagarya 2007). Powerful agencies, such as the World Bank, the IMF and the WTO, the US and UK Treasuries, and opinion-shaping media such as *The Financial Times* and *The Economist* have championed such pro-globalization views and influenced policymaking in the developing world (Wade 2002, 568).

However, many more opinions and studies have questioned the liberal arguments for globalization, and contend that the rich and powerful countries and classes have little interest in greater equity. As Jay Mazur, US union leader, maintained in 2000, "globalization has greatly increased inequality between and within nations."[1] Peter Evans' 1979 publication, *Dependent Development*, observed that MNCs formed collusive partnerships with the state and large companies. He also noted that this tri-party systematically disadvantages both labor and the national economy. In this scenario, globalization increases inequality between haves and have-nots. Dani Rodrik (1997) theorizes that as globalization increases the elasticity of demand for labor (with capital being mobile), the bargaining power of workers facing foreign investment is reduced. FDI is thus likely to increase income inequality in the host society.

In 2002 and 2004, Robert Wade's sequel articles in the journal *World Development* strengthened the anti-globalists position at an empirical level. Investigating historical macroeconomic trends in the world, Wade finds global inequality has risen, possibly due to globalization. Here he makes use of China as an example, given that the country succeeded in globalization but failed in equality. Wade points out, "China's surging inequality is now greater than the Communist won the civil war in 1949, and inequality between regions is perhaps higher than in any other sizable country" (Wade 2004, 578). And as he indicates, China's rising inequality during reform was possibly caused by FDI.

Some large-*n* studies, which include China as one case, also found support for critics of globalization and FDI in particular. Dennis Quinn (1997) provides a "robust, positive, statistically significant correlation between capital account liberalization and increased income inequality" (Quinn 1997, 12). Reuveny and Li (2003) researched 69 countries from 1960-95 and found FDI increased the level of inequality. Alderson and Nielsen (1999) also found a positive

association between these two factors, using 88 countries' data observed at different points in time between 1969 and 1994.

Other studies try to reconcile the divided evidence regarding FDI's impact on distribution. Andrew Sumner (2005) offers an extensive review of the theoretical and empirical relationship between FDI and income inequalities. Sumner argues that FDI wages are generally higher than local wages, and the differentials between skilled and unskilled workers are significant. Thus, although FDI may be associated with an increase in average wage in a nation, it worsens distribution of income and is not good for the poor in general. According to him, FDI tends to concentrate in non-agriculture sectors and employs skilled urban labor. This excludes the large part of the poor from benefiting from gains of FDI. While some East Asian countries seem to witness the crowding-in effect of FDI, Sumner argues that "restrictive" FDI policy was responsible and thus he explicitly argued against liberal FDI policies.

A similar view was expressed by Cheol-Sung Lee, Francois Nielsen, and Arthur Alderson (2007). Lee, Nielsen and Alderson found that whether or not FDI brings down income inequality depends on the state. The effects of FDI on inequality is positive at low to intermediate levels of government size, but the effect is substantially attenuated or negative in societies with a larger public sector. they conclude that stronger states react to distributive pressure from FDI and extract gains to broader economy. Bornali Bhandari (2007) focuses on transition countries and reaches a similar conclusion that FDI exacerbated wage income inequality, although reducing capital income inequality. In another words, FDI is good for capital investors but not so good to the poor in the country.

As mentioned before, China-based scholars were persistent in discrediting FDI with growing inequality in the country. Panlong Tsai (1995) argued unambiguously that FDI inflows

led to a worsening of income distribution in China. Yasheng Huang (2003) called the Chinese government's preferential treatment of FDI "selling China," as FDI crowded out local investment. Huang (2008) further argued that FDI failed to bring economic gains to broader society and resulted in larger income inequality. More recently, the World Bank published a book studying growing inequality in Guangdong province, where abundant FDI concentrates, and offers sobering remarks: "After three decades of continuous, fast economic growth, China has entered a new phase of development in which inequality has become one of the top challenges of its development agenda. Not only does the trend of rising inequality weaken social cohesion and fuel conflicts and instability, but it also undermines the credibility of market-oriented reform and hinders long-term development" (World Bank 2011, 39).

All these studies, either cross-national, large *n*, or China-based, use framework and evidence at the national level. Nathan Jensen and Guillermo Rosas (2007) criticized the national-level analysis in the case of Mexico. They argued that such analyses suffer from numerous endogeneity problems. Across-country, political and economic situations vary considerably, and it is very likely that the research failed to capture important factors. The positive effect of FDI on income inequality, for example, may be due to the omission of key alternative variables that have caused growing income inequality. Their study of state-level statistics from Mexico indeed yields a negative causation between FDI and inequality.

One of the confounding factors, which is particularly likely in China, is the existence of other changes alongside FDI inflows. For example, when China implemented preferential FDI policies, it also implemented measures including state-owned enterprises (SOEs) privatization, changes in national investment patterns, and terms of trade. The other changes may just be responsible for widening income gaps, and yet are not captured in the existing analyses. Further,

there may be factors that enhance FDI flows, but also result in income inequality. These factors are also causes of endogeneity in previous studies. Lastly, the Chinese FDI patterns are very skewed, as the vast majority concentrate in one part of the country. FDI's impact on national inequality may be entirely different from its real function. In another words, if its *real* function reduces inequality by improving the income of the poor in receiving regions, it may result in higher inequality in the country as a whole.

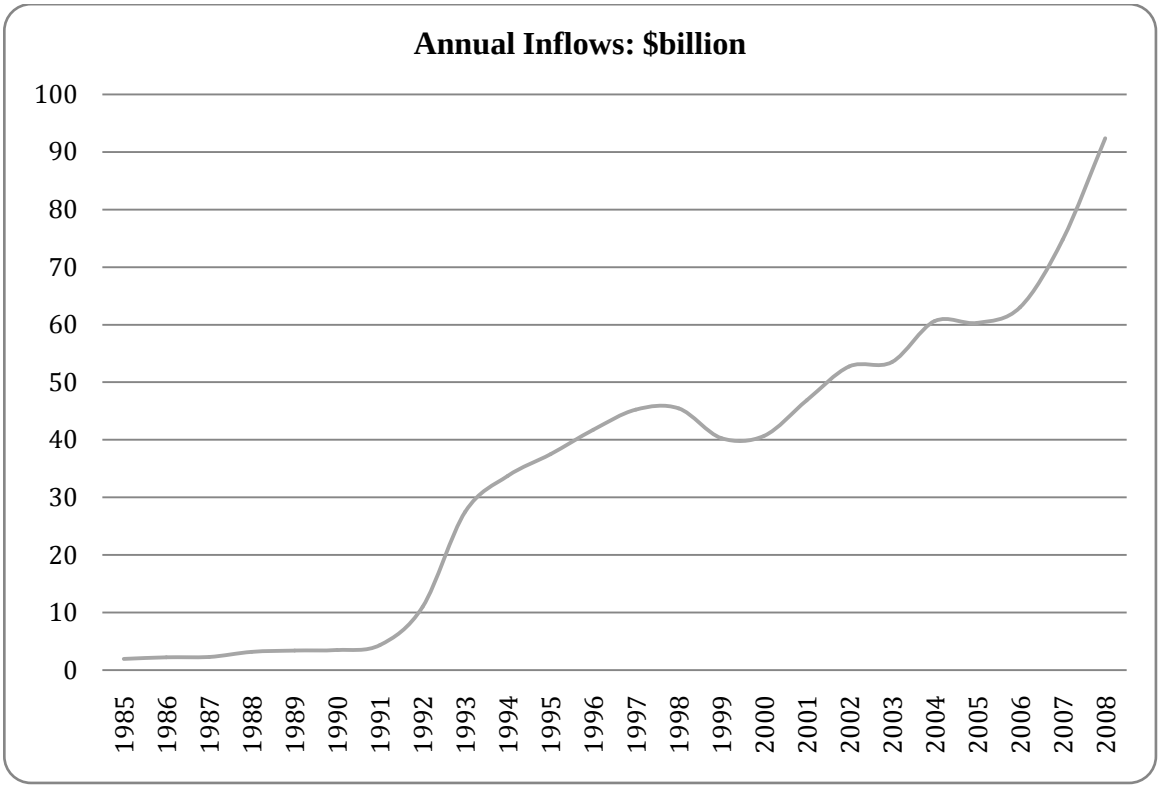
As Jensen and Rosas (2007) point out, sub-national tests of a single country control for specific conditions within the country, as all subnational observations have similar policy and political environment. Subnational testing, however, introduces new endogeneity due to possible confounding factors at the subnational level. However, such endogeneity problems can be minimized if the country under examination has polarized FDI patterns, as we can construct an instrumental variable model that specifically deals with subnational endogeneity issues. China's highly skewed FDI distribution offers an excellent opportunity for such an IV model construction. More than three quarters of FDI is concentrated in the coastal provinces, while the inland provinces have had negligible FDI inflows during the reform era. The central provinces fall between the two extremes. Differences among the three sets of provinces can be captured with an instrumental variable for FDI, "distance from the sea." In theory, distance from the sea has no direct impact on our dependent variable, the urban-rural household income gap, and thus reduces endogeneity problems caused by confounding, subnational factors that have effects on FDI.

3. CHINA'S FDI PATTERNS: SKEWED GEOGRAPHIC DISTRIBUTION

The PRC initiated FDI liberalization in 1980 with the implementation of four special economic zones (SEZs) in Southern China. Policies embodied in the zones were highly

preferential to foreign investment, meaning that foreign investors typically enjoyed better access and investment environment than Chinese local investors. In 1984, China increased the number of areas open and preferential to FDI, announcing the opening of 14 coastal cities. In 1992, the PRC's FDI liberalization expanded geographic coverage to the whole nation. Although internal variations remain, all provinces in China were encouraged to attract foreign investors. FDI inflows have been substantial since the 1990s, as demonstrated in Figure 1.

Figure 1: FDI Inflows to China, 1980 to 2008

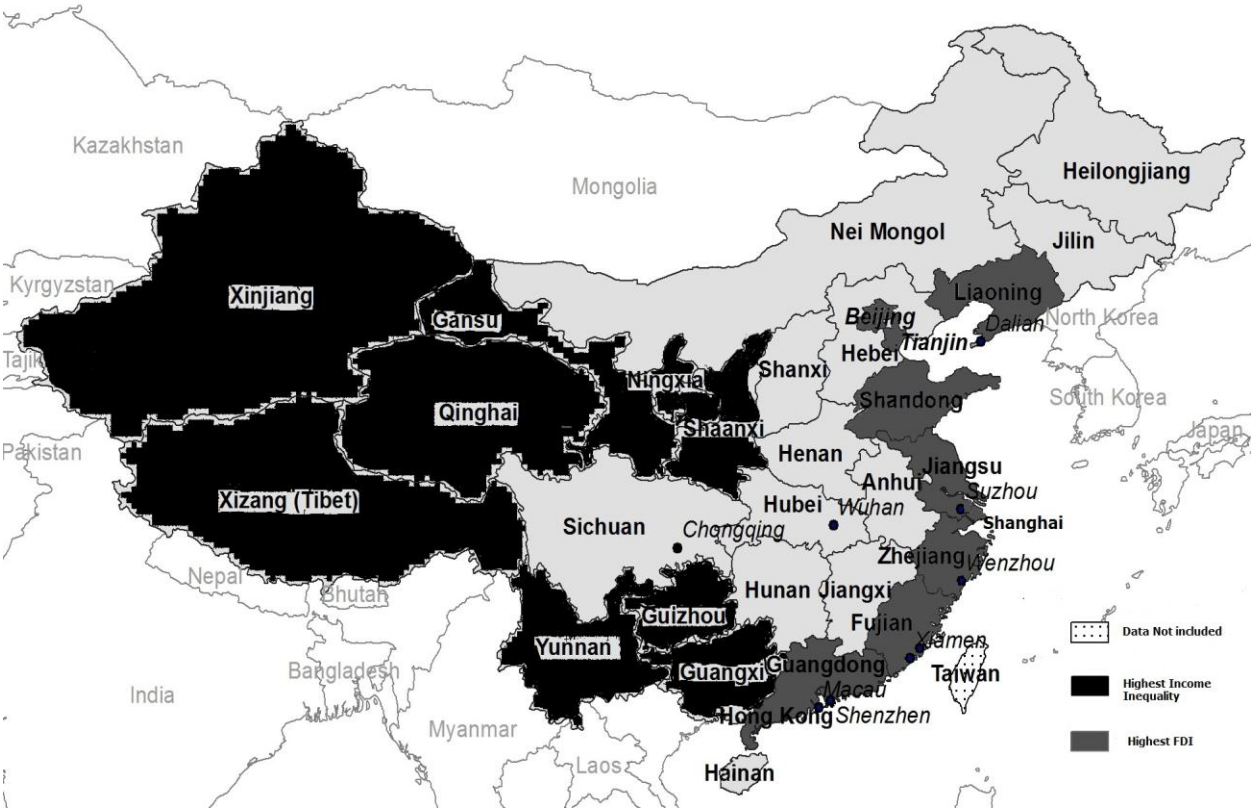


Source: Raw data is from China's National Statistics Bureau, *The China Statistical Yearbook*, 1980-2010 editions.

Starting from nearly zero in 1980, China attracted a total of $4 billion FDI from 1980 to 1984.[2] In 1985, the country received over $2 billion FDI. The first major spike in FDI came in 1992, following the drastic liberalization move in the country. In 1993, the PRC emerged as the largest recipient of FDI in the developing world, and throughout the 1990s it maintained strong FDI inflows. This trend was only slightly disrupted by the 1997/8 Asian financial crisis (AFC), which pressured the Chinese government to negotiate for WTO membership and significantly deepened liberalization toward FDI. China opened a wide range of sectors to foreign investors, and FDI swarmed in as a result. In 2002, China emerged as the top destination of FDI worldwide.

Other than its remarkable speed, China's FDI inflows have the following feature. FDI inflows are regionally uneven and have clear geographic patterns. Provinces in coastal China have attracted the lion's share of FDI, as demonstrated in Figure 2 (the Map of China). The nine provinces which attracted more than $48 billion FDI from 1985-2008 on average, are Guangdong, Jiangsu, Shandong, Zhejiang, Liaoning, Fujian, and three provincial municipalities, Shanghai, Tianjin, and Beijing. Indicated in gray, these provinces are all located near the country's east coastline. The province that attracted the next-highest level of FDI had only $26.9 billion in 1985-2008. These five provinces have rather similar amounts of FDI and they are all roughly located in central China. The western region, shown in black in the map, attracted very little FDI. If FDI had a significant impact (either positive or negative) on inequality, it should have affected changes in inequality across the three regions.

Figure 2: FDI Concentration within China (2011)



Source: Compiled by the authors. Raw data are from the *Chinese Stastistical Yearbook*, 2012 edition.

The causes of such a distribution of FDI in China are multi-faceted and typically not captured in the previous works at the national level. First, across regions in China, the developmental legacies have varied. The coastal provinces from Liaoning to Shanghai to Guangdong included important port cities during the late Qing and Republican era (roughly the first half 19th century). Industrialization and entrepreneurship developed rapidly in coastal China, particularly in the provinces near Shanghai. During reform, their entrepreneurial tradition made the provinces more acceptable of and attractive to FDI. This was also due to co-ethnic linkages between the Mainland and overseas Chinese entrepreneurs. Indeed, the vast majority of diaspora entrepreneurs in East Asia emigrated from Guangdong, Fujian, Zhejiang, Shanghai, Jiangsu, and Shandong—all located in coastal China. Diaspora entrepreneurs invested early in the Mainland and constituted the largest source of FDI there. It was natural that their investment might have concentrated in areas that they claimed ancestral homes.

Due to these inherited historical and social endowments, reform policies have been applied differently to these regions during different stages of economic reform in China, again, generating confounding factors to the national-level analyses of FDI's impact on inequalities. In 1980, the national government set up four special economic zones (SEZs) in Guangdong and Xiamen, drawing on their ethnic and geographic proximity to Hong Kong. Similarly, in 1984, the fourteen open coastal cities (OCCs) were all located in the coastal region. In 1988, Beijing passed the coastal development strategy, granting more freedom in attracting FDI to local governments there. In 1992, Deng Xiaoping's Southern Tour that unleashed a new wave of FDI frenzy started in Shanghai and ended in Guangdong. Since 1992, all regions in China were granted pro-FDI policies. Nevertheless, the policy environment surrounding FDI may still be different across various regions in China. Change or the lack of change in connection to different

periods of economic reform may have affected FDI distribution and income inequalities within China, another source of endogeneity problems in national-level studies.

This paper's central goal is to determine, with the best possible precision and given the limitation in data availability, whether FDI inflows were "causing" inequality in China. As mentioned before, the large-*n* statistic models and case studies of China have both used the country as a whole and have found that FDI inflows and inequality rose rapidly at the same time. Yet the association might be mistaken for causation, as China's FDI concentrates in one part of the country and inequality was measured at the national level. Confounding factors, historical legacies, social endowment, and reform policies, which either do or do not influence FDI flows, may have affected the change in income inequalities in China. In any of these scenarios, the attribution of rise in inequality to growth in FDI is imprecise.

Our remedy is to draw on the new subnational statistics provided by the Chinese national bureau of statistics (CNBS) and construct a two-stage instrumental variables (IVs) model. In the first stage, we construct IVs to capture differences across regions that may have affected internal FDI distribution, and in the second stage, the deduced FDI values are used to test their effect on changes in income inequality in specific provinces in China. We then add regional and provincial fixed effect variables in our models to capture region- and province-specific factors in the dataset. Our results are more valid than national-level studies and more precise than simple sub-national analyses of the relationship between FDI and income inequality.

4. URBAN-RURAL INEQUALITY IN CHINA

Urban-rural inequality in China has its origin in the socialist period. As Martin White (2010) points out the market reform was not the sole cause of income inequality in the world's most populous country. In fact, during the first five years of reform, income inequality

considerably declined. In 1984, for example, China's gini coefficient was less than 0.2.[3] Since then, however, inequalities rose rapidly. In 2007, the gini coefficient reached as high as 0.47, making China one of the least equal societies in the world. In the same period, the Chinese government implemented highly preferential policies toward foreign investors and attracted burgeoning FDI inflows in the country. Is FDI responsible for the growth in inequality?

Andrew Walder (2002) disputed the simple association between open door policy and rising inequality. He argued that market-oriented change, including openness to FDI, has no intrinsic impact on inequality. Similarly, Dennis Tao Yang (1999) argued that urban-based state policies were responsible for rising income inequality in China, not liberal FDI policies. Shao Daosheng, a researcher at the Chinese Academy of Social Sciences (CASS), blamed the government policies: specifically, the state-owned enterprise (SOE) reforms laid off massive numbers of workers, and land seizure in the countryside created millions of landless peasants and forced relocation of population under the government's infrastructure development frenzy.[4] Luo and Zhu (2008) explained that inequality in education and differential returns to schooling and sector employment were responsible for inequality. Hertel and Zhai (2004) held the labor and land markets distortions responsible for rural-urban inequality.[5] Many, such as renowned Chinese economist Wu Jinglian, attacked corruption.[6]

Yet none of these works on China's inequality have focused on finding the roles of FDI. For those scholars and policy advocates that tried to connect FDI and inequality, the conclusions were invariably critical of FDI and have evidently shifted the government's preferential FDI policies toward more restrictive. Our study hopes to find the more precise distributive effect of FDI and adds to the discourse on China's redistributive politics and the broader debate on globalization and inequality in the world.

The gini coefficient is a standard measurement of income inequality in the world, but sub-national gini coefficients, unfortunately, are unavailable for a systematic empirical test in China. The Chinese National Statistics Bureau (CNSB) released information on household income in urban and rural areas from 1949 to 2008; the first fifty years (1949-1998) were retroactively surveyed while the recent decade was accorded by national surveys each year. This is the only available income inequality data at the subnational level in China, which we rely on to construct the dependent variable. The same database also includes GDP, fixed assets, foreign trade, etc. Other studies of China's inequalities have revealed that inequalities, measured by Gini coefficients, regional disparities, and urban-rural gaps respectively, covary significantly and have grown at similar magnitudes.

We use urban-rural divide as our dependent variable of inequality for two additional considerations. First, the trends and magnitudes of growth in urban-rural inequality are similar to other inequalities, including regional inequality and gini coefficient, according to a World Bank study by Luo and Zhu (2008), yet the latter data are rather unsystematic. Second, urban-rural divide in China has been politically charged. Frances Stewart (2002, 2009) finds that horizontal inequalities, such as that between urban and rural households, are more likely to cause large-scale social violence. The above-mentioned arguments of China scholars that FDI enlarged urban-rural income gaps have evidently made an impact on policy responses to restrict FDI inflows. Thus, finding a more precise impact of FDI on urban-rural inequality in China is quite urgent.

Then, how has urban-rural inequality changed in China? Table 1 presents the deterioration in the urban-rural inequality (URI) since the mid 1980s. In 1985, urban households had slightly more than 1.9 times disposable income than rural households; in 1990, the gap was

more than two. When FDI inflows became substantial in the 1990s, URI increased significantly. In 1995, it was already 2.8 times, and in 2005 the gap surpassed three. In 2008, urban residents were more than three times richer than rural households.

Table 1: Urban-Rural Inequality (URI) during Reform China

Unit=ratio of urban to rural household income

	1985	*1990*	*1995*	*2000*	*2005*	*2008*	*Rate of Increase*
National average	1.911	2.147	2.800	2.824	3.127	3.134	1.64
Coastal	1.641	1.858	2.275	2.266	2.565	2.671	1.63
Central	2.044	2.401	3.115	2.960	3.368	3.372	1.65
Inlands	2.034	2.130	2.964	3.263	3.429	3.332	1.64

Source: Raw data from the Chinese National Statistics Bureau.

Differentiating by regions, we find that the coastal region had less URI than central and inland regions throughout the reform era, but the rising trend was similar for all the three regions. URI in the coastal region was 1.6 in 1985, and increased to 2.7 in 2008, a rate of increase of 1.63. China's inland area had the country's highest URI in 1985, at around 2, and increased by a rate of 1.64 to 3.3 in 2008. The increase in the central region was the largest, from 2 in 1985 to 3.4 in 2008—a rate of 1.65. Presently, central China has the worst urban-rural divide in the country, with urban households making 3.4 times more than their counterparts in rural areas.

The urban-rural household income indicators are able to capture the direct effect of FDI, because of China's household registration system [*hukou*]. A rural *hukou* is extremely difficult to

change to an urban one, and yet workers with rural *hukou* can and have extensively been employed in foreign-invested companies. Their income is counted as rural household income. China's household survey and statistics on urban and rural incomes have been remarkably consistent during the reform era, and as a whole can best capture the relative distribution of gains from FDI.

The CNSB offers longitudinal data on urban and rural household per capita income at the sub-national levels, as well as other macroeconomic indicators of various provinces. Such data sets allow for a systematic analysis of FDI's impact on inequality. The causal inference based on urban-rural disparity casts lights on other kinds of income inequalities, as Luo and Zhu (2008, 3-4) conclusively established that urban-rural inequality rose with the same magnitude and in the same direction as other kinds of income inequalities in China, gini coefficient and regional divide, for instance.

A study set out to find FDI's impact on urban-rural inequality in China has several important policy and theoretical implications. Like other inequalities, urban-rural gaps present obstacles to deepening economic change, as the rural poor cannot increase consumption, which is often needed for continual growth (Wade 2002, 2004). The need to expand rural consumption is acute in China, as the country has relied on export markets in Europe and America, where various financial crises had severely repressed the demands. If China is to maintain high growth, the source has to come from domestic consumption. At the local level, were FDI found to *cause* widening urban-rural divide, local governments, now under the mandate to address rural poverty and social stability, should seriously reconsider their preferential FDI policies. Such a result—if FDI increases URI—adds evidence to skeptics of globalization and supports the restriction of FDI. By contrast, were FDI found to reduce urban-rural divide, the message for policymakers in

China is clear: you do not need to choose between growth and equality. FDI benefits both goals. What attracts FDI into a region may well help the locality to narrow its urban-rural divide.

Other than capturing whether FDI "causes" widening urban-rural inequality, we also want to shed light on whether government investment biases have had a bigger impact. In our models, we add the amount of investment in fixed assets reported by CNSB in the same database. This information covers investment in infrastructure, real estate, and office buildings. It relates closely to the government investment policies and the state-driven investment patterns. Our hypothesis is that government investment has been biased toward urban areas where government offices and important SOEs are located. The rising investment in fixed assets should have a positive impact on the growing urban-rural divide.

5. SPECIFICATION OF THE STATISTICAL MODELS

Our dataset is a panel data across 31 provinces from 1987 to 2008, including 704 observations. The baseline model in our analysis is an OLS regression on the key variable of interest—FDI flows, and other related variables, which we think might shift the urban-rural income inequality over time. Using the baseline model as a benchmark, we then estimate different variant models: 1) with regional dummies; 2) with province fixed effect; 3) with instrumental variables only; 4) with instrumental variables and regional dummies; and 5) with instrumental variable and province fixed effect. We compare results from the six models to show the benefits and precision in the IV models.

In the baseline OLS model, there are three independent variables that we hypothesize have impact on urban-rural income inequality. As shown in the following equation, the provincial-level income gap between urban and rural areas in each year is dependent on the log

value of FDI, the log value of GDP, and the log value of the investment in fixed assets, plus a random error term ϵ .

$$\mathrm{II}_{\mathrm{it}} = c_{it} + \beta_1 * ln\mathrm{FDI}_{\mathrm{it}} + \beta_2 * ln\mathrm{GDP}_{\mathrm{it}} + \beta_3 * ln\mathrm{Investment}_{\mathrm{it}} + \epsilon_{\mathrm{it}}$$

In the model above, the index i represents province and t indicates year. There are two possible methodological issues in the OLS model, however. First, there may be omitted variables that influence changes in FDI, yet not included in the model. Second, there may be reverse causation between FDI and inequality, which means that inequality could also affect the decision of FDI. Each of these problems creates endogeneity in the OLS model.

To deal with the first problem, we include regional dummies in the next model—OLS Regional Effect. The regional dummies capture the inequality difference among coastal provinces, central provinces, and inlands. One may argue that the income inequality has been caused by the geographic differences. The three regional dummies can adjust the effects in the above argument. Moreover, we include another model specification—Province Fixed Effect model. This model controls any provincial-level variations. In other words, with the province fixed effect, the results show the effect of FDI inflows on the income inequality within each province.

To solve more missing variable and causality issues, we thus develop the following model of two-stage least squares (2SLS, or instrumental variable) regression. In the first stage, we try to capture factors causing the changes in FDI, and in the second stage, we use the deduced FDI statistics from the first stage to capture its impact on rural-urban inequality.

There are several factors that influence the decisions of FDI by foreign companies. For example, the level of education for population in a region, which indicates the quality of labor that foreign investors typically value. Therefore, it makes education level a valid instrument for FDI, given that at the provincial level, education does not directly affect URI. Further, China's internal distribution of FDI presents a convenient strategy to control for other subnational, confounding factors. FDI has concentrated in provinces near the sea. We thus construct the variable "Convenience" to describe "the distance from the sea" as another instrumental variable. Convenience captures differences between provinces with substantial FDI and those without. Those differences could be entrepreneurial tradition, infrastructure, or local policy implementations, which have independent, causal effect on FDI inflows. The two-stage test also resolves the reverse causation problem, and we capture FDI's impact on income distribution, not the other way around.

The 2SLS model is the following:

$$First\ Stage:$$

$$lnFDI_{it} = c_1 + \gamma_1 * ln\mathrm{GDP}_{\mathrm{it}} + \gamma_2 * ln\mathrm{Investment}_{\mathrm{it}} + \gamma_3 * \mathrm{Convenience} + \gamma_4 * \mathrm{Education}_{\mathrm{it}} + \varepsilon_{\mathrm{it}}$$

$$Second\ Stage:$$

$$\mathrm{II}_{\mathrm{it}} = c_2 + \beta_1' * lnFDI_{it}^{*} + \beta_2' * ln\mathrm{GDP}_{\mathrm{it}} + \beta_3' * ln\mathrm{Investment}_{\mathrm{it}} + \omega_{\mathrm{it}}$$

In the first stage, we predict the endogenous variable $lnFDI_{it}$ onto four exogenous variables and a constant. These four exogenous variables are the two exogenous variables in the OLS model and the two instrumental variables we constructed. In the second stage, we run a regression on the predicted value $lnFDI_{it}^{*}$ from the first stage, and the other two exogenous variables in the OLS model.

We also extend our 2SLS model into another two additional specifications: 1) with regional dummies and 2) with the province fixed effect. These two models capture the effects of geographic differences on income inequality. We expect that the most interesting results come from the last specification--2SLS with province fixed effect. This specification wipes out all provincial level factors and the key variable of interest, *ln*FDI, has been instrumented. Thus, it gives the most accurate and reliable estimation outcome.

The CNSB data is by far the most comprehensive data on China's economic, social, and demographic changes from 1949 to 2008 for all the nation's provinces. Particularly, after 1998, CNSB collected and released annual data on China's provinces, which made it possible to systematically examine regional inequalities in China across time.[7] We extract data on national accounts, population and employments, investment in fixed assets, people's livelihood and wages, government finance and banking, price indicators, education, foreign trade and investment, domestic trade, as well as sectors. We ultimately focus on the analysis of GDP, FDI, urban household income, rural household income, investment in fixed assets, and education from the large dataset. We use yearly urban and rural household income data to compute URI (urban-rural inequality). For the education variable we use the percentage of graduates from primary schools. We believe the size of the post-primary labor force influences firms' decision to invest in particular locations

We select our sample in the period from 1987 to 2008. Although China started economic reform in 1979, FDI became substantial only after 1986, when URI was at its lowest point in China. We end our sample in 2008 as many observations were missing after this year.

In our sample, for each province in each year, we observe the value of FDI inflows, trade and exports, GDP, employment rate, urban and rural household disposal income per capita, and

level of education (i.e. the percentage of graduates of primary school entering secondary). First, we define our dependent variable URI, "II_{it}", as inequalities between urban and rural households for each province in each year from 1987 to 2008. This ratio for each province is calculated as urban household disposal income per capita divided by rural household disposal income per capita. Second, from the above panel data, we then generate the key explanatory variable: the mean dollar value of FDI inflows during the period 1987-2008 across each province. Third, the other explanatory variables are defined as the following: the GDP value (millions, in log term) for each province in every year from 1987 to 2008, and investment in fixed asset (in log value) over the same period.

The two instrumental variables are Convenience and Education. We construct the Convenience variable by taking three discrete values, 0, 1 and 2 according to the closeness to the coastline. Closeness to coastline facilitates transportation; as such provinces typically have seaports, which attract FDI. Most FDI in China is concentrated in the coastal region. Table 2 describes the value of Convenience for each state. There are 15 provinces that have a Convenience value of 0. These provinces are separated by at least two provinces from the coastline, covering most inland areas in China. Ten provinces, which border the coastline, have a value of 2. The remaining 6 provinces are somewhere in between, separated from the coastline by one province. The value for these provinces is 1.

Table 2: The Value of Each State for Variable "Convenience"

Convenience Value	States	No. States
0	Chongqing, Gansu, Guangxi, Guizhou, Heilongjiang, Inner Mongolia, Jilin, Ningxia, Qinghai, Shaanxi, Shanxi, Sichuan,	15

	Tibet, Xinjiang, Yunnan	
1	Hebei, Henan, Anhui, Hubei, Hunan, Jiangxi	6
2	Liaoning, Tianjin, Beijing, Shandong, Jiangsu, Shanghai, Zhejiang, Fujian, Guangdong, Hainan	10

The other instrument variable, Education, comes from our data directly. It is the percentage for graduates from primary school and entering secondary school. It indicates human resources available in each province and influences FDI decisions by foreign companies. For each province in every sample year, we observe this index. We take the average of this percentage during the sample years as the Education instrument.

Table 3 presents the summary statistics of variables we use in our regression models. The dependent variable in our regression models is the within-province income gap between urban and rural areas. The mean of this income gap ratio is 2.71, with a standard deviation of 0.76. Summary statistics on other variables are also reported in the table.

Table 3: Variable Summary Statistics

Variable	Obs	Mean	S.D.	Min	Max
Income Inequality	704	2.71	0.76	1.14	5.60
lnFDI	704	10.08	2.52	0.69	14.74
lnGDP	704	7.34	1.40	2.87	10.51
lnInvestment	704	6.30	1.49	1.67	9.64
Convenience	704	0.88	0.89	0.00	2.00
Education	704	89.10	11.84	39.60	100.00

6. EMPIRICAL RESULTS

We run our regression in six different specifications. The first specification is the benchmark OLS model. We then run the OLS by adding regional dummies in the second specification. The third specification is the one with province fixed effect. Among the two-stage least square (2SLS) models, the fourth specification is the baseline model with two instruments and the fifth specification is the baseline 2SLS with the regional dummies. Last, the most important model is the 2SLS model with province fixed effect. This last model gives us the most precise and accurate results. Thus we shall focus on explaining the results generated by this model. Before we do this, we present our simpler models first and go over the differences between the six specifications (see Table 4).

In the OLS baseline model, the coefficient of FDI variable is negative, -0.1932, and statistically significant. This means the FDI inflows decrease the income inequality, holding other factors constant. The other dependent variables are GDP level and the fixed asset investments. The effect of GDP growth on the income gap over time is negative, -0.8382. This means that with the growth of GDP level every year, the income gap shrinks. The coefficient of the fixed asset investment is 1.0619, which shows the effect of the investment on income gap is positive and significant.

It is natural to consider the regional difference of income gap since it clearly has different levels of economic development across the east, central, and west in China. In our second specification, OLS Regional Effect model, we include the regional dummies. The west region is the benchmark to compare with the east coast and the central areas. The result shows that compared to the west, the east coast has a significantly lower income gap and the value of this gap is -0.697 on average over time. After controlling the regional effect, we look at the FDI

inflows' effect again and the regression result is -0.0643 at 5% significance level. This means that the negative effect of FDI inflows on the income inequality indeed exists, excluding the unbalanced economic development or other factors across different regions. The other two variables show the robust sign and magnitude compared to the results in the OLS baseline model.

In the Fixed Effect model, we use province-level fixed effect to control any provincial level unobservable factors. Any unbalanced factors/policies or geographic differences have been controlled by this fixed effect. This is also called "within" estimation, meaning that the result in this specification is within each province. The coefficient of FDI variable is -0.0173. The results show that, within each province, the FDI inflows have no significant effect on the income inequality since the coefficient is not statistically significant, although the sign is consistent with the previous estimation. The GDP variable has no significant effect (-0.0406) either but the investment variable has significant positive effect (-0.3218) and is consistent with the previous findings. Notice that the fitness of the model, i.e. R square, jumps to more than 80% from 25% in the OLS baseline model. This shows the current fixed effect model fits the data much better. That is also the reason why we adopt the fixed effect method in our final best specification at the end.

Table 4: Statistical Results

Variable	OLS Baseline	OLS Regional Effect	Fixed Effect	2LSL (1)	2SLS (2)	2SLS (3)
lnFDI	-0.1932***	-0.0643**	-0.0173	-0.5996***	-0.7311***	-0.5003**
lnGDP	-0.8382***	-0.8697***	-0.0406	0.4607***	-0.3876**	0.2541
lnInvestment	1.0619***	0.9736***	0.3218***	1.3020***	1.3982***	0.6917***
East Costal		-0.6970***			0.3681*	
Central		0.0503			0.2012*	
Province Fixed Effect	NO	NO	YES	NO	NO	YES
Constant	4.1205***	3.8300***	3.3048***	3.9304***	3.9106***	2.7844***
N	704	704	704	704	704	704
R^2	0.2582	0.3951	0.842			

Note: The dependent variable is the Income Inequality. *p<.05; ** p<.01; *** p<.001

Up to this point, we believe the simple OLS models, even with regional dummies or fixed effect, suffer from edogeneity issues. We think the decision of FDI inflows in each province by foreign companies is correlated with unobservables. Thus, we solve this issue by adding instrumental variables, i.e. a 2SLS model in the following specifications.

In the 2SLS (1) model, we use two instrumental variables: Convenience and Education. The three dependent variables are the same as in OLS baseline model. By doing a 2SLS estimation, we control the endogenous issue of FDI inflows. As shown in the results of 2SLS (1) specification, the coefficient of FDI variable is -0.5996 and statistically significant at the 1% level. Compared to the results in OLS baseline model, the 2SLS model gives consistent estimation results with higher magnitude, which shows the improvement of accuracy. The GDP and fixed asset investment have significantly negative and positive effect, respectively. This is

consistent with the finding in OLS baseline model, OLS Regional Effect model and the Fixed Effect model. The consistency shows the robustness across our model specification. Moreover, we conduct a sargan test after the estimation to check whether these instruments are valid. The test result shows the instruments pass the over identification requirement, meaning that these two are valid instruments.

In the 2SLS (2) specification, we add regional dummies to capture the difference across geographic/economic areas. Comparing the current results to the ones in OLS Regional Effect model, we find that the coefficient of FDI variable is -0.7311 and it is significant. The magnitude of FDI inflows' effect increased largely. Meanwhile, the effect of GDP growth keeps a negative sign and the magnitude decreases; the effect of fixed asset investment still has positive effect on income inequality and has a large value, 1.3982. Compared to the west region, the east coast and central areas both have higher income gaps. This is a different result from what we observe from OLS Regional Effect, which shows a smaller income gap in the east coastal area. To solve this problem, we dig deeper and present a better model--the 2SLS (3) specification combines instrumental variables estimation with province fixed effect. The combination of instrumental variable and the province fixed effect generates the most precise and desirable results. The results here are consistent with the results in other models. It shows that the effect of FDI inflows is negative and significant. The effect of GDP is positive but insignificant, which means the increase in GDP has no statistically significant effect on income inequality. The fixed asset investment has positive and significant effect.

In terms of magnitude and marginal effect, the coefficient -0.5003 means on average each province's income inequality will decrease by -0.5003 given the FDI inflows increase by 1% in average from 1987 to 2008. This means the mean level of income inequality would become

roughly 2.66 (2.71-0.5003) on average; some provinces may reduce more and the rest may decrease less than the average. The effect is fairly large. In percentage terms, it is 18% (0.5003/2.71) in reduction when FDI inflows only change by 1% in the period under study. The quantitative effect of fixed asset investment is significant. The numbers suggest, if there is 1% increase in the fixed asset investment, there is 25% (0.6917/2.71) increase in income inequality. This is at the similar level to FDI inflows but the fixed asset has positive effect. In other words, if the FDI inflows increase over time, the income inequality would decrease over time; however, if the fixed asset investment increases over time, the income inequality would increase over time. Thus, these two effects would cancel each other out. This is the reason why we did not observe a constant and large decrease in income inequality over the period under study (1987-2008).

Finally, since we used the province level fixed effect, the effects from the estimation are on average of all 31 provinces over the sample period. This means some provinces may have a stronger negative effect of FDI than others; some province may have stronger positive effect of fixed asset investment on income inequality. The net effect on nation-wide income inequality may be positive, due to the effect of investment in fixed assets and the skewed concentration of FDI inflows in the country.

7. CONCLUSION: LESSONS FROM CHINA

The findings of this paper correct earlier analyses of FDI and its impact on inequality in China. Different from cross-national studies, our two-stage, instrumental variable (IV) estimation at subnational level robustly shows that FDI has significantly reduced urban-rural household income gaps in China. Yet due to preexisting inequality between regions, skewed FDI distribution in the coastal region aggravated gaps between the poor in the inlands and the rich in

the coast, that perhaps explains why national studies would yield the positive effect of FDI on inequality.

FDI's causal and negative effect on income inequality offers policy lessons to China and officials throughout the developing world. In China, to combat urban-rural divide, the government should apply its preferential FDI policies more aggressively in the inlands and encourage local officials to set up conditions that facilitate the relocation of FDI from the east coast to this part of the country. To other developing countries, the findings establish that FDI can be good for equitable growth, but the kinds of FDI that operate in China should be paid more attention. Mentioned above, FDI in China was mostly in manufacturing and exports sectors and heavily employed surplus labor in rural China. The Chinese government offered generous incentives, credits, and subsidies to such FDI, without adding more restriction on other kinds. The practice is in line with the direction of liberalization. Indeed, China's selective, yet liberalization-plus policies toward foreign investments should have more relevance to policymakers in other countries striving for equitable growth.

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[1] Cited in Wade (2004).

[2] Unit in US$, unless indicated otherwise.

[3] Provided in Adam Wagstaff, "Decomposing Changes in Income Inequality into Vertical and Horizontal Redistribution and Reranking," World Bank, WPS 3559, April 2005.

[4] See Shao Daosheng, "pinfu chabie yu liangji fengfa" Income inequality and Polarization, minzhu yu fazhi (*Democracy and the Rule of Law*), 2005, pp.30-33

[5] Both cited in Thomas Hertel and Fan Zhai, "Labor Market Distortion, Rural-Urban inequality and the Opening of China," World Bank, WPS 3455, 2004.

[6] See, for example, Yao Jingxian, "jingji zhuanxingqi de woguo pinfu liangji fengfa de yuanyin tanxi (Analysis of Income Inequality in China's Transition Period), Northern Economy and

Trade, No. 4, 2007; Yan Mengwei, "ruhe kandai shehui zhong de pingfu fengfa wenti (How to View Income Inequality)", *Theory and Modernization*, No1, 2007, pp.5-12.

[7] There is another popularly used dataset for the study of China's income inequality, Chinese Household Income Project (CHIP) surveys conducted by the Economics Institute, CASS. Despite some advantages, the CHIP surveys, however, only capture about one third of the provinces and one fifth of the years covered in the NSB data. Besides, NSB dataset include cross-time, provincial statistics on other economic indicators. For the purpose of subnational testing, NSB is more appropriate.