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The desegregating effect of school tracking ☆

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ABSTRACT

This paper makes the following point: "detracking" schools, that is preventing them from allocating students to classes according to their ability, may lead to an increase in income residential segregation. It does so in a simple model where households care about the school peer group of their children. If ability and income are positively correlated, tracking implies that some high income households face the choice of either living in the areas where most of the other high income households live and having their child assigned to the low track, or instead living in lower income neighbourhoods where their child would be in the high track. Under mild conditions, tracking leads to an equilibrium with partial income desegregation where perfect income segregation would be the only stable outcome without tracking.

1. Introduction

Tracking is the practice of allocating the pupils of a school to different classes according to their academic ability. Tracking is highly controversial and has generated an often heated academic and policy debate[1]; this has typically focused on the effects of tracking on educational attainment and other students' outcomes, such as post-education earnings.[2] In this paper we look beyond the educational output, and examine the effects of tracking on the degree of income segregation in residential areas and their schools. Central to the paper is the idea that the characteristics of local schools are an important determinant of households' location choices.[3] One such characteristic is whether or not the local school tracks its students. Tracking affects the peer group, an important input in the educational production function, and thereby it becomes one of the determinants of households' location choices and hence of the socio-economic composition of a residential area and its schools. In turn, these choices are relevant to society, because, for example, a residential pattern where households of different socio-economic background live near one another reduces ghettoes, exposes disadvantaged adolescents to lifestyles, behaviours and ambitions

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[1] The early analysis of Coleman and his co-authors (Coleman et al., 1966) already considers the effects of tracking; the turning point towards "detracking" is discussed in Wheelock (1992) and Argys et al. (1996). A comprehensive survey of the initial debate among educationalists is Lucas (1999).

[2] Betts (2011) reviews the empirical literature on the effects of tracking, and Brunello and Checchi (2007) and Hanushek and Wößmann (2006) provide an up-to-date overview of the international differences in extent and implementation of tracking.

[3] Here again the literature is vast; Calabrese et al. (2012) build a general equilibrium model to study the welfare implications of Tiebout sorting (1956). Using a similar setting, Nechyba (1999) investigates the effect of private schools on residential segregation and on school segregation in a metropolitan area. de Bartolome and Ross (2003), de Bartolome and Ross (2004), de Bartolome and Ross (2007) and Hanushek and Yilmaz (2010) analyse the interactions between Tiebout type incentives and the trade-off between geographical access and land space first studied by Alonso (1964). Recent studies of the link between school performance and housing prices are Downes and Zabel (2002), Dhar and Ross (2012), Clapp et al. (2008), Gibbons and Machin (2003) and Bayer et al. (2007). Black and Machin (2011) is an extensive review of the empirical literature.

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typical of classmates and friends from more disparate social backgrounds, and might enhance social mobility. Understanding the nature of the link between schools' policies regarding tracking and residential income segregation in a given geographical area becomes therefore very important. Our paper is a step in this hitherto untrodden direction.

Our main result is straightforward and simply stated: tracking may weaken income segregation, that is the tendency of households to cluster according to income and socio-economic status. Our paper contributes to the policy debate on tracking by showing that the trend towards "detracking American schools" (Argys et al., 1996) might well have the probably unintended consequence of exacerbating income segregation and of thus hampering social mobility.

Empirically, income segregation has long been observed not to match the complete stratification predicted by a naïve Tiebout-type location model (Pack and Pack, 1977; Persky, 1990; Calabrese et al., 2006). Explanations for the high degree of income mixing have ranged from a two-dimensional distribution of households' characteristics (Epple and Platt, 1998; Epple and Romano, 2003), to the interactions between income differences in commuting costs and the strength of the preference for public goods (de Bartolome and Ross, 2003, 2004, 2007), to the way in which the marginal rate of substitution between commuting and housing varies with income (LeRoy and Sonstelie, 1983). Our findings add a further possible explanation for the observed level of income mixing, and they are in line with some recent empirical evidence showing that social mobility is larger when schools select students by past performance rather than by residential location (Lee, 2011a,b).

We build a simple stylised model. Households choose where to live, and property prices adjust to demand and supply. The quality of the education received by their children is one of the variables which influences households' location choices. We compare two alternative policy scenarios, one where schools track students, the other where the allocation of students to classes is random. We show that when schools do not track students, the equilibrium is such that households are fully segregated by income: all the poor live in one district and all the rich live in the other. On the other hand, when schools track their students, in equilibrium both rich and poor live in both districts, and their children attend the same schools. The intuition for this "desegregation" equilibrium is easily explained. It hinges on two linchpins, both solidly established in the literature: the peer group effect[4] and the positive correlation between a child's ability and her socio-economic background.[5] When the peer group a child has at school matters to her parents, and when there is a positive correlation between ability and socio-economic background, parents from a high socio-economic background whose children are of middling ability face a dilemma: they have to choose between living in a district with many other households of good socio-economic background where however their child is likely to be placed in the low track, and living in a district with fewer households of high socio-economic background, but a higher chance that their child is in the top track at school, and thus benefits from a higher ability peer group. This dilemma is similar in nature to the choice that parents face in Epple et al. (2002), where profit-maximising private schools compete with homogenous public schools in a given district. When public schools track their students, they attract more high ability students while losing some lower ability ones from richer households to private schools. The children of parents who opt for those private schools have a lower quality peer group than the public school high track but a higher quality peer group than the public school low track.[6] Lest contemplation of this dilemma be considered beyond households' actual behaviour, note the intriguing evidence revealed by Cullen et al. (2013) and Estevan et al. (2012). These papers show that indeed households do behave strategically to benefit from school policies: students in Texas "trade down", that is they choose a school with fewer able children in order to be more likely to be in the "Ten Percent" of ablest children in the school and so gain automatic admission to a state university.

Though the intuition for our main result might appear convincing, it is important to check that it is not unravelled by the simultaneous decisions of all households and by the operation of the property market. In Propositions 2 and 3, therefore, we establish necessary and sufficient conditions on the joint distribution of income and ability such that when schools practice tracking, households residential choices display income desegregation. As we argue, these conditions are not very stringent.

The paper is organised as follows. The model is presented in Section 2: the households in 2.1, the schools in 2.2, the housing market in 2.3. In Section 3, after some preliminaries and definitions, in 3.1, we derive in turn the equilibrium when schools do not track their students, Section 3.2, and when they do: the desegregation equilibrium in Section 3.3, and the full segregation equilibrium in Section 3.4. Section 3.5 briefly discusses the intuition underlying our results and their possible consequences, and Section 3.6 carries out limited welfare comparisons. Section 4 concludes, and the Appendices contain some mathematical details.

2. The model

2.1. The households

We study a given population of households, with size normalised to 1, living in a stylised city with two geographically separate neighbourhoods, or districts, labelled 0 and 1. Households differ in income (a shorthand term for socio-economic background) and in the ability of their children. Both income and ability are exogenously given. We assume that income can take only two values, y_R and $y_P < y_R$; a proportion α of the households has income y_R, and the rest has income y_P. For the sake of brevity we will often refer to households with income y_R and y_P as "rich" and "poor". Ability is measured by a uni-dimensional parameter $b \in \left[\underline{b}, \overline{b}\right]$. We choose a simplified model in order both to present our result as starkly as possible, and also to show that the more "complicated" equilibrium where households residential choices lead to mixing of households with different socio-economic backgrounds can emerge even in a highly simplified set-up, with the deck, as it were, stacked against complex outcomes.

[4] Intuition and casual observation suggest that children learn from each other, because they help, or hamper, one another, because they stimulate each other, because they compete to do well, and so on. Moreover, when schools track students, classes comprise students of similar abilities, and teachers are less likely to slow down or repeat their lessons to make sure weaker students keep up, and can press ahead with the syllabus instead. Winkler (1975), Arnott and Rowse (1987), de Bartolome (1990) are early economic analyses of the impact of peer group effects; Astin (1993) an influential education one. There is also ample empirical evidence documenting their importance. Bishop (2006), Sacerdote (2011) and Epple and Romano (2011) are recent surveys of the vast economic literature.

[5] Sirin's meta-analysis of around 75 studies published in the 90s finds an average correlation of 0.299 (Sirin, 2005, p. 437), in line with the figure of 0.343 in the earlier studies considered by White (1982). An early economic analysis is Perl (1973). Notice that this assumption does not imply a positive correlation between innate ability and socio-economic background, as it could be the consequence of greater pre-school parental investment by better-off parents.

[6] Hidalgo (2010) compares tracking to a comprehensive school system, and, in her main result, finds that tracking may be the system providing greater equality of opportunities in the sense of Roemer (1998). Other theoretical contributions on the relative merits of selective versus comprehensive schooling systems include Brunello et al. (2007), Eisenkopf (2009), Takii and Tanaka (2009) and Hidalgo (2011).