



Public education spending and private substitution in urban China[☆]

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ABSTRACT

This paper documents robust evidence that increases in public spending on basic education are associated with significant reductions in household private tutoring spending in urban China. This reduction comes primarily from the top and bottom income households, suggesting multi-dimensional demands for private tutoring. It concentrates on households with an only boy and is larger for middle-school than primary-school children. Increases in public education spending are associated with significant reduction in school tuition, which is homogeneous across households of different income levels. Changes in household spending on textbooks in response to more public education spending are modest but statistically insignificant.

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1. Introduction

Most governments devote considerable resources to provide universal basic education. Whether more public school spending leads to better educational outcomes is essential for education policy-making. Empirical studies aiming to estimate this causal relationship abound, but a consensus is lacking.¹ One confounding factor that has been little studied in the literature is the behavioral response of households to changes in public education inputs by varying their own inputs such as parents' time assisting children's school work and spending on learning materials and private tutoring (Todd and Wolpin, 2003). Todd and Wolpin point out that estimates based on the production function approach will capture a "policy-effect" that incorporates both a direct impact of school inputs on outcomes and an indirect impact through household responses to such inputs. Neglecting the latter is particularly

problematic for developing countries where household spending is an important contributing factor in the entire education system.²

This paper estimates the relationship between local government education spending and household education spending in urban China, which has arguably the largest basic education system in the world. We extract detailed information about household spending on public school tuition, textbooks, and private tutoring from the 2002–2006 Urban Household Survey data for households with children in compulsory education (primary and middle schools). The unique features of the decentralization system in China imply that municipal public education spending is not in response to household preferences. To deal with potential confounding factors that may be related to both public education spending and household spending, we estimate a model controlling for city and province-year fixed effects and a wide range of household and municipal characteristics; we also construct falsification tests to alleviate the concern that our estimates are driven by unmeasured contemporaneous changes in local economy or policies.

We have several robust findings. First, increases in public education spending are associated with significant decreases in household spending on public school tuition, a mandatory spending item; this decrease in tuition spending is homogeneous across income groups, suggesting

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¹ Hanushek (2002) and Glewwe et al. (2011) survey these studies in both developed and developing countries.

² Bray (2003) and Dang and Rogers (2008) are two recent surveys that summarize evidence on the prevalence of private tutoring in both developing and developed countries; also see Kim and Lee (2010) and references therein. Chi et al. (2011) document household education spending in urban China for 2007. These studies mostly investigate what household characteristics may affect household spending and do not consider the interaction with government inputs.

a lump-sum income transfer to households with school-aged children. Changes in household spending on textbooks, another mandatory item, are modest but not precisely estimated. Second, increases in public education spending are associated with significant decreases in household spending on private tutoring, a discretionary spending item, and the reduction comes primarily from the lowest and highest income households. This is consistent with predictions from a simple model where household demand for private tutoring may be multi-dimensional, some substitutes to public spending and others complements. While higher public school spending and better school teaching substitute basic education tutoring of all households, changes in demand for complementary tutoring vary depending on household income levels.

Third, urban households with an only girl spend more on private tutoring than those with an only boy, especially at the primary-school level; in addition, the reduction in household tutoring spending in response to higher public education spending concentrates on only-boy households, and it is much larger at the middle-school level. These findings suggest that the only-child policy may inadvertently contribute to gender equality in education in urban China. They are also consistent with the differential admission policies for middle school and high school.

This paper contributes to the growing literature that studies how changes in public education resources affect private inputs, in both time and money. Kim (2001), using PSID data, finds that increases in school expenditure lead to a reduction in childcare time of mothers with high-school education or less but no change for college-educated mothers, suggesting differential substitutability between school inputs and inputs of different types of parents. Houtenville and Conway (2008) find that parents appear to reduce their efforts in response to increased school resources; in addition, they find that parental effort has a strong positive impact on children's achievement. Pop-Eleches and Urquiola (2013) find that Romanian children who are barely eligible for admission to higher-quality secondary schools are less likely to get help on homework from their parents, suggesting that parents view their own effort and school quality as substitutes.

Using data collected from the rural areas of India and Zambia, Das et al. (2013) estimate that households reduce spending on textbooks or writing materials when they expect an increase in public spending on these items. They also find that an unanticipated increase in public spending that is not accompanied by a corresponding reduction in private spending leads to an increase in student test scores. Shi (2012) shows that when school fees are reduced in rural China, households increase their spending on school supplies. Both papers study rural households that have considerably lower income than households in our sample, and hence the margin of response is rather different. Bray (2003) and Bray and Kwok (2003) document that private tutoring is predominantly an urban phenomenon.³

The paper is organized as follows. Section 2 provides background information about public financing of basic education in China and the roles played by household spending. Section 3 outlines the theoretic framework and the empirical model. Section 4 describes the data and summary statistics of key variables. Section 5 presents the estimation results. Section 6 concludes with a brief discussion of policy implications and future work.

2. Background of China's basic education system

2.1. Public finance of basic education in China

Basic education in China spans primary school (Grades 1–6), middle school (Grades 7–9), and high school (Grades 10–12) education. The Compulsory Education Law of 1986 stipulates that primary and middle school education is mandatory for all children. It also established a decentralized system of financing and administration of basic education, in which municipal governments assume the primary responsibility.⁴

One serious challenge to basic education financing in this decentralized system is the lack of accountability of local officials to local residents' preferences for public goods that is intrinsic to China's unique decentralization system (Bardhan, 2002; Xu, 2011). In this system, termed "Regionally Decentralized Authoritarian" by Xu (2011), local officials are responsible for and have decision-making power in all aspects of local administrative and economic affairs, but they are appointed, evaluated, and promoted by the upper level governments and not through local elections, and the evaluation is based first and foremost on local economic growth and tax revenue. Li and Zhou (2005) provide evidence that provincial officials' promotions are determined by the performance of their province relative to the national average. Jin et al. (2005) and Gordon and Li (2011) show that given the fiscal incentives they face, local officials prioritize their efforts to activities promoting economic development. Xu (2011) cites abundant evidence that the current Chinese institution provides local officials strong incentives to allocate public resources and work efforts to activities that directly improve short-term economic performance, rather than to cater to local residents' preferences for public goods such as basic education.

Not only are local residents unable to express their preferences for public goods through electing local officials, but they are also unable to influence local public goods provision through "voting by their feet" (Tiebout, 1956). While it is no longer a major hurdle for labor market mobility, China's rigid residence registration system (*Hukou*) continues to restrict households' ability to move to a municipality with higher-quality public schools. Households occasionally are able to enroll their children in a public primary or middle school outside their *Hukou* city by paying a hefty fee. This lack of mobility exacerbates the disincentive of local officials in public goods provision. Consistent with Keen and Marchand (1997) prediction that under decentralization, local officials care more about mobile factors than immobile factors, Jia et al. (2014) document that China's decentralization is associated with larger local spending on infrastructure relative to education, the former being essential in attracting investment.

To influence local officials' spending decision on basic education, the Education Law of 1995 mandates a "two-growth" rule for local education spending (Tsang, 1996). First, the growth rate of the budgetary education spending should be higher than the growth rate of regular government revenue at the locality; second, per student budgetary education spending (both personnel and non-personnel) should increase annually. Since the 1995 law does not specify a target spending level or growth rate, both the growth rate and the level of per-student spending exhibit great variations across localities and within a locality over time. The most important source of variation is local economic conditions. Basic education is financed out of the local tax revenue, which, in the tax-sharing system created by the fundamental tax reform of 1994, consists of the local share of the tax levy (including tax refunds) and transfers from the provincial governments. In urban areas, the

³ Mu and Du (2012) study how pension coverage expansion in urban China affects household spending on children's education. They find that expansion of coverage leads household to spend more on children's education, in particular on private tutoring and interest classes.

⁴ In rural areas the responsibility was delegated to the township government till 2001. The county (municipality) government re-assumed the responsibility at the mandate of the State Council following the 2000 reform that abolished the education surcharges on rural households.

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