How important is access to markets as a driver of economic prosperity? In new research, **Stephen Redding** and **Daniel Sturm** address this question by analysing the post-war division of Germany and its impact on the border cities in the West suddenly cut off from their nearby trading partners.

Location, location, location

The division of Germany after World War II and the reunification of East and West Germany in 1990 can be thought of as a 'natural experiment' in which it is possible to assess the importance of market access for economic development. With the foundation of East and West Germany as separate states in 1949, West German cities close to the border went from being at the heart of an integrated Germany to being on the edge of the Western world. As a result, these cities experienced a disproportionate loss of market access, losing numerous nearby trading partners with whom they could previously interact at low cost.

Our research finds that following division, West German cities close to the new border experienced a marked decline in population growth relative to other West German cities. We estimate that over the 40-year period of division, there was a decline in their annual rate of population growth of 0.75 percentage points, which implies a cumulative reduction of about one third in the size of border cities relative to non-border cities.

The difference in population growth rates for the two groups of cities was not apparent prior to division but emerged immediately afterwards. And the effect was strongest in the 1950s and 1960s, declining over time. This is consistent with gradual adjustment to a new long-run distribution of population. We also find evidence to confirm that our results are capturing loss of market access rather than other potential explanations, such as systematic differences in city structure, destruction during World War II or the fear of further armed conflict.

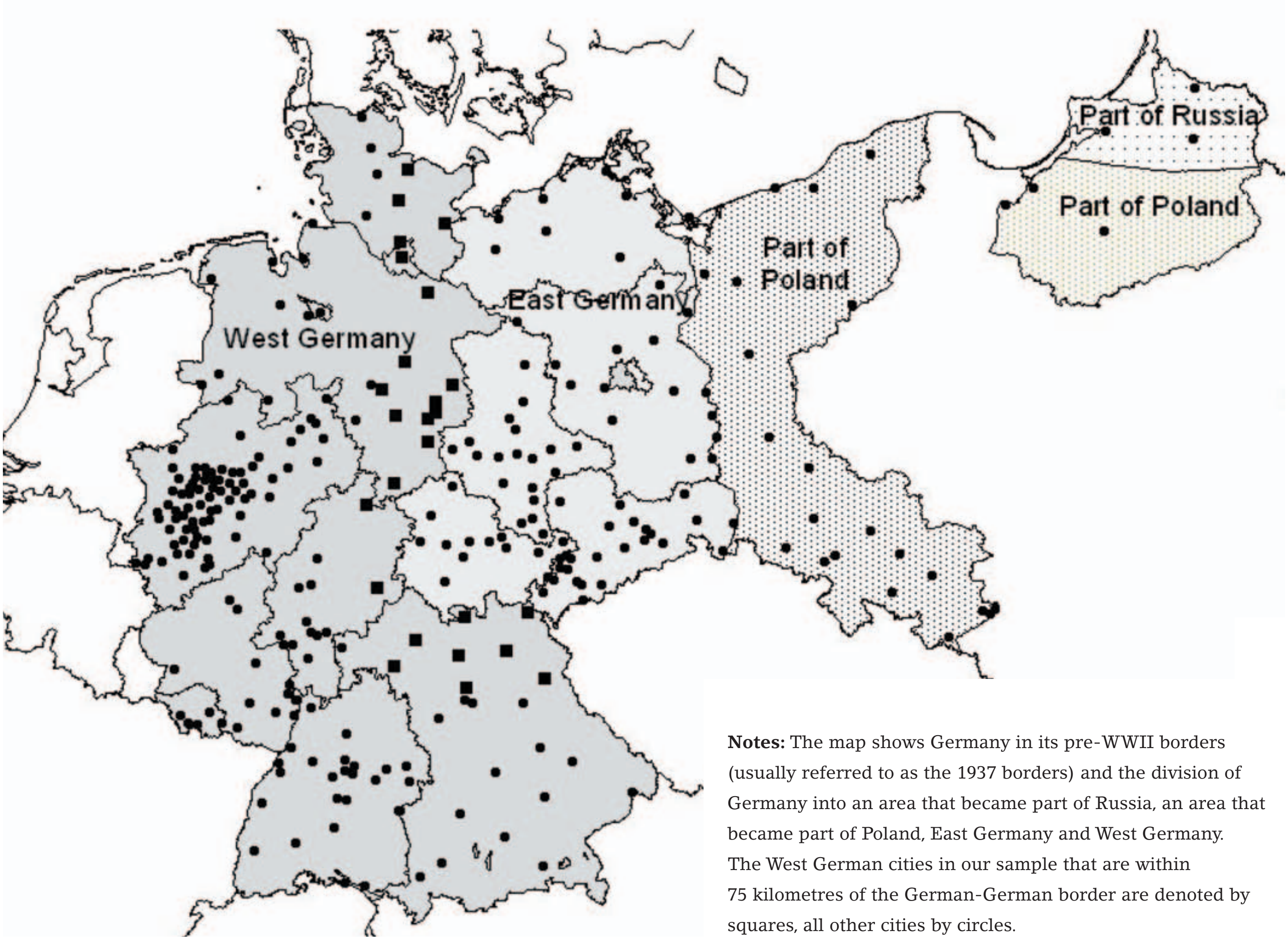
Germany's post-war division

Following World War II, Germany's boundaries changed dramatically. Map 1 illustrates how the pre-war country was divided into four different parts: West and East Germany and two areas that became parts of Poland and Russia. West Germany made up roughly 53% of the pre-war area and just over 58% of the pre-war population of 69.3 million. East Germany comprised 23% of the area and 22% of the population. And the areas that became parts of Poland and Russia contained 24% of the area and 14% of the population. The remaining 6% of the population was in East and West Berlin.

The political process leading to the division of Germany took several unexpected turns. While various proposals to divide the country after its eventual defeat were discussed during the early phase of World War II, the United States and Russia backed off such plans towards the end of the war. Instead, the main planning effort was to organise the military occupation of Germany. Early on, it was decided that separate zones of occupation would be allocated to the American, British and Russian armies. The planning process for the zones began in spring 1943, negotiations continued during 1944 and the protocol formalising the zones was signed in London in September 1944.

The protocol divided Germany into zones of roughly equal population after excluding the areas expected to become parts of Poland and Russia. In line with the location of the advancing armies, the northern part of what would later become West Germany was to be occupied by British forces, the southern part was to be controlled by American forces, and the remaining eastern parts of the country were to be occupied by the Russian army. In addition, it was agreed that American, British and Russian forces would jointly occupy Berlin. The protocol was modified in 1945 to create a small French zone in the south-western corner of Germany, which was achieved by reducing the size of the American and British zones.

Map 1:
Germany before World War II



Notes: The map shows Germany in its pre-WWII borders (usually referred to as the 1937 borders) and the division of Germany into an area that became part of Russia, an area that became part of Poland, East Germany and West Germany. The West German cities in our sample that are within 75 kilometres of the German-German border are denoted by squares, all other cities by circles.

As tensions between the Western allies and Russia increased with the onset of the cold war, the zones of occupation became the basis for the foundation of separate East and West German states in 1949. The territory of West Germany was the combined area of the American, British and French zones, and was extended to include the Saarland from 1957. East Germany was founded on the Russian zone.

While the two new countries maintained some politically motivated and largely symbolic economic co-operation, any local economic links between areas on either side of the border were entirely suppressed from 1949, when East Germany introduced central planning. From 1952, there were extensive border fortifications and the new border between East and West Germany became one of the most sealed and best guarded in the world. Limited transit between East and West Berlin remained possible until 1961, when the Berlin Wall was built.

Following Germany's division, West German cities close to the border experienced a marked relative decline in population

The division of Germany was formalised in international treaties and was generally believed to be permanent. But growing dissatisfaction among East Germans about heavy restrictions on mobility, lack of personal freedom and the declining performance of the economy led to large-scale demonstrations in 1989, culminating in the fall of the Berlin Wall on 9 November 1989. East Germany rapidly disintegrated and only eleven months later, East and West Germany were formally reunified on 3 October 1990.

New economic geography

Our research examines the implications of German divison and reunification using the analytical techniques of the 'new economic geography' (Fujita et al, 1999; Helpman, 1998). In these models, the location of economic activity and the distribution of population across cities are determined by the balance between 'agglomeration' and 'dispersion' – those forces that attract firms and workers to large markets and those that repel them from those markets.

Agglomeration forces arise from increasing returns to scale, transport costs and consumer preferences for variety. Firms like to concentrate production because of economies of scale, and they like to concentrate production close to large markets because of transport costs. Workers like to consume a variety of goods and, combined with transport costs, this means that they like to be near to where many firms produce.

Population in border cities actually fell between 1960 and 1980, while population in non-border cities continued to grow

Table 1:

The 20 West German 'border cities'

Those lying within 75 kilometres of the former border between East and West Germany

Bamberg	Hannover
Bayreuth	Hildesheim
Braunschweig	Hof
Celle	Kassel
Coburg	Kiel
Erlangen	Lübeck
Fulda	Lüneberg
Göttingen	Neumünster
Goslar	Schweinfurt
Hamburg	Würzberg

Figure 1:

Indices of border and non-border city populations

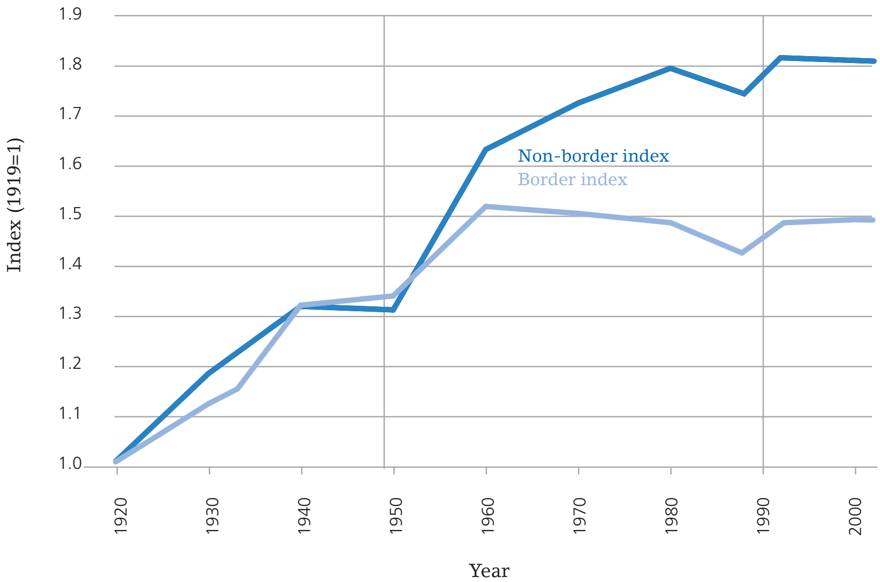
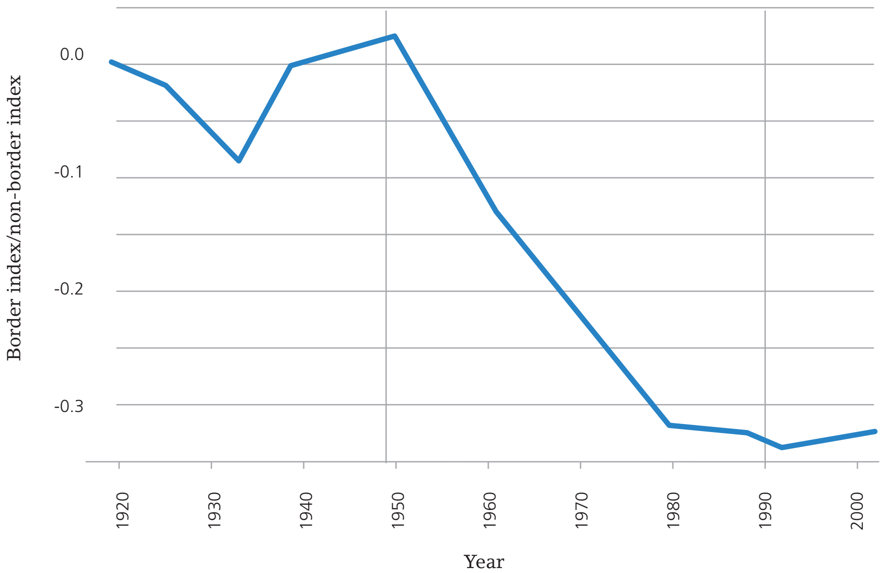


Figure 2:

Difference in population indices, border/non-border



Dispersion forces arise from the limited supply of immobile resources like land and housing. As the size of a city grows, the prices of immobile resources increase, raising workers' cost of living. Workers are assumed to be geographically mobile and will relocate until the real wage is equalised across cities.

We use the model to simulate the division of Germany. The key prediction that emerges from the simulation is that West German cities close to the border should decline relative to other cities because they are disproportionately affected by the loss of access to markets and sources of supply on the other side of the border. Among the border cities, the decline in relative size is predicted to be greater for smaller cities, where their own markets are smaller and where access to economic activity elsewhere is correspondingly more important.

Changing populations of West German cities, 1919-2002

To examine whether the predictions of the economic geography model are confirmed, we examine data for the period 1919-2002 and measure the population changes in 119 West German cities that had more than 20,000 inhabitants in 1919. Pre-war populations are only available for the census years of 1919, 1925, 1933 and 1939. For the post-war period, we have data at 10-year intervals between 1950 and 1980 plus 1988 and 1992 (immediately before and after reunification) and 2002. Table 1 lists the 20 cities in our data that we classify as border cities, those located within 75 kilometres of the border. Our basic empirical strategy is to compare the population growth of these cities with the population growth of the remaining cities both before and after Germany was divided.

Figure 1 shows the changing city populations over time of the two groups as a whole. (For each group, population is expressed as an index relative to its 1919 value, and the two vertical lines indicate the year 1949 when the Federal Republic of Germany (West Germany) and the German Democratic Republic (East Germany) were established and the year

1990 when the two countries were reunited.) Figure 2 represents the difference between the two population indices, indicating the impact of division on the population of border cities relative to non-border cities.

Before World War II, the population growth of border and non-border cities was very similar, with the former growing slightly slower during the Great Depression of the early 1930s but recovering their trend growth rate by 1939. During World War II and its immediate aftermath, border cities experienced marginally higher population growth than non-border cities, probably due to migration from East Germany and the areas of pre-war Germany that became part of Poland and Russia.

This pattern changed sharply after 1949, when East and West Germany emerged as separate states with different economic systems and local economic links were severed. From this point, West German cities close to the new border experienced substantially lower rates of population growth than non-border cities. Population in the border cities actually fell between 1960 and 1980, whereas population in non-border cities continued to grow.

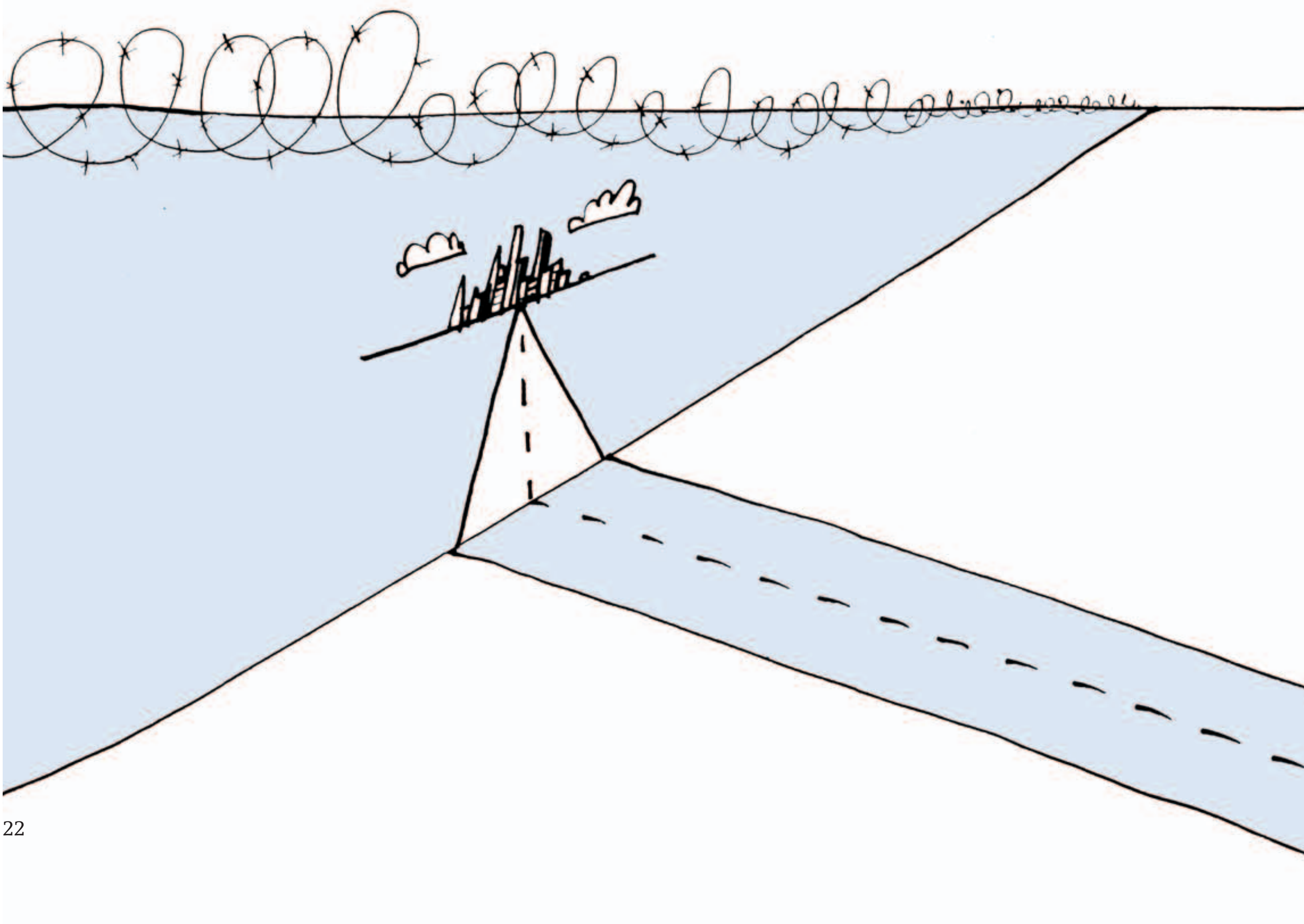
By the early 1980s, the discrepancy in rates of population growth was beginning to close, which is consistent with the idea that the negative effect of division on border cities had gradually worked itself out and the distribution of population in West Germany was approaching a new 'steady state'. But the slower decline of the border cities during the 1970s and 1980s may also be explained in part by the extensive regional policy programmes aimed at supporting the areas close to the border with East Germany, which grew substantially during this period. To the extent that these subsidy programmes were successful in promoting the development of the border regions, our estimates provide a lower bound to the negative effect of division on border cities.

Following reunification in 1990, there was a step-increase in city populations in West Germany, reflecting migration from the former East Germany. This migration raised population in non-border cities by somewhat more than in border cities. From 1992, population in the border cities grew somewhat faster than in non-border cities, which is consistent with the beginning of a recovery arising from improved market access after reunification.

Is market access the explanation?

The observed decline of the border cities is consistent with market access being an important determinant of regional prosperity as predicted by the economic geography model. Furthermore, the results are hard to explain in terms of institutions or natural endowments, which are the

Over the 40 years of division, there was a cumulative reduction of one third in the size of border cities relative to non-border cities



two main competing explanations for variations in economic prosperity. Our sample of West German cities shared the same institutions and also had very similar natural endowments over time.

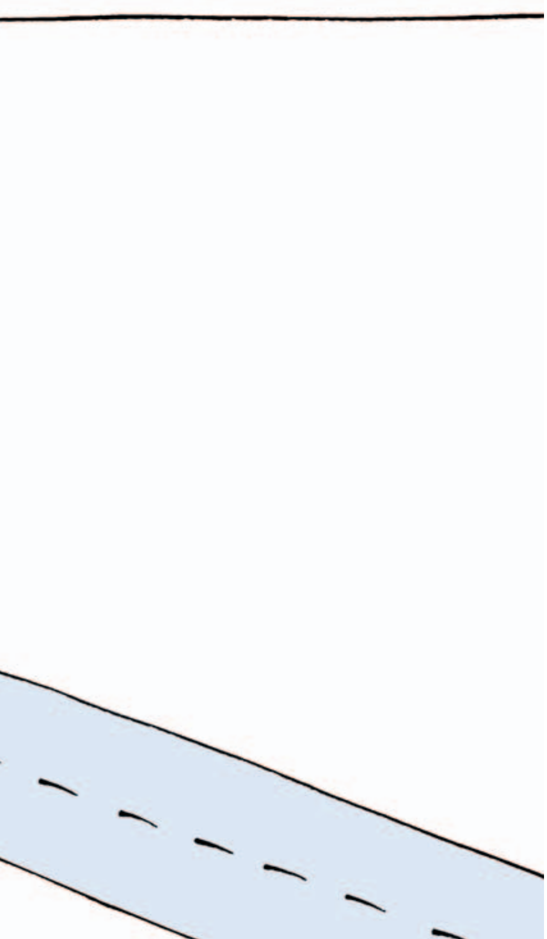
Nonetheless, there are other possible explanations for the results:

- First, cities close to the new border could have specialised in industries that experienced a secular decline in the post-war period.
- Second, the border cities could have suffered a disproportionate amount of war-related damage, which may have hindered their post-war development.
- Finally, people may have moved away from the border out of a belief that these cities would be particularly vulnerable in case of a new armed conflict in Western Europe.

We provide a number of additional pieces of evidence to show that the decline of the border cities is explained by their loss of market access and not by these alternative explanations:

- First, we use a measure of market potential – a widely used proxy for market access – to estimate the loss of market access due to the new border for each city in our dataset. The drop in market potential caused by the new border provides a complete explanation of the differential growth of the border cities.
- Second, as suggested by the new economic geography model, the decline of the border cities was not uniform. Smaller cities were disproportionately affected by the loss of hinterland.
- Third, those parts of the population that were no longer economically active reacted less to the imposition of the border than the economically active population.
- Finally, we establish that neither the degree of war-related destruction nor patterns of specialisation can explain the relative decline of the border cities.

Our research findings do not imply that institutions and natural endowments are irrelevant in determining economic development: the experience of East Germany during the period of division is itself an interesting case study demonstrating the relevance of institutions. The contribution of our work is to provide clear evidence for the importance of market access as a driver of economic prosperity.



Germany's experiences provide clear evidence for the importance of market access as a driver of economic prosperity

Smaller cities were disproportionately affected by being cut off from their nearby trading partners in East Germany

This article summarises 'The Costs of Remoteness: Evidence from German Division and Reunification' by Stephen Redding and Daniel Sturm, CEP Discussion Paper No. 688 (http://cep.lse.ac.uk/pubs/download/dp0688.pdf).

Stephen Redding is a senior lecturer in economics at LSE and a group leader in CEP's research programme on globalisation. **Daniel Sturm** is assistant professor at the University of Munich and an associate of CEP's globalisation programme.

Further reading

Masahisa Fujita, Paul Krugman and Anthony J Venables (1999), *The Spatial Economy: Cities, Regions and International Trade*, MIT Press.

Elhanan Helpman (1998), 'The Size of Regions', in David Pines, Efraim Sadka and Itzhak Zilcha (eds), *Topics in Public Economics*, Cambridge University Press.