Journal of Systems Science and Information
June, 2015, Vol. 3, No. 3, pp. 193–213
DOI: 10.1515/JSSI-2015-0193

Can Financial Shortages in China's Education Be Contagious?

Jiafeng GU
Institute of Social Science Survey, Peking University, Beijing 100871*, China*
E-mail: isssgujf@pku.edu.cn

Tiyan SHEN
School of Government, Peking University, Beijing 100871*, China*
E-mail: tyshen@pku.edu.cn

Jiadong ZHANG
School of Software and Microelectronics, Peking University, Beijing 100871*, China*
*E-mail: zhangjiadong*1988*@gmail.com*

Abstract The full models are estimated by spatial econometric models using county-level data from 1513 Chinese counties. The results indicate the existence of spatial contagion effects among local governments with respect to spending on local education. Financial shortages in education tend to be contagious; they affect counties or regions in geographic proximity. Contagion occurs due to three different fundamental causes: Intergovernmental competition, political economy and neighborhood watch. The possibility of contagion depends strongly on education investment, financial and economic conditions, cultural diversity, urban/rural distribution, and population structure. Poor counties are much more likely to become "infected" by neighboring financial behavior in education. The empirical evidence suggests that the speed of contagion is faster in economically underdeveloped areas than in economically developed areas.

Keywords education expenditure; financial shortage; contagion; spatial econometrics; Moran's I

1 Introduction

The shortage of public funds for education is well chronicled in studies and articles ranging from diverse sources such as the *Economics of Education Review*, to monthly magazines such as *Reader's Digest*[1]. In some countries, years of insufficient investment in education have led to rundown facilities, unmotivated teachers, and poor student learning outcomes[2]. However, it's not easy to fight against financial shortages in education because of the contagion phenomenon. A financial shortage in education in one area may bring about the onset of financial shortage in a nearby area within a short period of time[3]. Financial shortages would spread to neighboring counties that are strongly dependent and closely connected to one another[4]. The phenomenon has led some to conclude that the financial shortages in education are susceptible to contagion[5].

Received June 11, 2014, accepted September 2, 2014
Acknowledgments: Special thanks go to Zuoquan ZHAO and Yaojun ZHANG for general guidance and specific comments. All remaining errors and omissions are our own.

Before 1997, the term "contagion" usually referred to the spread of a medical disease. However, many countries have been mired in economic recession since 2007 and the cuts in government spending on education as a result of the global economic crisis triggered a massive financial crisis in education. For example, 2.6 million children now attend schools in districts that are in financial jeopardy in the state of California in the US[1]. In Europe, the education system has been confronted with new cuts since 2009 in almost half of the countries including Austria, Finland, Germany, Ireland, Italy, Moldova, Norway, Poland, Spain, and the UK according to EI survey[2]. In some countries of the Asia-Pacific region, including countries such as China, India, Fiji, Mongolia, Pakistan, Philippines and Thailand, governments have increased investments in education, while even in many regions of those countries, educational investments have been insufficient and vulnerability remains high. Some districts are even on the brink of financial crisis in education[6]. It seems that financial shortages in education spread throughout the world like a contagious disease. Though interest in contagion in social field surges after a series of social crises since 1997[7], there is little analysis of why financial shortages in education in one area can spread spatially.

2 Overview of Literature and Rationale for Study

Public expenditure on education is one indicator of the political priority of education in national policy. The UN recommends that governments spend at least six percent of their GDP on education[3]. Note that the Conference committed to 6% of GNP. In most Asian and Pacific countries, public spending on education in 2008 ranged from 2.0% to 6.0% of GDP. Thus, public expenditure on education as a percentage of GDP falls below the 6% threshold for most countries in the region. The recommended proportion of total government expenditure allocated to education is 15% to 20%[4]. Among Asian and Pacific countries and territories where data are available for 2008, most allocated 10% to 20%[8]. Even in those countries, the local governments in some regions have no fiscal space to use fiscal stimulus to fight the growing fund shortage in education. The challenge of the growing fund shortage threatens the whole education community. It increases the job stress of teachers and administrators alike. It leads to increased staff turnover, undermines curriculum quality, thereby exacerbating the education inequity. Most of all, the shortage of public funds hurts children by forcing too many students into few classroom. The EFA Global Monitoring Report 2011 noted that "chronic underfinancing is a guaranteed route to failure[5]". In view of this pending crisis, countries try their best to fight against the growing shortage of funds in education and this issue becomes one of their nations' highest public policy priorities[9].

[1]The data comes from the website: http://www.cde.ca.gov/nr/re/ht/fe.asp.

[2]http://download.ei-ie.org/Docs/WebDepot/Report_of_the_EI_Survey_on_the_Impact_of_the_Global_Economic_Crisis_on_Education_en.pdf.

[3]UNESCO and CONFINTEA VI, Harnessing the Power and Potential of Adult Learning and Education for a Viable Future: Belem Framework for Action, Para. 14a, p. 5. Available at: www.unesco.org/ fileadmin /MULTIMEDIA/INSTITUTES/UIL/confintea/pdf/working_documents/ Bel%20Framework_Final.pdf.

[4]Oslo Declaration, UNESCO and the High Level Group meeting on Education for All (EFA). Available at: http://www.unesco.org/education/Oslo_Declaration_final_17dec08.pdf

[5]UNESCO, *The Hidden Crisis: Armed Conflict and Education*, Education for All Global Monitoring Report 2011 (Paris, 2011), p. 101.

Numerous studies have explored how various characteristics of countries or regions influence the allocation of public educational funds[10]. It has long been believed that the prospect for fund shortage in education is a function of the specific characteristics prevailing in individual countries or regions, disregarding the potential influence of regional factors and the spatial context. This assumption is highly questionable. Instead of acting with greater autonomy, there are theoretical reasons to support that local jurisdictions are responding to the choices of neighboring jurisdictions in setting the level of their own education expenditures, so that one observes spatial contagion of education financing among those nearby jurisdictions[11]. As proved by the policy spillover model, the shortage of public funds in education could spread across the administrative boundaries of one jurisdiction and affect the expenditure of neighboring jurisdictions, which is similar to the spreading patterns of a medical disease or a financial crisis[12]. The yardstick competition theory also shows that fiscal policies of neighbors are crucial and jurisdictions tend to mimic each other, which causes contagion in education financing[13]. In other words, the contagion pattern of financial shortage in education strongly suggests that the risk of fund shortage in education is not determined merely by attributes of individual jurisdictions, and that regional factors and events in neighboring jurisdictions can influence the prospects for financial shortage in education.

Recently we have seen the advent of spatial contagion theory as a way to look afresh at the patterns and causes of social phenomena. Many contagion phenomena that social scientists study entail substantively important spatial interdependence[14]. Local policies are interdependent and contagious where fiscal decisions strongly link economic growth and distribution[15]. Solé-Ollé presents a framework for measuring contagious spillovers resulting from local expenditure policies and estimates a reaction function with interactions between local governments[16]. The contagion in public expenditures will assume positive/negative values as a result of contagious spillovers depending on the pattern of complementarity or substitutability among local public services. The contagion in local expenditures among neighboring political units can be spatially interdependent due to spillovers, cooperation effects, competition effects or mimicking[17]. Despite considerable, albeit anecdotal, evidence that financial shortages in education are contagious, there appears to be no literature that directly addresses the question of whether and, if so, why financial shortages in education tend to spread.

There is still no firm consensus on the appropriate definition of contagion in social science[18]. Suliman defines contagion as a transmission of unanticipated shocks from one country to another. Here we define contagion as the spread of financial shortage in education from one local jurisdiction to neighboring jurisdictions[19]. The fight against fund shortage in education implies strategic and non-strategic interdependence in local jurisdictions' policymaking. The so-called spatial contagion theory of education financing is clearly associated with the spatial competition literature incorporating the spatial dimensions of the data underlying the empirical analysis[20]. The spatial contagion theory of financial shortages in education does include some important dynamic mechanisms in the process of regional education policies. The policies in one region depend on occurrences in other regions. We test the contagion hypothesis that in their decisions on public education spending, local governments take into account the decisions of neighbors. We focus mainly on spatial interactions in educational financing between neighboring counties

and expose the practical and theoretical underpinnings of indigenous and contagious systems of educational financing, ignorance of which limits the value of the governments' treatment to contain financial shortages in education and stifles beneficial collaboration. To this end, we propose two major research questions:

How to detect the contagion of financial shortages in education and what are the main features?

What are the mechanisms for the spread of financial shortages on education from neighbor to neighbor and how to contain the contagion?

We use the education expenditures data and demographic and socioeconomics data of 1513 counties in China in 2000 to investigate the inherently spatial contagious dynamics behind the public education expenditure determination in China. The two central dilemmas in educational financing limited fiscal resource and increasing education expenditure become ever greater issues for developing countries as well as those under economic transitions. It's a local issue. However, it's a global challenge for those countries. Developing countries and economically transitioning countries share the same pressure from financial shortage in education. Despite those countries' efforts to allocate more resources to education, the financial shortage in education remains, with no exception of China. It was reported that the financial deficit at China's county level exceeded 40% and in some western provinces it exceeded 60% (INFORMATION GUIDE 2005). Severe fund shortages call for an active role of the local governments and the central government as well. Against this backdrop, the experiences of China may be used as an example to fight against financial shortages in education.

Besides traditional OLS regression method, we use the spatial econometrics method to estimate the spatial interactions among neighboring counties. Spatial econometrics is a subfield of econometrics that deals with the treatment of spatial interaction (spatial autocorrelation) and spatial structure (spatial heterogeneity) in regression models for cross-sectional and panel data and is widely applied in the research of social science recently[21]. Spatial probit models are also used to investigate the mechanisms of contagion[22]. The paper is organized as follows: Section 3 presents the method including data and empirical models; Section 4 presents the results and section 5 discusses the results and concludes.

3 Method

3.1 Data, Sample and Variables

As the primary providers of public services, county governments in China shoulder majority of the responsibilities of providing local education. Whether the county-level governments have sufficient fiscal resources and motivations to deliver these public services determines the development level of local education. Oi suggests that the variation across counties in China is even larger than that across provinces, so it's important to investigate the behavior of counties[23]. Given the growing accessibility of systematic county-level data, there have been increasing efforts in and outside China to understand the governments' spending behavior at county level recently. This study will also join this course of county-level analysis, with the aim to find out how spatial structure affects county governments' spending behavior in education and whether it motivates them to devote limited resources to education which exacerbates the contagion in

financial shortages of education. County data make it possible to explore detailed geographic patterns as well as to obtain a large number of cross-sectional observations in education finance field. Moreover, from a practical standpoint, the county may be the best proper spatial unit of analysis for determining local education expenditure in Chinese county-oriented rural compulsory education finance system.

The financial shortage is displayed by the low proportion of the government appropriation for education in financial expenditure and the low proportion of the budgetary financial educational investment in GDP[24] and similar indicators were utilized in previous education expenditure determination studies[25]. The county-level education expenditure data are obtained from China Educational Finance Statistical Yearbook in 2001.

We also use county-level economic datasets retrieved from various sources for the spatial regression analyses in Section 4. These include indicators of economic performance such as GDP following conventional approaches[26]. The GDP data (10000 RMB) comes from the Data Sharing Infrastructure of Earth System Science. Two key indicators including total education expenditure per capita (1 RMB Yuan per capita) and total education expenditure (1000 RMB Yuan) are used to investigate the direct effects of governments' policies on financial shortages in education and those data come from China Educational Finance Statistical Yearbook in 2001. The amount of local government revenue has implications for the education expenditure and the local government revenue per capita (10000 RMB Yuan per capita) is used[26]. There are three demographic factors including the proportion of minority population, the proportion of non-agricultural population and elder population. All those data are retrieved from the County-level Census Data[27]. Poterba also used similar variables to investigate the determinants of education expenditure[28]. We select 1513 counties from 2074 counties in China because of the missing values for some counties. Table 1 presents summary statistics of the data set.

Table 1 Summary statistics

	Mean	Std.Dev.	Min	Max
proportion of government expenditure allocated to education	29.222	7.143	8.430	62.88
public education expenditure as a percentage of GDP	3.734	2.158	0.637	21.718
total education expenditure per capita	147.906	65.823	26.29	617.87
total education expenditure	66485.931	57420.308	1969	659886
Local government revenue per capita	0.021	0.015	0.002	0.179
GDP	251524.157	295949.548	4601	3417705
the proportion of minority population	15.480	28.417	0	99.28
the proportion of non-agricultural population	15.778	10.338	2.36	91.55
the proportion of elder population	6.811	1.623	1.4	13.82

3.2 Empirical Model

3.2.1 Spatial Autocorrelation Test

We use the spatial autocorrelation statistics to test the assumption that the local education expenditure can be influenced by neighboring regions[29]. In this study, Moran's I is used to test the spatial interactions of Chinese county-level education expenditure. For a row-standardized spatial weight matrix, Moran's I can be expressed as

$$I = \frac{N}{\sum_i \sum_j w_{ij}} \frac{\sum_i \sum_j w_{ij}(X_i - \overline{X})(X_j - \overline{X})}{\sum_i (X_i - \overline{X})^2}$$

where N is the number of spatial units indexed by i and j; X is the variable of interest; $\overline{X}$ is the mean of X; and w_{ij} is a matrix of spatial weights.

A spatial weight matrix is needed in the Moran's test[30]. This is an $N \times N$ positive and symmetric matrix that exogenously determines for each observation (row) which locations (columns) belong to its neighborhood. We construct contiguity-based spatial weights to describe the relationship among neighboring counties. To the contiguity-based spatial weights, weights are defined:

$w_{ij} = 1$ if $j \neq i$ and unit j is a "neighbor" of unit i. $w_{ij} = 0$, otherwise.

3.2.2 Spatial Regression Models

We first use the OLS model as a reference to estimate the determinants of expenditures and use the residuals from that model to test against spatial alternatives. Formally, the OLS model is defined as

$$Y = \alpha + X\beta + \varepsilon \tag{1}$$

where Y is an $N \times 1$ of observations which indicate education expenditures such as the proportion of government expenditure allocated to education and public education expenditure as a percentage of GDP; X is an $N \times 7$ matrix of explanatory variables including total education expenditure per capita, total education expenditure, local government revenue per capita, GDP, the proportion of minority population, the proportion of non-agricultural population, the proportion of elder population; ε is a vector of errors, β is the vector of regression parameters and α is the intercept parameter. N is the number of observations in the sample.

Incorporating spatial effects into the model presented earlier gives the following spatial lag model[31]. Formally, the spatial lag model is defined as

$$Y = \alpha + \rho WY + X\beta + \varepsilon \tag{2}$$

where WY is the spatially lagged dependent variable and ρ is the spatial autoregressive parameter.

To do sensitivity analysis, we also use spatial probit models. Spatial probit models take the general form of

$$y^* = \alpha + \rho W y^* + X\beta + \varepsilon \tag{3}$$

where y^* is the indicator and it is defined by

$$y^* = \begin{cases} 1, & \text{if } y > \acute{y} \\ 0, & \text{if } y \leq \acute{y} \end{cases}$$

$\acute{y}$ is the threshold value.

4 Results

4.1 Moran's I Test for Spatial Contagion

One of the most popular frameworks to test for spatial contagion is to examine the significance of the spatial correlation coefficients[32]. Here, the empirical examination of the evidence for contagion in educational financial shortage largely focuses on co-movements in educational financing. As illustrated in Table 2, the Moran's I of proportion of government expenditure allocated to education and public education expenditure as a percentage of GDP is 0.35 and 0.469 respectively and they are statistically significant ($p < 0.01$). It implies that 0.35 percent change in weighted average of the neighborhood counties' proportion of government expenditure allocated to education is associated with a one percent change in a county's proportion of government expenditure allocated to education. Similarly, it also implies that 0.469 percent change in weighted average of public education expenditure as a percentage of GDP is associated with a one percent change in a county's public education expenditure as a percentage of GDP. Those two coefficients are both statistically significant, which shows that there is a strong and significant co-movement in educational financial shortages among neighboring counties.

Table 2 Moran's I test

	Whole sample ($N = 1520$)	
	Moran's I	P Value
proportion of government expenditure allocated to education	0.3500	0.001
public education expenditure as a percentage of GDP	0.4690	0.001
total education expenditure per capita	0.5607	0.001
total education expenditure	0.5813	0.001
local government revenue per capita	0.4078	0.001
GDP	0.5668	0.001
the proportion of minority population	0.8217	0.001
the proportion of non-agricultural population	0.5432	0.001
the proportion of elder population	0.7721	0.001

The other results in Table 2 are consistent with the literature of contagion theory. The Moran's I values of all those variables such as economic, financial, population factors are statistically significant. If there is considerable spatial overlap among the co-movement of educational financing and these other variables, it's reasonable to say that contagion can occur due to a number of different fundamental causes. In other words, if two counties are located in the same geographic region, with many similarities, and with strong direct linkages through economic

and social system, they tend to be closely connected. If a county is in educational financial shortage, this increases the probability of neighboring counties being affected. It implies that the term contagion applies to the spread of financial shortage between two counties that are similar and closely linked.

The spatial contagion theory of how financial shortages in education are transmitted spatially can be divided into three mechanisms: intergovernmental competition, political economy and neighborhood watch. Competition among local governments in China is commonly referred to as the intergovernmental competition[33]. The intergovernmental competition alone and its implications for the local government's role in securing the education expenditures can lead to increased co-movement in educational financing. As early as 1979, China started to devolve government authority in the form of delegating fiscal and administrative powers from the central government to the provincial and lower level governments. Local governments were encouraged and rewarded by promoting the development of their local economies. The intergovernmental competition is said to promote diffusion of public policies by benchmarking with other neighboring governments, to minimize organizational costs of the public sector and to reinforce accountability. Unfortunately, this policy intensifies the intergovernmental competition, which has significantly reduced the transfer of resources from rich areas to poor ones. As a result, the inequity in public spending has increased dramatically, which made those poor areas more vulnerable to financial shortages in education.

Understanding the incentives that politicians have to spend on education in China seems particularly important because the behavior of local politicians in China affects the expenditures on education significantly. It's suggested that the Chinese Communist Party (CCP)'s cadre evaluation system, combined with China's geography-based governing logic, has motivated local administrators to compete with one another to generate high economic growth. The local cadres' thirst for the economic growth embedded in CCP institutions shows cases where cadre evaluation appeared to encourage strong economic performance by local level officials. Under the current cadre promotion system and driven by economic interests, local officials have strong preference on economic construction over public services including education.

Neighborhood watch is not just used in crime prevention field[34]. The broader and more inclusive definition was given by Mencius, an itinerant Chinese philosopher and sage, two thousand years before: To deal with the unexpected calamity, neighbors watch each other vigilantly. Local governments in their pursuit of maximizing their own interests may indulge in beggar-thy-neighbor policies and in the process may wittingly or unwittingly monitor the policies of neighbors[35]. Neighborhood watch might serve to increase the inflow of useful information from neighbors. An increase in information concerning adverse effects from its neighbors might lead to a greater number of interactions between itself and its neighbors. If the feedback from neighborhood watch is negative and there are financial shortages in education in those neighboring counties, the financial situation in education can spread quickly across borders. It's true because a large percentage of the rural population in China still lives below the poverty line and there is not enough economic development to support local education. Neighborhood watch in China is hard to escape the fatalism of "sharing the hardships not the comforts with neighbors", which can trigger contagion in financial shortages of education in those poor regions

more easily.

We ask whether this test and results are robust. Our primary concern here is that omitted variables such as economic fundamentals can cause spatial co-movement of educational financial shortage. As a consequence, the presence of contagion may not always be significant under different economic conditions. In order to address this problem of omitted variables, it is necessary to perform more restrictive tests. We divide the sample into five groups based on GDP per capita, with the top 20% named as "group 1", the next 20% named as "group 2", and so on down to the bottom 20% named as "group 5". We perform Moran's I test separately for those five groups to see what is the difference among them. The results of the sensitivity test are shown in Table 3. To all those five groups, the Moran's I value is statistically significant.

Table 3

	Moran's I Value (P Value)	
	proportion of government expenditure allocated to education	public education expenditure as a percentage of GDP
group 1	0.3153 (0.001)	0.2317 (0.001)
group 2	0.2163 (0.001)	0.4323 (0.001)
group 3	0.2403 (0.001)	0.4580 (0.001)
group 4	0.2957 (0.001)	0.2592 (0.001)
group 5	0.4087 (0.001)	0.3395 (0.001)

We have calculated a set of Moran's I values for two educational financing variables for our five group. We begin by asking whether the contagion in educational financial shortage would change under different economic conditions. Although all the Moran's I values of those two variables are statistically significant and indicate that the contagion in educational financial shortage really exists, the coefficients fluctuate between 0.2 to 0.5, which imply that the speed of contagion may be different under different economic conditions due to different degrees of intergovernmental competition, different feedback by neighborhood watch, or different political economies.

4.2 Spatial Determination of Financial Shortage in Education

Moran's I test can help detect potential contagion in educational financial shortage, but it is obviously not sufficient to determine causal relations, since it ignores the role of other potentially important factors that are likely to spread across counties. Hence, to assess whether spatial position and context variables in other counties influence the risk of contagion in educational financial shortage, we must consider a multivariate model of the likelihood of contagion that captures relevant county characteristics that may induce spatial contagion. Table 4 presents the results of the estimation of local education expenditures at county level in China. Model (1) and model (3) provide OLS estimates for comparison, while model (2) and model (4) provide estimates with spatial lag models (SLM). Proportion of government expenditure allocated to education is the dependent variable in model (1) to and model (2) and public education expenditure as a percentage of GDP is the dependent variable in model (3) to model (4).

Table 4 Results of regression in the whole sample

	proportion of government expenditure allocated to education		public education expenditure as a percentage of GDP	
variable	model(1): OLS	model(2): SLM	model(3): OLS	model(4): SLM
CONSTANT	32.045(34.031)***	60.106(7.882)***	4.982(22.61)***	2.387(9.95)***
total education expenditure per capita	0.024(6.834)***	0.017(5.479)***	0.016(6.248)***	0.014(18.829)***
total education expenditure	0.00005(7.32)***	0.00004(7.086)***	0.00001(7.236)***	1.032(4.438)***
local government revenue per capita	−179.686(−11.517)***	−139.786(−10.102)***	−51.079(−13.991)***	−41.854(−12.557)***
GDP	−0.000004(−3.2)***	−0.000004(−3.635)***	−0.000004(14.393)***	−0.000003(−12.567)***
the proportion of minority population	−0.027(−4.184)***	−0.015(−2.584)***	0.015(9.981)***	0.008(5.547)***
the proportion of non-agricultural population	−0.076(−4.101)***	−0.056(−3.442)***	−0.03(−7.012)***	−0.029(18.829)***
the proportion of elder population	−0.466(−3.915)***	−0.28(−2.684)***	−0.289(−10.349)***	−0.146(−5.579)***
ρ		0.53(18.766)***		0.453(17.526)***
R-squared	0.205	0.385	0.53	0.613
Log likelihood	−4947.86	−4795.86	4217.29	4345.36
AIC	9911.72	9609.73	−8418.57	−8672.72
SC	9954.29	9657.62	−8376	−8624.83
multicollinearity condition number	18.201		18.201	
Moran's I (error)	0.3231***		0.2949***	
Lagrange multiplier (lag)	415.965***		306.1***	
Robust LM (lag)	2.837*		12.617***	
Lagrange multiplier (error)	461.162***		383.983***	
Robust LM (error)	48.034 ***		90.5***	

Note: * Significant at 10%. ** Significant at 5%. *** Significant at 1%.

According to the Akaike Information Criterion (AIC) and R-squared value, spatial lag model is better than OLS model. All tests of Lagrange multiplier (lag), Robust LM (lag), Lagrange multiplier (error) and Robust LM (error) are significant, which means there is important information missing without incorporating spatial dynamics in estimating the financial shortage in education. Those results based on county-level dataset not only demonstrate significant geographic contagious patterns in education expenditures but also reveal the high degree of spatial correlation among counties. It reveals that the OLS coefficients are biased and/or inefficient in the presence of spatial correlation among the observed unit of analysis and spatial econometric models are preferred in estimating the financial shortage in education at county level.

Model (2) and model (4) in Table 3 present maximum likelihood estimates for the spatial lag models. The coefficients for the spatial lag term ρ are positive and significant. The main purpose to observe spatial contagion is satisfied because the estimations are able to deliver robust ρ as the coefficient of spatial autocorrelation in model (2) and model (4). The positive coefficients indicate that the likelihood of a financial shortage in education is higher if its neighboring counties have suffered the financial shortage in education. Meanwhile, the contagious impacts are not negligible. As illustrated in model (2), if there happens to be a financial shortage in education due to the low proportion of government expenditure allocated to education in one county, the possibility of the outbreak of educational financial shortage in its neighboring county is 53% in model (2). Correspondingly, if there happens to be a financial shortage in education due to the low public education expenditure as a percentage of GDP in one county, the possibility of the outbreak of educational financial shortage in its neighboring county is 45.3% in model (4).

When we coin the term "contagion from the neighbors", we are referring to the phenomenon whereby the local government in its own self-defense and as a means of maintaining its competitive positions and influence in intergovernmental competition is forced into mirroring the neighbors. The analysis of spatial lag term ρ, as reported in Table 4, makes it clear that we can reject the null hypothesis of no contagion effect due to intergovernmental competition. There are significant evidence here that local governments with neighbors in financial jeopardy are more prone to financial shortage in education than governments with neighbors that are healthy. In order to attract more foreign investment, local governments in China allocate a disproportional share of fiscal revenue to infrastructure and other productive goods and a smaller share to other public goods such as education, which would crowd out public spending on education. This pattern of intergovernmental competition in China is in essence rooted in the official appointment system and the performance evaluation system in which GDP is a critical factor. Local governments are motivated to engage in a GDP race to the top and overlook educational financing, which is forecasted by Bardhan[36] when he points out that fiscal decentralization could decrease social welfare.

Although there are reasons to treat intergovernmental competition as an important explanation for the contagion in financial shortage of education, it remains possible that economic, social and population factors have effects on the contagion due to the neighborhood watch mechanism. Any government, no matter what the political complexion of the neighborhood circumstances are, will be sensitive to threats to its competitive position and keep an eye on

what is happening in its neighbors. The incentive for this kind of neighborhood watch is clear. Wherever local governments perceive their position to be fragile or threatened, their decisions will be designed to diminish these threats by borrowing policies from their neighbors in order to undermine the strength of those neighbors. In the same way, it is plausible that all insecure governments regardless of the nature of neighborhood threat manifest common policy responses. Under certain conditions, neighborhood threat has an identifiable impact on government's spending patterns on education. These conditions involve the policy areas including education investment, financial and economic condition, cultural diversity, urban/rural distribution and population structure and the contagious effects can be manifested by those factors through the mechanism of neighborhood watch. The following results in Table 4 confirm the significance of the neighborhood watch.

The results in Table 4 show that counties with lower education investment have a higher probability of financial shortage in education than those counties with higher education investment because all the coefficients of total education expenditure per capita and total education expenditure are positive and statistically significant[6]. The lower the total education expenditure per capita or the total education expenditure is, the lower the proportion of government expenditure is allocated to education and the lower is the public education expenditure as a percentage of GDP, which means a higher risk of financial shortage in education. In other words, the risk of financial shortage in education is negatively associated with education investment.

The risk of financial shortage in education is positively associated with financial and economic conditions. The coefficients of local government revenue per capita and GDP are negative and statistically significant. Those phenomena need more explanation. The results show that financial and economic development at county level can decrease the proportion of government expenditure allocated to education and public education expenditure as a percentage of GDP. One explanation is the so-called "crowding-out" effect. In China, given the importance of local economic development, the local authorities are particularly sensitive to the possibility that they are perceived as policy laggard in economic growth. In China, it is politically damaging to be seen as a straggler compared to one's neighbors in developing local economy. As a result, counties are motivated to engage in the economic development race to the top. To accelerate the pace of economic development, local authorities allocate more financial resources to economic growth while the budget in education and health is cut. The investment in economic development crowds out the investment in education. As a result, though local government revenue per capita increases due to local economic growth, local government spends relatively less on education. In some counties, the massive government bailout plays a decisive role in developing the local economy while the educational investment is slashed.

The relationship between the risk of financial shortage in education and the proportion of minority population is mixed. The proportion of government expenditure allocated to education is negatively associated with the proportion of minority population while public education expenditure as a percentage of GDP is positively associated with the proportion of minority population. Both coefficients are statistically significant. China is a unified country with multi-

[6]Because we investigate financial shortage in education here, so all those coefficients in those regression models should be analyzed from the inverse direction.

ethnicities. Besides the Han ethnic groups there are 55 other ethnic groups, with a population of 104.5 million, which accounts for about 8.41% of China's total population according to the 2000 National Population Census. China has paid a lot of attention to the development of education for ethnic minorities. Earmarked funds have been appropriated to meet the financial needs of ethnic minority education. However, education in ethnic minority areas still lags far behind that of most other regions in China in almost every major aspect of educational development. The educational investment in ethnic minority is still low. As a result, the risk of financial shortage in education is high in ethnic minority areas. To make sure ethnic minority gets a good education, local governments are required to allocate more financial resources to education and public education expenditure as a percentage of GDP is high in ethnic minority areas.

The risk of financial shortage in education is positively associated with the proportion of non-agricultural population. The coefficient of the proportion of non-agricultural population is negative and statistically significant. In China, the urbanization of population is one of the key characteristics that determine the education expenditures at county level. The wide gap in real income between peasants and non-agricultural workers is a major incentive for agriculturalists to become urban workers. In China, one form of rural-urban migration is through the employment of rural residents in urban areas as "temporary" workers, contract workers or in the category of "both worker and peasants" in both the state and collective sectors. This kind of migration decreases the education expenditures at county level in rural area because the local financial income decreases as this kind of migration increases. Moreover, financial pressure is relieved by the initiative to build a new socialist countryside in 2006. One key to this new policy is to increase funding for rural education. The initiative changes the socio-geographical space of county level education expenditures and improves the educational investment significantly in rural areas of China.

The risk of financial shortage in education is positively associated with the proportion of the elderly population. The coefficient of the proportion of elderly population is negative and statistically significant. With the advent of the so-called "Generation War" between young and old in competing for limited fiscal resources, there has been widespread concern about the possible effects on education spending and on the justice of countries for providing support for their elderly population at the cost of education of the young[37]. The gray peril hypothesis assuming that there exists negative correlation between the share of the elderly population and educational spending is confirmed in some studies[38]. This hypothesis is confirmed in this study again.

4.3 The Sensitivity Analysis on Spatial Contagion

To check whether the effects of contagion dominate different parts of the sample, we split our sample into five groups according to economic development. The sample is divided into five groups based on GDP per capita, with the top 20% named as "group 1", the next 20% named as "group 2", and so on down to the bottom 20% named as "group 5". Correspondingly, spatial lag models (SLM) are applied from model (5) to model (9). The dependent variable is the proportion of government expenditure allocated to education. Table 5 reports the estimates for the risk of contagion in five models.

Table 5 Results of regression in different samples

	proportion of government expenditure allocated to education				
variable	model(5): SLM	model(6): SLM	model(7): SLM	model(8): SLM	model(9): SLM
CONSTANT	19.438(7.224)***	25.02(8.025)***	19.922(6.44)***	16.664(4.827)***	12.131(4.133)***
total education expenditure per capita	0.01(1.556)	0.032(4.294)***	0.008(0.943)	0.033(2.674)***	0.027(2.509)**
total education expenditure	0.00003(2.668)***	0.00003(1.59)	0.00006(3.164)***	0.00003(1.419)	0.0001(4.31)***
local government revenue per capita	−144.955(−5.939)***	−218.69(−6.409)***	−138.553(−5.259)***	−177.32(−2.583)***	−172.762(−1.968)**
GDP	0.000003(−1.515)	0.000006(0.754)	−0.00001(−1.73)*	−0.000007(−0.821)	−0.00003(−2.178)**
the proportion of minority population	0.0025(0.963)	−0.013(−0.736)	0.012(0.812)	−0.021(−1.615)	−0.022(−2.02)**
the proportion of nonagricultural population	−0.066(−2.092)**	−0.11(−3.122)***	−0.062(−1.66)***	−0.086(−2.07)**	−0.111(−1.74)*
the proportion of elder population	−0.095(−0.46)	−0.644(−2.823)***	−0.393(−1.607)	−0.642(−2.266)**	−0.269(−0.822)
ρ	0.453(17.526)***	0.262(3.576)***	0.436(6.24)***	0.505(7.806)***	0.566(9.509)***
R-squared	0.405	0.367	0.294	0.34	0.421
Log likelihood	−938.048	−942.94	−950.458	−970.373	−989.257
AIC	1894.1	1903.88	1918.92	1958.75	1996.51
SC	1927.52	1937.27	1952.34	1992.14	2029.94
sample	Group 1	Group 2	Group 3	Group 4	Group 5

Note: * Significant at 10%. ** Significant at 5%. *** Significant at 1%.

All those five models in Table 5 present maximum likelihood estimates for the spatial lag models. All coefficients for the spatial lag term ρ are positive and significant. The positive coefficients indicate that the probability of the financial shortage in education increases in one county when a financial shortage happens in neighboring counties. It seems that the sensitivity tests here confirm a key finding of this paper: namely a financial shortage in education elsewhere in the neighbors seems to significantly increase the odds of a shortage in the domestic education of the target county. However, these results do not allow us to distinguish among the various theories of contagion. For example, the empirical results give us less implication of the importance of individual channels through which contagion might occur. However, the results do provide some insights on the fact that the financial shortage in education in one county can affect other neighboring counties.

To eliminate side effects of intergovernmental competition, the Chinese central government established a transfer system in 1994 that has injected increasing funds to subnational treasuries and funded around 40% of subnational government expenditures. However, intergovernmental fiscal transfer does not necessarily guarantee local fiscal sufficiency in education. A large amount of special education subsidies has not been used in education but siphoned off to other uses like financing local governments' administrative costs and payments to local officials. Actually, China is far from unique in such kind of leakage. Comparative studies suggest that similar problems exist in other countries as well[39]. As long as there is loose management of transferred funds and inadequate monitoring, leakage is almost inevitable. Under the current cadre promotion system that is driven by economic interests, local officials have strong preference on economic growth over education. Local governments in China enthusiastically invest in economic growth. In comparison, there is no strong reason for local governments to spend on public goods and services including education. Hence, fiscal transfers are not the effective measure to deal with possible contagion in financial shortages of education and risks from contagion in educational financial shortages still exist, given the contending needs and limited resources.

Moreover, the results show that this speed of contagion well differs in different economic conditions. According to those models from model (5) to model (9) in Table 5, the coefficients are 0.453, 0.262, 0.436, 0.505 and 0.566, respectively. We find that economically underdeveloped counties are more exposed to contagion than economically developed counties. It confirms that poor counties are much more likely to become "infected" by the neighboring financial behavior in education. To those poor counties, contagion in financial shortage can occur due to the vulnerabilities in debt structures and financial systems of those counties. Those results are also compatible with theories that emphasize the information-coordination effect of education financial system through the mechanism of neighborhood watch. The evidence suggests that the speed of contagion is faster in economically underdeveloped areas than in economically developed areas. But, this does not mean that the developed counties are insulated from the financial shortage in education.

Table 6 Estimation results of spatial probit model

variable	proportion of government expenditure allocated to education		public education expenditure as a percentage of GDP	
	model(10): classic probit estimator estimation	model(11): marginal effects	model(12): classic probit estimator estimation	model(13): marginal effects
constant	0.172(0.871)		1.455(5.644)***	
total education expenditure per capita	0.005(6.603)***	0.002(6.624)***	0.014(10.223)***	0.003(10.243)***
total education expenditure	0.00001(5.165)***	0.000023(5.155)***	0.00004(13.591)***	0.00001(13.555)***
local government revenue per capita	−42.686(−9.157)***	−14.646(−9.249)***	−36.32(−7.306)***	−7.626(−7.317)***
GDP	−0.0000004(−1.698)*	−0.0000002(1.697)*	−0.00001(−16.994)***	−0.000002(−16.931)***
the proportion of minority population	−0.005(−3.497)***	−0.002(−3.499)***	0.008(4.323)***	0.002(4.326)***
the proportion of non-agricultural population	−0.015(−3.307)***	−0.005(−3.31)***	−0.03(−5.184)***	−0.006(−5.184)***
the proportion of elder population	−0.054(−2.144)**	−0.018(−2.143)**	−0.356(−10.536)***	−0.075(−10.534)***
correctly predicted	0.696		0.875	
Log likelihood	−904.707		−527.405	
LR test	258.527***		1036.171***	
Kelejian-Prucha(error)	13.638***		9.721***	
Pinkse (error)	193.055***		135.923***	
Pinkse-Slade (error)	191.104***		1023.073***	

Note: * Significant at 10%. ** Significant at 5%. *** Significant at 1%.

There is a large inequality in the distribution of spending on education across regions and across levels of education. The extent of the shortage of funds for education differs across the counties and the outcomes vary widely. The National Compulsory Education Programme promulgated in 1995 aimed at correcting for both discrepancies by targeting central education transfers to 592 poor counties (about one-fifth of all counties) and some other counties in the central and western regions, mandating compulsory education of 9 years in cities and 6 years in rural areas, guaranteeing teachers' salaries and providing free textbooks in many counties (including the poorest 592) from 2002. Such policy alleviates financial shortage in education to some extent. However, risks from contagion in financial shortage of education still remain, especially for poor counties. If some neighbors experience the financial shortages in education, it will spill over to other neighboring counties through intergovernmental competition, neighborhood watch or other cross-county linkages.

We perform further test based on spatial probit models in order to explore this issue. Spatial probit models that explicitly take into account of 'spatial' interactions among observed counties are particularly well-suited to study contagion, which by definition can only occur if there are interactions among subjects. Even if the financial shortages in education are contagious, contagion itself can only occur if there are interactions between counties. In model (10) and model (11), we use as our instrument a dummy variable that equals to 1 if proportion of government expenditure allocated to education is larger than 30% and 0 otherwise. In model (12) and model (13), we use as our instrument a dummy variable that equals to 1 if public education expenditure as a percentage of GDP is larger than 3% and 0 otherwise. If those two indicators are smaller than those threshold values, the counties are experiencing financial shortage in education.

The results in Table 6 are similar to the results in Table 4. It confirms that the spatial structure of contagion in financial shortage of education is robust. Our results confirm some previous findings in the literature: spatial probit estimates lend support in favor of the contagion hypothesis with intergovernmental competition and neighborhood watch as primordial transmission mechanisms. Additionally, our contribution highlights the statistical significance that economic development can't mitigate financial shortages in education and stop the contagion by itself. We must, however, point out that while there is empirical evidence that shows economic growth can't guarantee the increase of education investment at the same pace, it's not easy to reach a consensus on the role of economic growth on education financing. The idea that economic growth can stimulate government spending in education and can end the financial shortages in education has been disproved in many studies.

Since the economic reform 30 years ago, China's economic development has been miraculous. Its strong economic growth over the past 30 years (averaging more than 9 percent annually) is unparalleled in modern history. In monetary terms, China's progress in increasing education investment has indeed been remarkable. However, government spending on education has failed to match the pace of economic growth. It has not come close to meeting the demands of a compulsory education law introduced in 1986 that required local governments to ensure that all children receive nine years of free education. Nor has there been enough money to cope with the more than threefold increase in the number of tertiary students since 1999. As a proportion

of GDP, government spending on education hardly changed at all in the 1990s. A target set in 1993 of raising this to 4% of GDP by 2000 has not been reached until 2012. According to the OECD study, China's total spending on education, including both government and private as a proportion of GDP, was just ahead of India's. But it was lower than in several other Asian developing countries with a similar age structure, such as Thailand and the Philippines. Government spending in India was higher as a proportion of GDP than in China[40]. To fight against financial shortage in education is still an arduous task and the road is long.

Economics-in-command advocates the claim that the growth of economy can "inject" new stimulus into the education system, increasing education investment and therefore productivity. This raises an obvious question: Can educational projects that can hardly generate direct and instant benefits defeat economic projects, which are easily detectable and can more effectively demonstrate the "achievements" of local officials to their superiors and increase their chance of promotion when they have to struggle between limited resources and contending needs for money? As the primary providers of public services, county governments in China shoulder majority of the responsibilities of providing compulsory education[41]. Higher levels use control over officials' advancement to elicit compliance with economic targets. The system still focuses cadres' attention on economic growth and revenue generation. While cadres in county governments seek to fulfill the demands of the cadre evaluation system, they lack adequate revenues to fulfill their functions and expenditure responsibilities, creating a "revenue hunger" particularly at local government levels. As a result, performance criteria that conflict with revenue-generating activities are less likely to be implemented faithfully. Those investments that are in conflict with short-term economic growth and revenue generation are cut in order to spend more on economic activities. As Naughton and Yang[42] point out, "Each time the hierarchy gives priority to one objective, it temporarily draws resources away from other legitimate objectives." Unfortunately, there are always a lot of reasons for such bias toward economic growth even when education system is on the brink of financial crisis.

5 Discussion and Policy Implications

We attempt a synthesis of theoretical and empirical work on educational financial contagion. Although a professional consensus on the appropriate definitions of contagion in financial shortage of education has yet to emerge, we document substantial research progress towards this goal. At the theoretical level, the three mechanisms including intergovernmental competition, political economy and neighborhood watch are the key elements for understanding how contagious effects in education financing arise. On the empirical front, the results demonstrated the existence of some economic, social and population conditions that open the way for contagion of financial shortages in education. Our study investigates not only how these financial shortages in education are transmitted, but also whether environment variables coming from economic, social and population systems affect a county's vulnerability to this contagion. The analysis focuses on the spatial behavior of financial contagion in education, where financial shortages in education spread from neighbor to neighbor. The results indicate that a neighborhood effect is one of the strong determinants of which counties suffer from contagion. Environment features and institutional factors are also important besides the neighborhood effect. It is argued that

the focus on better understanding of financial expenditures data on education and decision-making at the local government level are promising avenues for understanding the transmission of financial shortages in education across neighboring counties.

Containing the likelihood of contagious financial shortages in education is a pressing policy issue at regional, national and international levels. Risks from contagion in financial shortages of education still remain, both for developing countries and for developed countries. If one region or country experiences a financial shortage in education, it will spill over to other neighbors easily. Therefore, government officials and policymakers should continue to take steps to strengthen individual education investment and the regional joint prevention mechanism in order to reduce the risks from contagion in the future. These steps can be classified into three categories: Better public policies, improved intergovernmental fiscal transfer strategies, and stronger network of neighboring cooperation. The incentive structure of local officials must be reworked by reforming the cadre management system to address the bias toward economic growth. The payment and management of fiscal transfers must also be strengthened so as to prevent the diversion of funds to unintended uses outside education field and create a favorable incentive structure for the improvement of education. At the same time, stronger cooperation with neighbors, including not only population migration and investment but also financial assistance, is tied inseparably to the regional joint prevention mechanism in order to reduce the chance of contagion in financial shortages of education.

Given the data and methodological limitations, this study can be improved in several ways. First, we use proportion of government expenditure allocated to education and public education expenditure as a percentage of GDP as the dependent variables. We try to find other indicators. However, much of this data is missing. In a subsequent study with better-balanced data, we will conduct a comprehensive analysis with more instruments to measure financial shortage in education. Second, spatial econometrics has its roots in the study of geography, so naturally these applications have typically used geographic notions of distance in their spatial model specification. However, there is no inherent reason for why spatial distance should be limited to geographic distance. If other distances such as social distance or economic distance can be used, it can give more insight on this issue. Third, not all counties are included in this research because of missing data. We intend to investigate all counties in China to avoid this sample selection bias in future research.

References

[1] Brown P H, Park A. Education and poverty in rural China. Economics of Education Review, 2002, 21(6): 523–541.

[2] Blankenau W, Camera G. Public spending on education and the incentives for student achievement. Economica, 2009, 76(303): 505–527.

[3] Wedgwood R. Education and poverty reduction in Tanzania. International Journal of Educational Development, 2007, 27(4): 383–396.

[4] Gu J F. Spatial dynamics and determinants of county-level education expenditure in China. Asia Pacific Education Review, 2012, 13(4): 617–634.

[5] Fleisch B. Primary education in crisis: Why South African schoolchildren underachieve in reading and mathematics. Cape Town: Juta and Company Ltd, 2008.

[6] Regional Report on Progress Towards Education for all in Asian and the Pacific. Bangkok: UNESCO, 2011.
[7] Angst C M, Agarwal R, Sambamurthy V, et al. Social contagion and information technology diffusion: The adoption of electronic medical records in US hospitals. Management Science, 2010, 56(8): 1219–1241.
[8] The Economic and Social Commission for Asia and the Pacific. Statistical Yearbook for Asia and the Pacific 2011. Bangkok, Thailand: United Nations Publication, 2011.
[9] Zhao L. Between local community and central state: Financing basic education in China. International Journal of Educational Development, 2009, 29(4): 366–373.
[10] Wolf F, Zohlnhöfer R. Investing in human capital? The determinants of private education expenditure in 26 OECD countries. Journal of European Social Policy, 2009, 19(3): 230–244.
[11] Ghosh S. Strategic interaction among public school districts: Evidence on spatial interdependence in school inputs. Economics of Education Review, 2010, 29(3): 440–450.
[12] Baicker K. The spillover effects of state spending. Journal of Public Economics, 2005, 89(2): 529–544.
[13] Giuliodori M, Beetsma R. On the relationship between fiscal plans in the European Union: An empirical analysis based on real-time data. Journal of Comparative Economics, 2008, 36(2): 221–242.
[14] Hondroyiannis G, Kelejian H H, Tavlas G S. Spatial aspects of contagion among emerging economies. Spatial Economic Analysis, 2009, 4(2): 191–211.
[15] Brown D S, Hunter W. Democracy and human capital formation: Education spending in Latin America, 1980 to 1997. Comparative Political Studies, 2004, 37(7): 842–864.
[16] Solé-Ollé A. Expenditure spillovers and fiscal interactions: Empirical evidence from local governments in Spain. Journal of Urban Economics, 2005, 59(1): 22–53.
[17] Geys B. Looking across borders: A test of spatial policy interdependence using local government efficiency ratings. Journal of Urban Economics, 2006, 60(3): 443–462.
[18] Pesaran M H, Pick A. Econometric issues in the analysis of contagion. Journal of Economic Dynamics and Control, 2007, 31(4): 1245–1277.
[19] Suliman O. The large country effect, contagion and spillover effects in the GCC. Applied Economics Letters, 2011, 18(3): 285–294.
[20] Gu J F. Spatial recruiting competition in Chinese higher education system. Higher Education, 2012, 63(2): 165–185.
[21] Anselin L. Spatial econometrics: Methods and models. Dordrecht: Kluwer Academic, 1988.
[22] McMillen D P. Probit with spatial autocorrelation. Journal of Regional Science, 1992, 32(3): 335–348.
[23] Oi J C. Fiscal reform and the economic foundations of local state corporatism in China. World Politics, 1992, 45(1): 99–126.
[24] Fox J, Bartholomae S, Lee J. Building the case for financial education. Journal of Consumer Affairs, 2005, 39(1): 195–214.
[25] Busemeyer M. Determinants of public education spending in 21 OECD democracies, 1980–2001. Journal of European Public Policy, 2007, 14(4): 582–610.
[26] Greenbaum R. A spatial study of teachers' salaries in Pennsylvania school districts. Journal of Labor Research, 2002, 23(1): 69–86.
[27] The Country-level Census Data. Beijing: China Staticis Press, 2000.
[28] Poterba J. Demographic structure and the political economy of public education. Journal of Policy Analysis and Management, 1997, 16(1): 48–66.
[29] McMillen D, Singell L, Waddell G. Spatial competition and the price of college. Economic Inquiry, 2007, 45(4): 817–833.
[30] Moran P A P. Notes on continuous stochastic phenomena. Biometrika, 1950, 37: 17–33.
[31] Getis A, Mur J, Zoller H. Spatial econometrics and spatial statistics. New Yord: Palgrave Macmillan, 2004.
[32] Albuquerque R, Loayza N, Servén L. World market integration through the lens of foreign direct investors. Journal of International Economics, 2005, 66(2): 267–295.
[33] Duncan R, Tian X. China's inter-provincial disparities: An explanation. Communist and Post-Communist Studies, 1999, 32(2): 211–224.

[34] Wong K C. Community policing in China: Philosophy, law and practice. International Journal of the Sociology of Law, 2001, 29(2): 127–147.

[35] Stiglitz J E. Beggar-thyself versus Beggar-thy-neighbor policies: The dangers of intellectual incoherence in addressing the global financial crisis. Southern Economic Journal, 1999, 66(1): 2–38.

[36] Bardhan P. Decentralization of governance and development. Journal of Economic perspectives, 2002, 16(4): 185–205.

[37] Fletcher D, Kenny L. The influence of the elderly on school spending in a median voter framework. Education Finance and Policy, 2008, 3(3): 283–315.

[38] Berkman M, Plutzer E. Gray peril or loyal support? The effects of the elderly on educational expenditures. Social Science Quarterly, 2004, 85(5): 1178–1192.

[39] Islam M N, Choudhury S A. Testing the exogeneity of grants to local governments. Canadian Journal of Economics, 1990, 23(3): 676–692.

[40] Challenges for China's public spending: Toward greater effectiveness and equity. Paris: OECD, 2006.

[41] Hiroshi S. Public goods provision and rural governance in China. China: An International Journal, 2008, 6(2): 281–298.

[42] Naughton B J, Yang D L. Holding China together: Diversity and national integration in the post-Deng era. New York: Cambridge University Press, 2004.