In the Shadow of Brothers

Educational Achievements of Migrant Girls

July 14, 2024

Abstract

Gender-bias in parental investments can have subtle implications for how education policies impact migrant girls. Using exogenous variation created by a Swedish school-entry policy, I analyze how prolonged time at home with siblings before entering public education impacts migrant girls human capital formation. Native children usually have a maturity advantage over younger classmates when they enter school late, which also can have positive spillovers to younger siblings. But for migrant girls, remaining at home with a brother could reduce the parental investments if parents value sons' education over daughters'. The results show that prolonged time at home with an oldest brother has lasting negative impacts on younger sisters' school outcomes, while time with an older sister has positive effects. Likewise, the maturity advantage of late school entry only benefits migrant girls with younger sisters but not those with younger brothers. These negative impacts are unique to migrant girls and likely stem from parents' gender-bias, as boys and native children do not experience similar effects. The effects are more pronounced in families from more traditional backgrounds, and can be partly accounted to differences in mothers' labor decisions when sons or daughters enter school late.

WORK IN PROGRESS **Do not quote or circulate**

1 Introduction

Recent surges in migration have underscored the critical importance of public policies that support the integration of migrants. Public education, a foundational pillar in this effort, is essential for integrating migrant children. However, many existing education policies are designed to align with how native parents raise their children and invest in their human capital. If migrant families exhibit different patterns of parental investment due to cultural norms, there is a risk that education policies that work for native children may be ineffective or could even have unintended consequences for migrant children.

A key concern in this context is the welfare of girls within migrant families. Research indicates that migrant families from cultures with traditional gender roles tend to uphold these norms in the host country, influencing their investment in their children's human capital (Blau *et al.*, 2013; Giavazzi *et al.*, 2019). Sons are often perceived as benefiting more from education in the labor market due to household specialization in their future families (Almond *et al.*, 2013; Anukriti *et al.*, 2022). In contrast, daughters might be viewed as gaining less from education, especially in cultures that prioritize early marriage or domestic roles for women (Fernández and Fogli, 2009; Dahl *et al.*, 2022). With finite resources and a desire to maximize children's future earnings, parents may invest more in their sons' education than in their daughters' (Butcher and Case, 1994; Mitrut and Wolff, 2014).

The differential treatment of sons and daughters within migrant families could have subtle implications for how educational policies impact migrant girls. Parents are key mediators between education policies and children's learning, providing supplemental time investments and resources that help unpack the benefits of such policies (Currie and Almond, 2011; Greaves *et al.*, 2023). When education policies and parental investments complement each in building children's human capital, gender bias in parental investments can lead to two critical issues. First, if a migrant girl is the focus of a policy, its effectiveness might be compromised by the presence of brothers, who may limit the parental support she receives. Second, if a brother is the focus of the policy, a negative spillover effect could occur, with parents diverting resources from the girl to her brother. Therefore, understanding how education policy and family structure interact to shape migrant girls' educational outcomes is of utmost importance.

Against this background I study how a common policy, which dictates the timing of school entry, interacts with family structure to influence the human capital formation of migrant girls. In Sweden, children enter public education in the year they turn seven. This creates a natural cut-off in age at school entry on January 1^{st}, where those born close in time in December and January will start school one year apart. According to the existing

literature, native children who enter school a year later due to the cut-off usually have a 'maturity advantage' over relatively younger classmates while in school (Bedard and Dhuey, 2006; Mühlenweg and Puhani, 2010; Fredriksson and Öckert, 2014; Cook and Kang, 2020). Recent papers have also found positive spillovers when a child enters school late both on younger siblings' human capital formation (Karbownik and Özek, 2021; Zang *et al.*, 2023) and on mothers' employment and marriage stability (Landersø *et al.*, 2017).

It is especially interesting to study the school-entry-age policy in the context of migrant families. Just as the policy provides exogenous variation in the age a child enters school, it also provides exogenous variation in the length of time a child remains at home with siblings before entering public education. During this time, the siblings will depend primarily on parental investments before public education takes over. If migrant parents prioritize investments to sons over daughters, the duration of time spent at home with siblings can have serious implications for migrant girls' human capital formation.

In light of this, I explore two different but related treatments that the cut-off in school entry age generates. The first one is where migrant girls spend longer time at home with an older brother or sister because he or she enters school late. If migrant parents exhibit gender-bias in their investments decisions, remaining at home with a brother could reduce the amount of investments a younger sister receives. Meanwhile, remaining at home with an older sister could benefit younger sisters if parents invest in them more equally.

The second treatment is where first-born girls in migrant families start school late due to the cut-off and therefore will remain at home with either a younger sister or brother. The otherwise positive policy impact of starting school late could prove less efficient for these girls depending on how parental investments are diluded by the presence of a younger sibling. If remaining at home with a brother has negative implications for migrant girl's human capital formation, it may offset the maturity advantage of being relatively older at school entry.

I examine the effects of the two treatments using a Regression Discontinuity Design. I compare end-of-compulsory school outcomes of students born close in time around the January 1^{st} cut-off but who start school in two subsequent cohorts. For the sibling-spillover analysis I compare the outcomes of younger sisters in migrant families whose oldest sibling is born either before or after the cut-off. When estimating the direct effects of entering school late I compare the outcomes of oldest sisters in migrant families who is born either before or after the cut-off.

I run separate regressions for all combinations of sibling-gender pairs to examine how migrant girls are differentially impacted by remaining at home with either a sister or brother. For the sibling-spillover analysis I split the sample of younger sisters by whether the oldest sibling is a brother or sister. For the direct effects I split the sample of first-born girls by

whether they have a second-born sister or brother. The analysis is replicated for migrant boys and natives to compare with the main results.

The data comes from Swedish administrative school, tax and population records. This gives me the great advantage of being able to link all siblings and families in Sweden, and identify their migrant backgrounds based on detail information on the parents' origin. The main sample consists of all siblings born in Sweden to two non-Nordic parents between 1988-2003. I refer to them as 'second-generation migrants' and observe their end-of-compulsory school outcomes between 2004-2019, when they are 15/16 years of age.[1]

This study presents several key findings for second-generation migrant girls. First, prolonged time at home with the oldest brother has lasting negative impacts on younger sisters' human capital formation. My analysis shows that having an oldest brother who enters school late due to the cut-off has significant and negative impacts on girls' end-of-compulsory school outcomes.

Second, the negative impacts on girls come specifically from having an older brother at home, rather than just any older sibling. On the contrary, prolonged time at home with the oldest sister has positive impacts on girls' school outcomes. The fact that the spillover effects differ by the gender of the oldest sibling provides evidence of gender-bias in parental investments. As long as a son remains at home, he will receive relatively more parental investments than a younger sister, which negatively impacts her human capital formation. On the other hand, parents will value two daughters' education more equally. When an oldest sister remains at home, the younger sister continues to receive a more equal amount of investments as her sister.

Third, late school entry positively impacts the school outcomes for oldest girls in migrant families, but only if they have a younger sister. My analysis of the direct effects of late school entry on girls' own school outcomes shows positive and significant effects for those with a second-born younger sister. However, the effects are statistically insignificant and closer to zero for girls with a second-born younger brother. For girls, remaining at home with brothers for longer completely offsets the maturity advantage of being relatively older than their classmates when entering public education. Thus, prolonging the time that girls rely on parental investments when brothers are at home have negative implications for her human capital formation regardless of whether he is older or younger than her.

Fourth, only girls in migrant families experience negative effects from prolonged time

[1]Only including siblings born in Sweden ensures that I observe their exact birth dates, which is important for my analysis. First, it allows me to test the underlying assumption that there is no systematic manipulation of births around the cut-off. Second, including first-generation migrants in the sample leads to over subscription of January 1st birth dates since it is a praxis in Sweden to assign this birth date to migrants who do not have proper documentation.

at home with a brother on their human capital formation. When I replicate the analysis for boys in migrant families, I find that siblings do not influence the effects of late school entry for them. There are no statistically significant sibling spillovers on younger brothers' school outcomes, and the effects of late school entry for oldest sons are positive and similar in magnitude independent of whether he remains at home with a younger sister or brother.

I also replicate the analysis for a sample of native students from families comparable to migrant families in terms of socioeconomic status.[2] Contrary to the findings in the literature, I find no sibling spillovers of late school entry in native families. I find that late school entry has positive impacts on first-born children regardless of the gender of the younger sibling. Most importantly, I find no differences in the effects for native boys and girls. It is only in migrant families that girls are influenced by remaining with siblings at home while boys are not.

Lastly, I provide additional evidence that the results for second-generation migrant girls stem from gender-bias in migrant parents' investment decisions. Dividing the sample based on whether the mother comes from a more or less gender-equal origin country provides suggestive evidence that brothers have a more significant negative influence on girls in families from more gender traditional cultures. Growing up in a family with gender-traditional norms makes it less likely that parents prioritize daughters' and sons' education equally.[3]

Furthermore, I show that migrant mothers are more likely to increase employment and wages when their daughters enters school late due to the cut-off. But when sons enter school late, it only has a small impact on her probability to work, which is not reflected in wages. This is in stark contrast to native mothers, who are equally more likely to increase employment and earn higher wages independent of whether a son or daughter who starts school late. Being present at home while raising a son seems to be regarded as a more 'permanent' responsibility for mothers in migrant families, regardless of whether he has entered school and is benefiting from being among the oldest in class.

This is an interesting results since although parents may think the mother's time is a worthwhile investment, it is likely counter-intuitive. For girls, there is a positive income effect within the family that further amplifies the maturity advantage of starting school late.

[2]The validity of the Regression Discontinuity Design requires a assumption of no manipulation of births around the January 1^{st} cut-off. However I find that high-earning and well-educated native parents time the birth of their children to the beginning of the year. I therefore compare my results for second-generation migrant students to the results of native students from families below the 20^{th} income percentile, for whom the balance tests hold. More details can be found in Appendix C.

[3]Coming from a more gender traditional culture is weakly positively correlated with the mothers' labor market integration and coming from a country with lower human development. But when I split the sample based on these factors I do not find that the negative influence of brothers on the policy impacts for migrant girls remains equal.

Boys loose out on this advantage when their mothers do not increase employment. This spills over to their sisters, since mothers will not increase employment when an oldest girl starts school late if she has a younger brother at home.] Overall, this finding provides an important and novel insight as to why the labor force participation among migrant mothers continues to be low in Sweden (Friedrich *et al.*, 2022).

This study contributes to the peer-effects literature and specifically to the growing literature on sibling influences and spillovers. Early papers primarily focused on the externalities of classmates' abilities on the student's own grade outcomes and its methodological shortcomings (Manski, 1993; Sacerdote, 2011; Angrist, 2014). The literature has in recent years focused in on the peer effects of siblings.[4]. A few papers have focused on the heterogeneous spillover effects by the gender-composition of siblings (Qureshi, 2018; Dossi *et al.*, 2021; Adamecz-Völgyi *et al.*, 2023). In terms of methods, two studies align with mine. By utilizing the cut-off in school entry age for the oldest sibling to study its impact on their younger sibling both Karbownik and Özek (2021) and Zang *et al.* (2023) find positive spillovers of the oldest sibling delaying entry on the younger sibling's school performance in families with low socioeconomic status. Landersø *et al.* (2017) utilizes the school entry cut-off in Denmark to study its effect on family resource allocation.

My study contributes to this literature by examining sibling influences within migrant families. These dynamics are particularly interesting because, although siblings grow up together in the host country, they are significantly influenced by parental investments shaped by gender norms from their home country. Similar to (Landersø *et al.*, 2017), I find that delayed school entry improves native mothers' employment. However, importantly, I find that the impacts on migrant mothers are highly influenced by the gender of their children. This finding is crucial because it shows that resource allocation in migrant families is more strongly influenced by gender preference. This leads them to make suboptimal economic choices compared to native families, in a host-country where both parents working is norm.

This study also makes a novel contribution to the long-standing school-starting-age literature. Studies on primarily native children have found positive effects of being older at school start both in the short-run (e.g. Bedard and Dhuey, 2006; Mühlenweg and Puhani, 2010; Dhuey *et al.*, 2019) and to some extent in the long-run (Angrist and Krueger, 1991; Black *et al.*, 2011; Fredriksson and Öckert, 2014). Papers studying heterogeneous effects have found mixed results for the effects by gender (Datar, 2006; Puhani and Weber, 2008; Cook

[4]The literature has used various sources of variation in order to establish causality: grade-retention policies (Figlio *et al.*, 2023), school-peer quality (Nicoletti and Rabe, 2019), college admission (Altmejd *et al.*, 2021), ADHD diagnosis (Breining, 2014; Persson *et al.*, 2021), health shocks (Parman, 2013; Yi *et al.*, 2015), disability (Fletcher *et al.*, 2012; Black *et al.*, 2021), and health interventions (Alsan, 2017; Daysal *et al.*, 2022).

and Kang, 2020), socioeconomic status (Elder and Lubotsky, 2009; Fredriksson and Öckert, 2014; Suziedelyte and Zhu, 2015), and minority status (Leuven *et al.*, 2010; Cook and Kang, 2020). Like these studies, I use the cut-off in school entry age to compare outcomes of older and younger school starters. But the main interest of this paper is not to only evaluate how the policy impacts migrants and natives.

My contribution to this literature is to analyze school-entry rules in the context of migrant-family strucutre. I propose a new interpretation of the exogenous variation created by the cut-off, specifically that it varies the time siblings rely on parental investments at home before entering school. By identifying sibling pairs with different gender combinations, I demonstrate that migrant parents tend to make gender-specific investments, which disproportionately and adversely impact their daughters.

There are remarkably few papers that evaluate how families' cultural backgrounds influence second-generation migrant girls' educational integration. A few study the effects of cultural distance between host and origin country on female migrants' opportunities, but primarily focusing on labor market and fertility choices in adulthood (Fernández and Fogli, 2009; Blau *et al.*, 2013; Kleven, 2022). Others have focused on how migrant parent's investments in their daughters may react to policy changes and religious views (Mitrut and Wolff, 2014; Nollenberger *et al.*, 2016; Dahl *et al.*, 2022). There is some evidence that migrant girls benefit more from early investments outside the home when they get access to day care (Drange and Telle, 2015; Corazzini *et al.*, 2021). Meanwhile there is strong evidence of son-preference in fertility choices among migrants in North America (Almond and Edlund, 2008; Almond *et al.*, 2013; Blau *et al.*, 2020), and in Sweden (Mussino *et al.*, 2019).

This study contributes to the literature by demonstrating that a common education policy can unintentionally affect migrant girls due to their parents' cultural beliefs about gender roles. It reveals that family cultural beliefs have enduring impacts, extending well beyond son preference in fertility and mothers' labor supply. These beliefs create adverse consequences for migrant girls, even when they grow up in one of the world's most gender-equal countries.

References

Adamecz-Völgyi, A., Jerrim, J., Pingault, J.-B. and Shure, D. (2023). Overconfident boys: The gender gap in mathematics self-assessment.

Almond, D. and Edlund, L. (2008). Son-biased sex ratios in the 2000 united states census. *Proceedings of the National Academy of Sciences* (15), 5681–5682.

—, — and Milligan, K. (2013). Son preference and the persistence of culture: evidence

from south and east asian immigrants to canada. *Population and Development Review* (1), 75–95.

Alsan, M. (2017). *The gendered spillover effect of young children's health on human capital: evidence from Turkey*. Tech. rep., National Bureau of Economic Research.

Altmejd, A., Barrios-Fernández, A., Drlje, M., Goodman, J., Hurwitz, M., Kovac, D., Mulhern, C., Neilson, C. and Smith, J. (2021). O brother, where start thou? sibling spillovers on college and major choice in four countries. *The Quarterly Journal of Economics* (3), 1831–1886.

Angrist, J. D. (2014). The perils of peer effects. *Labour Economics*, 98–108.

— and Krueger, A. B. (1991). Does compulsory school attendance affect schooling and earnings? *The Quarterly Journal of Economics* (4), 979–1014.

Anukriti, S., Bhalotra, S. and Tam, E. H. (2022). On the quantity and quality of girls: Fertility, parental investments and mortality. *The Economic Journal* (641), 1–36.

Bedard, K. and Dhuey, E. (2006). The persistence of early childhood maturity: International evidence of long-run age effects. *The Quarterly Journal of Economics* (4), 1437–1472.

Black, S. E., Breining, S., Figlio, D. N., Guryan, J., Karbownik, K., Nielsen, H. S., Roth, J. and Simonsen, M. (2021). Sibling spillovers. *The Economic Journal* (633), 101–128.

—, Devereux, P. J. and Salvanes, K. G. (2011). Too young to leave the nest? the effects of school starting age. *The review of economics and statistics* (2), 455–467.

Blau, F. D., Kahn, L. M., Brummund, P., Cook, J. and Larson-Koester, M. (2020). Is there still son preference in the united states? *Journal of Population Economics*, 709–750.

—, —, Liu, A. Y.-H. and Papps, K. L. (2013). The transmission of women's fertility, human capital, and work orientation across immigrant generations. *Journal of Population Economics*, 405–435.

Breining, S. N. (2014). The presence of adhd: Spillovers between siblings. *Economics Letters* (3), 469–473.

Butcher, K. F. and Case, A. (1994). The effect of sibling sex composition on women's education and earnings. *The Quarterly Journal of Economics* (3), 531–563.

Cattaneo, M. D., Jansson, M. and Ma, X. (2018). Manipulation testing based on density discontinuity. *The Stata Journal* (1), 234–261.

Cook, P. J. and Kang, S. (2020). Girls to the front: How redshirting and test-score gaps are affected by a change in the school-entry cut date. *Economics of Education Review*, 101968.

Corazzini, L., Meschi, E. and Pavese, C. (2021). Impact of early childcare on immigrant children's educational performance. *Economics of Education Review*, 102181.

Currie, J. and Almond, D. (2011). Human capital development before age five. In *Handbook of labor economics*, vol. 4, Elsevier, pp. 1315–1486.

Dahl, G. B., Felfe, C., Frijters, P. and Rainer, H. (2022). Caught between cultures: Unintended consequences of improving opportunity for immigrant girls. *The Review of Economic Studies* (5), 2491–2528.

Datar, A. (2006). Does delaying kindergarten entrance give children a head start? *Economics of Education review* (1), 43–62.

Daysal, N. M., Simonsen, M., Trandafir, M. and Breining, S. (2022). Spillover effects of early-life medical interventions. *Review of Economics and Statistics* (1), 1–16.

Dhuey, E., Figlio, D., Karbownik, K. and Roth, J. (2019). School starting age and cognitive development. *Journal of Policy Analysis and Management* (3), 538–578.

Dossi, G., Figlio, D., Giuliano, P. and Sapienza, P. (2021). Born in the family: Preferences for boys and the gender gap in math. *Journal of Economic Behavior & Organization*, 175–188.

Drange, N. and Telle, K. (2015). Promoting integration of immigrants: Effects of free child care on child enrollment and parental employment. *Labour Economics*, 26–38.

Elder, T. E. and Lubotsky, D. H. (2009). Kindergarten entrance age and children's achievement impacts of state policies, family background, and peers. *Journal of human Resources* (3), 641–683.

Fernández, R. and Fogli, A. (2009). Culture: An empirical investigation of beliefs, work, and fertility. *American economic journal: Macroeconomics* (1), 146–177.

Figlio, D. N., Karbownik, K. and Özek, U. (2023). *Sibling Spillovers May Enhance the Efficacy of Targeted School Policies*. Tech. rep., National Bureau of Economic Research.

Fletcher, J., Hair, N. L. and Wolfe, B. L. (2012). *Am I My brother's keeper? Sibling spillover effects: The case of developmental disabilities and externalizing behavior*. Tech. rep., National Bureau of Economic Research.

Fredriksson, P. and Öckert, B. (2014). Life-cycle effects of age at school start. *The Economic Journal* (579), 977–1004.

Friedrich, B., Laun, L. and Meghir, C. (2022). Earnings dynamics of immigrants and natives in sweden 1985–2016. *Quantitative Economics* (4), 1803–1847.

Giavazzi, F., Petkov, I. and Schiantarelli, F. (2019). Culture: Persistence and evolution. *Journal of Economic Growth*, 117–154.

Greaves, E., Hussain, I., Rabe, B. and Rasul, I. (2023). Parental responses to information about school quality: Evidence from linked survey and administrative data. *The Economic Journal* (654), 2334–2402.

Karbownik, K. and Özek, U. (2021). Setting a good example? examining sibling spillovers in educational achievement using a regression discontinuity design. *Journal of Human Resources*.

Kleven, H. (2022). *The geography of child penalties and gender norms: Evidence from the United States*. Tech. rep., National Bureau of Economic Research.

Landersø, R., Nielsen, H. S. and Simonsen, M. (2017). School starting age and the crime-age profile. *The Economic Journal* (602), 1096–1118.

Leuven, E., Lindahl, M., Oosterbeek, H. and Webbink, D. (2010). Expanding schooling opportunities for 4-year-olds. *Economics of Education Review* (3), 319–328.

Manski, C. F. (1993). Identification of endogenous social effects: The reflection problem. *The review of economic studies* (3), 531–542.

Mitrut, A. and Wolff, F.-C. (2014). Investing in children's education: are muslim immigrants different? *Journal of Population Economics*, 999–1022.

Mühlenweg, A. M. and Puhani, P. A. (2010). The evolution of the school-entry age effect in a school tracking system. *Journal of human Resources* (2), 407–438.

Mussino, E., Miranda, V. and Ma, L. (2019). Transition to third birth among immigrant mothers in sweden: Does having two daughters accelerate the process? *Journal of Population Research*, 81–109.

Nicoletti, C. and Rabe, B. (2019). Sibling spillover effects in school achievement. *Journal of Applied Econometrics* (4), 482–501.

Nollenberger, N., Rodríguez-Planas, N. and Sevilla, A. (2016). The math gender gap: The role of culture. *American Economic Review* (5), 257–261.

Parman, J. (2013). *Childhood health and sibling outcomes: The shared burden and benefit of the 1918 influenza pandemic*. Tech. rep., National Bureau of Economic Research.

Persson, P., Qiu, X. and Rossin-Slater, M. (2021). *Family spillover effects of marginal diagnoses: The case of ADHD*. Tech. rep., National Bureau of Economic Research.

Puhani, P. A. and Weber, A. M. (2008). Does the early bird catch the worm? In *The economics of education and training*, Springer, pp. 105–132.

Qureshi, J. A. (2018). Additional returns to investing in girls' education: Impact on younger sibling human capital. *The Economic Journal* (616), 3285–3319.

Sacerdote, B. (2011). Peer effects in education: How might they work, how big are they and how much do we know thus far? In *Handbook of the Economics of Education*, vol. 3, Elsevier, pp. 249–277.

Suziedelyte, A. and Zhu, A. (2015). Does early schooling narrow outcome gaps for advantaged and disadvantaged children? *Economics of Education Review*, 76–88.

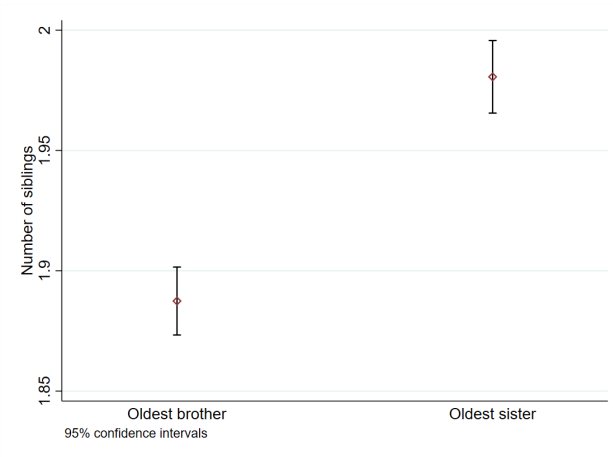
Yi, J., Heckman, J. J., Zhang, J. and Conti, G. (2015). Early health shocks, intra-household resource allocation and child outcomes. *The Economic Journal* (588), F347–F371.

Zang, E., Tan, P. L. and Cook, P. J. (2023). Sibling spillovers: Having an academically successful older sibling may be more important for children in disadvantaged families. *American Journal of Sociology* (5), 1529–1571.

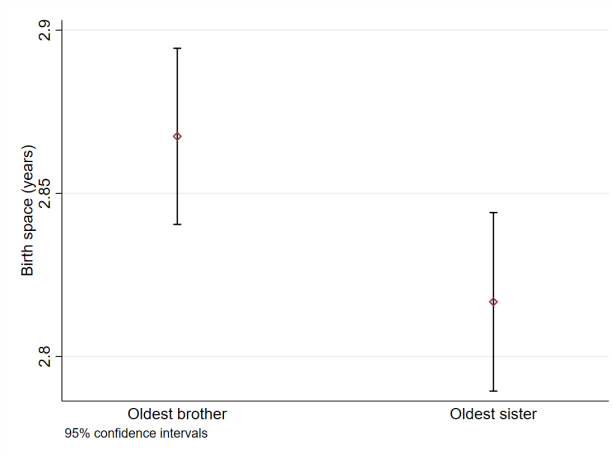
2 Figures

Figure 1: Fertility choices in migrant and native families

Migrant families

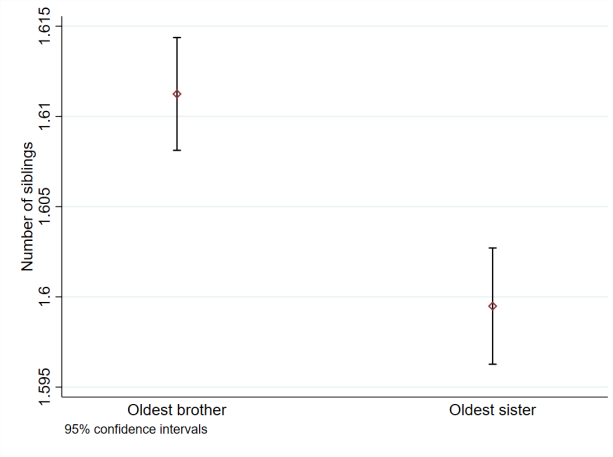


(a) Number of siblings for oldest girls and boys

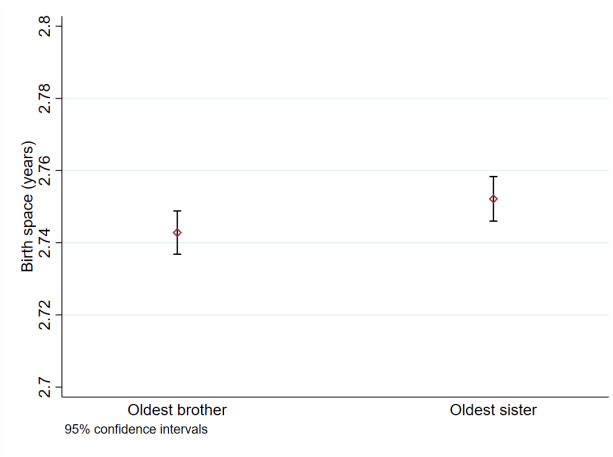


(b) Birth spacing between first and second-born

Native families



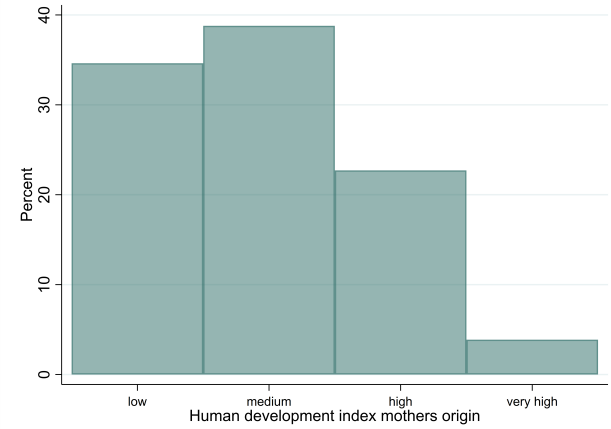
(c) Number of siblings for oldest girls and boys



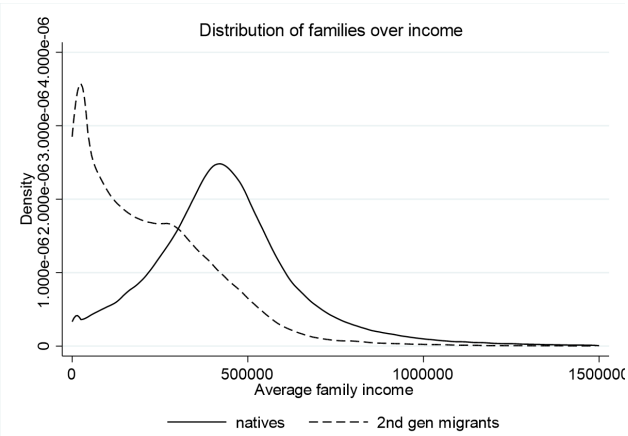
(d) Birth spacing between first and second-born

Notes: Confidence-interval plots of the average number of siblings and birth spacing (in years) between first and second birth in families with either a first-born daughter or son. Families are included conditioning on having at least two children born between 1988-2003. Panel (a)-(b) show plots for migrant families where all children were born in Sweden to two-non Nordic parents. Panel (c)-(d) show the corresponding plots for native families.

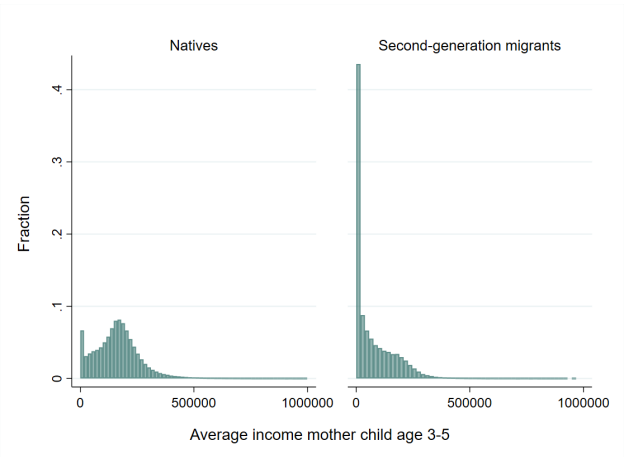
Figure 2: Descriptives



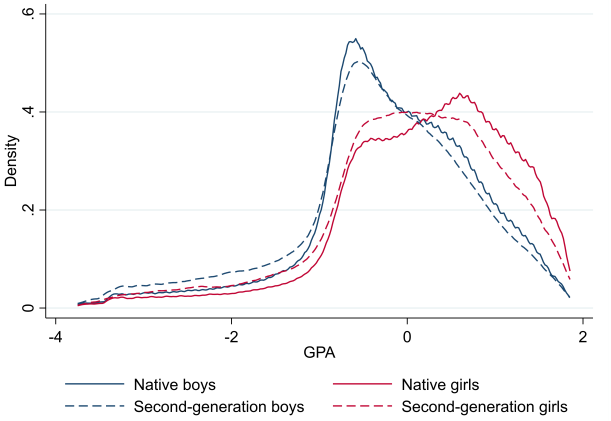
(a) Sample divided by human development of mothers origin



(b) Density annual family incomes



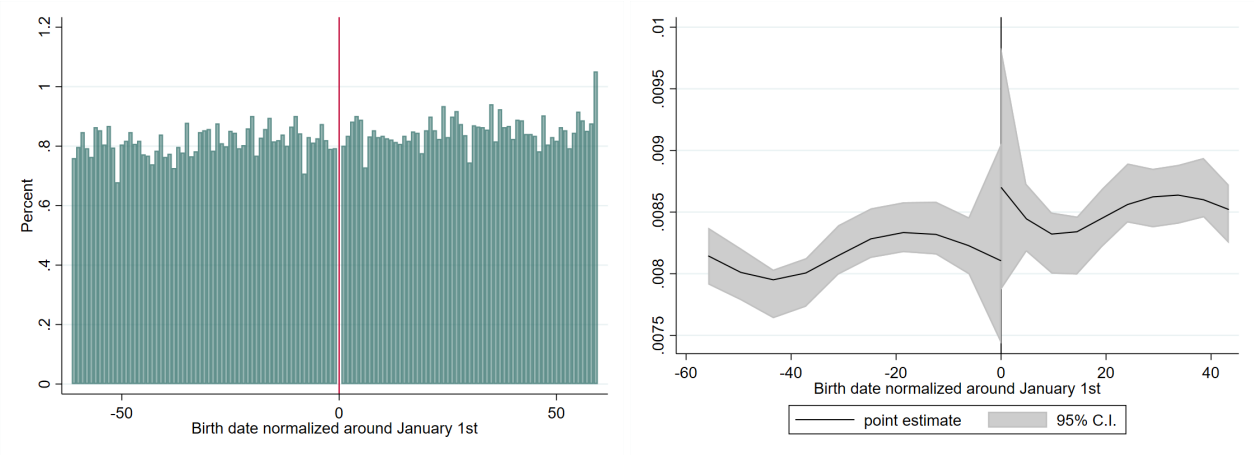
(c) Differences in mother earnings



(d) Density end-of-compulsory school grades

Notes: Panel (a) shows the density distributions of students across the GPA scale in 9^{th} grade between 2004-2019. The GPA is standardized to a mean zero and standard deviation of one. Kolmogorov-Smirnov-tests show that the distributions are significantly different from each other. Panel (b) shows the average annual family incomes for migrant and native families when child is age 3-5. Migrant families include those with children born in Sweden to parents born in non-Nordic countries. Panel (c) shows the fraction of mothers with average incomes between 0-1 000 000 SEK for native and second-generation migrant children. Incomes are calculated by taking the average annual earnings of the mother when the child is of daycare age (3-5 years old). Panel (d) shows the sample of second-generation migrant students divided by the human development index (HDI) of mother origin. HDI is the average over the sample period divided into UNDP categories: low < 0.550, medium 0.550-0.699, high 0.700-0.799, very high ≤ 0.800. For reference Sweden's average HDI was 0.900 during the sample period.

Figure 3: Regression Discontinuity Design specification checks

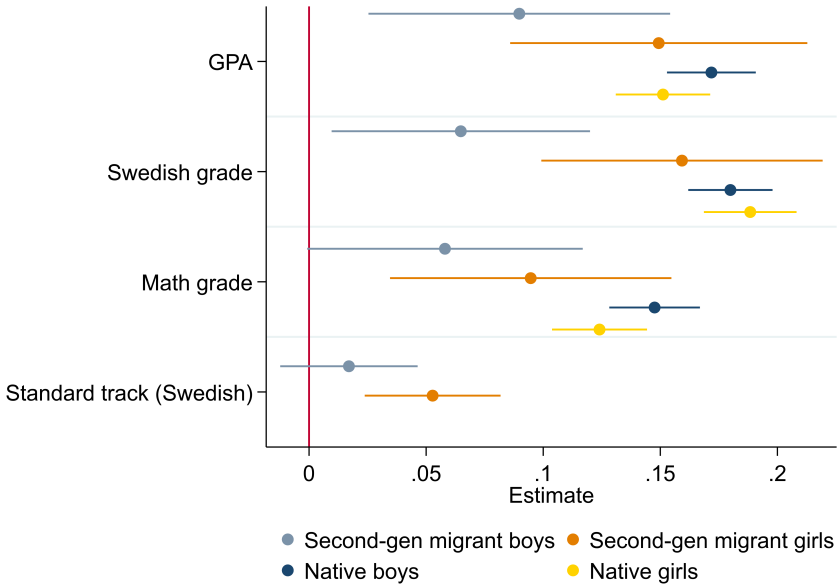


(a) Distribution of births

(b) Density test

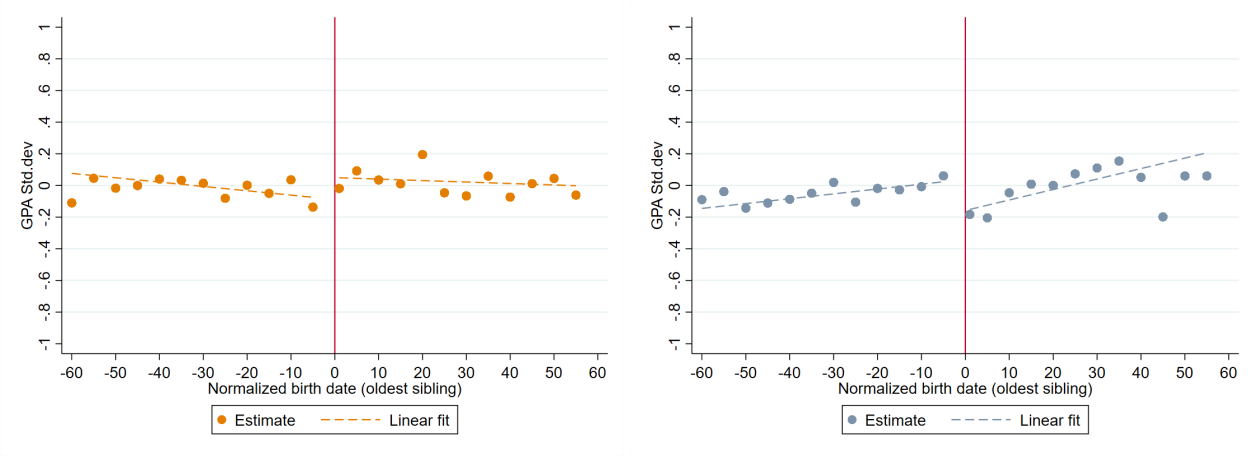
Notes: Panel (a) shows the percent of second-generation migrant children born each day between November 1^{st} and February 28^{th}. Leap-year births are recoded to February 28^{th}. Panel (b) shows the density discontinuity of the running variable (birth date) at the January 1^{st} cut-off. This test uses local-polynomial density estimators as explained in Cattaneo *et al.* (2018).

Figure 4: The effects of delayed school entry on grade outcomes



Notes: xxxxx

Figure 5: Graphical evidence: sibling spillovers second-generation migrant girls

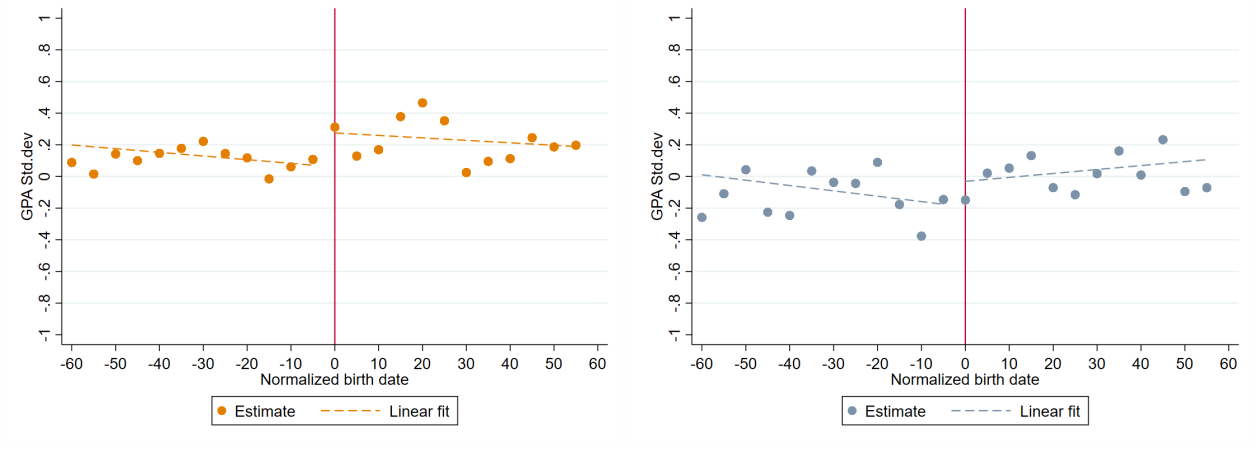


(a) Girls with oldest sisters

(b) Girls oldest brothers

Notes: XXXX.

Figure 6: Graphical evidence: direct effects second-generation migrant girls



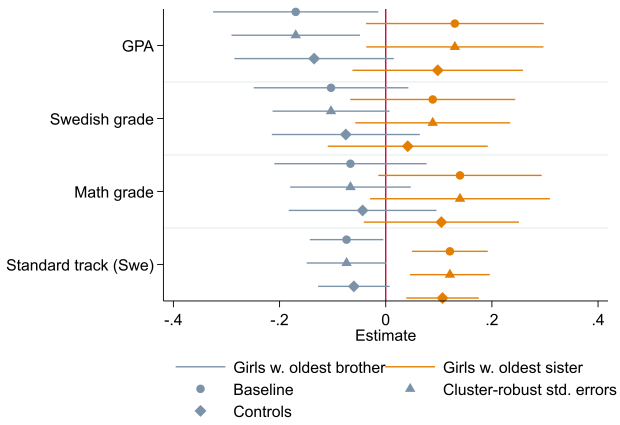
(a) Girls with younger sister

(b) Girls younger brother

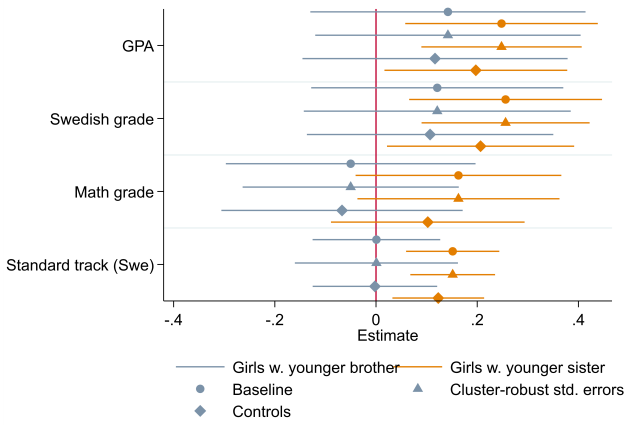
Notes: XXXX.

Figure 7: Robustness checks – second-generation migrant girls

Clustering standard errors or adding controls

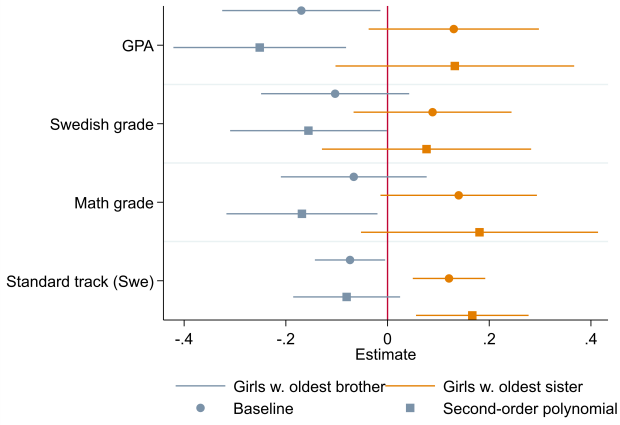


(a) Sibling spillovers younger sisters

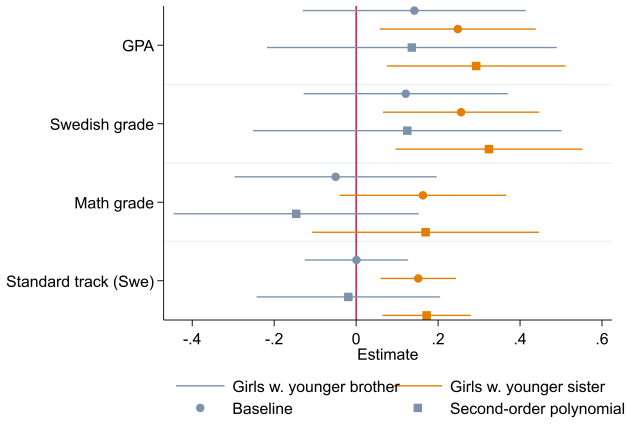


(b) Direct effects oldest sisters

Functional form

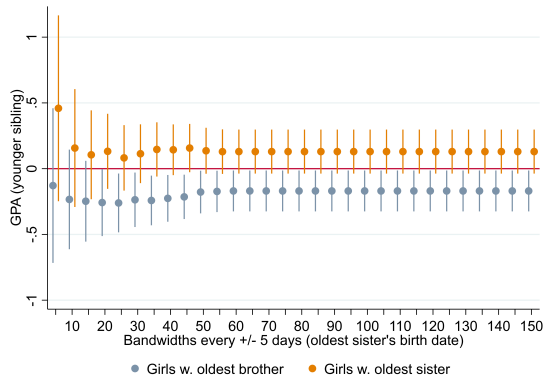


(c) Sibling spillovers younger sisters

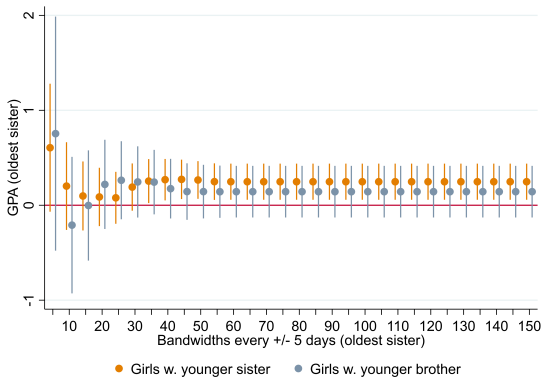


(d) Direct effects oldest sisters

Bandwidths



(e) Sibling spillovers younger sisters



(f) Direct effects oldest sisters

Notes: XXXX.

3 Tables

Table 1: Summary Statistics

	Boys		Girls		t-test
	(1) mean	(2) sd	(3) mean	(4) sd	(5)
A. School outcomes					
Standardized GPA	-0.320	1.050	0.020	1.042	-0.339***
Standardized Swedish grade	-0.447	0.907	0.009	0.985	-0.456***
Standardized Math grade	-0.234	0.978	-0.202	0.979	-0.032***
Enrolled standard track (Swedish)	0.647	0.478	0.700	0.458	-0.052***
Enrolled public school final year	0.784	0.411	0.766	0.423	0.018***
Enrolled any upper-secondary	0.863	0.344	0.868	0.339	-0.004**
Enrolled academic upper-secondary	0.701	0.458	0.748	0.434	-0.047***
B. Family characteristics					
Mother's average annual income age 3-5	72 779	91 058	72 957	90 955	-177
Father's average annual income age 3-5	140 214	150 090	141 938	157 431	-1723*
Mother's years of education	10.872	2.655	10.881	2.685	-0.008
Father's years of education	11.281	2.652	11.309	2.671	-0.028
Age of mother at first birth	25.887	5.132	25.941	5.167	-0.055
Mother time in Swe before birth	5.920	5.747	5.949	5.736	-.029
Living in low-share migrant neighborhood age 3	0.507	0.500	0.505	0.500	.001

Notes: *** p<0.01, ** p<0.05, * p<0.1. This table provides summary statistics for second-generation migrant female and male students in Swedish 9^{th} grade between 2004-2019. The sample has been restricted to those born in November-February. All grade outcomes have been standardized to have a mean zero with a standard deviation of one.

Table 2: Placebo regressions parent background characteristics

	Fathers		Mothers		
	(1) schooling (years)	(2) earnings (percentiles)	(3) schooling (years)	(4) earnings (percentiles)	(5) 10 years or more in Swe
Delayed entry	-0.048	-0.425	-0.159	0.018	0.018
	(0.180)	(1.050)	(0.184)	(1.041)	(0.016)
Observations	9,177	9,177	9,177	9,177	9,177
R-squared	0.022	0.042	0.055	0.040	0.011
Outcome mean	10.52	23.18	10.02	22.26	0.131

Notes: *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors in parentheses. Reduced-form RD regression with quadratic control function and a 60-day bandwidth around the January 1^{st} cut-off. Sample of all first-born second-generation migrants between 1988-2003. Delay indicates that the first-born child in the family was born in Jan-Feb as opposed to Nov-Dec. Parent's schooling and earnings measured after the child is born, but before the child starts school.

Table 3: Sibling spillovers when oldest delays entry for younger sisters in migrant families

Younger Sisters	**With Oldest Sister**				**With Oldest Brother**			
	(1) GPA	(2) Swedish grade	(3) Math grade	(4) Standard track (Swedish)	(5) GPA	(6) Swedish grade	(7) Math grade	(8) Standard track (Swedish)
Delayed entry	0.130	0.089	0.140*	0.121***	-0.170**	-0.103	-0.066	-0.074**
	(0.085)	(0.079)	(0.078)	(0.036)	(0.079)	(0.074)	(0.073)	(0.035)
Observations	3,254	3,287	3,287	3,250	3,122	3,147	3,147	3,119
R-squared	0.042	0.040	0.038	0.080	0.044	0.047	0.034	0.075
Outcome mean	-0.00143	-0.00935	-0.214	0.672	-0.0278	-0.0386	-0.224	0.681

Notes: *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors in parentheses. Reduced-form RD regression with a linear control function and a 60-day bandwidth around the January 1^{st} cut-off. The sample consists of all siblings among second-generation migrant students in 9^{th} grade between 2004-2019. Older indicates that the oldest sibling was born in Jan-Feb as opposed to Nov-Dec. The outcomes are measured for the younger sibling. Grade outcomes are standardized to have a mean zero with a standard deviation of one.

Table 4: The effects of delaying school entry for oldest girls in migrant families

Oldest Girls	**With Younger Sister**				**With Younger Brother**			
	(1) GPA	(2) Swedish grade	(3) Math grade	(4) Standard track (Swedish)	(5) GPA	(6) Swedish grade	(7) Math grade	(8) Standard track (Swedish)
Delayed entry	0.248**	0.256***	0.163	0.152***	0.142	0.121	-0.050	0.001
	(0.097)	(0.097)	(0.104)	(0.047)	(0.139)	(0.127)	(0.126)	(0.064)
Observations	1,979	1,989	1,989	1,912	1,179	1,191	1,191	1,143
R-squared	0.045	0.052	0.031	0.042	0.039	0.039	0.030	0.054
Outcome mean	0.171	0.0880	-0.0462	0.708	-0.0451	-0.0754	-0.228	0.626

Notes: *** p<0.01, ** p<0.05, * p<0.1.

Table 5: Robustness: Data Driven Bandwidth Selection – second-generation migrant girls

A. Sibling Spillovers								
Younger Sisters	**With Oldest Sister**				**With Oldest Brother**			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	GPA	Swedish grade	Math grade	Standard track (Swedish)	GPA	Swedish grade	Math grade	Standard track (Swedish)
Delayed entry	0.129	0.088	0.140*	0.121***	-0.172**	-0.107	-0.067	-0.074**
	(0.086)	(0.080)	(0.078)	(0.036)	(0.080)	(0.075)	(0.073)	(0.035)
Bandwidth (+/- days)	57	56	65	59	57	56	65	59
Observations	3,158	3,127	3,307	3,250	3,017	2,991	3,176	3,118
R-squared	0.042	0.041	0.038	0.080	0.045	0.047	0.034	0.075
Outcome mean	0.00237	-0.00365	-0.213	0.672	-0.0262	-0.0401	-0.223	0.681
B. Direct Effects								
Oldest Girls	**With Younger Sister**				**With Younger Brother**			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	GPA	Swedish grade	Math grade	Standard track (Swedish)	GPA	Swedish grade	Math grade	Standard track (Swedish)
Delayed entry	0.249**	0.256***	0.163	0.152***	0.139	0.119	-0.049	0.001
	(0.097)	(0.098)	(0.104)	(0.047)	(0.139)	(0.128)	(0.126)	(0.064)
Bandwidth (+/- days)	57	56	65	59	57	56	65	59
Observations	1,923	1,896	2,002	1,912	1,154	1,147	1,197	1,143
R-squared	0.045	0.052	0.031	0.042	0.039	0.040	0.030	0.054
Outcome mean	0.171	0.0872	-0.0474	0.708	-0.0346	-0.0662	-0.232	0.626

Notes: *** p<0.01, ** p<0.05, * p<0.1.

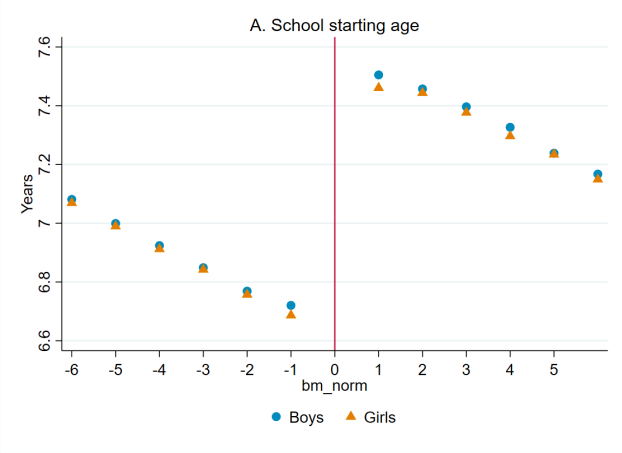
A Appendix A – Tables and Figures

Table A1: Countries

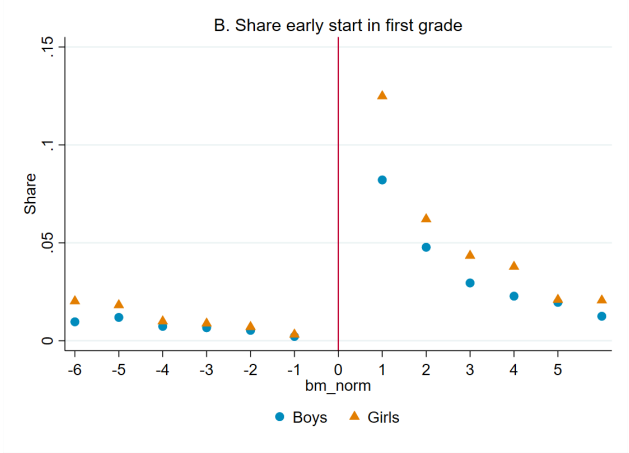
(1) **ID**	(2) **Country group**	(3) **HDI value**	(4) **HDI class**	(5) **GII**	(6) **GII>m**
00	Sweden	0.900	very high	0.055	no
29	Bosnia-Herzegovina	0.674	medium	0.326	no
30	Jugoslavia, Chroatia, North Macedonia, Slovenia	0.729	high	0.221	no
31	Gdansk, Poland	0.761	high	0.216	no
32	Ireland, Great Britian	0.837	very high	0.231	no
33	Germany	0.870	very high	0.142	no
34	Greece, Italy, Malta, Monaco, Portugal, San Marino, Spain, Vatican State	0.799	very high	0.207	no
35	Estonia, Latvia, Lithuania	0.746	high	0.326	no
36	Albania, Armenia, Azerbadjan, Bulgaria, Georgia, Kazachstan, Kygyzstan, Moldavia, Romania, Russia, Tajikistan, Turkmenistan, Ukraine, Uzbekistan, Belarus	0.705	high	0.416	yes
37	Slovakia, Czhech Republic, Hungary	0.751	high	0.295	no
38	Andorra, Belgium, France, Lichtenstein, Luxembourg, Netherlands, Switzerland, Austria	0.856	very high	0.149	no
39	Canada, USA	0.885	very high	0.269	no
40	Antigua and Baruda, Bahamas, Barbados, Belize, Costa Rica, Cuba, Dominican Republic, El Salvador, Grenada, Guatemala, Haiti, Honduras, Jamaica, Mexico, Nicaragua, Panama, St Lucia, St Vincent, St Kitt and Nevis and Anguil, Trinidad and Tobago	0.624	medium	0.485	yes
41	Chile	0.740	high	0.463	yes
42	Argentina, Bolivia, Brasilien, Colombia, Ecuador, Guyana, Paraguay, Peru, Surinam, Uruguay, Venezuela	0.661	medium	0.515	yes
43	Dijibouti, Eritrera, Ethiopia, Somalia, Sudan	0.126	low	0.249	no
44	Algeria, Bahrain, Cyprus, Egypt, French Marocco, Arab Emirates, Gaza, Israel, Jemen, Jordan, Kuwait, Lebanon, Libya, Marocco, Palestina, Quatar, Saudi Arabia, South Jemen, Syria, Tunisia	0.417	low	0.357	yes
45	Angola, Benin, Botswana, Burkina Faso, Burundi, Central African Rep., Comoros, Equatorial Guinea, Ivory Coast, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Cameroon, Cap Verde, Kenya, Congo, Lesotho, Liberia, Madagaskar, Malawi, Mali, Mauritania, Mauritius, Mocambique, Namibia, Niger, Nigeria, Rwanda, Senegal, Sierra Leone, Swaziland (Eswatini), South Africa, Tanzania, Chad, Togo, Uganda, Dem rep of Congo, Zambia, Zanzibar, Zimbabwe	0.417	low	0.599	yes
46	Iran	0.658	medium	0.622	yes
47	Iraq	0.557	medium	0.686	yes
48	Turkey	0.641	medium	0.584	yes
49	Hong Kong, Japan, China, South Korea, North Korea	0.664	medium	0.231	no
50	Myanmar/Burma, Philippines, Indonesia, Laos, Malaysia, Singapore, Thailand, Vietnam	0.607	medium	0.414	yes
51	Afganistan, Bangladesh, Bhutan, Brunei, India, Kampuchea, Maldives, Mongolia, Nepal, Oman, Pakistan, Sikkim, Sri Lanka	0.438	low	0.435	yes
52	Australia, Fiji, Kiribati, Micronesia, Nauru, New Zeeland, Palau, Papa new Guinea, Salomon islands, Tonga, Vanutua, Samoan islands	0.875	very high	0.181	no

Notes: Country groups are specified in the data as countries with close cultural and geographical proximity. HDI refers to human development index, GII to gender inequality index, constructed by UNDP. A higher value indicates higher human development or higher gender equality, and should be interpreted as the within-country group mean weighted by the total migrant population from each country in Sweden during the study period.

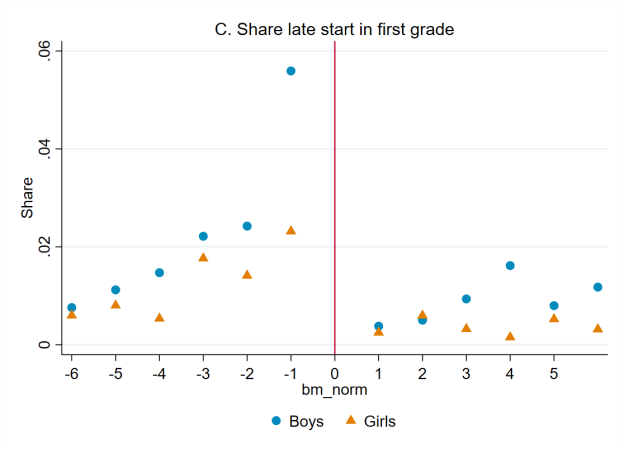
Figure A1: First stage second-generation migrants



(a) Discontinuity in school entry age at cut-off



(b) Share of early starters by birth month



(c) Share of late starters by birth month

Notes: The sample used for this estimation differs from the main sample: the data comes from "Elevregistret" and includes second-generation migrant students from the 2002/2003 and 2003/2004 birth cohorts. This data includes only birth month. Panel A shows the discontinuity in school starting age over the cut-off, Panel B the discontinuity in the share of students that start at an earlier age than expected, and Panel C the discontinuity in the share of students that start later than expected (so-called red-shirting).

Table A2: First stage (1^{st} grade) and old/young for grade (9^{th} grade)

	First Stage		**Old or Young for Grade**			
	Age at school entry		Older than 16		Younger than 15	
	(1)	(2)	(3)	(4)	(5)	(6)
	Girls	Boys	Girls	Boys	Girls	Boys
Born Jan-Feb	0.784***	0.792***	-0.099***	0.178***	-0.147***	0.125***
	(0.012)	(0.013)	(0.007)	(0.008)	(0.009)	(0.007)
Elevregister data set	X	X				
Main data set			X	X	X	X
Observations	1,783	1,641	19,730	19,730	20,524	20,524
R-squared	0.687	0.713	0.032	0.070	0.048	0.053
Outcome mean	7.117	7.078	0.0408	0.0755	0.0686	0.0510

Notes: *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors in parentheses. This table regards second-generation migrant girls and boys. Reduced-form RD regression with linear control function and a 60-day bandwidth around the January 1^{st} cut-off. Estimating the first stage (effect of birth month on school-entry age) uses data from "Elevregistret" and includes second-generation migrant students from the 2002/2003 and 2003/2004 birth cohorts. This data includes only birth month. Estimation for young and old for grade is done with data on the full sample. Old (young) indicates whether the student is older (younger) than 15/16 at the end of compulsory school.

Table A3: Sibling spillovers for younger sisters by family traditional origin

A. Younger Sisters with Oldest Sister

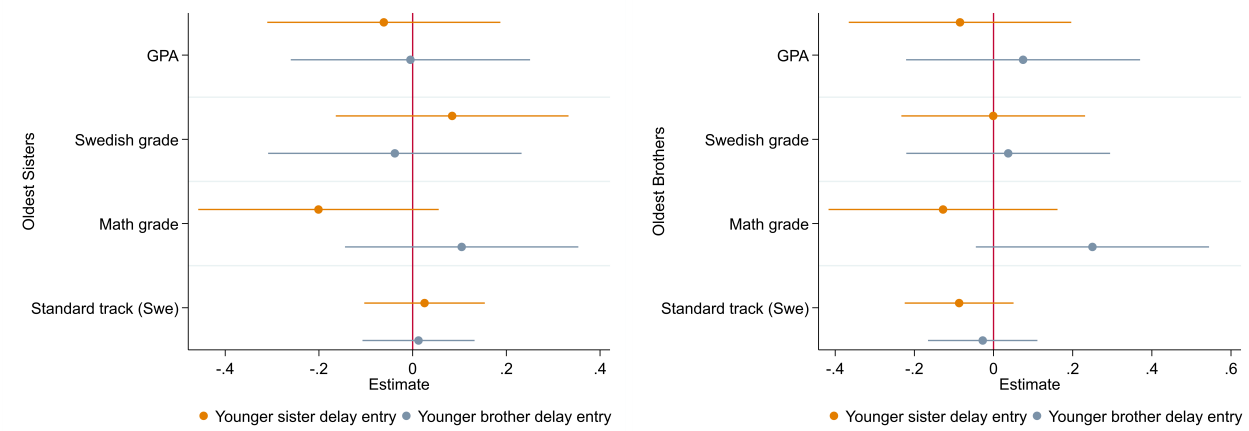
	GPA		**Swedish grade**		**Math grade**		**Standard track (Swe)**	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Gender traditional	Less	More	Less	More	Less	More	Less	More
Delayed entry	0.048	0.180*	0.059	0.083	-0.001	0.207**	0.052	0.160***
	(0.142)	(0.107)	(0.139)	(0.098)	(0.134)	(0.099)	(0.060)	(0.045)
Observations	1,105	2,149	1,117	2,170	1,117	2,170	1,106	2,144
R-squared	0.068	0.043	0.072	0.038	0.074	0.037	0.162	0.077
Outcome mean	0.0219	-0.0134	0.0247	-0.0269	-0.205	-0.219	0.712	0.652

B. Younger Sisters with Oldest Brother

	GPA		**Swedish grade**		**Math grade**		**Standard track (Swe)**	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Gender traditional	Less	More	Less	More	Less	More	Less	More
Delayed entry	-0.056	-0.203**	-0.110	-0.084	0.000	-0.092	-0.003	-0.113**
	(0.131)	(0.101)	(0.120)	(0.094)	(0.119)	(0.093)	(0.059)	(0.044)
Observations	1,079	2,043	1,087	2,060	1,087	2,060	1,084	2,035
R-squared	0.106	0.050	0.116	0.055	0.094	0.040	0.121	0.075
Outcome mean	0.0586	-0.0735	0.0337	-0.0767	-0.179	-0.248	0.707	0.667

Notes: *** p<0.01, ** p<0.05, * p<0.1.

Figure A2: Placebo test: effect of younger sibling delaying school entry for oldest sibling



(a) Effects on Oldest Sister

(b) Effects on Oldest Brother

Notes:

Table A4: The effects of delayed school entry for oldest girls by family traditional origin

A. Oldest Girls with Younger Sister								
	GPA		**Swedish grade**		**Math grade**		**Standard track (Swe)**	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Gender traditional	Less	More	Less	More	Less	More	Less	More
Delayed entry	0.083	0.321***	0.255	0.241**	0.069	0.193	0.046	0.195***
	(0.162)	(0.123)	(0.166)	(0.121)	(0.172)	(0.131)	(0.074)	(0.059)
Observations	667	1,312	671	1,318	671	1,318	645	1,267
R-squared	0.055	0.045	0.068	0.047	0.051	0.026	0.057	0.053
Outcome mean	0.260	0.126	0.190	0.0362	0.0207	-0.0802	0.772	0.675
B. Oldest Girls with Younger Brother								
	GPA		**Swedish grade**		**Math grade**		**Standard track (Swe)**	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Gender traditional	Less	More	Less	More	Less	More	Less	More
Delayed entry	-0.006	0.204	-0.114	0.243	-0.142	-0.005	-0.072	0.017
	(0.227)	(0.179)	(0.217)	(0.160)	(0.208)	(0.160)	(0.100)	(0.082)
Observations	388	791	393	798	393	798	378	765
R-squared	0.077	0.032	0.095	0.032	0.056	0.027	0.138	0.043
Outcome mean	-0.0741	-0.0309	-0.0604	-0.0828	-0.250	-0.217	0.611	0.633

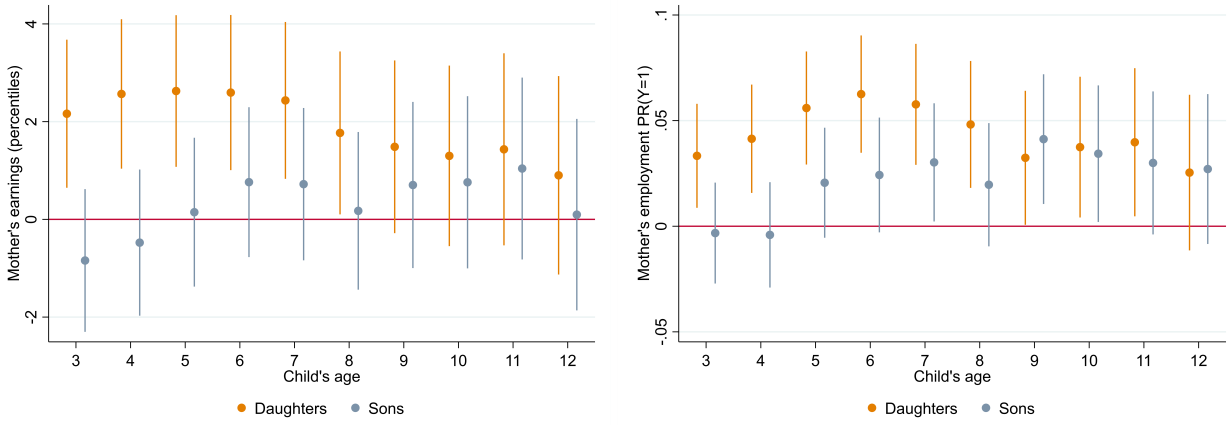
Notes: *** p<0.01, ** p<0.05, * p<0.1.

Table A5: Effects of Delaying School Entry on Mothers' labor market outcomes

	Girls		**Boys**	
	(1) Mother earnings (percentiles)	(2) Mother employment	(3) Mother earnings (percentiles)	(4) Mother employment
Delayed entry	2.434***	0.058***	0.721	0.030**
	(0.819)	(0.015)	(0.795)	(0.014)
Observations	21,195	21,195	22,326	22,326
R-squared	0.006	0.027	0.004	0.023
Outcome mean	28.98	0.387	29.19	0.388

Notes: *** p<0.01, ** p<0.05, * p<0.1.

Figure A3: Effects of Child born Jan-Feb on migrant mothers' labor outcomes ages 3-12



(a) Mother's earnings (percentiles)

(b) Mother's employment

Notes:

Appendix B – Second-generation Migrant Boys

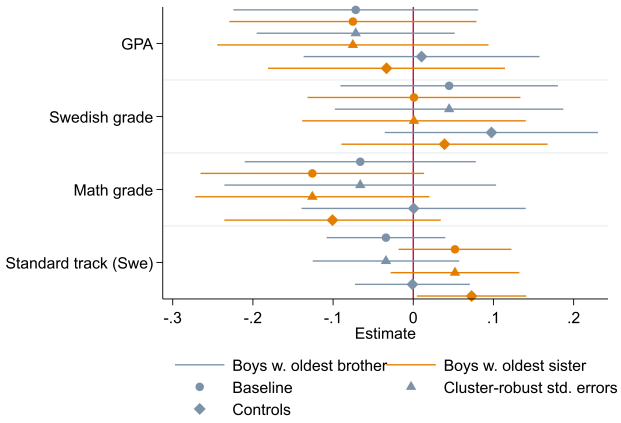
Table B1: Results for second-generation migrant boys

A. Sibling spillovers								
Younger Brothers	**With Oldest Sister**				**With Oldest Brother**			
	(1) GPA	(2) Swedish grade	(3) Math grade	(4) Standard track (Swedish)	(5) GPA	(6) Swedish grade	(7) Math grade	(8) Standard track (Swedish)
Delayed entry	-0.075	0.001	-0.126*	0.052	-0.072	0.045	-0.066	-0.034
	(0.079)	(0.068)	(0.071)	(0.036)	(0.078)	(0.069)	(0.073)	(0.038)
Observations	3,286	3,331	3,331	3,301	3,103	3,130	3,130	3,104
R-squared	0.055	0.058	0.046	0.083	0.036	0.040	0.032	0.048
Outcome mean	-0.350	-0.489	-0.240	0.632	-0.336	-0.483	-0.232	0.632
B. Direct Effects								
Oldest Boys	**With Younger Sister**				**With Younger Brother**			
	(1) GPA	(2) Swedish grade	(3) Math grade	(4) Standard track (Swedish)	(5) GPA	(6) Swedish grade	(7) Math grade	(8) Standard track (Swedish)
Delayed entry	0.052	0.064	0.054	-0.017	-0.031	-0.078	-0.077	0.164**
	(0.107)	(0.090)	(0.102)	(0.046)	(0.141)	(0.123)	(0.127)	(0.064)
Observations	1,962	1,988	1,988	1,907	1,186	1,194	1,194	1,153
R-squared	0.047	0.032	0.029	0.051	0.024	0.041	0.022	0.053
Outcome mean	-0.215	-0.367	-0.103	0.673	-0.325	-0.445	-0.213	0.567

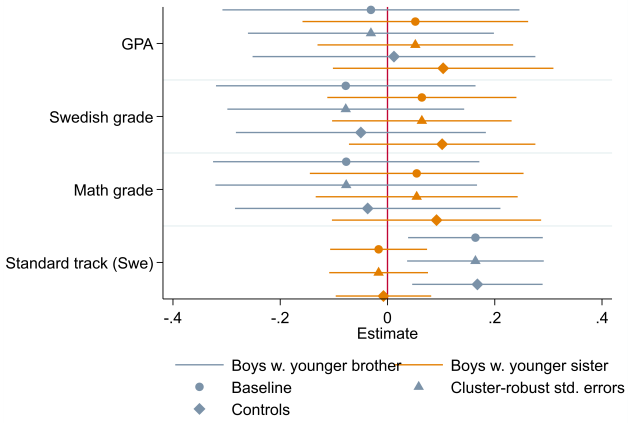
Notes: *** p<0.01, ** p<0.05, * p<0.1.

Figure B1: Robustness checks - boys

Clustering standard errors or adding controls

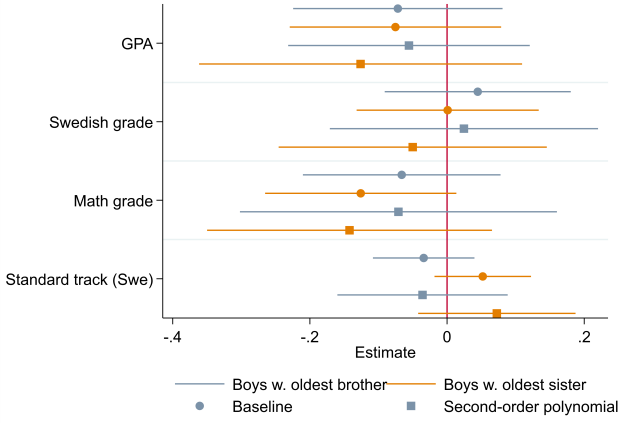


(a) Sibling spillovers younger brothers

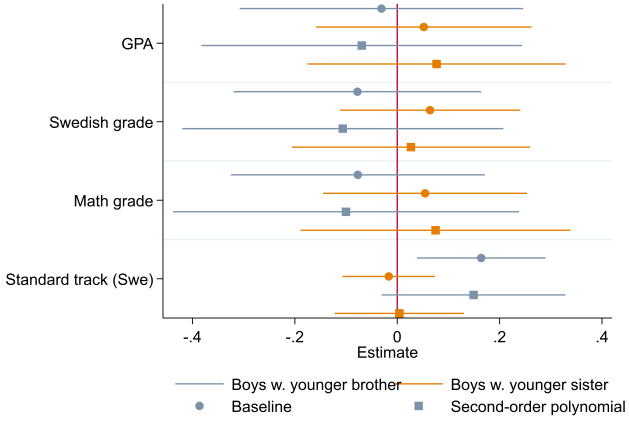


(b) Direct effects oldest brothers

Functional form

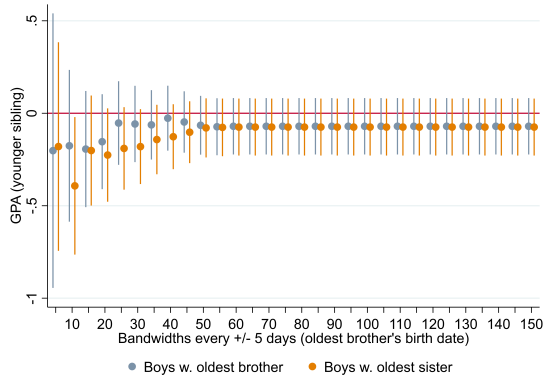


(c) Sibling spillovers younger brothers

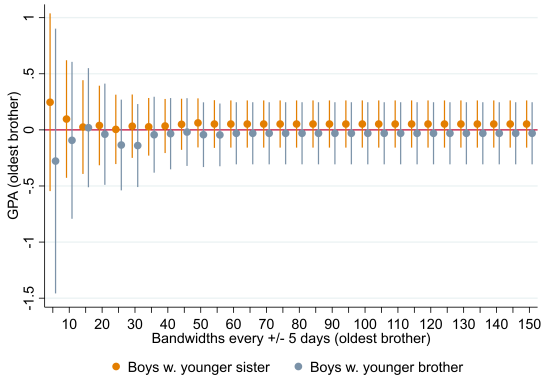


(d) Direct effects oldest brothers

Bandwidths



(e) Sibling spillovers younger brothers



(f) Direct effects oldest brothers

Notes: XXXX.

Table B2: Robustness: Data Driven Bandwidth Selection – second-generation migrant boys

A. Sibling Spillovers								
Younger Brothers	**With Oldest Sister**				**With Oldest Brother**			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	GPA	Swedish grade	Math grade	Standard track (Swedish)	GPA	Swedish grade	Math grade	Standard track (Swedish)
Delayed entry	-0.078	-0.002	-0.125*	0.052	-0.071	0.044	-0.065	-0.035
	(0.079)	(0.068)	(0.071)	(0.036)	(0.078)	(0.070)	(0.073)	(0.038)
Bandwidth (+/- days)	57	56	65	59	57	56	65	59
Observations	3,199	3,193	3,347	3,301	3,024	3,000	3,152	3,103
R-squared	0.056	0.059	0.046	0.083	0.037	0.040	0.032	0.048
Outcome mean	-0.345	-0.488	-0.241	0.632	-0.337	-0.480	-0.232	0.633
B. Direct Effects								
Oldest Boys	**With Younger Sister**				**With Younger Brother**			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	GPA	Swedish grade	Math grade	Standard track (Swedish)	GPA	Swedish grade	Math grade	Standard track (Swedish)
Delayed entry	0.052	0.061	0.055	-0.017	-0.036	-0.082	-0.076	0.164**
	(0.108)	(0.091)	(0.102)	(0.046)	(0.142)	(0.124)	(0.126)	(0.064)
Bandwidth (+/- days)	57	56	65	59	57	56	65	59
Observations	1,901	1,896	2,006	1,907	1,158	1,144	1,205	1,153
R-squared	0.047	0.032	0.029	0.051	0.024	0.042	0.022	0.053
Outcome mean	-0.212	-0.364	-0.105	0.673	-0.318	-0.443	-0.214	0.567

Notes: *** p<0.01, ** p<0.05, * p<0.1.

Table B3: Results for second-generation migrant boys by family traditional origin

A. Spillovers: Younger Brothers with Oldest Sister

	GPA		Swedish grade		Math grade		Standard track (Swe)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Gender traditional	Less	More	Less	More	Less	More	Less	More
Delayed entry	-0.283**	0.052	-0.100	0.040	-0.268**	-0.044	-0.084	0.124***
	(0.136)	(0.096)	(0.117)	(0.083)	(0.119)	(0.090)	(0.060)	(0.044)
Observations	1,107	2,179	1,126	2,205	1,126	2,205	1,113	2,188
R-squared	0.096	0.057	0.085	0.064	0.091	0.045	0.153	0.081
Outcome mean	-0.358	-0.346	-0.482	-0.492	-0.272	-0.223	0.641	0.627

B. Spillovers: Younger Brothers with Oldest Brother

	GPA		Swedish grade		Math grade		Standard track (Swe)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Gender traditional	Less	More	Less	More	Less	More	Less	More
Delayed entry	0.010	-0.126	0.129	0.010	0.073	-0.148*	-0.071	-0.032
	(0.140)	(0.095)	(0.125)	(0.083)	(0.134)	(0.089)	(0.068)	(0.046)
Observations	996	2,107	1,009	2,121	1,009	2,121	995	2,109
R-squared	0.060	0.052	0.083	0.048	0.067	0.041	0.095	0.058
Outcome mean	-0.353	-0.328	-0.496	-0.477	-0.253	-0.222	0.658	0.620

C. Direct Effects: Boys with Younger Sister

	GPA		Swedish grade		Math grade		Standard track (Swe)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Gender traditional	Less	More	Less	More	Less	More	Less	More
Delayed entry	0.260	-0.036	0.192	0.021	0.232	-0.029	-0.017	-0.007
	(0.167)	(0.137)	(0.151)	(0.112)	(0.172)	(0.126)	(0.076)	(0.058)
Observations	682	1,280	695	1,293	695	1,293	673	1,234
R-squared	0.097	0.042	0.103	0.021	0.083	0.021	0.086	0.059
Outcome mean	-0.148	-0.251	-0.346	-0.378	-0.0757	-0.118	0.724	0.646

D. Direct Effects: Boys with Younger Brothers

	GPA		Swedish grade		Math grade		Standard track (Swe)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Gender traditional	Less	More	Less	More	Less	More	Less	More
Delayed entry	0.040	-0.067	0.087	-0.134	-0.075	-0.090	0.130*	0.079
	(0.272)	(0.168)	(0.224)	(0.146)	(0.216)	(0.154)	(0.073)	(0.052)
Observations	352	834	356	838	356	838	777	1,673
R-squared	0.068	0.026	0.126	0.048	0.069	0.021	0.085	0.036
Outcome mean	-0.312	-0.330	-0.464	-0.438	-0.247	-0.199	0.615	0.611

Notes: *** p<0.01, ** p<0.05, * p<0.1.

Appendix C – Natives

This appendix shows the main results replicated for native students. Before interpreting the results, it is important to note a major caveat: native parents seem to systematically the time of births after the January 1^{st} cut-off. Figure C1 shows the specfication tests. Panel (a) shows bunching in the number of births of native children right after January 1^{st}, and the share of births remain relatively higher for the first 60 days of the year. The density-discontinuity test in Panel (b) also indicate manipulation. Furthermore, Table C1, columns (1)-(4), indicate that having high-earning or well educated parents predict being born after the cut-off.

Altogether it seems like native parents in Sweden time the birth of their children to January as opposed to December, a practice most common among parents with high socioeconomic status. This creates a major issue for interpretation of the Regression-Discontinuity estimates for native students, since we cannot be sure that any positive effect on grades are due to the maturity advantage of delayed school entry or from systematically being more likely to come from a family with relatively high socioeconomic status. Overall, it makes a comparison of the results to that of the second-generation migrant students futile at best.

To handle this issue I select a sample of native students, for which the underlying assumption holds. This sample consists of children born in Sweden to two Swedish-born parents whose joint annual average earnings were at the 20^{th} income percentile or below while the child was of day care age. Panels (c) and (d) in Figure C1 indicate that there was no systematic manipulation of births after the cut-off for this sample. Columns (5)-(8) in Table C1 also show that parental background variables do not predict births after the cut-off. In terms of socioeconomic status of the family, this new sample of native students are actually more comparable to second-generation migrant students. The annual average income for a family at the 20^{th} percentile is around 123 766 SEK.[5] Comparing this to density distributions of native and migrant families across annual incomes, we see that a large share of migrant families will earn around 250 000 SEK or less on average. In fact, the median migrant family in the sample earns 171 057 SEK per year on average, while the median native family earns 435 321 SEK. Since this is significantly more than the earnings with the sample of native families at the 20^{th} percentile or below, I will refer to them as the low socioeconomic (SES) native sample.

Table C2 shows the effects of an oldest siblings delaying school entry on their younger sibling's grade outcomes in the full native sample while Table C3 shows the corresponding

[5]The income percentiles are jointly calculated for the families in the native and second-generation migrant samples.

effects in the low-SES sample. For native children in general, having an oldest sister or brother delay school entry never has any impact on younger siblings' school performance. Contrary to findings from the United States by both Karbownik and Özek (2021) and Zang *et al.* (2023) this is also true for siblings in low-SES families.

Table C4 shows the effects of delaying school entry for the oldest sibling on their own grade outcomes when they either have a younger sister or brother for the full native sample. Both oldest sisters and brothers experience positive effects from delaying school entry on their grade outcomes regardless of the gender of their sibling. The corresponding estimates for the low-SES sample are presented in Table C5. For oldest sisters and brothers in low-SES families there is no significant impact of delaying school entry across most grade outcomes, except for GPA for those with younger sisters and math grades for oldest brothers in this group.

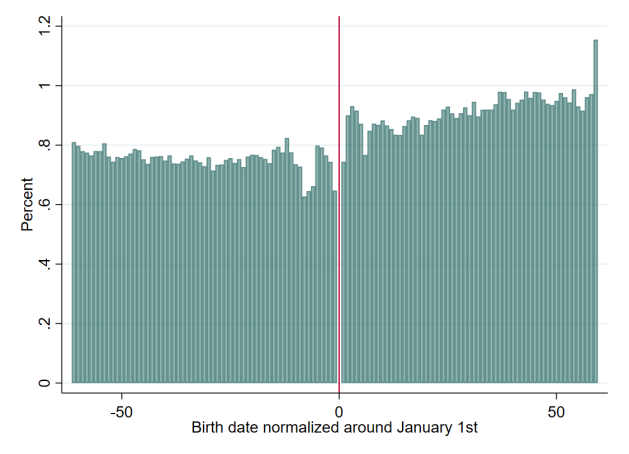
The most important takeaway is that for both the full and low-SES native samples, there are no visible gender differences in effects. Native girls are not negatively impacted by prolonging time at home with a brother. This is a clear and important distinction from the results for second-generation migrant girls.

Table C1: Placebo regressions parent background characteristics

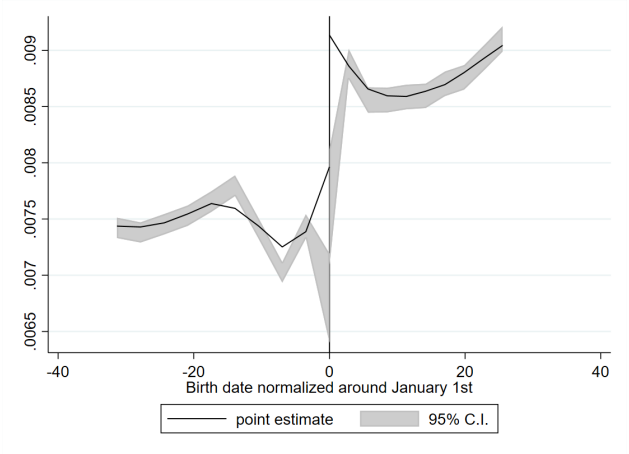
	Full Native Sample				**Low-SES Native Sample**			
	Fathers		**Mothers**		**Fathers**		**Mothers**	
	(1) schooling (years)	(2) earnings (percentiles)	(3) schooling (years)	(4) earnings (percentiles)	(5) schooling (years)	(6) earnings (percentiles)	(7) schooling (years)	(8) earnings (percentiles)
Delayed entry	0.016	0.856***	0.063***	1.283***	-0.028	0.125	0.082	-0.059
	(0.023)	(0.251)	(0.020)	(0.243)	(0.064)	(0.243)	(0.057)	(0.475)
Observations	241,804	241,804	241,804	241,804	30,846	30,846	30,846	30,846
R-squared	0.017	0.024	0.042	0.047	0.017	0.007	0.019	0.025
Outcome mean	11.86	54.12	12.16	53.45	10.87	14.03	11.18	25.71

Notes: *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors in parentheses. Reduced-form RD regression with quadratic control function and a 60-day bandwidth around the January 1^{st} cut-off. Sample of all first-born second-generation migrants between 1988-2003. Delay indicates that the first-born child in the family was born in Jan-Feb as opposed to Nov-Dec. Parent's schooling and earnings measured after the child is born, but before the child starts school.

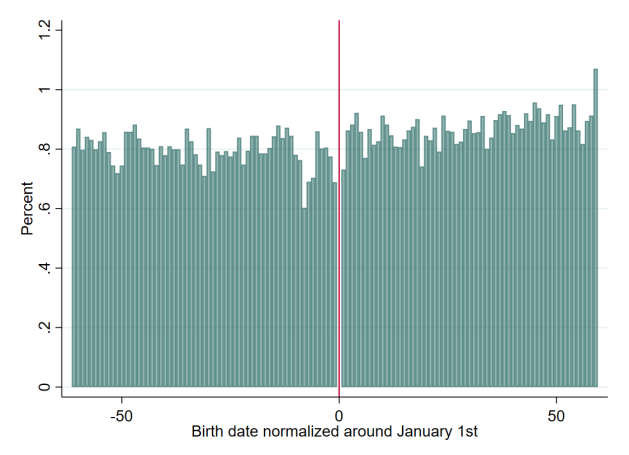
Figure C1: Natives: Regression Discontinuity Design specification checks



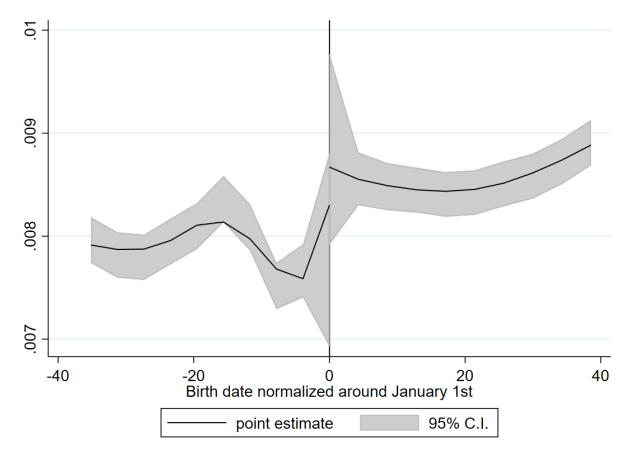
(a) Distribution of births - full sample



(b) Density test - full sample



(c) Distribution of births - low SES sample



(d) Density test - low SES sample

Notes: Panels (a)-(b) shows the percent of native children born each day between November 1^{st} and February 28^{th}. Leap-year births are recoded to February 28^{th}. Panels (c)-(d) shows the density discontinuity of the running variable (birth date) at the January 1^{st} cut-off. This test uses local-polynomial density estimators as explained in Cattaneo *et al.* (2018).

Table C2: Full native sample: sibling spillovers

A. Younger Sisters	**With Older Sister**			**With Older Brother**		
	(1)	(2)	(3)	(4)	(5)	(6)
	GPA	Swedish grade	Math grade	GPA	Swedish grade	Math grade
Delayed entry	0.013	0.019	-0.000	-0.008	-0.027	-0.006
	(0.024)	(0.024)	(0.024)	(0.023)	(0.023)	(0.024)
Observations	32,911	33,139	33,139	35,096	35,350	35,350
R-squared	0.006	0.006	0.006	0.007	0.008	0.005
Outcome mean	0.207	0.323	0.0652	0.164	0.281	0.0343
B.Younger Brothers	**With Older Sister**			**With Older Brother**		
	(1)	(2)	(3)	(4)	(5)	(6)
	GPA	Swedish grade	Math grade	GPA	Swedish grade	Math grade
Delayed entry	0.006	0.018	0.012	0.006	-0.002	0.008
	(0.023)	(0.022)	(0.024)	(0.022)	(0.021)	(0.023)
Observations	34,542	34,851	34,851	36,607	36,991	36,991
R-squared	0.007	0.006	0.007	0.008	0.008	0.008
Outcome mean	-0.190	-0.305	-0.0458	-0.205	-0.323	-0.0521

Notes: *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors in parentheses. Reduced-form RD regression with a linear control function and a 60-day bandwidth around the January 1^{st} cut-off. The sample consists of the full sample of native siblings who in 9^{th} grade between 2004-2019. Older indicates that the oldest sibling was born in Jan-Feb as opposed to Nov-Dec. The outcomes are measured for the younger sibling. Grade outcomes are standardized to have a mean zero with a standard deviation of one.

Table C3: Low-SES native sample: sibling spillovers

A. Younger Sisters	**With Older Sister**			**With Older Brother**		
	(1)	(2)	(3)	(4)	(5)	(6)
	GPA	Swedish grade	Math grade	GPA	Swedish grade	Math grade
Delayed entry	0.082	0.042	0.022	0.062	0.064	0.074
	(0.074)	(0.068)	(0.061)	(0.077)	(0.068)	(0.063)
Observations	4,365	4,459	4,459	4,687	4,790	4,790
R-squared	0.015	0.020	0.013	0.013	0.016	0.012
Outcome mean	-0.231	-0.0143	-0.301	-0.295	-0.0914	-0.327
B. Younger Brothers	**With Older Sister**			**With Older Brother**		
	(1)	(2)	(3)	(4)	(5)	(6)
	GPA	Swedish grade	Math grade	GPA	Swedish grade	Math grade
Delayed entry	-0.024	0.015	-0.068	-0.028	-0.086	-0.059
	(0.074)	(0.061)	(0.062)	(0.070)	(0.058)	(0.059)
Observations	4,396	4,523	4,523	4,618	4,754	4,754
R-squared	0.013	0.011	0.010	0.014	0.015	0.017
Outcome mean	-0.605	-0.602	-0.368	-0.639	-0.625	-0.396

Notes: *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors in parentheses. Reduced-form RD regression with a linear control function and a 60-day bandwidth around the January 1^{st} cut-off. The sample consists of native siblings who in 9^{th} grade between 2004-2019 and whose family are below the 20th income percentile (low socioeconomic status). Older indicates that the oldest sibling was born in Jan-Feb as opposed to Nov-Dec. The outcomes are measured for the younger sibling. Grade outcomes are standardized to have a mean zero with a standard deviation of one.

Table C4: Full native sample: the effects of delaying school entry for oldest children

A. Oldest Sisters	**With Younger Sister**			**With Younger Brother**		
	(1)	(2)	(3)	(4)	(5)	(6)
	GPA	Swedish grade	Math grade	GPA	Swedish grade	Math grade
Delayed entry	0.220***	0.160***	0.116***	0.163***	0.168***	0.130***
	(0.026)	(0.026)	(0.028)	(0.044)	(0.045)	(0.046)
Observations	25,413	25,311	25,413	10,003	9,917	10,003
R-squared	0.028	0.031	0.018	0.034	0.042	0.028
Outcome mean	0.485	0.390	0.257	0.360	0.227	0.104
B. Oldest Brothers	**With Younger Sister**			**With Younger Brother**		
	(1)	(2)	(3)	(4)	(5)	(6)
	GPA	Swedish grade	Math grade	GPA	Swedish grade	Math grade
Delayed entry	0.181***	0.171***	0.148***	0.158***	0.119***	0.072*
	(0.025)	(0.025)	(0.027)	(0.038)	(0.039)	(0.041)
Observations	26,836	26,674	26,836	12,133	12,030	12,133
R-squared	0.024	0.038	0.021	0.029	0.043	0.027
Outcome mean	-0.166	-0.0391	0.104	-0.233	-0.129	0.0393

Notes: *** p<0.01, ** p<0.05, * p<0.1.

Table C5: Low-SES native sample: the effects of delaying school entry for oldest children

A. Oldest Sisters	**With Younger Sister**			**With Younger Brother**		
	(1)	(2)	(3)	(4)	(5)	(6)
	GPA	Swedish grade	Math grade	GPA	Swedish grade	Math grade
Delayed entry	0.176**	0.111	0.059	0.101	0.102	-0.052
	(0.079)	(0.085)	(0.074)	(0.112)	(0.123)	(0.105)
Observations	3,229	3,183	3,229	1,694	1,645	1,694
R-squared	0.036	0.041	0.028	0.040	0.049	0.035
Outcome mean	0.150	-0.0504	-0.141	-0.0411	-0.246	-0.307
B. Oldest Brothers	**With Younger Sister**			**With Younger Brother**		
	(1)	(2)	(3)	(4)	(5)	(6)
	GPA	Swedish grade	Math grade	GPA	Swedish grade	Math grade
Delayed entry	0.167**	0.118	0.132*	0.135	0.074	-0.017
	(0.067)	(0.078)	(0.074)	(0.095)	(0.113)	(0.099)
Observations	3,466	3,402	3,466	1,956	1,906	1,956
R-squared	0.033	0.042	0.026	0.041	0.048	0.043
Outcome mean	-0.512	-0.482	-0.254	-0.569	-0.572	-0.334

Notes: *** p<0.01, ** p<0.05, * p<0.1.

Table C6: Natives: effects of Delaying School Entry on Mothers' labor market outcomes

A. Full Native Sample

	Girls		Boys	
	(1)	(2)	(3)	(4)
	Mother earnings (percentiles)	Mother employment	Mother earnings (percentiles)	Mother employment
Delayed entry	0.951***	0.024***	1.335***	0.028***
	(0.287)	(0.004)	(0.278)	(0.004)
Observations	197,980	197,980	210,500	210,500
R-squared	0.001	0.019	0.001	0.019
Outcome mean	51.75	0.729	51.79	0.729

B. Low-SES Native Sample

	Girls		Boys	
	(1)	(2)	(3)	(4)
	Mother earnings (percentiles)	Mother employment	Mother earnings (percentiles)	Mother employment
Delayed entry	0.325	0.009	0.429	0.021*
	(0.602)	(0.012)	(0.585)	(0.012)
Observations	30,904	30,904	32,566	32,566
R-squared	0.003	0.017	0.003	0.020
Outcome mean	30.22	0.408	30.23	0.412

Notes: *** p<0.01, ** p<0.05, * p<0.1.