Intergenerational mobility and school inequality in the US

Children of different income groups attend schools of different quality. To understand how unequal school opportunity contributes to differences in social mobility and human capital, Professor Jean Hindriks, Head of the Economics School of Louvain at UCLouvain, Belgium, and Dr Andreu Arenas, Assistant Professor of Economics at the University of Barcelona, have extended the classical Becker-Tomes-Solon parent-child transmission model to include unequal opportunity in their modelling of parental investment into children's education and intergenerational mobility.

Across neighbourhoods in the US, there are noticeable differences in intergenerational mobility. High-mobility areas, where social position tends to change from one generation to the next, exhibit less residential segregation, less income inequality, and better primary schools than areas with lower intergenerational mobility. In addition to the differences in family characteristics across neighbourhoods, it has been shown that these correlations are caused by the neighbourhoods themselves. Of particular interest is the observation that upward mobility in educational attainment has significant links to local public education policy.

The importance of good schooling has increased with technological change. The ensuing demand for education is resulting in more socially segregated communities. Every parent wants their family to live in the best community they can afford, where their children can receive the best education possible so that they can compete in a global and digital economy. Those who cannot afford to move into communities with the best schools are left behind without the same opportunities.

Dr Jean Hindriks, Professor of Economics and Head of the Economics School of Louvain at UCLouvain, Belgium, and Dr Andreu Arenas, Assistant Professor of Economics at the University of Barcelona, have incorporated these recent empirical insights in the development of their theoretical framework on intergenerational mobility. To understand how unequal school opportunity contributes to differences in social mobility and human capital, they have built a model of parental investment into children's education and intergenerational mobility and extended the classical Becker-Tomes-Solon parent-child transmission model.

UNIFORM SCHOOL SYSTEM
Models based on a uniform school system, such as the Becker-Tomes-Solon model, assume that parents have a uniform tendency to invest in their children and when schools are of higher quality parents are willing to invest more. While the model of human capital (the value or cost of the skills, knowledge, and experience possessed by an individual or population) and school quality are standard, this involves a complementarity between parental investment and school quality. Empirical research has shown that UK families living in neighbourhoods with better school quality invest relatively more in their children's education. Furthermore, in the US, parents of children attending Head Start (a program providing early childhood education, health, nutri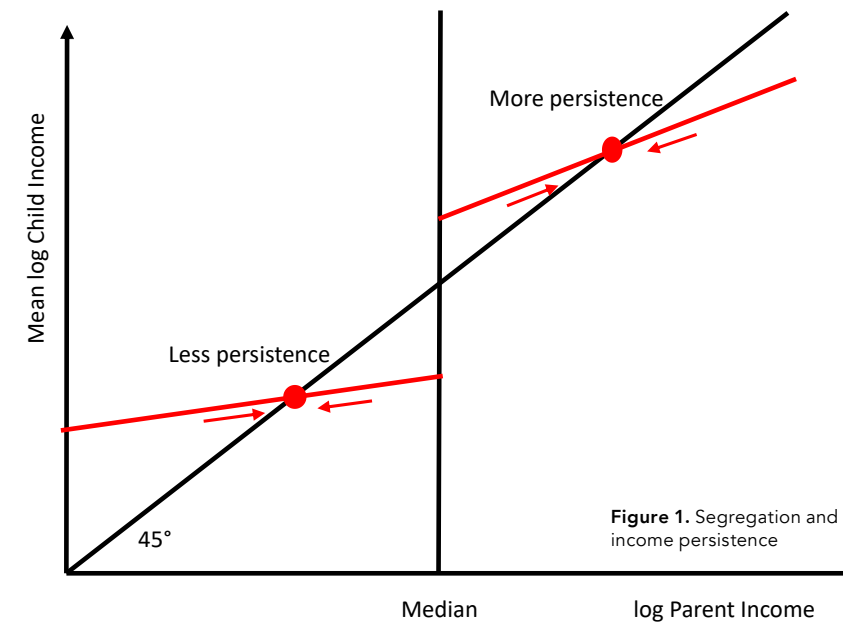tion, and parent involvement support for low-income families) were found to have a greater involvement with their children than other low-income parents.

UNEQUAL SCHOOL OPPORTUNITY
Prof Hindriks and Dr Arenas introduce unequal opportunity to their model. This accounts for both unequal school quality and an unequal probability of access to the best schools. They explain how unequal school opportunity increases the parenting gap, i.e. the difference between high and low parenting 'quality' (involvement, investment, opportunity, etc.) experienced by children. This prompted their analysis of the dynamic pattern of parental investment, studying the effects of unequal school opportunity on parental investment, human capital, and intergenerational mobility.

School inequality describes the disparity in school quality across neighbourhoods. Unequal access involves the relationship between parental income and access to the best schools. This is linked to educational policies promoting equality of opportunity with equal access to schools for children from any neighbourhood, including priorities in school choice mechanisms, leading to positive assortative matching with the preferential matching of high-quality schools with high-income families across communities.

Figure 1. Segregation and income persistence

calibrated their model to assess the magnitude of this mobility–efficiency trade-off. Their simulations reveal that school equalisation and desegregation policies have more effect on mobility than on efficiency.

HUMAN CAPITAL
While average investment can increase or decrease under unequal school opportunity, the research suggests that average human capital always increases because of the complementarity between school productivity and parental investment that shapes human capital. In the high-income group, school segregation was observed to increase parental investment where the productivity of investment was also higher. Likewise, it reduced investment where the productivity was lower.

PARENTAL INVESTMENT
Intuitively, we would expect to find that high-income families attend high-quality schools and invest a higher proportion of their income in education, and low-income families attend low-quality schools and invest a smaller proportion of their income. Prof Hindriks and Dr Arenas argue that unequal school opportunity exacerbates the parenting gap by making it more attractive for families with a higher

> *Unequal school opportunity exacerbates the parenting gap by making it more attractive for high-income families to invest into their children's education.*

capacity to invest (i.e., high-income families), to invest into their children's education. High-income families increase their investment in education partly because their children attend better schools, offering in turn higher returns to those investments, while low-income parents invest less because of poor-quality schooling. This increases the parenting gap, creating a "double down" on inequality. As a result, unequal school opportunity increases income persistence at the top and reduces overall income mobility. However, there is a tradeoff because unequal school opportunity also increases average human capital, an efficiency gain (in terms of increased skills and knowledge) stemming from positive assortative matching. The researchers

INTERGENERATIONAL ELASTICITY
The researchers calculate the intergenerational elasticity of income as a measure of intergenerational mobility. Besides inheritance, parents pass their economic status to their children through education. They showed that when there is more variation in parental income at the top of the income distribution than at the bottom, which is the case in almost every country, the increase in income persistence among high-income families, due to better school quality, and the increasing gap between the top and the bottom, have stronger effects than the decrease in persistence among low-income families. This leads to a decrease in intergenerational mobility overall.

UNEQUAL OPPORTUNITY AND SORTING DECISIONS
The simulations disclosed that the complementarity between school quality and parental investment can potentially shape the positive sorting decisions. This results in children of high-income parents being allocated high-quality schools. To understand the significance of this trade-off, the researchers calibrated the model to match the US income distribution. Then they simulated the effects of de-segregation and school equalisation policies. These simulations disclosed that equal opportunity policies
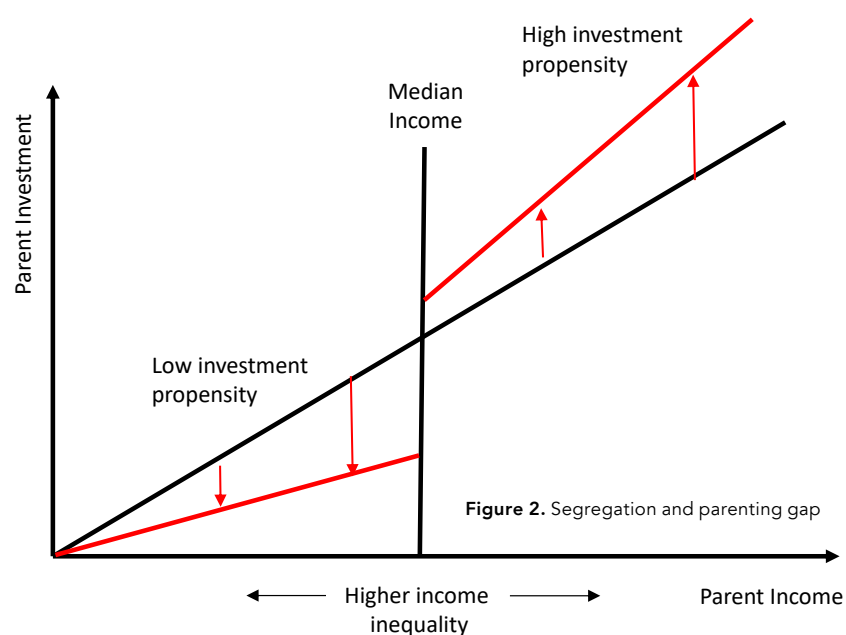
High investment propensity

Median Income

Parent Investment

Low investment propensity

Figure 2. Segregation and parenting gap

Higher income inequality

Parent Income

produce high intergenerational mobility gains at a relatively small efficiency cost.

MODEL SIMULATIONS AND RESULTS

The interaction between income inequality and unequal school opportunity was also simulated. This facilitated a study of the effect of simultaneous changes in school inequality, segregation, and income inequality. This analysis revealed a multifaceted interpretation of school quality and its inequality. The researchers found a variety of reasons for the differences in school productivity – including differences in school inputs, peers, the family, and the surrounding community. These findings are consistent with the interpretation of school inequality as a natural result of school segregation, or a broad neighbourhood effect.

The simulations also revealed that independent increases in income inequality do not necessarily lead to an increase in intergenerational persistence. Increases in income inequality, when accompanied with increases in unequal school opportunity, however, do result in a positive correlation between inequality and persistence. This interaction of income inequality with school inequality and segregation reveals that income inequality reduces social mobility and suggests that unequal school opportunity plays a significant part in explaining the Great Gatsby curve.

THE GREAT GATSBY CURVE
The Great Gatsby curve illustrates the relationship between the concentration of wealth in one generation and the ability of those in the next generation to move up the economic ladder compared to their parents. The curve was introduced by Professor Alan Krueger, an American economist and Chairman of the Council Economic Advisers. Named after Francis Scott Fitzgerald's book, The Great Gatsby, in which the main character Jay Gatsby, born to a poor family, made a lot of money but failed to escape from his past. The book closes down as, "So we beat on, boats against the current, borne back ceaselessly into the past." The Great Gatsby Curve can be used to illustrate the illusions of educational mobility in areas of high-income inequality.

EQUALITY OF OPPORTUNITY
Professor Hindriks and Dr Andreu Arenas' model combines unequal school quality together with an unequal access to high-quality schools that is linked to social segregation. Income dispersion tends to be higher at the top, so in most cases unequal school opportunity decreases intergenerational mobility. Having calibrated their model to the USA, their simulations suggest that the social mobility costs of school inequality and segregation are large when compared with the gain in human capital. Moreover, equality of opportunity through school equalisation and desegregation policies can have positive effects on mobility with relatively small efficiency costs.

> *These simulations disclosed that equal opportunity policies produce high intergenerational mobility gains at a relatively small efficiency cost.*

Income inequality interactions

κ	p	φ	IGE	Aggregate HK	κ	p	φ	IGE	Aggregate HK
0.054	0.64	1.0469	0.350	1.00021	0.045	0.55	1.0469	0.315	1.00004
0.056	0.66	1.0501	0.355	1.00026	0.05	0.6	1.0501	0.331	1.00013
0.058	0.68	1.0532	0.361	1.00034	0.055	0.65	1.0532	0.348	1.00027
0.06	0.7	1.056	0.366	1.00041	0.06	0.7	1.0561	0.366	1.00040
0.062	0.72	1.0588	0.372	1.00048	0.065	0.75	1.0588	0.386	1.00057
0.064	0.74	1.0614	0.378	1.00057	0.07	0.8	1.0614	0.406	1.00078
0.066	0.76	1.0639	0.383	1.00065	0.075	0.85	1.0639	0.427	1.00100

Changes in φ, small elasticity of p and κ   Changes in φ, large elasticity of p and κ

Corr(inequality, IGE)>0 = Gatsby Curve

κ - school quality gap
p - school segregation
ϕ - income inequality
IGE - intergenerational elasticity
HK - human capital level

Figure 3. Gatsby simulation. Left panel: low interaction between income inequality and unequal school opportunities. Right panel: high interaction between income inequality and unequal school opportunities.

Behind the Research

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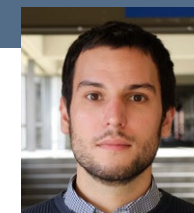
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Research Objectives

Prof Hindriks and Dr Arenas developed a theoretical framework on intergenerational mobility.

Detail

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Jean Hindriks is a Professor of Economics and Head of the Economics School of Louvain at UCLouvain (Belgium), and a founding member of the Itinera Institute (Brussels). He obtained his PhD from the University of Namur (Belgium).

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Personal Response

What motivated you to extend the classical Becker-Tomes-Solon parent-child transmission model to include unequal opportunity?

❝ Recent work by Raj Chetty and co-authors shows the importance for income and education of growing up in good neighbourhoods, outlining the effects of social segregation. Moreover, parents increasingly use schooling to transmit their status to their offspring, which is especially important in a context of rapid technological change. In addition, there is a negative relationship across countries between inequality and social mobility (the Gatsby curve), which is not implied by the classical transmission models. We thought that integrating these insights would give us interesting new results and implications of the interaction between inequality, education, and social mobility. It turned out that unequal school opportunity bridges the gap between inequality and mobility. ❞

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