LOCAL GOVERNMENT AUTONOMY AND CITY GROWTH: EVIDENCE FROM CHINA

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ABSTRACT

How does local government autonomy affect economic development? The theoretical and empirical literatures suggest that decentralization to local authorities may have either a beneficial or harmful effect on local economic growth. This ambiguity in the empirical evidence may be due to the fact that most measures of decentralization are endogenous. In this study we use panel data on Chinese prefectural cities from 1985-1993 to estimate the effects of local autonomy on city growth taking advantage of a quasi-experiment afforded by the fact that some municipalities were separately listed on the state plan (MSL, or *Jihua Danlie Shi* in Chinese) during the 1980s, which gave them the authority to set their own economic development agendas. Because cities that were listed on the MSL were significantly different than other cities along numerous dimensions, we match these cities with control groups of comparable cities, following the method proposed by Altonji *et al* (2003) on matching based on observables. Regardless of the matching criteria used, we find that MSL status increases a city's total industrial output and total employment. Accordingly, the evidence from China indicates that decentralization had positive effects on local economic performance.

Key words: local government autonomy, city growth, municipalities separately listed on the state plan (MSL)
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I. INTRODUCTION

Since the 1970s the Chinese economy has grown at an average annual rate of at least 9 percent. Much scholarship has been devoted to explaining this "Chinese Economic Miracle." Among the numerous hypotheses that have been advanced, reform and decentralization are considered by many scholars to be key contributors to China's economic success in the past three decades. Xu (2011), for instance, argues that China's rapid economic growth can be attributed to its *regionally decentralized authoritarian system*. Under this system, the central government maintains highly centralized authority over political policies and personnel decisions, while in the economic realm decision making power is widely dispersed, with authority largely delegated from the central government to local governments, and from governments to enterprises.

Like its reforms in other areas, China's decentralization process has followed a gradualist approach, characterized by a series of experiments whose successful implementation in pilot regions is emulated in other parts of the country (Coase and Wang 2012). While the existing literature has examined the effects of special economic zones (SEZ) and fiscal decentralization in the Chinese context, this study explores the impact of another decentralization experiment, the policy of municipalities separately listed on the state plan (MSL), adopted between the mid-1980s and the mid-1990s, which effectively granted certain Chinese municipalities the planning authority of provincial governments.

Specifically, we use panel data on Chinese prefectural level cities from 1985

to 1993 to study the relationship between local government autonomy and city-level economic expansion as well as the potential mechanisms through which autonomy impacts growth. We find that MSL status increased the level and growth rate of industrial output and employment in the city. As for potential mechanisms, we find that MSL cities do not differ significantly from the other cities in terms of foreign direct investment (FDI) or provision of public goods, but they tend to have lower government revenue to industrial output ratios, implying lower tax burdens for firms located in these cities. This suggests that local government autonomy leads to a lower fiscal burden, which in turn facilitates city growth. This is our preferred interpretation of how the policy of municipalities separately listed on the state plan (MSL) has influenced urban development in China.

To determine the impact of MSL status on economic performance, we use a difference-in-difference estimator, in which the change in economic performance in treatment cities (*i.e*. those granted MSL status) is compared with the change in performance of control cities (*i.e.* those not granted MSL status) before and after the adoption of MSL status. Although the use of city-level fixed effects allows us to control for time-invariant unobserved heterogeneity that may influence city-level economic performance, there is nevertheless the potential for selection bias because cities that were granted MSL status differ substantially from non-MSL cities in a variety of ways that may affect economic growth. To deal with this selection problem, we match the MSL cities with different control

groups of cities that share with the MSL cities various common features, following the method proposed by Altonji *et al* (2003) on matching based on observables. In particular, we match the MSL cities with control groups of cities that (i) are located within coastal provinces; (ii) are along the coast (i.e. sea-port cities); (iii) are along the coast or along a major river; (iv) have a history as former colony cities; (v) were designated as economic reform pilot cities; (vi) were larger than Shenzhen in 1985 in terms of industrial output; (vii) had higher initial human capital levels (as measured by a per capita college student population larger than Ningbo in 1985 or a technical personnel population per capita larger than Xi'an in 1985); (viii) are not provincial capitals; and (ix) were granted MSL status after 1985. Our basic findings remain robust to these different matching schemes.

We contribute to the literature in at least two ways. First, we make use of the MSL as a quasi-experiment, where MSL status is potentially uncorrelated with the city's economic development. As a result, our empirical findings are somewhat less subject to endogeneity and measurement problems that plague other research on the impact of fiscal decentralization. In addition, we explore the mechanisms through which local government autonomy affects city growth and find that the main benefit of the MSL policy is to allow cities to reduce their tax burdens, which leads to faster economic growth. Our findings therefore contribute to the literature on the relationship between federalism and economic growth.

The remainder of the paper is structured as follows: Section 2 reviews related literature, while Section 3 offers background information on the MSL policy. Section 4 describes our data and our identification strategy, while empirical results are presented in Section 5. Section 6 concludes.

II. LITERATURE REVIEW

The main body of literature relevant to the current study is that on decentralization. While many studies suggest that decentralization promotes economic growth, others argue the opposite.

Scholars have identified many channels through which decentralization helps economic growth. Decentralization may be beneficial because it prevents political rents from being captured primarily by elites in capital cities. Both De Long and Shleifer (1993) and Henderson and Wang (2007) find that political centralization is harmful for city growth. Similarly, Glaeser (1995) finds that in more politically centralized countries, urban agglomerations are concentrated in large capital cities, at the expense of smaller, non-capital cities. Decentralization may also facilitate local economic development because it results in a better match of public goods provision with local preferences and endowments. Work by Hayek (1945), Tiebout (1956), Musgrave (1959), Oates (1972), and Besley and Coate (2003) suggests that decentralization, by promoting local political accountability and reducing informational asymmetries, supports a more efficient and effective provision of local public goods. A third line of research supporting the positive impact of decentralization explores its role in affecting a

country's macroeconomic performance. For example, using international data, Treisman (2000) shows that decentralization improves inflation control. Lin and Liu (2000) and Jin et al. (2005) find that decentralization has had positive effects on economic growth in China, especially on the expansion of non-state owned sectors.

Theoretical work on the benefits of decentralization generally relies on the Tiebout model, which assumes (i) a democratic political system where people vote to determine public policies based on their preferences, and (ii) the mobility of residents across jurisdictions. These conditions may not hold in developing and authoritarian countries. In fact, Lockwood (2002) and Besley and Coate (2003) demonstrate that the relative benefits of decentralization depend on the degree to which there are externalities in the provision of public goods as well as the differences in preferences across regions. Crook and Sverrisson (1999) further point out the importance of technology, human capital, and government capacity in determining the superiority of decentralization versus centralization. Several empirical studies find that decentralization is harmful in the context of developing countries. Work by Azfar et al. (2001) on Uganda, Akin et al. (2005) on the Philippines, and Chen (2010) on China suggests that fiscal decentralization in these countries was harmful to welfare. According to these studies, decentralizing reforms reduced local governments' incentives to provide public goods.

In spite of these caveats, scholars have generally argued that fiscal

decentralization in the Chinese context has been a key contributor to Chinese economic growth because of the role it plays in prompting sub-national governments to preserve and develop the market system (Montinola *et al* 1995, Qian and Weingast 1997, Qian and Roland 1998, and Jin *et al* 2005). Lin and Liu (2000) and Jin and Zou (2005) present empirical evidence that fiscal decentralization in China is positively correlated with economic growth, especially the growth of private firms.

One mechanism through which decentralization affects economic growth that may be unique to the Chinese context is the promotion tournament played among local leaders who compete for higher positions in government based on economic performance of their respective regions (Chen, Li, and Zhou, 2005; Li and Zhou, 2005; Huang and Sheng, 2009). This unique mechanism may also account for some of the negative effects of decentralization that have been documented in China. Using a quasi-experiment afforded by the abolition of agricultural taxes in Henan Province, Zuo *et al* (2011) estimate that fiscal decentralization led local governments to place a greater focus on infrastructure expenditure at the expense of public services and human capital accumulation, harming the region's long-term development. Along similar lines, Davoodi and Zou (1998), using cross-country data, and Zhang and Zou (1998), using Chinese provincial-level data, find a negative correlation between fiscal decentralization and economic growth.

Why do different studies produce such contradictory findings regarding the

relationship between decentralization and economic development? Perhaps the most important reason is that there are few unbiased measures of decentralization. Empirical studies typically proxy for decentralization by using the ratio of regional government expenditure to total government expenditure. As this ratio is endogenously determined in the process of economic growth, and may change for reasons unrelated to decentralization per se, it may contaminate estimates of the impact of decentralization on economic performance. A better approach would be to use quasi-experiments, where decentralization initiatives are piloted in some places but not others. In the current study, we will make use of such a quasi-experiment, specifically the policy of municipalities separately listed on the state plan (MSL) adopted during the mid-1980s and the mid-1990s to study the impact of decentralization in China.

III. THE MSL POLICY EXPERIMENT

MSL is the short-hand term for the policy of "municipalities separately listed on the state social and economic plan," a policy experiment implemented by the Chinese central government which began in 1983 and was one of the first initiatives targeted at urban areas shortly after the beginning of the reform era. In February of 1983, the State Council designated Chongqing as the first city with MSL status. Thirteen other MSLs were approved between 1984 and 1989. Table 1 lists all 14 MSL cities and the dates when they achieved and lost MSL status. Figure 1 locates the MSL cities on the map of China, with the dark colors

indicating MSL cities.[1]

In 1985 the main policy objectives and the specific administrative measures for MSLs were promulgated. The key advantage of MSL status lies in the planning autonomy that MSL cities enjoy within the national annual plan, which grants these cities the same authority in economic planning and management as the provinces. Administratively, MSLs still had the same ranking as the other prefectural level cities until 1994, when all MSLs except Dalian, Qingdao, Ningbo, Xiamen, Shenzhen, and Chongqing were stripped of their MSL status. At the same time, all the 14 original MSLs were elevated to vice-provincial level cities, together with Hangzhou and Jinan. In 1997, Chongqing was further elevated to a provincial level city, with 15 vice-provincial-level cities remaining, among which ten are provincial capital cities and five are non-capital MSLs (Dalian, Qingdao, Ningbo, Xiamen, and Shenzhen).

According to the "Notice regarding the Implementation and Improvement of the Work Plans for the Seven MSLs" issued in 1985 jointly by the State Commission for Structural Reform Committee and the State Commission for Economic Planning, cities with MSL status were to be listed separately when making national plans for all major economic indices and would therefore be granted the same authority in economic planning and management as the provinces. Specifically, MSLs would be free to formulate their own plans, which

[1] The MSL policy applied to the urban areas of each MSL city. Over time, the urban area of prefecture-level cities has expanded. Because we could only find a detailed map for the current period, the dark color in the map corresponds to the current urban area for each MSL. If we had a map of urban areas at the time the MSL policy was implemented, the dark areas would therefore be smaller.

are separate from the plans of their corresponding province, concerning industrial and agricultural production, transportation services, mail services, postal services, fixed asset investment, urban construction, purchase and sales of major commodities, energy and other major materials, foreign trade, labor and wages, government loans, science and technology development, as well culture, education, and public health.

For example, as an MSL, the city of Xiamen is able to set its own plans in industrial production, fixed asset investment, foreign trade volume, labor hiring, as well as bank credit, without having to get approval from the province of Fujian. After Xiamen creates its plans, they are simply added to the overall plans for Fujian, before submitting to the central government for the drafting of the national plan. As these plans covered essentially all aspects of economic activity in China at the time, MSL cities effectively possessed a level of autonomy that previously was only enjoyed by provinces. In particular, government revenues and expenditures of MSLs are only subject to the approval of the national government, and are no longer subject to oversight by provincial governments.

Table 1 lists the MSL cities and presents information on their population in 1985 as well as the years in which each city was granted MSL status. Of the 14 MSL cities, eight are provincial capitals. In addition, eight MSLs are either coastal cities or capital cities of coastal provinces, and the remaining cities are all located along the Yangtze River, with the exception of Xi'an. Finally, apart from Ningbo, Shenzhen, and Xiamen—which were relatively small when granted MSL status,

with populations of 520,000, 370,000, and 280,000, respectively—the remaining MSLs were all large cities with populations over one million. These facts suggest that when determining which cities would be granted MSL status, the central government may have deliberately chosen larger cities that enjoyed superior market access, natural endowments, and political status. Because these are all factors that may independently influence subsequent economic performance, we need to be careful in drawing causal inferences from this variation.

IV. EMPIRICAL STRATEGY AND DATA

To determine the impact of MSL status on city economic development, we estimate the following fixed-effect differences-in-differences regression model:

$$(1)\ Y_{it} = \alpha + \beta(MSL_{it}) + X_{it}\chi + C_i + T_t + \varepsilon_{it}$$

In this regression the dependent variable, Y_{it}, is the size of city i in year t, measured by industrial output or total employment; MSL_{it} is a dummy variable equal to 1 if city i has been granted MSL status by year t and 0 otherwise; X_{it} is a set of city level characteristics that vary over time; C_i is the fixed effect of city i; T_t is a fixed effect for year t; and ε_{it} is the error term. To determine whether MSL status affected a city's industrial output or employment growth rate we estimate the following model:

$$(2)\ y_{it} = \alpha + \beta(MSL_{it}) + \rho Y_{it-1} + X_{it}\chi + C_i + T_t + \varepsilon_{it}$$

In equation (2) y_{it} is the growth rate of city i during year t, measured by the growth rate of industrial output or total employment; Y_{it-1} is the size of city i in year $t-1$; and the remaining variables are defined as before. In both regressions,

the coefficient of interest is β, the coefficient on the MSL status indicator. If $\beta > 0$, MSL status increased the size or growth rate of a city, relative to cities that did not have MSL status.

The data for the analysis are from the *Statistical Yearbook of Chinese Cities* (1985-1994). We include in our sample the 159 cities that had been established as prefectural level cities by 1985. The main outcome variables are industrial output and total employment for each city in each year of the sample period (1985-1994), where the output value has been deflated to the 1980 price level. Unfortunately, we cannot use GDP to measure city size because the city-level GDP data did not become available until the late 1980s.

Among the city-level control variables, we include per capita government revenues and the ratio of government expenditures to revenues to capture the influence of access to fiscal resources on city development. Since it does not have to be "taxed" by the provincial government, an MSL city will potentially have access to more fiscal resources after MSL designation, and the greater availability of fiscal resources may then have a direct effect on the city's growth. But as such an impact is mechanical in nature and only reflects a transfer of economic resources, it is not the focus of our analysis, but is merely a variable for which we must control. We also include the number of technical personnel per thousand non-rural residents and college student enrollment per thousand non-rural residents to control for the city's level of human capital.

In addition to directly examining the effects of MSL status on output and

employment at the city level, we will also explore potential mechanisms through which MSL status affects economic performance. To do so we will use data on the number of telephones installed (normalized by non-rural population), area of paved roads (in kilometers squared), and the value of total fixed asset investment to measure the quality of a city's infrastructure. Finally, exports and total foreign direct investment (FDI) will be used to measure the degree of exposure to globalization.[2]

Table 3 presents the summary statistics of the main variables used in our analysis. A glance at the table reveals that MSL cities were substantially different from non-MSL cities in terms of industrial production, total employment, and the level of human capital, both when MSL policy was first implemented (1985) and when the policy was completed (1993). This suggests that MSL cities may have been inherently different from the non-MSL cities, even prior to the start of the policy experiment. While the use of city-level fixed effects allows us to control for unobserved differences across cities that are time invariant, it is possible that these initial differences may have afforded MSL cities a time-varying, dynamic advantage, which will bias upward our estimates of the effect of MSL status on local economic performance. To address this problem we will follow the method proposed by Altonji *et al* (2003) regarding selection based on observables. Specifically, we will match the MSL cities with subsamples of non-MSL cities that share various common observable characteristics. To the extent that these

[2] For some variables there are missing observations. Accordingly, the sample is not fully balanced in terms of city-years.

matched subsamples of non-MSL cities enjoy similar dynamic advantages as MSL cities (apart from MSL status), this approach will yield unbiased estimates of the effects of the MSL program on local economic performance, conditional on being within the subsample.

V. REGRESSION RESULTS

In this section we first present our baseline regression estimates of the effects of MSL status using the entire sample of prefecture-level cities. We will then turn attention to our estimates of the impact of MSL status using matched subsamples of comparable cities.

5.1 Baseline results

Table 4 presents our baseline estimates of the effects of the MSL policy using the complete sample of 159 prefecture-level cities. In columns (1) and (3), the dependent variables are the log of industrial output and the growth rate of industrial output, respectively, while in columns (2) and (4) the dependent variables are the log of total employment and the growth rate of total employment, respectively. Accordingly, columns (1) and (2) show the coefficient estimates of equation (1) while columns (3) and (4) display the coefficient estimates of equation (2). MSL status has a positive and significant effect on city development, except when the log of total employment level is the outcome variable (when the coefficient on MSL status is marginally significant, with a p-value of 0.119). The effects are also economically significant. The point

estimates indicate that having MSL status increases industrial output by 24.7 percent and total employment by 7.25 percent. In terms of growth rates, MSL status increases the industrial output growth rate by 21.3 percent and the employment growth rate by 8 percent. These are large effects, given that the average growth rates of industry output and employment for the sample are 11.78 percent and 6.84 percent, respectively.

The signs of other coefficients are also in line with expectations. A higher level of per capita government expenditure is positively and significantly correlated with industrial output (both its level and its growth rate), but is not correlated with either the level or growth rate of employment. The ratio of government expenditures to revenues has a significant and negative effect on all four outcomes, most likely reflecting the fact that cities tend to experience poor fiscal conditions (a higher expenditure/revenue ratio) and slow growth simultaneously. Curiously, however, the coefficients on our measures of human capital (population of college students per capita and technical personnel per capita) are negative but generally insignificant. We attribute this to the fact that when it comes to measuring the impact of human capital on economic performance, is not clear whether the per capita value or the total stock of human capital is what matters. If we use the total college student and technical personnel populations (not normalized by population), the coefficients become positive and generally significant (and the coefficients of the remaining variables remain quantitatively and qualitatively similar). Finally, in the growth rate

regressions (columns 2 and 4), the lagged values of industrial output and population have a negative and significant effect on their respective growth rates. This result is consistent with the convergence prediction of the Solow model.

5.2 Results using matched samples

To address the possibility that our baseline results are biased because MSL cities enjoyed inherent dynamic advantages relative to non-MSL cities we matched the MSL cities with comparable subsamples of non-MSL cities. Specifically, we use nine observable city-level characteristics to create nine matched subsamples of comparable cities: (i) cities located in coastal provinces, (ii) cities located along a coast line (i.e. sea port cities); (iii) cities located along a coastline or a major river; (iv) cities that have a colonial history; (v) cities that experimented with economic structural reforms before 1985; (vi) cities with industrial output levels exceeding RMB 2.35 billion in 1985, the industrial output level of Shenzhen 1985, which had the lowest output level among all MSLs; (vii) cities with a population of college students per thousand residents not smaller than Ningbo's in 1985, which had the lowest number of college students per thousand among all MSLs (i.e. higher human capital cities); (viii) cities that are not provincial capitals; and (ix) cities that were not MSLs by 1984. To the extent that these subgroups of cities enjoyed similar dynamic advantages as the MSL cities (apart from MSL status), difference-in-differences estimates of the effect of MSL status that use these matched subsamples should be unbiased, conditional upon being included within the subsample.

(1) Subsample of cities from coastal provinces

Eight of the fourteen MSLs are located in coastal provinces.[3] These cities may have experienced faster growth because their locations were advantageous to foreign trade and foreign investment. To control for this potential source of bias, we construct a subsample of cities from coastal provinces, which includes all MSLs and non-MSLs that are situated in the Chinese coastal provinces of Liaoning, Hebei, Shandong, Jiangsu, Zhejiang, Fujian, Guangdong, Hainan, and Guangxi.[4] Panel A of Table 5 displays coefficient estimates from regressions that use this subsample of cities. We find that the coefficient on MSL status continues to be positive and statistically significant in most specifications. The fact that the magnitudes of these coefficients are larger than those obtained using the full sample of cities suggests that positive effect of MSL status obtained using the full sample cannot be attributed to the fact that several MSL cities were located in coastal provinces.

(2) Subsample of coastal (i.e. sea port) cities

It is possible that the advantages of being a sea port are greater than the advantages of merely being within a province that has a coastline. Given that a large number of the MSL cities are sea ports, we also constructed a subsample of exclusively sea port cities. Coefficient estimates from estimating the impact of

[3] The coastal province MSL cities are Shenyang, Dalian, Qingdao, Nanjing, Ningbo, Xiamen, Guangzhou, and Shenzhen

[4] Our data set includes only two coastal cities in Hebei province (Tangshan and Qinhuangdao), and one in Guangxi province (Beihai). Accordingly we re-estimated the regressions excluding cities from Hebei or Guangxi province and found qualitatively similar results.

MSL status on economic performance using only sea port cities are shown in Table 5, Panel B. Once again, the coefficient on the MSL indicator is positive and significant in all specifications.

(3) Subsample of coastal (i.e. seaport) and riverside cities

In a similar fashion, one might suspect that being located close to any kind of waterway (either the ocean or a major river) may bias our estimates of MSL status on city growth, as all fourteen MSLs are located either along the coast or along a major river. To address this concern, we constructed a subsample of coastal and riverside cities, where coastal cities are those that are seaports and a riverside city is defined to be any city along one of the three major navigable rivers in China (the Yangtze River, the Yellow River, and the Pearl River).[5] Panel C of table 5 shows the coefficient estimates using this subsample. As before, the impact of MSL status is significant in most specifications.

(4) Subsample of cities with colonial history

We next consider the subsample of cities that have colonial histories. Specifically, we restrict attention to cities that had once been designated as concessions or leased territories, or had hosted foreign embassies or consulates during the late Qing dynasty but prior to the founding of the People's Republic of China. It is possible that because these cities were exposed to western economic or social influences in their pasts they potentially have better growth prospects (Jia 2012). This is a potential source of bias because thirteen of the fourteen MSL

[5] Because the Yellow River frequently dries up, we estimated these regressions excluding cities along the Yellow River and find very similar results.

cities in our sample can be classified as having had a colonial history. Panel D of Table 5 presents estimates of MSL status on economic development using this subsample of cities.[6] Once again, the MSL indicator is positive and statistically significant in all specifications.

(5) Subsample of pilot economic structural reform cities

In 1985, the same year that the Chinese central government detailed the policy advantages that would be enjoyed by MSL cities, another policy experiment began in which 72 cities were designated by the central government as the pilot cities that were allowed to experiment with structural economic reforms in a wide range of areas.[7] The objective of the experiment was to invigorate enterprises and let central cities play important role in economic development. The reforms included giving operational autonomy to enterprises over labor management practices, price setting, logistics, and finance; allowing markets to play a more important role; and giving local governments more autonomy over their revenues and expenditures. As all 14 MSLs were included among the pilot reform cities, it is possible that these urban reforms rather than

[6] The MSLs with colonial history are Harbin, Changchun, Shenyang, Dalian, Nanjing, Ningbo, Xiamen, Qingdao, Wuhan, Guangzhou, Shenzhen, Chongqing, and Chengdu; while the non-MSLs with colonial experience include Fushun, Benxi, Anshan, Yingkou, Tieling, Siping, Qiqihaer, Fudanjiang, Suzhou, Zhenjiang, Hangzhou, Wuhu, Fuzhou, Jiujiang, Yantai, Shashi, Yueyang, Zhanjiang, and Kunming.

[7] The 72 pilot cities for economic structural reform were Shijiazhuang, Tangshan, Handan, Qinhuangdao, Taiyuan, Huhehaote, Baotou, Shenyang, Dalian, Dandong, Yingkou, Fushun, Changchun, Siping, Jilin, Haerbin, Qiqihaer, Jixi, Mudanjiang, Jiamusi, Nanjing, Changhzou, Hangzhou, Ningbo, Wenzhou, Huzhou, Hefei, Bengbu, Nanchang, Jingdezhen, Pingxiang, Jiujiang, Jinan, Weifang, Qingdao, Zhengzhou, Kaifeng, Luoyang, Luohe, Anyang, Wuhan, Shashi, Xiangfan, Changsha, Hengyang, Guanghzou, Foshan, Jiangmen, Zhanjiang, Nanning, Liuzhou, Chongqing, Chengdu, Zigong, Panzhihua, Deyang, Leshan, Guiyang, Zunyi, Duyun, Kunming, Dali, Xi'an, Baoji, Lanzhou, Tianshui, Xining, Yinchuan, and Wulumuqi.

the MSL policy itself drove city growth.[8] To test for this source of bias, we created a subsample of cities that includes only the 72 pilot reform cities. As shown in Panel E of Table 5, the coefficient on the MSL indicator remains positive and significant in all specifications.

(6) Subsample of cities with an industrial base larger than Shenzhen in 1985

Our next subsample includes all prefectural level cities that produced industrial output of at least of RMB 2.36 million in 1985, which was the industrial output of Shenzhen, the smallest MSL at the beginning of the policy experiment. Our objective here is to construct a control group of non-MSL cities that had a reasonably large industrial base at the beginning of the sample period. To the extent that the size of the initial industrial base determines future growth, this will help match MSL cities with non-MSL cities that had a similar level of industrial production (and therefore may have had similar dynamic advantages with respect to industrial production). Coefficient estimates obtained using this subsample are shown in Panel F of Table 5. As before, MSL status continues to have a positive and statistically significant impact on city-level economic development in all four specifications.

(7) Subsamples of higher human capital cities

Glaeser and Saiz (2004), among others, have argued that human capital plays

[8] Although Shenzhen was not included in the list of reform pilot cities issued by the central government, the latter issued notice regarding the implementation of the MSL policy emphasizing that all MSLs would be included in the pilot city list. Thus we include Shenzhen among the reform pilot cities, but excluding it from the reform pilot city list does not change our findings. To be consistent with our earlier analysis, we exclude the county level cities of Zunyi, Duyun, and Dali from the economic reform pilot cities.

an important role in driving urban growth. Table 3 shows that MSL cities had larger per capita college student population as well as larger per capita populations of technical personnel than non-MSL cities. These facts suggest that the initial level of human capital may have been higher in MSL cities, which may have conferred on these cities a dynamic advantage. To address this issue we estimate our regression model using two subsamples: (i) cities that had a population of college students per capita larger than Ningbo in 1985, the city that had the smallest per capita college student population among MSLs; and (ii) cities that had a population of technical personnel per capita larger than Xian in 1985, which had the smallest per capita technical personnel population among MSLs. As shown in Panels G and H, the coefficient on the MSL indicator is still positive and statistically significant in most of our specifications.

(8) Subsample of cities that are not provincial capitals

Of the 14 MSL cities, 8 (57 percent) are provincial capitals. In contrast, only 26 of the 155 (16.77 percent) of the non-MSL cities in the data set are provincial capitals. Our results may therefore be driven by the fact that MSL cities enjoy disproportionate political clout by virtue of their status as capital cities. Since political clout facilitates urban growth (as suggested by the empirical literature that finds a positive correlation between capital city status and urban development), this may bias our estimates of MSL status. Accordingly, we re-estimated our regression model using a subsample of cities that excluded capitals. As shown in Panel I, the coefficient on MSL status remains positive and

significant.

(9) Subsample of cities that attained MSL status after 1984

Of the 14 MSL cities in our sample, 7 had attained MSL status in 1984 or earlier. It seems possible that the original 7 MSL cities were selected because they were identified as having the greatest potential for economic growth. We therefore re-estimated our regression model excluding those seven original MSL cities. Our estimates of the impact of MSL status remain positive and statistically significant in most of our specifications (see Panel J).

In summary, the positive and significant impact of the MSL policy on city-level industrial output and employment is robust to the different matching criteria used.

VI. MECHANISMS THROUGH WHICH MSL STATUS AFFECTS GROWTH

Our findings so far indicate that MSL status caused faster economic growth. But through what channels did MSL status induce faster growth? In this section, we explore the specific mechanisms through which the MLS policy impacts city growth.

As discussed earlier, MSL cities were granted provincial-level autonomy over government finances, credit availability, infrastructure, and investment decisions. Accordingly, there are many channels through which MSL status may have affected economic performance.

One possible channel is fiscal. The autonomy granted by MSL status may have allowed MSL cities to reduce their tax burdens, which would in turn attract

investment, spurring output and employment. While we have data on city-level tax revenues, we do not have city-level GDP data, which makes it difficult to measure the overall tax burden. Accordingly, we measure the tax burden using two alternative measures: tax revenues divided by industrial ouput, and tax revenues divided by total employment. Table 6 shows regression results of the impact of MSL status on these measures of the tax burden, controlling for all the other variables included in our baseline specification from Section 5. The coefficient on MSL status is negative and statistically significant in these regressions, suggesting that MSL status may have aided economic growth by allowing local governments to reduce taxes.

MSL status may have also promoted economic growth by encouraging local government officials to be open to more foreign trade and investment. Once again, data limitations make it difficult measure the extent of foreign trade and investment at the city-level. Data on foreign direct investment (FDI) and foreign trade are only available at the county level. Accordingly, we use county-level FDI and trade data to proxy for their city-levels. While this is a possible source of measurement error, we do not believe it to be too severe because most FDI and foreign trade take place within the central city of a county. Columns (1) and (2) of Table 7 show the estimates of the effect of MSL status on FDI and foreign trade, again controlling for all the variables included in our baseline specification. The estimates indicate that MSL status had no effect on foreign trade and a negative effect on FDI. While these results suggest that this international openness

channel played no role, we would urge caution in interpreting these results on account of the measurement error problems noted earlier.

A final channel through which MSL status may have affected city development is through local infrastructure and public goods. It is possible that the autonomy granted by MSL status allowed local governments to improve the provision of basic public goods like roads, telecommunications infrastructure, or fixed investment, which in turn facilitated economic growth. To examine this possibility, we collected data on area of paved roads, total number of telephones installed, the level of fixed-asset investment at the city level (including both public and private investment), and the size of each city's capital stock.[9] As shown in columns (3) through (6) in Table 7, MSL status did not affect either the area of paved roads nor the number of telephones installed, but it did weakly increase fixed investment and the size of a city's capital stock. This suggests that the growth of MSL cities can be partly attributed to increased investment in public infrastructure.

VII. CONCLUSIONS

Using prefecture-level city data from 1985 to 1993, this paper analyzes the effects of a Chinese decentralization experiment—the Municipality Separately Listed (MSL) policy—on city growth. Past studies have shown a mixed relationship between decentralization and local economic performance. To some

[9] We use the perpetual inventory method developed by Goldsmith (1951) to obtain estimates of the fixed asset stock. Here we assume that the fixed asset stock in 1985 was 10 times of fixed asset investment in that year. Then the fixed asset stock in any later year is the fixed asset investment in that year plus 90% fixed asset stock of the previous year. This implies that we assume a discount rate of 10%.

extent, this ambiguity is due to the fact that measures of decentralization are endogenous. The quasi-experiment of the MSL policy allows us to more cleanly identify the impact of decentralization

Our fixed effect panel regression estimates show a positive and significant relationship between MSL policy and city growth. However, because MSL cities may have enjoyed inherent advantages relative to non-MSL cities, we constructed several matched samples of comparable cities that may have enjoyed similar advantages as the MSL cities, using an identification strategy inspired by Altonji *et al* (2003). We believe that this methodology helps us reduce the bias due to the fact that MSL status may be correlated with other factors that affect economic development. Regardless of the subsample used, we continue to find a positive, large, and statistically significant effect of MSL status on local economic development. These findings suggest that decentralization—at least in the context of this particular policy experiment—facilitated economic growth.

Finally, we also study the potential mechanisms through which MSL status improved local economic performance. We find that the MSL policy had a negative and statistically significant impact on our measures of the local tax burden and a positive and significant effect on fixed investment and the capital stock. MSL status did not increase foreign trade or the level of FDI. Additionally, MSL status does not appear to have induced an expansion of local public goods (roads and telephone lines), although we cannot rule out that part of the

increased in fixed investment is in public infrastructure. Accordingly, it would seem that the primary mechanism through which the MSL policy affected economic growth is by reducing the fiscal burden.

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Figure 1: Location of MSL cities in China

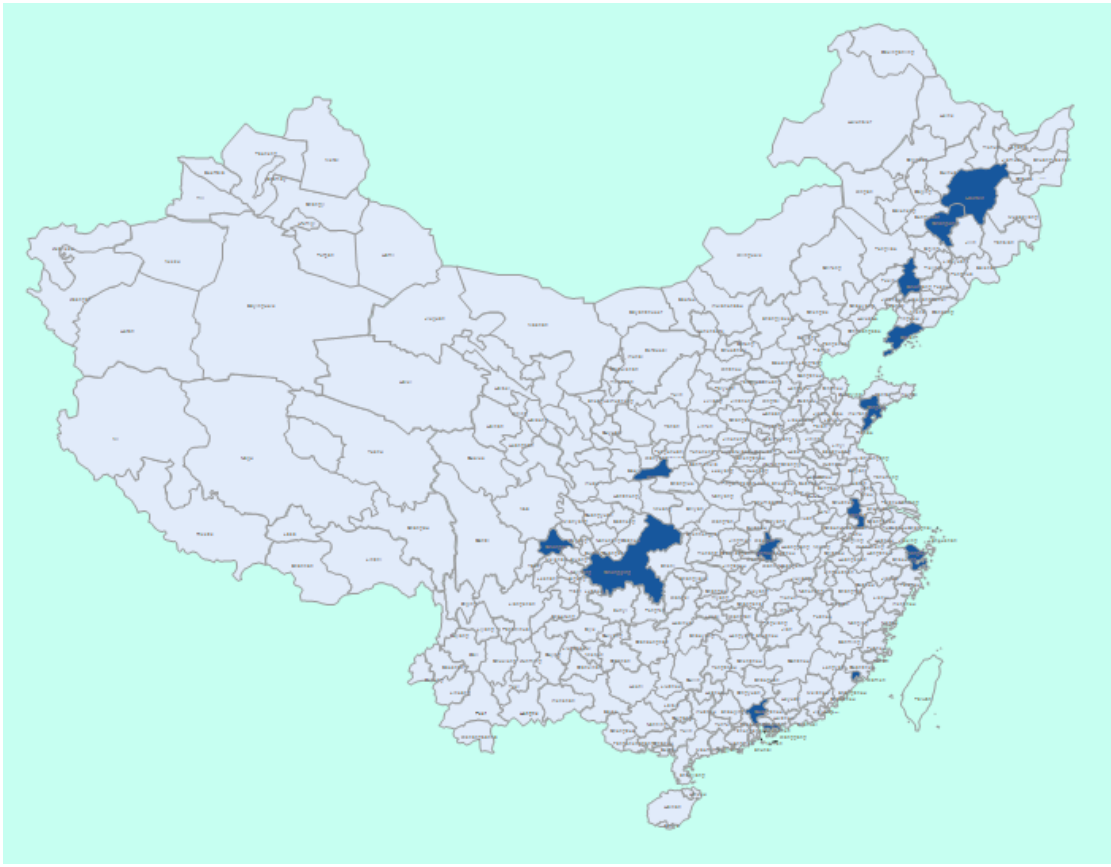

Table 1: MSL Cities

City	Year when MSL status granted	Year when MSL status removed	Population (in thousands) when MSL status granted
Chongqing	1983	1997	1,989.60
Wuhan	1984	1994	2,899.00
Shenyang	1984	1994	3,173.20
Dalian	1984	Remained MSL	1,334.30
Guangzhou	1984	1994	2,486.10
Xi'an	1984	1994	1,686.30
Haerbin	1984	1994	2,217.30
Qingdao	1986	Remained MSL	1,176.60
Ningbo	1987	Remained MSL	520.4
Xiamen	1988	Remained MSL	370.1
Shenzhen	1988	Remained MSL	280
Nanjing	1989	1994	2,061.70
Chengdu	1989	1994	1,687.00
Changchun	1989	1994	1,651.5

Data source: *China City Statistic Yearbook* from 1984 to 1995.

Table 2: Key variable names and their definitions

Variable	Definition
Output	Total industrial output value (in billions of constant RMB)
Employment	Total employment (in ten thousands)
Gov_percap	Government expenditure per non-farm resident
Ratio	Government expenditure divided by revenue
Students_percap	College students per thousand non-rural residents
Tech_percap	Technical personnel per thousand non-rural residents
FDI	Foreign direct investment (in constant RMB)
Exports	Value of exports (in thousands of constant RMB)
Roads	Total area of paved roads
Tel	Number of telephones installed
Capital	Fixed capital stock (in thousands of constant RMB)
Invest	New fixed capital investment (in thousands of constant RMB)

Table 3: Summary statistics on MSL vs. non-MSL cities in 1985 and 1993

	MSL in 1985	Non-MSL in 1985	t-statistic	MSL in 1993	Non-MSL in 1993	t-statistic
Output	78.88	20.11	11.12**	209.86	52.53	11.57***
	(44.14)	(17.02)		(98.42)	(47.45)	
Employment	80.50	24.80	10.48***	142.87	40.49	14.33***
	(42.05)	(17.51)		(61.94)	(23.75)	
Gov_percap	458.72	281.11	2.21**	1602.63	935.38	3.00***
	(669.12)	(241.69)		(2202.17)	(533.59)	
Ratio	0.46	0.79	1.64	0.69	0.96	1.46
	(0.20)	(0.81)		(0.13)	(0.73)	
Students_percap	119.07	218.78	3.51***	271.75	138.45	4.34***
	(24.69)	(9.27)		(32.77)	(9.61)	
Tech_percap	4162.14	3374.53	10.23***	6340.50	4698.09	12.05***
	(412.912)	(139.29)		(555.58)	(204.07)	
FDI	4328.60	633.06	4.02***	54096.87	10507.80	6.85***
	(8904.70)	(1375.60)		(47676.96)	(20515.90)	
Exports	44371.33	16563.83	3.81***	465741.90	137228.40	3.10***
	(37375.64)	(27432.43)		(477092.60)	(395375.10)	
Roads	477.40	141.54	9.99***	968.73	298.94	9.87***
	(255.50)	(117.69)		(388.34)	(252.94)	
Tel	58651.07	12331.73	12.62***	327177.30	83197.86	10.41***
	(31771.59)	(11268.17)		(192983.70)	(74297.26)	
Capital	1582105.00	428060.60	8.82***	2638732.00	726565.20	9.66***
	(790183.90)	(477051.50)		(1341430.00)	(699860.10)	
Investment	158234.80	42975.41	8.82***	593918.10	161069.60	10.83***
	(78986.98)	(47660.76)		(301575.80)	(135738.60)	
Number of cities	14	145		14	145	

Note: Standard errors in parentheses. Data sources: *China City Statistic Yearbook* from 1985 to 1994.

Table 4: Baseline regression results using full sample of cities

	(1) Log(Output)	(2) Log(Employment)	(3) Output growth rate	(4) Employment growth rate
MSL	0.247***	0.0725	0.213**	0.0797*
	(0.0733)	(0.0657)	(0.0853)	(0.0431)
Log(Govt_percap)	0.143***	-0.0152	0.131***	0.00331
	(0.0465)	(0.0401)	(0.0499)	(0.0319)
Ratio	-0.0124	-0.0120	-0.0105	0.000979
	(0.0208)	(0.0164)	(0.0183)	(0.00901)
Log(Student_percap)	-0.00821	-0.0558**	-0.00816	-0.0357**
	(0.0248)	(0.0235)	(0.0286)	(0.0152)
Log(Tech_percap)	-0.0223	-0.0395	-0.00115	0.0178
	(0.0254)	(0.0257)	(0.0258)	(0.0174)
LagLog(Output)			-0.953***	
			(0.179)	
LagLog(Employment)				-0.408***
				(0.0561)
N	1,247	1,247	1,113	1,113
R-squared	0.892	0.939	0.523	0.384

Note: Robust standard error in parentheses. *, **, and *** denote statistical significance at 10%, 5% and 1% levels, respectively. Year fixed effects and city fixed effects are included.

Table 5: Regression results using matched subsamples of cities

Panel A: Cities in coastal provinces

	(1)	(2)	(3)	(4)
MSL	0.238**	0.0971	0.243*	0.108*
	(0.101)	(0.0899)	(0.127)	(0.0624)
Observations	503	503	449	449
R-squared	0.826	0.943	0.562	0.383

Panel B: Coastal cities (i.e. seaport cities)

	(1)	(2)	(3)	(4)
MSL	0.313**	0.218*	0.0562	0.190**
	(0.129)	(0.116)	(0.0678)	(0.0875)
Observations	314	314	281	281
R-squared	0.968	0.96	0.435	0.344

Panel C: Coastal and riverside cities

	(1)	(2)	(3)	(4)
MSL	0.218***	0.117	0.0685*	0.100*
	(0.117)	(0.105)	(0.0818)	(0.0861)
Observations	334	334	299	299
R-squared	0.969	0.946	0.444	0.342

Panel D: Cities with colonial histories

	(1)	(2)	(3)	(4)
MSL	0.247**	0.122**	0.201	0.119***
	(0.0994)	(0.0584)	(0.124)	(0.0397)
Observations	295	295	262	262
R-squared	0.705	0.964	0.555	0.36

Panel E: Structural economic reform pilot cities

	(1)	(2)	(3)	(4)
MSL	0.239***	0.109*	0.207**	0.0657*
	(0.0739)	(0.0575)	(0.0857)	(0.0351)
Observations	623	623	555	555
R-squared	0.842	0.95	0.548	0.314

Panel F: Cities with industrial production larger than Shenzhen in 1985

	(1)	(2)	(3)	(4)
MSL	0.229***	0.141**	0.196*	0.115***
	(0.0850)	(0.0678)	(0.106)	(0.0438)
Observations	477	477	424	424
R-squared	0.663	0.959	0.562	0.482

Panel G: Cities with college student per thousand larger than Ningbo in 1985

	(1)	(2)	(3)	(4)
MSL	0.230***	0.0509	0.204**	0.0710*
	(0.0750)	(0.0647)	(0.0871)	(0.0409)
Observations	937	937	839	839
R-squared	0.868	0.933	0.530	0.373

Panel H: Cities with technical personnel per thousand larger than Xi'an in 1985

	(1)	(2)	(3)	(4)
MSL	0.242***	0.0702	0.212**	0.0821**
	(0.0736)	(0.0654)	(0.0866)	(0.0433)
Observations	1123	1123	1003	1003
R-squared	0.886	0.940	0.520	0.398

Panel I: Cities that were not provincial capitals

	(1)	(2)	(3)	(4)
MSL	0.520***	0.273**	0.178*	0.219**
	(0.129)	(0.114)	(0.105)	(0.0853)
Observations	1,013	1,013	905	905
R-squared	0.953	0.897	0.529	0.393

Panel J: Cities that attained MSL status after 1984

	(1)	(2)	(3)	(4)
MSL	0.258***	0.0710	0.0861**	0.0713*
	(0.0712)	(0.0657)	(0.0427)	(0.0425)
Observations	1,184	1,184	1,057	1,057
R-squared	0.958	0.919	0.532	0.383

Note: Robust standard errors in parentheses. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively. Control variables are the same as the baseline model.

Table 6: MSL status and the tax burden

	Tax revenues to output	Tax revenues to employment	Growth rate of tax revenues to output	Growth rate of tax revenues to employment
MSL	-0.400***	-0.233***	-0.348***	-0.203***
	(0.0614)	(0.0487)	(0.0872)	(0.0526)
Observations	1,261	1,261	1,126	1,126
R-squared	0.614	0.831	0.488	0.504

Note: Robust standard errors in parentheses. *, **, and *** denote statistical significant at 10%, 5%, and 1% levels, respectively. Control variables are the same as baseline model.

Table 7: MSL status and trade, public good provision, and infrastructure investment (all variables in logs)

	FDI	Exports	Roads	Tel	Capital	Invest
MSL	-0.741***	0.131	0.144	0.0302	0.0618*	0.1806**
	(0.261)	(0.159)	(0.218)	(0.0939)	(0.0364)	(0.0907)
Observations	1,032	1,254	1,261	1,261	1,253	1,249
R-squared	0.705	0.886	0.611	0.905	0.893	0.892

Note: Robust standard errors in parentheses. *, **, and *** denote statistical significant at 10%, 5%, and 1% levels, respectively. Control variables are the same as baseline model.

Table 8: MSL status and trade, public good provision, and infrastructure investment (all variables in growth rates)

	FDI	Exports	Roads	Tel	Capital	Invest
MSL	-0.889**	0.0465	0.0758	0.0441	0.00303	0.1033
	(0.345)	(0.148)	(0.240)	(0.136)	(0.0227)	(0.1305)
Observations	844	1,119	1,122	1,126	1,118	1115
R-squared	0.467	0.385	0.684	0.357	0.382	0.155

Note: Robust standard errors in parentheses. *, **, and *** denote statistical significant at 10%, 5%, and 1% levels, respectively. Control variables are the same as baseline model.