School choice and implications for equity: the new political geography of the Swedish upper secondary school market

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ABSTRACT
The current study investigated the spatial restructuring of the Swedish upper secondary school market over time, which happened as a consequence of school choice reform started in the early 1990s. The school choice reform enabled students to choose and attend schools (public or private) based on preference rather than residential area. Consequently, public and private school providers compete for students in a form of quasi-market. Using register data for Swedish upper secondary school students from 1997 to 2011 (N = 664,895), the study showed two major changes in school market structure: an increase in urbanised commuting patterns and differentiated school choice possibilities within and across municipalities. The assumption of economic balance between supply and demand through school choice is strongly contested by these outcomes. Furthermore, not only is market failure prevalent and creating differences in educational opportunities between places but these tendencies are so far progressively escalating over time and demonstrating how students’ choices today affect and limit educational opportunities for future students.

Introduction
The idea and logic of the market is now well-established in educational policy (Dovemark 2004; Lundahl 2002; Lundahl et al. 2013), subsequent to a restructuring of the welfare state and the introduction of reforms dedicated to school choice, competition and privatisation in all the Nordic countries, but more so in Sweden (Antikainen 2010; Beach 2010; Bunar 2010a, 2010b, 2008). The proximity allocation principle for school choices was replaced by a universal voucher system, along with other market mechanisms, allowing tax-financed private providers to generate profit in order to start schools (Wiborg 2015). As a result of this, the educational system was spatially restructured in three significant and important ways. First, students could choose to study at schools outside their residential municipality. Second, private education providers could organise and deliver education in competition with each other and in competition with public providers in different municipalities. Third, a quasi-market was established and student mobility between municipalities intensified compared to pre-reforms (National Agency of Education 2011, 2013).
education supply has expanded; volume has increased by 61% since the reforms were enacted. However, there seems to be some problems with the spatial dimensions of this expansion.

This article identifies, substantiates and discusses the possible causal mechanisms and future implications of these problems in relation to the restructuring of upper secondary education in Sweden between 1997 and 2011. A socio-spatial framework, which recognises the importance of how we think about and organise space, is used to understand the development of the Swedish upper secondary school marketisation (Massey 2005). An important observation concerns how the 279 (out of 290) municipalities which contained a minimum of one school in 1997, has decreased to 259 in 2015. A central question is raised about the conflict between growing regional differences in the geographical availability of education and equitable access to education. To answer this question, a pairing of geography and education is needed (Dikeç 2001; Gulson and Symes 2007; Taylor 2009). The spatial materialisation of the market on the ground (Berndt 2015) is therefore in focus, which we define as the geographical outcome originating from education restructuring and interactions between national policy, students’ choices and available educational provisions (Le Grand 1991; Lund 2008).

These interacting mechanisms co-create the quasi-market. Mapping the distributive arrangements of resources, educational provisions and mobility patterns of students is fundamental to understanding the spatial effects. Space is always under construction; spatialisation can both change and stabilise distributional patterns (Dikec 2001; Massey 2005; Soja 2010). This highlights the non-static character of space and motivates the analysis of this interaction and its developments over time. The nature of geographically uneven development is a process, which can be influenced. The production of scientific, research-based knowledge is vital for influencing this process in appropriate and socially just ways.

We used a functional region approach (Brown and Holmes 1971; National Agency of Education 2011), based on students’ commuting patterns, to identify local school markets in Sweden between 1997 and 2011. The present study also attempts to answer two related research questions:

(1) How has student mobility between municipalities developed and how has this influenced spatial interaction, arrangements and patterns in educational space in Sweden over time?

(2) How has the volume and distribution of upper secondary provision changed in the Swedish quasi-market over time?

These questions seek to provide important knowledge about the state of the Swedish education system after 1992.

**Defining the educational quasi-market**

Studies of market outcomes in education often tend to define educational markets as administrative areal units, such as districts, cities or regions, for example in studies where an urban market is defined by the metropolitan city where the market is geographically located, such as “the Stockholm school market” or “the inner-London school market” (Bunar 2010b; Forsberg 2015; Reay 2004). While an empirical analysis involving the so-called “concrete market” (Berndt and Boeckler 2009, 535) entails a geographical connection, considering the
recent spatial turn in social sciences, a more dynamic approach is needed. Demarcating a market spatially outside of the theoretical concept of an economical entity, the material practices of actors and character of space are important because:

Capitalism too is "carried into places by bodies". Indeed politically, it is important that this is recognised, in order to avoid that imagination of the economy (or the market) as a machine, a figuring that renders it unavailable to political debate (Massey 2004, 8).

The production of space is therefore never complete as: "We make space in the conduct of our lives, and at all scales, from the intimate to the global" (Massey 2006, 90). The functional region approach defines spatial relationships by flows of people. This approach identifies regions through grouping together geographical areal units surrounding a centre – a self-sufficient market core – based on spatial interaction between these units (Kim, Chun, and Kim 2015). This model is then paired with a longitudinal approach, to provide an opportunity to study the structure, and more importantly the restructuring process, of educational space and its geographical outcomes. The importance of studying school choice in relation to the distributive patterns of educational patterns is motivated by the co-constitutive process of the educational quasi-market:

A quasi-market is established and re-established in relation to and between national education policy – pupils’ choice of education – and upper secondary schools’ profiles and the programmes they offer (Le Grand 1991). It is important to discuss this as a two-way process. Pupils’ choices are constituted in the relationship between individual aspirations and interests (including mediated family preferences of how a good life can and should be lived) and the educational supply in a specific time and place (Lund 2008, 636).

Thus, changes in students’ choices, as well as the available educational supply, are vital to market formation. Within this quasi-market, parents and students are portrayed as consumers, school providers are described as producers, and school outcomes are presented as adequate consumer information before making a consumption decision (Ball and Youdell 2008; Dobson 2008; Dumay and Dupriez 2013; Lundahl 2002).

**Borders and restructuring: common shortcomings of quasi-markets in education**

Waslander, Pater, and Van Der Weide (2010) pointed to two problems of educational markets. One problem was inelasticity in supply and demand. It is apparent within education that parents as customers to school markets do not respond strongly to underachieving schools and this contributes to failure of the market’s rectifying mechanism (65). A second problem concerns market supply. Some schools cannot (e.g. due to lack of space) or will not (e.g. because of goals of exclusivity) grow in relation to student groups; as a consequence, educational offerings cannot be regulated through students’ choice. Schools that are in high demand have to be able to increase their intakes and school intakes have to be responsive to parental demands. Otherwise, as seen in the Chilean education system, variation in school socioeconomic segregation across different municipalities (Valenzuela, Bellei, and de los Ríos 2014) will determine market development. Alternatively, as in decentralisation reforms in Argentina, benefits will tend to accrue mainly for already educationally advantaged students and economically robust regions (Galiani, Gertler, and Schargrodsky 2008; Galiani et al. 2002). As in the UK, when performing counterfactual analysis on data from the National
Pupil database, ability-based segregation is always lower in hypothetical schools in comparison to observed schools (Allen 2007).

Burgess et al. (2007) found, for instance, that if there were more school options, school segregation was higher in comparison to residential segregation. Decentralisation, market and choice reforms are thus associated with problems regarding student differentiation, with many systemic imperfections aggravating market adjustments.

**The Swedish choice**

The decentralisation, deregulation and privatisation of schools in Sweden, using a choice mechanism and voucher programme, was intended to increase effective use of public funds, diversify educational supplies, raise standards and make school providers more responsive to the demands of parents and students (Fredriksson 2010). However, the congruence between policy aims and the character of the choices being made by students seems to be somewhat imperfect (Puaca 2013). Since the transfer of state governance through decentralisation, local authorities have primary responsibility for planning and managing education (Nytell 2006). Providing students with equal educational opportunities through choice, rather than a demand for equal outcomes, was emphasised to promote social mobility (Arreman Erixon and Holm 2011). This was based on Friedman's (1955) argument of choice furthering increased freedom and mobility (Statens offentliga utredningar 1981:34; Proposition 1991/92:95). Indeed the right to choose a school was described as a fundamental principle in a free society; market logic and competition were highlighted as a way of improving educational quality. The freedom reforms were presented as being especially beneficial for less privileged students (Börjesson 2016). Both economic incentives and goals of equality, such as equity in educational opportunities regardless of geographical location (Svensk Författarsamling, 1 § 8, 2010), were present (Erikson 2016).

Swedish studies on school choice suggest that both individual and geographical factors aid in reproducing inequalities (Börjesson 2016; Trumberg 2011; Lidström, Holm and Lundström 2014). This is in contrast to the intended consequences of school choice outlined in official policies and political declarations. Swedish-born students have a significant inclination towards selecting more distant schools if their housing area has a high proportion of foreign-born students or students from families with social assistance (Andersson, Malmberg, and Östh 2012). School segregation has increased since the school choice reform (Bunar 2010b; Sahlgren 2013; Trumberg 2011), adding to the already existing differences in school composition caused by residential segregation (Lindbom 2010; Östh, Andersson, and Malmberg 2013; Yang Hansen and Gustafsson 2016). Thelin and Niedomysl (2015) also found that students’ background characteristics (such as ethnicity and parental education level) (Böhlmark, Holmlund, and Lindahl 2015) and geographical context have substantial importance for students’ school choice and academic performance.

A recent investigation by Forsberg (2015) found that existing social structures, in place prior to school choice reforms, have had a strong influence in shaping Stockholm’s educational market. All the above-mentioned factors then adversely affected these existing social differences, thus exacerbating social differentiation across schools and programmes. Access to education further was differentiated geographically, with private schools concentrating in metropolitan areas and absent in rural areas (Lundahl et al. 2013). There was also a significant increase in school closures in sparsely populated areas after 2000 (Åberg-Bengtsson
Moreover, difficulties in finding financial support for travel or relocation hindered rural youngsters from freely choosing upper secondary schools outside of their residential municipality. Research has shown that some students feel disappointed or left behind when classmates with greater resources commute to schools in other municipalities (Holm 2013). The effects of market restructuring thus need to be understood in relation to students’ choices and mobility, alongside local educational opportunities, as these factors constitute the spatial consequences of choice in a quasi-market system.

School choice as a market regulating mechanism

Racism is also a factor to consider when investigating the choice processes and school selection patterns in market restructured education systems such as Sweden. In American schools, Saporito and Lareau (1999) found that the proportion of African American students in a school was the first-order factor that white families based their school choice on. Second-order factors that influenced choice included SAT-score, teacher experience, school size, student–teacher ratio, student volume and academic quality. The avoidance of schools with minority students was rationalised by parents, who associated students of ethnic backgrounds with lower academic achievement (Holme 2002). Other studies show that white students tend to leave schools as the proportion of students with a migrant background increases (Fairstle and Resch 2002; Rangvid 2010; Saporito 2003).

Parallel results can be found for families in the Netherlands, Chile and Finland. When choosing a school for their children, parents avoid schools with social and ethnically mixed student populations, and regard students from underprivileged backgrounds as lowering school contentment. They thus choose white schools over non-white schools in nearby residential areas (e.g. Kosunen 2016; Kosunen and Carrasco 2016; Karsten et al. 2003). Similarly, Weis, Cipollone, and Jenkins (2014) found an intersection between class and race in college applications when investigating three American secondary schools. Middle-class students in these schools went to great lengths and used various strategies to secure a place at a prestigious university. Beach and Puaca (2014) have noted similar findings regarding elite programme choosers at Swedish universities.

In the UK, Reay (2004) problematised school choice, based on the finding that some middle-class families used exclusionary choice strategies to assist their children in gaining entrance to “better” schools. Families were found, for example, to relocate, to strategically use the most beneficial address after a parent separation, or to appeal against a school’s decision in the application process, despite not living in the catchment area. The participants in the study expressed a concern for ensuring better options for their children, and searched for more homogeneous, middle-class institutions where “there are people like me” (Reay 2004, 549). Francis and Hutchings (2013) presented similar findings in a larger survey study, where statistically significant differences in parental educational and choice strategies could be attributed to social group belongingness. They distinguish between two types of choosers: hyper choosers (i.e. using several sources of information as basis for choosing) and limited choosers (i.e. using one or none of the listed information sources as basis for choosing). Whereas earlier research found differences in choice strategies between working-class and middle-class parents, they find that although middle-class parents are overrepresented as hyper choosers, some working-class parents could be found in this group as well and vice versa. However, they still emphasise that a large proportion of the parents (more so, but not
exclusively, found in lower social groups) does not “adopt the choice behaviours anticipated by government policy” (Francis and Hutchings 2013, 5) where all parents are evenly informed active choosers.

Studying the process of school choice in England, Burgess, Greaves, and Vignoles (2017) find that where non-free school meal funded (FSM) and FSM-households demonstrate similarity in choice activity (i.e. number of choices being made), students from non-FSM households end up accessing better high performing schools. This was attributed to their geographical proximity to the schools. Similarly, prominent differences were noted between white and Asian and black families, where Asian and black families did show a preference for higher performing schools and being active choosers. It is noted however, that despite being more active choosers the students from these families’ children still ended up being enrolled in low performing schools. Having a good school geographically available thus seems to be of major importance for socioeconomically disadvantaged families as well as non-white families, who are having issues with accessing higher performing schools even when being active choosers. Unevenness in geographical availability of education therefore is imperative, as it seems that even when minority families are engaged in the choice process this will not counteract the effects of residential segregation or lack of educational supply in the local neighbourhoods.

Methods of analysis

This investigation uses register data from the Gothenburg Educational Longitudinal Database (GOLD), which contains geographic unit codes for students’ residential and school municipality. The functional regions were delineated by analysing the student flows between municipalities. Differences in comparison between the geographic codes were indicated in terms of commuting. For the present analysis, a subsample from GOLD was selected. The subsample consisted of 664,895 first year students in upper secondary education from the years 1997, 2000, 2003, 2006, 2008 and 2011. Sixteen-year-olds (approximately 95% per cohort) mainly represented these cohorts. However, individuals aged between 15 and 19 were also included, due to variation in age of enrolment caused by early school enrolment, expulsion, reapplying for different tracks or programmes or attending a preparatory individual studies programme.

Adjustment of the functional regions

Previous research has shown an increase in student commuting, with students covering longer distances and crossing over more municipal borders after choice reforms (National Agency of Education 2011, 2013). Both labour and education markets, for occasional cohorts, have previously been operationalised by mapping out aggregated commuter streams of students in and around municipalities as functional regions (National Agency of Education 2011, 2013; Statistics Sweden 2017a). Assessing functional regions through commuter statistics also seems to be the most common analytical approach in Europe (Cattan 2002).

In the present study, commuter statistics were used to categorise the municipalities as either self-sufficient (centre municipalities, CEM) or dependent (commuter municipalities, COM). A self-sufficient municipality was defined by two criteria: (1) total student migratory commuter flows did not exceed 20% of residential student population, and (2) the single
largest student commuter flow did not exceed 7.5% of residential student population (National Agency of Education 2011). If a municipality failed to fulfil these two criteria, it was categorised as dependent. These criteria have previously been examined through testing different flow proportions and have been found to be satisfactory approximations of market areas (CERUM 1993; Karlsson and Olsson 2006; Statistics Sweden 1992). While recognising that changes in these criteria would produce different results, considering aforementioned calculations and evaluations, we deem them reliable. Thus, we defined a school market as including a CEM (i.e. a dependent municipality, or market core) and connecting COMs (commuter municipalities). These municipality interdependencies serve to portray Swedish school market areas.

In the current study, the functional regions model was adjusted in order to facilitate an analysis over time. One of the main changes was including a third category: “transition municipality” (TM). This was included in order to expose the process of self-sufficient municipalities gradually losing self-sufficiency as student commuter patterns change (i.e. no longer fulfilling both of the previously listed model conditions for self-sufficiency). We made this adjustment because we discovered during analysis that changes in commuter streams and loss of municipality self-sufficiency tended to occur in stages rather than abruptly. We observed a tendency for an increasing proportion of the residential student population (>20%) to begin commuting to another municipality, or for one of the external streams to grow in size (>7.5%). The TM category therefore signifies municipalities that are neither completely self-sufficient nor dependent. In addition, the original concepts of local and regional markets (see National Agency of Education 2011, 2013) were then replaced with primary and secondary markets (see Figure 1). These new concepts were implemented to signify our definition of multi-core markets and the emerging symbiotic relationships between municipalities on more than one market level.

The adjusted model attempts to capture market expansions simultaneously on two levels and to portray local and regional changes interdependencies in detail. This is based on an assumption that the choice to attend a school outside one’s residential municipality serves as a good approximation of school market structures, as well as indicating the consequences of policy and organisational changes.

Figure 1. Classification of multi-core markets.
Detecting patterns in space

Global Moran’s I and Hot spot analysis (Getis Ord G*) were utilised in analysing spatial association in the student commuter flows (see Ord and Getis 1995). It is advisable to use Getis Ord G* in conjunction with the Moran’s I, as Getis Ord G* is more suited to discovering local patterns sometimes not revealed by the I’s statistics (Getis and Ord 1992). Commuter rates were calculated for each municipality by considering both outward and inward student flow according to the following formula:

\[
\text{Commuter rates} = \frac{\text{Student inflow} + \text{Student outflow}}{\text{Residential student population}}
\]

Inputting the feature class of the municipality partition in ArcGIS, the polygon contiguity and row standardisation were then used when performing the Global Moran’s I and Hot spot analysis, with the commuter rates as the dependent variable for both. Moran’s I tests the presence of spatial autocorrelation based on feature class values and location consecutively. A positive Moran’s I index indicates a tendency towards clustering, whereas a negative Moran’s I index indicates a tendency towards dispersion (only if \(p\)-value and \(z\)-score indicate statistical significance). Hot spot analysis tests data for spatial clustering of high and low values and if this clustering is statistically significant. It does this by comparing a feature with a high value to the surrounding features and their values and if the sum of these are significantly different from the expected sum. The Getis Ord G* statistics thus measures “the concentration or lack of concentration of the sum of values associated with variable X in the region of study” (Getis and Ord 1992, 192). A clustering of high values is defined (by ArcGIS) as a large \(z\)-score paired with a small \(p\)-value, whereas a low negative \(z\)-score paired with a small \(p\)-value indicate a clustering of low values. Thus, differences between features are measured in the number of standard deviations for each feature in relation to the mean of all features (ESRI 2018).

The present analyses will be sensitive to demographic changes; thus, an important feature of these calculations is taking the size of the residential population into consideration. To aid statistical comparisons, before making these calculations the 290 municipalities were categorised into nine homogenous “municipality groupings”, based on population density and business sector structure. This is in line with categorisations used by Yang Hansen and Gustafsson (2011). Municipality groupings included: metropolitan municipalities, suburban municipalities, larger cities, medium sized cities, sparsely populated municipalities, industrial municipalities, rural municipalities, other large municipalities and other small municipalities (Statistics Sweden 2017b).

Results

The results are structured into four sub-sections. The first three address the formation of the school markets, analysis of potential clustering and the changes in student commuter patterns over time. The fourth focuses on educational offerings in the school market setting.
Self-sufficiency and spatial interactions amongst municipalities

In 1997, there were 91 self-sufficient municipalities, 17 transition municipalities and 182 dependent municipalities. The spatial distribution of these categories for 1997 and the following cohorts are visualised in Figure 2. Between 1997 and 2011, the group of self-sufficient municipalities (CEMs) decreased by 57% (−57), while the group of dependent municipalities increased by 33% (+60).

The gradual transformation of some municipalities from a CEM to a TM then to a COM is noteworthy. This is exemplified in the maps as areas changing from dark grey, to black, to light grey between each year. This indicates a loss of self-sufficiency for the municipalities, demonstrated by larger quantities of residential students who commuted to another municipality for education (stemming from a choice to commute, from lack of local educational options, or both). This decline in self-sufficiency also seems to be one directional. CEMs continuously decreased and COMs increased in an apparently semi-permanent way. In addition to the above trend, 71% of municipalities (207 out of 290) were continuously categorised as the same category for all studied years. They were therefore considered stable. If they were re-categorised during the studied years, they were considered unstable. Of them, 81% (167 out of 207) were categorised as dependent (COMs) and 19% (40 out of 207) were categorised as self-sufficient.

A majority of the unstable municipalities (66 out of 83) were re-categorised from a CEM to a COM or a TM, that is, from a self-sufficient category to a dependent category. These municipalities thus changed from being self-sufficient and having a status as a market core that attracted students, to a commuter municipality where a large proportion of local students had to get their desired education outside the municipality. The other unstable municipalities were reclassified from a dependent TM or COM to a CEM at least once between 1997 and 2011. These municipalities managed to gain self-sufficiency by retaining a larger quantity of their residential students compared to previous years. However, only two of these municipalities retained their self-sufficiency in 2011. Thus, municipalities that transformed from dependent to self-sufficient municipalities only tended to retain their self-sufficiency sporadically. They retained more of their residential students for three years or so, but could not
maintain their numbers over time. None of the municipalities that started out as a dependent municipality (COM) and transformed to self-sufficient kept this self-sufficiency consistently between 1997 and 2011.

The distribution of self-sufficient municipalities (CEMs) across the nine municipality groupings is illustrated in Table 1. The group of self-sufficient stable municipalities was not randomly distributed across the municipality groupings. A majority of them were found within these categories: metropolitan areas and larger cities foremost and then medium-sized cities.

The three metropolitan market cores, Stockholm, Gothenburg and Malmö, all had an expanded inflow of students. This expansion was also prevalent for “larger cities” (21 out 22) and “medium-sized cities” (five out of nine). At the same time, all of the CEMs located in “sparsely populated municipalities” had reduced student inflows. However, this was not due to marketisation alone. Self-sufficient municipalities were unequally dispersed across municipality groups from the start, implying that municipality context played a part in having resources available to run a school and in retaining residential student population before choice reforms. Markets thus did not necessarily create inequalities, but rather were affected by existing inequalities. For example, smaller municipalities afflicted by depopulation and lower birth rates would have difficulties providing upper secondary education regardless. However, the urbanisation tendency became progressively pronounced over the analysed years. These smaller municipalities most likely became more disadvantaged post-reforms, when their students commuted to a greater extent than before. Differences between municipality groups were then reinforced over time.

For most municipalities, their status of self-sufficiency or dependence did not change over time, even though the size of external commuter streams increased in general. As a noteworthy example, one of the largest metropolitan school markets centring on Stockholm municipality (CEM, market core) retained its self-sufficient status between 1997 and 2011 and showed an increasing student commuter inflow and outflow. Both for 2008 and 2011, it tethered on the line of self-sufficiency (i.e. model criteria being greater or equal to 20% commuter outflow) since a larger part of the residential students also commuted out of Stockholm. These flows suggest intensifying bi-directional spatial interaction with surrounding municipalities, tied to geographical location (and municipal context). The maps in Figure 2 demonstrate self-sufficient municipalities disappearing from middle and northern regions of Sweden.

**Table 1.** Municipality groupings: distribution of self-sufficient municipalities and changes in student commuter inflows.

| Municipality groupings (n)                   | Self-sufficient “stable” municipalities | Student inflow |
|---------------------------------------------|----------------------------------------|----------------|
| Metropolitan areas (3)                      | 3                                      | + 3            |
| Suburban municipalities (36)                | 0                                      | −              |
| Larger cities (26)                          | 22                                     | + 21           |
| Medium-sized cities (40)                    | 9                                      | + 5            |
| Sparsely populated municipalities (29)      | 4                                      | + 4            |
| Industrial municipalities (53)              | 1                                      | −              |
| Rural municipalities (30)                   | 1                                      | −              |
| Other larger municipalities (31)            | 0                                      | −              |
| Other smaller municipalities (42)           | 0                                      | −              |
| Total (290)                                 | 40                                     | + 31           |

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The whole of intensifying student mobility is suggestive of growing spatial interaction and interrelations. The Moran’s I index was positive for all cohorts, paired with \( p \)-values and \( z \)-scores indicating statistical significance (Table 2), the results point to a tendency towards clustering in the commuter rate values as well as supporting the appearance of a process of declining self-sufficiency.

### Clustering in the market structures

Hot spot analysis identifies statistically significant spatial clusters of high values (hot spots) together with low values (cold spots). The output visualising statistically significant hot and cold spots in student commuting is shown in Figure 3. The results point to significant clustering of both high and low values spread across Sweden. Hot spots tended to be located in southern and middle regions of Sweden, whereas cold spots were distributed over both south and north Sweden, as well as through the middle of Sweden (although more prevalent in the north). Significant findings indicate a change in clustering of commuter rates for the metropolitan region of Stockholm. Initially the region had the characteristics of a cold spot (1997), but later transformed to a hot spot (2003–2011). This suggests that the spatial

### Table 2. Global Moran’s I statistics, dependent variable: student commuter rates/municipality.

|         | 1997  | 2003  | 2008  | 2011  |
|---------|-------|-------|-------|-------|
| Moran’s Index | 0.203 | 0.176 | 0.164 | 0.132 |
| \( z \)-score  | 5.313* | 4.616* | 4.583* | 3.704* |

\*\( p < .01 \).

![Figure 3](image_url). Hot spot analysis results. Year 2008 is not highlighted because of great similarities with year 2011.
clustering of higher values increasingly developed over time. In 1997, an initial clustering of low values was found in and around the metropolitan region of Gothenburg, whereas later years showed no significant clustering. A consistent clustering of high values was found in the south for municipalities surrounding or near the Malmö region.

**School market structural development**

The results outlined above indicated a process of declining self-sufficiency amongst municipalities, increasing spatial interaction, with an urbanisation tendency, and the presence of significant clustering of both high and low values. These changes are important as they consequently affect school market structures, given that they depend on variations in direction and size of student commuter flows between municipalities. The school market demarcated through the adjusted functional regions model is visualised for the analysed years in Figure 4. Market characteristics are summarised in Table 3.

The distribution of municipality categories in the map of the year 1997 is a consequence of a large group of self-sufficient municipalities, which were spread out across Sweden, with fewer connecting commuter municipalities. This was because a greater number of students attended a school in their residential municipality at this time: 28% of school markets (32 of 114) were single self-sufficient CEMs without connecting COMs. Following the changes in commuter flows between municipalities over the years, only 10% (five of 52) of school market areas in 2011 were represented by a single self-sufficient municipality. This meant that the market cores decreased over the years, and the areal size of school markets expanded. At the same time, the COMs became clustered around the remaining market cores as school market areas also expanded in terms of the number of attached COMs. This process is especially evident when visualised through an example comparison of the southern region of Sweden in Figure 5. Three distinct trends are thus discernible in the market structure formation and municipality classification over time. These are:

- Primary markets and CEMs progressively decreased
- Secondary markets and COMs steadily increased
- The market structures concentrated around a reduced number of strong self-sufficient municipalities (CEMs), which attracted students from surrounding municipalities and over greater distances.

**Educational offerings: location, volume and ownership**

The development of educational volume between 1997 and 2011 indicated positive changes, increasing from approximately 612 schools in 1997 to 1004 schools in 2011. However, the geographical availability of the educational supply related to ownership and municipality location progressed very differently in these years (Table 4). In 1997, 276 out of 290 municipalities provided at least one local upper secondary school, whereas in 2011 only 264 municipalities had a minimum of one available educational alternative. This translates to closures of all upper secondary education in 12 municipalities over 14 years. Ten of these closures occurred between 2008 and 2011. Half of these happened in sparsely populated municipalities, one in a rural municipality, one in an industrial municipality and the final two came about in smaller municipalities with less than 15,000 inhabitants. Sparsely populated
Figure 4. School markets as functional regions.
municipalities were also the only municipality group where a decline in municipal schools between 1997 and 2011 was not paired with a corresponding increase in private upper secondary schools (Table 4). In 2011, these sparsely populated municipalities are thus actually worse off in terms of geographical availability of education but also regarding choice of different types of providers and schools compared to both earlier in 1997 and the rest of Sweden in 2011.

Whereas positive progress was noted (in that more schools opened, thus theoretically increasing the possibility for choice), these changes did not occur in a random way but were strongly related to geographical location. The geographical locations of upper secondary schools are illustrated for 1997 and 2011, and compared by ownership in Figure 6 and Table 4. A modest 8% of upper secondary schools in Sweden were owned by a private provider in 1997. After a massive expansion, there was a roughly 50/50 school ownership division between municipal and private providers on the national level in 2011. In the metropolitan regions (municipality grouping 1), around 68% of upper secondary schools were operated by private providers in 2011. After a massive expansion, there was a roughly 50/50 school ownership division between municipal and private providers on the national level in 2011. In the metropolitan regions (municipality grouping 1), around 68% of upper secondary schools were operated by private providers in 2011. Comparatively, there was an 80/20 (%) split in municipal and private ownership in the municipality grouping of sparsely populated municipalities.

An intensification of dots (i.e. schools) can be found in maps for year 2011 for both municipal and private providers, which is in line with a general increasing volume of education. However, the map visualising the progress of school establishments by private providers shows a greater concentration of schools in the southern regions of Sweden. Looking at the

Table 3. Market structure components and characteristics.

|                  | 1997 | 2000 | 2003 | 2006 | 2008 | 2011 |
|------------------|------|------|------|------|------|------|
| Primary markets  | 114  | 104  | 86   | 75   | 61   | 52   |
| Secondary markets| 23   | 18   | 34   | 33   | 40   | 38   |
| Centre municipalities | 91   | 87   | 65   | 60   | 52   | 43   |
| Transition municipalities | 17   | 16   | 18   | 12   | 7    | 5    |
| Commuter municipalities | 182  | 187  | 207  | 218  | 231  | 242  |
| Students (N)     | 97,931 | 99,202 | 109,438 | 126,154 | 121,243 | 110,927 |

Figure 5. South of Sweden, school market comparison (left 1997, right 2011).
general distribution of schools, there were some empty areas, more pronounced in the northern regions but also present in the middle regions. One conclusion is that there was a decline in geographical availability of upper secondary education for sparsely populated and smaller municipalities, while education alternatives were simultaneously expanding vastly in urban and metropolitan regions.

Table 4. Comparison of educational supply per municipality group for years 1997 and 2011.

| Municipality groupings (n)   | 2011 m | sd | max | min | tot | 1997 m | sd | max | min | tot |
|-----------------------------|--------|----|-----|-----|-----|--------|----|-----|-----|-----|
| Metropolitan areas (3)      | 20     | 8  | 28  | 13  | 60  | 22     | 4  | 17  | 7   | 41  |
| Suburban municipalities (36)| 2      | 2  | 6   | 0   | 61  | 2      | 1  | 4   | 0   | 56  |
| Larger cities (26)          | 5      | 3  | 11  | 1   | 130 | 5      | 2  | 11  | 2   | 131 |
| Medium-sized cities (40)    | 2      | 2  | 12  | 1   | 95  | 2      | 1  | 5   | 1   | 89  |
| Sparsely populated municipalities (29) | 1    | 1  | 2   | 0   | 16  | 1      | 1  | 2   | 0   | 26  |
| Industrial municipalities (53)| 1    | 1  | 3   | 0   | 53  | 1      | 1  | 5   | 0   | 70  |
| Rural municipalities (30)   | 1      | 1  | 5   | 0   | 29  | 1      | 1  | 3   | 0   | 35  |
| Other larger municipalities (31)| 2    | 1  | 5   | 0   | 47  | 2      | 1  | 3   | 1   | 52  |
| Other smaller municipalities (42)| 1   | 1  | 0   | 0   | 26  | 1      | 1  | 2   | 0   | 36  |
| Total (290)                 | 2      | 3  | 28  | 0   | 517 | 2      | 3  | 41  | 0   | 560 |

| Municipality groupings (n)   | 2011 m | sd | max | min | tot | 1997 m | sd | max | min | tot |
|-----------------------------|--------|----|-----|-----|-----|--------|----|-----|-----|-----|
| Metropolitan areas (3)      | 44     | 24 | 72  | 27  | 133 | 5      | 3  | 7   | 1   | 14  |
| Suburban municipalities (36)| 1      | 2  | 7   | 0   | 49  | 0      | 1  | 2   | 0   | 10  |
| Larger cities (26)          | 6      | 4  | 15  | 1   | 168 | 1      | 1  | 3   | 0   | 14  |
| Medium-sized cities (40)    | 2      | 2  | 12  | 1   | 39  | 0      | 0  | 1   | 0   | 5   |
| Sparsely populated municipalities (29) | 0    | 0  | 2   | 0   | 4   | 0      | 0  | 0   | 0   | 0   |
| Industrial municipalities (53)| 1    | 1  | 6   | 0   | 32  | 0      | 0  | 1   | 0   | 4   |
| Rural municipalities (30)   | 1      | 1  | 3   | 0   | 15  | 0      | 0  | 1   | 0   | 3   |
| Other larger municipalities (31)| 1    | 1  | 6   | 0   | 28  | 0      | 0  | 1   | 0   | 1   |
| Other smaller municipalities (42)| 0   | 1  | 0   | 0   | 19  | 0      | 0  | 1   | 0   | 1   |
| Total (290)                 | 2      | 5  | 72  | 0   | 487 | 0      | 1  | 7   | 0   | 52  |

Figure 6. Comparison between 1997 and 2011 of upper secondary schools by provider (i.e. ownership).
Discussion

This article concerns a longitudinal analysis of the spatial materialisation of the Swedish upper secondary educational quasi-market, which was previously defined as the geographical outcome originating from interactions between national policy, students’ choices and available educational provisions (e.g. Le Grand 1991; Lund 2008). Based on estimated, visualised structuring of market spaces, we have identified an increasing cross-municipality spatial interaction between municipalities. This increase followed the marketisation reforms and changes in the number of (and access to) upper secondary educational offerings. These changes have shifted upper secondary market space over time, with increasing clustering around a decreasing number of self-sufficient municipalities and an increasing trend in commuter flows to urban and metropolitan areas. School markets have become more concentrated through a market adjustment process, with increasing differences in educational offerings and increasing rates of external student commuters across municipalities. These results imply that school markets are growing, while students in certain areas have also become gradually more mobile.

There are several noteworthy features embedded in the observed changes. The National Agency of Education (2011, 2013) found that student commuting between municipalities increased after 1995; this is supported by the current findings. However, results on the direction and origin of the geographic flows increase our understanding of this movement. One important feature is an urbanisation tendency. Urbanisation tendencies are not exclusive to school market developments, both labour commuter streams and population growths have shown similar inclinations and there may be interaction effects here. The largest population increases are seen in urban and suburban areas, with numbers predicted to increase even more in the future. The reverse development is predicted for rural areas (Statistics Sweden 2017c). Between 1970 and 2005 (a 35-year period), the reduction in the quantity of labour markets has been estimated to be 45%, with each market expanding in geographical size (Statistics Sweden 2010). A similar market concentration effect also has been predicted for school markets. However, such a predicted change in school market development has been greater relative to time, with the quantity of school markets reducing by 55% in 14 years. Municipal geographic context is connected with market concentration and student mobility; our results thus point to a dual importance of place both in terms of possibilities to become mobile and available local educational supply (school establishment/school closures).

Non-urban municipalities displayed increasing rates of students commuting to their urban counterparts, contributing to impoverishing these municipalities of students. Sparsely populated and smaller municipalities represented the majority of municipalities afflicted by closures of all local upper secondary education. Connecting to private providers clustering in metropolitan, urban and city municipalities, educational supplies are thus gradually being dispersed differently. Students are now looking (or forced to look) elsewhere for their education to a greater extent, and this will affect school survival in areas where outflows of students are high. Educational planning (using market principles) has thus had significant implications for educational opportunities for students in different municipalities.

The prerequisites for gaining self-sufficiency as a municipality post-reform appear to be associated with pre-reform municipal self-sufficiency. Throughout the studied years, almost 75% of the municipalities were continuously categorised in the same category, whilst a
smaller unstable group kept changing their status. However, none of the municipalities became self-sufficient without previously being self-sufficient at any point during this time. Stable self-sufficient municipalities were unequally distributed across different types of municipalities. This uneven distribution can in one sense be considered very reasonable because of disparities in population, size and resources. However, increasing commuting and school closures seemed to reinforce this. No municipality was able to re-establish itself as a school market core during the studied time period. This means that outflows of students for many municipalities persisted over time once established. Conditions for market adjustments (i.e. competition mechanisms) thus varied across municipalities. The stable municipalities had stability due to a continual flow of students persevering over time, while the unstable municipalities had quick changes from year to year, cohort to cohort, which most likely affected both supply and educational quality in these regions.

Although the choice mechanism is grounded in ideas of competition pushing out schools of lower quality through rational student selection, this study supports the idea that other factors, such as municipal context, might act as contributing determinants for school choice and school survival. These features signal a differentiating aspect in the geographic flows from spatial effects (Massey 1991). Whereas there is an argument for students being forced to be mobile in municipalities with little or no educational supply, the mobility of students’ crossing over municipality boundaries in pursuit of schooling in an urban area has repercussions over time. For future residential students in rural areas with low levels of school establishment, further school closures increase student outflows. To be mobile therefore becomes the only choice for these students. Educational opportunities seem to depend on geographical location, educational offerings in nearby areas and the desirability of the local municipal context.

One of the arguments in favour of increased mobility is that, for students living in areas where local options are low or poor, the opportunity to choose better education elsewhere is available. However, previous research indicates that the possibility to commute and make a choice is not equal across student groups and that some students lack resources, capacity or opportunity to make this choice (Holm 2013; Reay 2004). In addition to the infrastructural restrictions, there are distance limitations in accessing educational opportunities.

If a student cannot commute or make a choice, that student will be limited by what is on offer in the nearby areas. Thus, the market function will not work for areas where educational supply is low and where residential student groups lack information and/or resources. They cannot choose and risk being stuck with what is on offer. This is a market failure and problematic in terms of equity, social justice and the responsibility proclaimed by Swedish School Law about equal access to education, regardless of geographical location or economic situation (Svensk Författarsamling, 8 §, 2010). Moreover, not only is market failure prevalent and creating differences in educational opportunities between places, these tendencies are so far progressively escalating over time.

Conclusions

To conclude, the current study supports the idea of market failure. Student commuting patterns demonstrated an urbanisation tendency, which increased progressively over time, whilst educational offerings for areas outside the urban zones declined. This goes against the original policy intentions since it eliminates freedom and choice for many students.
outside of urban areas. Moreover, there is an escalation effect. Students’ choices today affect future educational opportunity, as non-urban, rural and unstable municipalities will most likely experience difficulties in providing education for local residential students, while market adjustments push the schools out and force large quantities of the students to seek education elsewhere. This clearly implies that the goals and aspirations of compensating social differentiation through market mechanisms are not successful. Residential location and educational opportunities also seem to be inter-related. Considering this, in addition to correlations between residential area and social class in Sweden, future research could investigate the social composition of these commuter flows and examine patterns of within-municipal mobility and school choice mechanisms affected by upper secondary school quasi-markets. The idea of students being pushed to relocate, rather than commuting, is another potential avenue for future research. Furthermore, performing international comparative work on student mobility patterns, geographical availability of education and the relationship between choice strategies and students’ long-term educational outcomes can better an understanding of effects and consequences in marketised systems in different social and cultural contexts.

Notes

1. Sweden is administratively divided into 21 counties (län) and 290 municipalities (kommuner). These municipalities are autonomous local governing units that are responsible for a number of social security and welfare services, including education. The largest municipality by area is Kiruna, 19,140 km² with 23,170 inhabitants. The smallest one is Bjurholm, 1307 km² with 2453 inhabitants. The three most population dense municipalities are the main metropolitan areas: Stockholm (949,164 inhabitants), Gothenburg (563,439 inhabitants) and Malmö (332,855 inhabitants) (Sveriges kommuner och landsting 2017).

2. Individuals missing a residential address or school location were excluded.

3. In Sweden a student who graduates from secondary education without a passing grade in all subjects is not eligible for applying to a national programme in upper secondary education. They can however apply to a preparatory programme (Individuella programmet) instead to qualify for upper secondary education later on.

4. See Methods section for extended description of these groupings.

5. CEMs included here are the municipalities that were classified as a CEM for each year analysed, i.e. the stable CEMs.

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