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The gender gap in entrepreneurship – The role of peer effects☆

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ABSTRACT

In virtually all industrialized countries, women are underrepresented in entrepreneurship, and the gender gap exhibits a remarkable persistence. We examine one particular source of persistence, namely the prevalence of gendered peer influences. We study how early career entrepreneurship is affected by existing entrepreneurship among neighbors, family members, and recent schoolmates. Based on an instrumental variables strategy, we identify strong and heavily gendered peer effects. While men are more influenced by other men, women are more influenced by other women. We estimate that differences between male and female peer groups explain approximately half of the gender gap in early career entrepreneurship.

1. Introduction

An entrepreneur is a person who seeks to create his/her own workplace, and potentially also generates workplaces for others. In all industrialized economies, there are considerably fewer female than male entrepreneurs (Kelley et al., 2012). The existing literature offers no generally accepted explanation for this gender gap. Its universality points toward fundamental gender differences related to, e.g., risk aversion (Jianakoplos and Bernasek, 1998; Byrnes et al., 1999; Croson and og Gneezy, 2009; Borghans et al., 2009), in attitudes toward competition (Niederle and Vesterlund, 2007; Gneezy et al., 2003; Bönte and Piegeler, 2013), or in the subjective perception of own capabilities (Langowitz and Minniti, 2007). However, although there is some evidence indicating a genetic component in these differences (Sapienza et al., 2009), it appears probable that they to some extent are culturally inherited, and therefore will diminish over time as traditional gender roles are moderated. Yet, it is not generally the case that the gender gap in entrepreneurship is particularly small in labor markets considered to have come far in terms of gender equality. The country that we study in the present paper – Norway – illustrates this point. In terms of labor force participation, Norway is one of the most gender-equal societies in the world: 48% of the active labor market participants are female. In terms of entrepreneurship, it is one of the most gender-unequal societies: Only 25% of

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the entrepreneurs are female (Berglann et al., 2011). And only a small fraction of this gender gap can be accounted for by observed individual characteristics, such as education and industry (Berglann et al., 2013).

One possible explanation for the large and persistent gender gaps in entrepreneurship activities is that the historically inherited male dominance in this area is preserved through gendered peer influences. Peer influences may operate in two forms. First, peers may act as role models; see, e.g., Gibson (2004), Van Auken et al. (2006), and BarNir et al. (2011). People might find entrepreneurship a more attractive and realistic occupational choice when they see other entrepreneurs in their social network. Second, peers may provide learning opportunities and access to important networks. In order to start a new business, one may need informants, customers, and (maybe) investors. Entrepreneurial peers can deliver these intangible "services". In addition, they can motivate and educate for entrepreneurship during the formative adolescence years (Guiso et al., 2015). Empirical evidence provided by Verheul et al. (2012), based on survey data from 29 different countries, indicates that the gender gap in entrepreneurship is more about the cognitive stage of "wanting it" than about the behavioral stage of "doing it". It has long been recognized that role models play an important role at the "wanting stage", and perhaps particularly so for women; see, e.g., Hisrich and Brush (1984). Based on a study of a sample of 393 undergraduate students from the U.S., BarNir et al. (2011) present evidence that role models have a particularly large effect on entrepreneurial self-efficacy for women, which again affects entrepreneurial intentions positively.

Recent empirical evidence also suggests that people tend to look for same-sexed role models; see, e.g., Ruef et al. (2003) and Bosma et al. (2012). Through interviews with 292 entrepreneurs in the Netherlands, Bosma et al. (2012) establishes that the majority have a role model in the pre- and/or post-start-up phase, and that same-sex models are strongly (and statistically significantly) overrepresented compared to what random assignment would imply. They also find that almost none of the entrepreneurs consider a distant and famous entrepreneur as their role model. Hence, the overrepresentation of men among existing entrepreneurs implies that men also have more same-sexed entrepreneurial role models to inspire new entrepreneurship attempts.

There is already an existing literature indicating that *spatial* variations in entrepreneurship are extremely persistent over time. Fritsch and Wyrwich (2014), for example, show that self-employment rates observed in German regions as far back as in 1925 are robust predictors for the regional patterns of entrepreneurship today. And recent studies from Sweden (Giannetti and Simonov, 2009; Andersson and Larsson, 2016) and Denmark (Nanda and Sørensen, 2008) indicate a prominent role for peer influences in explaining spatial persistence in entrepreneurship: The higher is the entrepreneurship activity among neighbors or colleagues, the higher is the probability that yet another person embarks on entrepreneurship, ceteris paribus. Minniti (2005) argues that entrepreneurship creates a "culture" of itself that influences individual behavior in its favor. Existing evidence also indicates that personal networks may have a larger influence on entrepreneurship behavior in small communities than in large ones; see Bauernschuster et al. (2010). This may potentially explain why gender-differences appear to be particularly persistent in a sparsely populated and highly decentralized country like Norway.

The research question we address in the present paper is whether – and to which extent – gendered peer influences also can explain the persistence of the gender gap in entrepreneurship. To identify and estimate peer effects is known to be a challenging methodological problem; see, e.g., Angrist (2013) for critical discussion. A number of confounding factors may exist, such as endogenous geographical migration and unobserved local variations in industry-composition. Moreover, when considering how a group's aggregate behavior influences the behavior of its individual members, there is what Manski (1993) labelled a *reflection problem*: It is difficult to disentangle the group's effects on its individual members from the fact that the group's behavior is a mechanical reflection of its members' behavior.

Our analysis is based on administrative register data from Norway with population-wide annual information about individual labor market states from 2002 through 2012. We examine peer influences on early career entrepreneurship within networks confined to neighborhoods, families, and schoolmates. Our analysis population consists of labor market entrants, which we follow for up to 10 years after entry. We investigate how their occupational choices – in terms of regular employment or entrepreneurship – are affected by the corresponding choices already made by their older peers. In this part of the exercise, the peers' behaviors are strictly pre-determined, and can, with appropriate controls, be interpreted as exogenous. In addition, we examine how their own occupational choices are affected by those of their schoolmates or fellow students (hereafter referred to as schoolmates). These choices are to some extent made simultaneously, and peer influences can run both ways. We deal with this and the associated reflection problem by using the pre-determined entrepreneurship activity among the schoolmates' parents as instruments. In this exercise, we exploit a recent finding reported by Lindquist et al. (2015) that the intergenerational transmission of entrepreneurship propensity is heavily gendered: Mothers influence daughters whereas fathers influence sons. This clearly also represents a channel for making the gender gap persistent.

Our findings consistently confirm the importance of peer effects at all levels. The incidence of an early career entrepreneurship endeavor is influenced by existing entrepreneurship rates in the local community, the family, and in the group of recent schoolmates. Close family has a larger influence than more distant family. Close neighbors have a larger influence than more distant neighbors. And importantly: same-sex peers generally have larger influence than opposite-sex peers. The latter implies that men have much more entrepreneurs in their most influential peer groups than women have. We estimate that this explains approximately 50% of the gender gap in early career entrepreneurship. The statistical uncertainty is considerable, however, and a 90% confidence interval on the fraction of the gender gap that is accounted for by differences between male and female peer groups ranges from 21 to 81%.

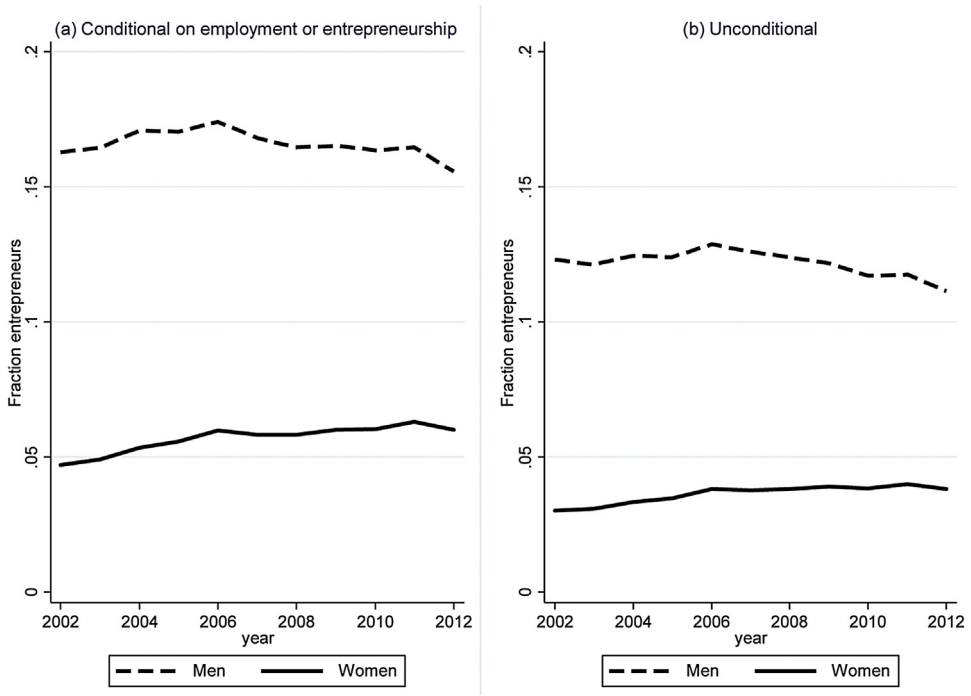

Fig. 1. Entrepreneurship rates by gender 2002–2012.
Note: The conditional entrepreneurship rate in panel (a) is defined as the number of persons aged 18–66 engaged in any form of entrepreneurial activity (incorporated or unincorporated) divided by the total number of economically active persons (employees and entrepreneurs) in the same age group. The unconditional rate in panel (b) is defined as the same number of persons with entrepreneurial activity divided by the total population aged 18–66.

2. Background and data

The foundation for our analysis is (encrypted) administrative register data from Norway, combining employer-employee registers with information on earnings and business income and firm ownership. For each year 2002–2012, we use these data to identify *regular employment* and *entrepreneurship* activities. Our entrepreneurship definition is considerably wider than the self-employment concept often encountered in the economics literature, as it also includes persons who are employed in limited liability firms in which they have a large ownership share (more than 30%), either directly or indirectly through other firms; see Berglann et al. (2011) for details. We extend the Berglann et al. (2011) definition somewhat, however, by also including persons who have regular employment as their main source of personal income, yet still operate an active business as self-employed (regardless its size and profitability).[1] The motivation behind this extension is that we wish to capture nascent entrepreneurship and entrepreneurship endeavors without implicitly conditioning on economic success.

Fig. 1 shows for men and women, respectively, annual entrepreneurship rates in Norway from 2002 to 2012. In panel (a), the rates are conditional on economic self-sufficiency, defined as having annual earnings from employment and/or entrepreneurship exceeding a subsistence level of NOK 180,000 (approximately $ 21,200).[2] In panel (b), they are unconditional. Both conditional and unconditional entrepreneurship rates are approximately three times as high for men as for women. There has, however, been a convergence during the period we look at, with slightly increasing female entrepreneurship rates and slightly decreasing male entrepreneurship rates.

There are considerable geographical differences in the entrepreneurship rate, and these differences are highly persistent over time. This is illustrated in Fig. 2, where we plot gender-specific entrepreneurship rates by travel-to-work area (TWA) in 2002 against the corresponding rates in 2012.[3] The circle sizes in Fig. 2 are proportional to the number of inhabitants in each TWA. It is clear that the geographical distribution of entrepreneurship in Norway was virtually unchanged over this 10 year period, and that the positive shifts in female entrepreneurship rates have been of similar magnitude in all parts of the country.

[1] We define an "active business" as a business with at least some recorded economic activity during the year in the sense that associated earnings are strictly non-zero.
[2] This threshold corresponds to approximately one third of average full-year-full-time earnings in Norway. Monetary amounts reported in this paper are inflated to 2016-value, and NOK is converted to $ based on the exchange rate applying in March 2016 ($ 1 = NOK 8.5).
[3] We use a partition with 46 such regions in Norway, with approximately 110,000 inhabitants on average; see Bhuller (2009).

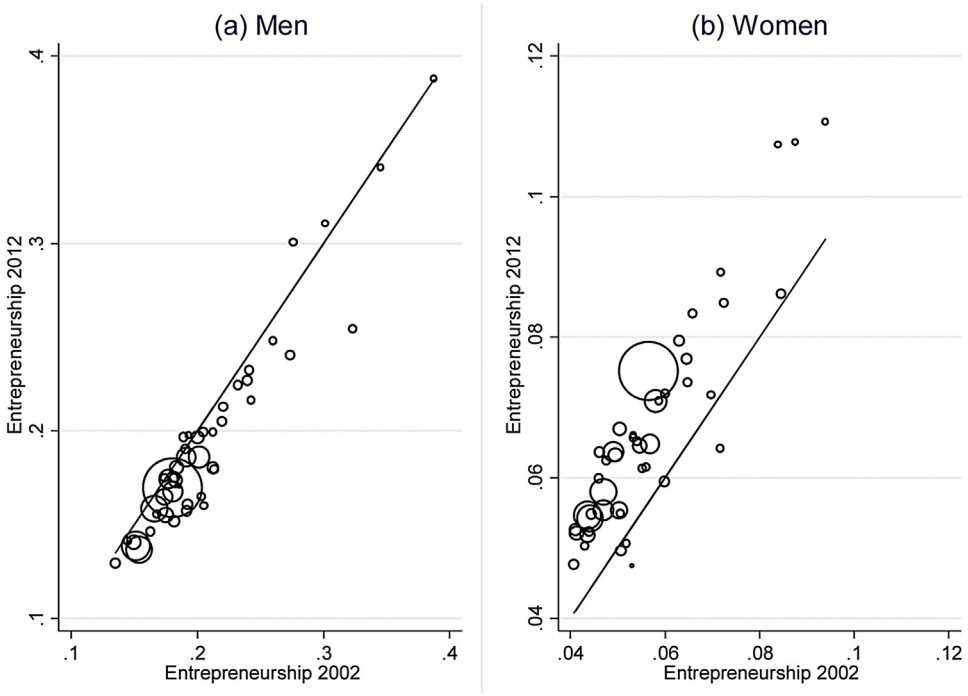

Fig. 2. Entrepreneurship rates by travel-to-work area (TWA). 2002 and 2012.
Note: Circle sizes are proportional to TWA size (average number of inhabitants over the two involved years). The lines are the 45° lines.

Our data contain rich information on family linkages, education (including school identity, type/level, and graduation year), places of residence (at the level of small neighborhoods), nationality, and demographic characteristics. These dimension of the data will be used to establish the individually assigned *peer groups* that potentially play a role in encouraging or discouraging entrepreneurship endeavors. Provided that some employment or entrepreneurship activity is recorded, the data also contain information about the chosen industry.

3. Empirical approach

The starting point of our empirical analysis is the group of persons who completed their education in 2001–2007. We interpret an educational career as completed in a given semester if a person was registered as a pupil/student that semester, but not in any of the following six semesters.[4] We refer to the year of completion as the *graduation year*, irrespective of whether a grade was obtained or not. We collect information about subsequent labor market states and construct annual entrepreneurship indicators for each year after the graduation year and until 2012. Hence, for these individuals we have panels of 5–11 consecutive outcome observations (depending on graduation year), each indicating entrepreneurial activity. The focus on early career entrepreneurship clearly entails the limitation that we miss out on the entrepreneurship activities occurring later in the lifecycle. Berglann et al. (2011) show that the entrepreneurship rate among Norwegians tends to grow with age, and that entrepreneurship activities are roughly twice as common in the mid 40's compared to the mid 20's. However, by studying labor market entrants, we ensure that we model occupational choices from the very start of the labor market career, at which point they are not governed by the persistence of previously chosen states, whereas their older peers' entrepreneurship behaviors can safely be considered exogenous. This way we ensure that while the members of our analysis population may have been affected by ongoing entrepreneurship activities in their local communities, they have not yet been able to influence these activities themselves. We thus have a hierarchical model, whereby the "old" may affect the behavior of the "young", but not vice versa, and we circumvent the reflection problem discussed by Manski (1993). Our focus on early career entrepreneurship also implies that we can rather directly examine how gender patterns in entrepreneurship are (or are not) transferred across generations. We have a simultaneity problem in relation to one potentially important peer group, though, namely that consisting of schoolmates. As we explain in more detail below, we deal with this by applying an instrumental variables strategy.

[4] More precisely, we require that an education lasting at least six months ended *and* that no education lasting more than three months was recorded the next three years.

Table 1
Descriptive statistics analysis sample.

	Men	Women
Number of graduates	133,714	119,585
Age at graduation	22.1	22.7
Educational level (%)		
Primary education or uncompleted secondary education	32.3	25.1
Secondary education	44.8	35.2
College/University	22.9	39.7
Any economic activity (employment or entrepreneurship) during first five years (%)	83.1	82.1
Any entrepreneurship activity during first five years (%)	10.5	5.7

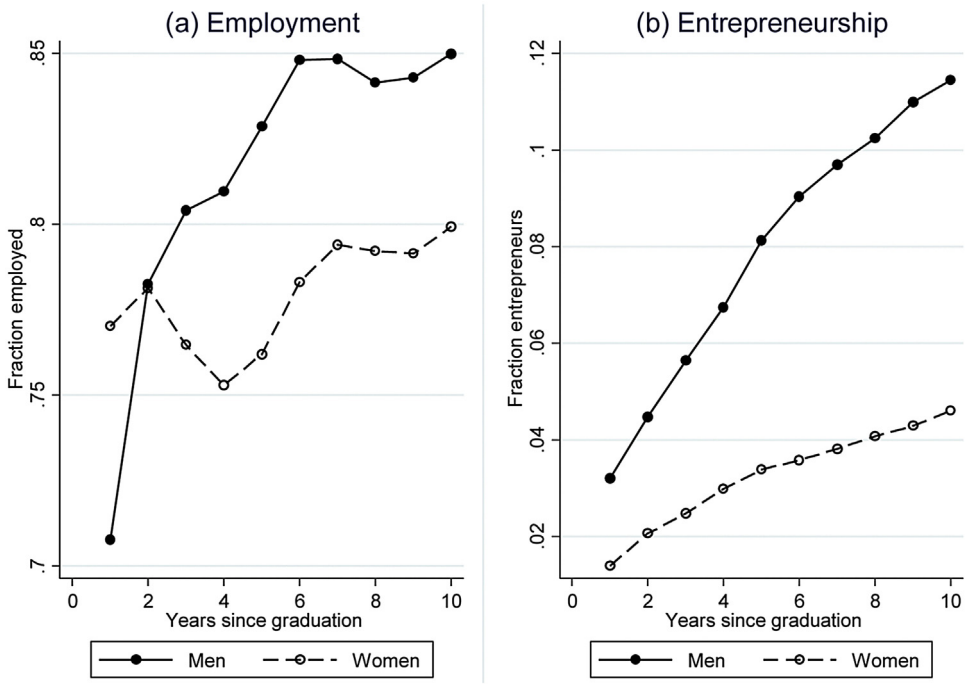

Fig. 3. Unconditional rates of regular employment and entrepreneurship by years since graduation (2001–2002 graduation cohorts).

The way we have constructed the data ensures that all graduation cohorts can be followed for at least five years. In order to examine the impact of various peer groups' influence on own entrepreneurship behavior, we define as our main outcome variable an indicator for at least some entrepreneurship activity within the first five years after the year of graduation. We return to alternative outcomes later on, both in the form of narrower entrepreneurship definitions, e.g., requiring that a completely new firm is established or that entrepreneurship is the main economic activity, and in the form of a year-by-year analysis where we exploit each graduation cohort as long as we are able to observe it.

Table 1 shows some descriptive statistics for our analysis population. We follow around 253,000 school graduates for five years or more. During the first five years, 10.5% of the men, and 5.7% of the women has been engaged in some form of entrepreneurship. Hence, the gender gap at this stage of the labor market career is 4.8 percentage points.

Fig. 3 presents unconditional employment and entrepreneurship propensities *by years since graduation* for the 2001–2002 graduation cohorts. We focus on these two cohorts in this particular graph for the reason that they can be followed for a full 10-year period. Looking at panel (b) it is evident that entrepreneurship rates, as well as the gender gap, increase rather monotonically with years since graduation.[5]

In Fig. 4, we plot the fractions with at least one incidence of early career entrepreneurship during the first five years after graduation against the existing same-sex entrepreneurship rates (in the graduation year) in the residential travel-to-work

[5] Note that the conspicuously high female employment rate in the first two years after graduation (panel (a)), as well as the subsequent drop, may be explained by the combination of a generous parental leave scheme in Norway providing (almost) full wage replacement for a year, but (in the period covered here) only conditional on at least six months of regular employment.

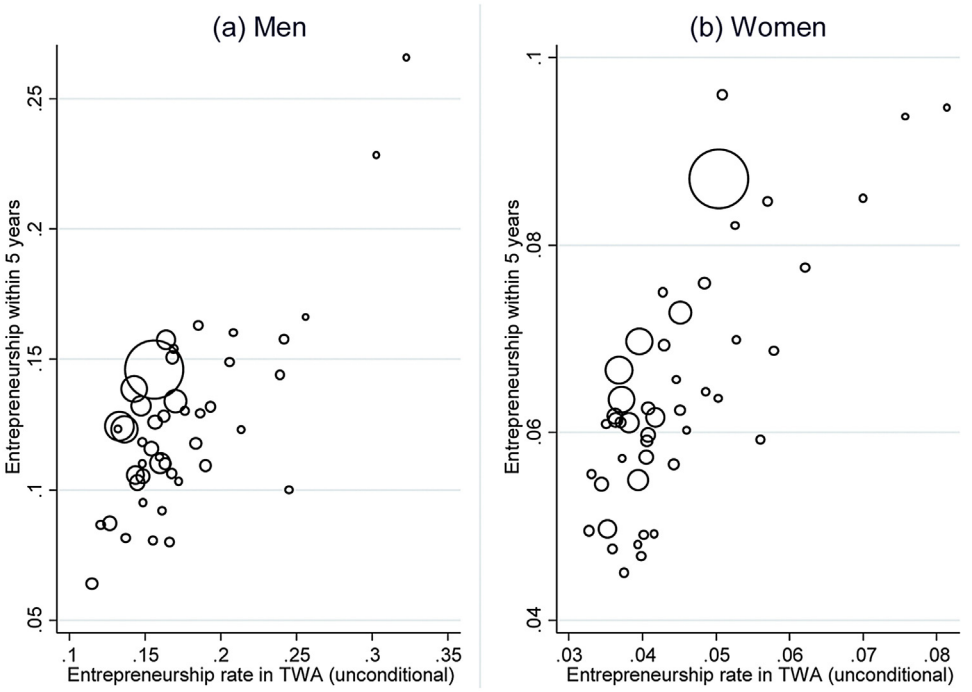

Fig. 4. Gender-specific graduation-year entrepreneurship rate in travel-to-work-area (TWA) and fraction with early career entrepreneurship during first five years after graduation.

area (TWA). Again, a remarkable pattern of persistence emerges. Early career entrepreneurship is higher the higher the local rate of same-sex entrepreneurship is to start with.

The descriptive patterns presented so far do of course not necessarily reflect peer effects. They may also reflect other sources of geographical variations in educational/occupational choices and/or industry composition. To isolate and estimate the peer effects, we set up a statistical model designed to eliminate potentially confounding factors.

Let Ent_i be our outcome variable for individual i, which in the main part of our analysis is equal to 1 if some entrepreneurship activity has been recorded (either as a main activity or as one of multiple activities) within five years after school completion, and 0 otherwise. We then set up linear probability model of the following form separately for men and women:

$$Ent_i = \sum_k \left(\gamma_{mk} e_{mki} + \gamma_{fk} e_{fki}\right) + controls + \varepsilon_i. \tag{1}$$

The right-hand-side variables of interest are the indicators for entrepreneurship behavior in the peer groups relevant for person i, denoted e_{mki} and e_{fki}, where the subscript k indicates the type of peer group and the subscripts (m,f) distinguish males from females. We use peer groups of three different types: Neighbors, family, and schoolmates. The groups are in all cases defined such that they exclude the reference person. The groups and their associated indicators are defined as follows:

Neighbors: We distinguish between close and distant neighbors, with both groups identified on the basis of residential addresses in the year of graduation. By "close neighbors", we mean persons living in the same "basic statistical unit" ("grunnkrets") as defined by Statistics Norway. These are designed to resemble genuine neighborhoods where residents are likely to interact.[6] There are 13,700 basic statistical units in Norway, each populated by around 350 individuals on average. By "distant neighbors", we mean persons living in adjacent neighborhoods belonging to the same "statistical tract" ("delområder"). These are also drawn up by Statistics Norway, and are designed to encompass neighborhoods that share common service/shopping center facilities. A typical statistical tract comprises around 8–9 neighborhoods and 3100 inhabitants. As indicators for the two neighbor groups' entrepreneurship behavior we use the overall fraction of entrepreneurs in the population aged between 30 and 61 in the year of own graduation (excluding own family members). By setting a lower age limit of 30, we avoid overlap between neighbors and schoolmates, and by setting an upper limit of 61 years, we avoid interference from early retirement (which for most workers in Norway may start at age 62).

Family members: For family members, we also distinguish between close and more distant relatives. By "close relatives", we mean parents and siblings. By "distant relatives", we mean uncles, aunts, and (first) cousins. As indicator for the family

[6] For a more thorough description of the neighborhood concept and other geographical entities used in this paper, see Statistics Norway (1999).

Table 2
Descriptive statistics for peer groups.

	IClose neighbors	IIDistant neighbors	IIIClosefamily	IVDistant family	VSchool-mates
Men:					
Male peer groups					
Average size	150	1,070	1.23	3.33	48
Average entrepreneurship indicator	0.16	0.16	0.13	0.10	0.09
Female peer groups					
Average size	150	1062	1.29	3.21	24
Average entrepreneurship indicator	0.04	0.04	0.03	0.03	0.03
Women:					
Male peer groups					
Average size	154	1103	1.22	3.32	26
Average entrepreneurship indicator	0.16	0.16	0.13	0.10	0.09
Female peer groups					
Average size	153	1,091	1.29	3.21	58
Average entrepreneurship indicator	0.04	0.04	0.03	0.03	0.05

members' entrepreneurship behavior, we again use the fractions involved in entrepreneurship at the time of own (person *i*'*s*) graduation.

Schoolmates: We identify schoolmates as the persons below age 30 who graduated from the same school/college/university with exactly the same education (based on a six-digit education code) in the same semester. By requiring that the age is below 30 years we avoid overlap with the group of neighbors, and also reduce the likelihood that entrepreneurship has already occurred at the time of graduation. As indicators for entrepreneurship behavior, we use the fraction of schoolmates that has engaged in some form of entrepreneurship within five years after graduation.

Eq. (1) embodies at least two potential identification challenges. The first is that of confounding factors: There may exist local or education-specific variations in entrepreneurship propensity that have nothing to do with peer effects. We deal with this challenge by including extensive sets of control variables. The control variables in (1) incorporate a large number of fixed effects. In a baseline model, they include:

- Age-at-graduation fixed effects (age = 18, 19,. . .,29),
- School fixed effects (1166 different educational institutions),
- Education fixed effects for the last observed educational track (219 different categories based on a three-digit international standard classification of education (ISCED)),
- Travel-to-work area by graduation-semester fixed effects (460 different combinations),
- For immigrants: Region-of-origin-country fixed effects (5 different regions).

In a robustness analysis below, we also include industry dummy variables for the subset of observations where employment or entrepreneurship has been recorded such that we have the required information about industry.

The second challenge is that of reverse causality: While the peer variables for neighbors and family members are strictly predetermined with respect to the outcomes, this is not the case for schoolmates. These variables are endogenous, in that they may have been affected by – as well as affected – the dependent variable in (1). To deal with the resultant simultaneity problem, we use an instrumental variable strategy. As instruments for the contemporaneous entrepreneurship activities in the groups of schoolmates we use the fractions of their mothers and fathers that were engaged in entrepreneurship at the time of graduation. Since mothers and fathers may affect sons and daughters differently, this gives us four instruments for the two endogenous peer group variables (i.e., entrepreneurship rates among fathers to sons, fathers to daughters, mothers to sons, and mothers to daughters). The identifying assumption is that the conditional correlation between a person's own entrepreneurship activities and that of the parents to his/her schoolmates is governed by the latter's impact on entrepreneurship among the schoolmates only.

Another point to note is that while it is natural to interpret causal relationships between the different groups' entrepreneurship propensities and the outcome variable as somehow related to *peer effects*, the effects identified for close family are also likely to reflect the transmission of genetic factors (Nicolaou and Shane, 2010; Lindquist et al., 2015). In addition, it is possible that inheritance of family businesses, access to cheap capital, and parent-offspring similarities in choice of industry play a role, although Lindquist et al. (2015) find little empirical support for these explanation based on Swedish data.

Descriptive statistics for the various peer groups are presented in Table 2. The group sizes of course differ enormously, with the average numbers varying from only 1–3 for the two family-groups, 25–50 for the schoolmate groups, around 150 for the close neighbor groups and more than 1000 for the groups of distant neighbors. It is also notable that entrepreneurship rates in the male peer groups are much higher than in the female peer groups.

Given that each graduate's entrepreneurship behavior can be affected by as much as 10 different peer groups, identification of each peer group's isolated influence may be problematic if the peer groups' entrepreneurship rates are highly correlated. As it turns out, there is a considerable (generally positive) correlation between the peer groups' entrepreneurship

rates, but the correlation is far from perfect, and only two out of the 45 different correlation coefficients that can be calculated are above 0.5; see Table A1 in the Appendix A for details.

In order to specify our instrumental variables (2SLS) model, let (e_{msi}, e_{fsi}) denote the entrepreneurship rates for person i's male (m) and female (f) schoolmates (s), respectively. The first step equations then take the following form:

$$e_{gsi} = \pi^{g}_{(fs)} e_i^{(fs)} + \pi^{g}_{(fd)} e_i^{(fd)} + \pi^{g}_{(ms)} e_i^{(ms)} + \pi^{g}_{(md)} e_i^{(md)} + controls + \xi_i,\ g = m, f, \tag{2}$$

where $(e_i^{(fs)}, e_i^{(fd)}, e_i^{(ms)}, e_i^{(md)})$ are the observed entrepreneurship rates observed for the respective groups' parents, where the superscripts indicate fathers to sons (fs), fathers to daughters (fd), mothers to sons (ms), and mothers to daughters (md). Hence, our first step equation is designed to exploit the findings reported by Lindquist et al. (2015) that fathers and mothers influence their sons and daughters differently. We expect, of course, that the mothers and fathers to sons are most important for the male peer group, whereas mothers and fathers of daughters are most important for the female group. However, we include all four instruments in both the first-step equations, as schoolmates may also have been affected by each other.

Let $(\hat{e}_{msi}, \hat{e}_{fsi})$ be the predictions from ordinary least square (OLS) estimations of Eq. (2). Our second step equation then becomes

$$Ent_i = \sum_{k \neq s} \left(\gamma_{mk} e_{mki} + \gamma_{fk} e_{fki}\right) + \gamma_{ms} \hat{e}_{msi} + \gamma_{fs} \hat{e}_{fsi} + controls + \zeta_i. \tag{3}$$

As the entrepreneurship outcomes of interest are binary, it may be argued that the linear regression framework is inappropriate, and that we should use logit or probit models instead. However, given that we need to control for a very large number of potentially confounding factors in this analysis – and that we consider it essential to do this without imposing unjustified functional form restriction – we have almost 1900 dichotomous covariates in the control variable vector. In the linear model, we can deal with this by means of an algorithm designed for projecting out dummy-encoded categorical variables; see Gaure (2013). This is not feasible within a logit/probit framework. However, based on a simplified version of the model, we show in the Appendix A (Table A2) that the average estimated marginal effects from a two-step logit model (with a linear first step) are very close to the coefficient estimates based on the 2SLS model.[7] As also shown in the Appendix (Fig. A1), the patterns of predicted entrepreneurship probabilities based on the two models are also relatively similar, although the linear model does give rise to a number of (slightly) negative probability estimates.

4. Main results

Our main estimation results are presented in Table 3. For comparison, we present both the OLS results and the second stage 2SLS results. The first stage 2SLS results are presented in Table 4. As expected, the estimates from the OLS (columns I and III) and 2SLS (columns II and IV) models in Table 3 are almost identical for all the peer influences, except for the two endogenous schoolmate peer entrepreneurship rates where the 2SLS estimates are somewhat larger than the OLS estimates. A possible interpretation of these latter differences is that the entrepreneurship activities of schoolmates are measured with some error in relation to their potential influence on the focal individuals' entrepreneurship decisions, either because they occur after the focal individual has made his/her own occupational choice or because they occur before a firm is formally established. Such mechanisms will tend to bias the OLS estimates toward zero. In our discussion of the results, we focus entirely on the 2SLS estimates.

Before we turn to the results of substantive interest, we briefly discuss the validity and power of our instruments for entrepreneurship among male and female schoolmates. Since we have four instruments for two endogenous variables, our model is overidentified, hence, we can test for invalid instruments. We report the Sargan tests for overidentifying restrictions at the bottom of Table 3 (Sargan, 1958). These test statistics show little evidence that our instruments are correlated with the error term in the second stage equation. The test statistic for men (Column II) is borderline significant, but this may reflect that the true peer effects are heterogeneous and thus that the estimate of a presumed homogenous effect will vary somewhat depending on the margin used for identification. In Table 4, we report the first-stage estimates for schoolmates' entrepreneurship activities, together with test statistics for weak instruments. It is clear that the instruments based on the predetermined entrepreneurship behavior of the peers' parents do have a considerable influence on the schoolmates' entrepreneurial activities, and that fathers are relatively more important for sons than for daughters. Unsurprisingly, both the male and female peer groups are primarily affected by their own parents. There is one exception from this pattern, though, namely that the male peers to female graduates are influenced by the fathers of their female schoolmates. This may reflect that men taking more female-dominated educations are more likely to be influenced by their female schoolmates. We present two different F-statistics for the power of the instruments. The *partial* F-statistic gives the conventional test for the joint impact of the excluded instruments separately for each of the endogenous variables. They suggest that the instruments are relatively strong, with a possible exception for the instruments for female schoolmates in the male regression (which has an F-statistic slightly below 10). However, with multiple endogenous variables, the partial F-statistics are unable to detect

[7] In the simplified model we have dropped the school fixed effects and replaced the travel-to-work area by graduation-semester fixed effects with separate dummy variables for travel-to-work area and graduation semester.

Table 3
Estimated peer effects (standard errors in parentheses). OLS and Second stage 2SLS. Dependent variable = Own entrepreneurship within five years after graduation.

	Men		Women	
	I OLS	II 2SLS	III OLS	IV 2SLS
Entrep. rate close neighbors				
Male	0.153***	0.151***	0.041***	0.040***
	(0.014)	(0.014)	(0.009)	(0.009)
Female	0.020	0.021	0.023	0.021
	(0.028)	(0.029)	(0.022)	(0.022)
Entrep. rate dist. neighbors				
Male	0.093***	0.093***	0.015	0.016
	(0.022)	(0.023)	(0.015)	(0.015)
Female	0.059	0.053	0.113**	0.110**
	(0.068)	(0.069)	(0.050)	(0.050)
Entrep. rate close family				
Male	0.059***	0.059***	0.020***	0.020***
	(0.003)	(0.003)	(0.002)	(0.002)
Female	0.042***	0.041***	0.042***	0.042***
	(0.006)	(0.006)	(0.005)	(0.005)
Entrep. rate dist. family				
Male	0.032***	0.032***	0.007	0.006
	(0.005)	(0.005)	(0.004)	(0.004)
Female	0.002	0.002	0.016**	0.015**
	(0.008)	(0.008)	(0.007)	(0.007)
Entrep. rate schoolmates				
Male	0.164***	0.268***	0.059***	0.079*
	(0.012)	(0.073)	(0.008)	(0.043)
Female	0.119***	0.277*	0.286***	0.485***
	(0.016)	(0.166)	(0.019)	(0.132)
Mean outcome	0.105	0.105	0.057	0.057
Overidentifying restrictions test (Sargan Chi-square (2))		4.689* [p = 0.096]		1.710 [p = 0.425]
Excluded instruments for entrep. rate schoolmates				
Male				
F partial		62.62		23.58
F conditional		84.41		26.22
Female				
F partial		8.695		21.01
F conditional		11.86		27.83
Number of observations (N)	133,714	133,714	119,585	119,585

Note: All regressions include indicator variables for age-at-graduation (12 categories), graduation school (1166 categories), education level/type (219 categories), travel-to-work area by graduation semester (460 categories), and origin-region for first- and second generation immigrants (5 categories). Standard errors are computed with a two-way cluster on neighborhood (close neighbors) and schoolmate/co-student peer group. *(**)(***) indicate statistical significance at the 10(5)(1) % levels.

cases in which interdependencies imply that it is difficult to identify which of the endogenous variables they operate through. We therefore also provide F-statistics proposed by Sanderson and Windmeijer (2016), which are *conditional* on the other endogenous variable. These statistics turn out to be well above conventional threshold levels for weak instruments (Stock and Yogo, 2005). Hence, our instruments appear to nicely disentangle the peer influences of male and female schoolmates.

Taken at face value, the second stage coefficients can be interpreted as the estimated change in early career entrepreneurship arising from a change in the respective peer groups' entrepreneurship rate from 0 to 1. Note, however, that the actual variation in the data – and thus the margin used for identification – varies enormously across the different peer groups. For the smallest peer groups (close family), the variation in the data actually goes from 0 to 1, whereas for the larger groups (distant neighbors) it typically goes from around 0.10 to 0.30 for the male peer groups and from around 0.03 to 0.10 for the female groups.

The second stage results suggest that men's entrepreneurship behavior is significantly affected by all the male peer groups. Female peer groups have considerably less influence on men, with statistically significant effects only for close family (mothers and sisters) and schoolmates. Women's entrepreneurship behavior is to a larger extent affected by both male and female peer groups. Yet, for all peer groups except close neighbors, own sex peers are much more important than those of opposite sex also for women.

Table 4
First stage 2SLS. Dependent variable = Average entrepreneurship rate in peer group within five years after graduation.

	Men		Women	
	I Male schoolmates	II Female schoolmates	III Male schoolmates	IV Female schoolmates
Entreprep. rate parents				
Fathers of male schoolmates	0.083***	0.002	0.095***	−0.001
	(0.006)	(0.004)	(0.012)	(0.003)
Mothers of male schoolmates	0.057***	0.001	0.051**	0.009
	(0.011)	(0.006)	(0.021)	(0.006)
Fathers of female schoolmates	−0.005	0.027***	0.015**	0.034***
	(0.003)	(0.006)	(0.007)	(0.005)
Mothers of female schoolmates	0.003	0.017*	0.025	0.0574***
	(0.007)	(0.008)	(0.016)	(0.012)
Number of observations (N)	133,714	133,714	119,585	119,585

Note: All regressions include indicator variables for age-at-graduation (12 categories), graduation school (1166 categories), education level/type (219 categories), travel-to-work area by graduation semester (460 categories), and origin-region for first- and second generation immigrants (5 categories). Standard errors are computed with a two-way cluster on neighborhood (close neighbors) and schoolmate/co-student peer group. *(**)(***) indicate statistical significance at the 10(5)(1) % levels.

Table 5
Estimated contributions to the gender gap in early career entrepreneurship by the differences between male and female peer groups.

	In percentage points [90% confidence interval]	In% of overall gender gap [90% confidence interval]
All peer groups	2.54 [0.99, 3.98]	51.7% [20.5, 81.1]
Neighbors	1.45 [0.50, 2.39]	29.4% [10.2, 49.2]
Family	0.33 [0.23, 0.43]	6.8% [4.7, 8.8]
Schoolmates	0.77 [−0.41, 1.84]	15.6% [−8.5, 37.2]

Note: The results in the table are based on a nonparametric bootstrap with 1000 re-samplings (with replacement) and re-estimations. The reported numbers are the mean, the 5th percentile, and the 95th percentile in the distributions of the respective statistics generated by these trials.

For both men and women, there is a tendency that close neighbors are more important than distant neighbors, and that close family members are more important than distant family members. The former of these observations become much more evident when we take into account that there are (on average) seven times as many distant as there are close neighbors.[8]

Viewed as a whole, our estimates suggest that peer effects are of considerable importance for early career entrepreneurship. We will now use the estimated 2SLS model to assess how much of the gender gap that can be attributed to differences in peer influences. We do this by computing the hypothetical entrepreneurship behavior under the assumption that male and female peer groups were characterized by exactly the same (average) entrepreneurship rates (equal to the average of the observed male and female peer group averages). For men, we then find that the incidence of entrepreneurship would have been 9.2% instead of the observed 10.5%. For women, it would have been 6.9% instead of the observed 5.7. Hence, the gender gap in our outcome variable would have been 2.3 instead of 4.8 percentage points. Peer group composition is thus estimated to explain 2.5 percentage points (52%) of the observed gender gap in early career entrepreneurship behavior. Following this logic, we can examine the contribution to the gender gap provided by each of the peer group types: neighbors, family, and schoolmates. We then find that the peer group composition among neighbors are most important (explains 29% of the gender gap), followed by schoolmates (16%) and family (7%).

These numbers are estimated with large statistical uncertainty, however. To obtain confidence intervals on the explanatory power of peer group composition, we have performed a non-parametric (clustered) bootstrap exercise, based on 1000 re-samplings (with replacement) and re-estimations. The results are presented in Table 5. They show that a 90% confidence interval for the overall impact on the gender gap from peer group composition runs from around 1 to 4 percentage points (21–81% of the gap). The statistical uncertainty is particularly large for the role of schoolmate peer groups.

5. Alternative models and outcomes

In this section, we first assess the robustness of our findings with respect to the selection of control variables and the composition of peer groups. We then look at alternative outcome measures, with respect to the definition and timing of entrepreneurship.

[8] See Markussen and Røed (2015) for a discussion of how peer effects arising from groups of different sizes should be compared and interpreted.

One potentially important identification challenge comes from local variations in industry composition, i.e., that typically entrepreneurial industries are more prevalent in some local areas than in others. Failure to account for this may imply that the spatial variation in entrepreneurial industries is falsely interpreted as neighborhood peer effects. To some extent, the use of education dummy variables also indirectly controls for industry composition, as many of the educations specialize for particular industries. Moreover, the use of TWA-by-year dummy variables controls non-parametrically for variations in industry composition at the commuting zone levels. To nevertheless check this further, we add into the model controls for the industry actually chosen by each individual. For this purpose, we use a two-digit code based on the Statistical Classification of Economic Activities in the European Community (NACE) with 88 different categories.[9] In this exercise, we also need to condition on at least one industry affiliation having been observed. In practice, this means that we can only use graduates for which either an employment relationship or an entrepreneurship activity has been observed during the first five years after graduation. This reduces the sample by 17–18%; conf. Table 1. The results are presented in Table 6, columns I and IV. They are very similar to those obtained in the baseline analysis. If anything, the estimated neighborhood peer effects become a bit larger than in the baseline model.[10]

Having introduced industry dummy variables, we can also assess whether peers in the same industry as the individual itself have the same influence as peers in other industries. Intuitively, we may expect peers in the same industry to have larger influence, as they potentially play a twin role of being both role models and coaches. Hence, if we remove persons operating as employees or entrepreneurs in the same industry from the respective peer groups, we may expect the estimated peer effects to decline. As it turns out, removing same-industry peers among neighbors and schoolmates has little influence on the estimated peer effects, whereas the removal of same-industry family members does imply considerably smaller peer effects; see Table 6, columns II and V. Hence, it appears that family members do affect occupational choices both through direct learning/coaching and through social acceptance/inspiration, whereas more distant peer groups primarily affect them as role models through social acceptance/inspiration.

Finally, the way we have designed the analysis data implies that some of the parents of schoolmates also live in the same neighborhood as the focal individual, potentially challenging the exclusion restriction. To check whether this has influenced our estimates, we report in columns III and VI results obtained when we have dropped from the dataset all schoolmates whose parents live in the same neighborhood as the focal individual. As can be seen from these results, this hardly changes our coefficient estimates at all.

As pointed out above, we have so far used a fairly comprehensive entrepreneurship definition in this paper, including all attempts at running a business, either as self-employed or as employed owner, and regardless of whether the business is new or not. We now turn to three alternative – and narrower – definitions of entrepreneurship. The first consider a person as entrepreneur only insofar as entrepreneurship at some point in time (during the five year outcome period) is a person's main economic activity – in the sense that it represents the most important source of income. The second consider a person as entrepreneur if he/she at some point in time is self-employed, and the third defines an entrepreneur as a person who creates a completely *new* business (in the sense that the firm did not exist at all two years prior to our recording of an entrepreneurship activity).

All these definitions imply lower estimated peer effects; see Table 7. However, since they are narrower than the one used in our main analysis, they need to be interpreted relative to lower average outcomes. This is particularly the case for the entrepreneurship definitions based on the main economic activity only and on the creation of a new firm. However, taking this into account, the pattern of estimated peer effects is very similar as that found in the main analysis. Men are generally more affected by other men (with the exception of distant neighbors' influence on entrepreneurship as the main activity; see Column I), whereas women are more affected by other women.

Up to now, our analysis has focused entirely on the summary outcome of "some entrepreneurship within five years after graduation", which is observed for all the graduates in our dataset. We now use our baseline model to examine peer effects on annual entrepreneurship outcomes, ranging from entrepreneurship in the first year after graduation and up to the 10th year after graduation. This analysis is based on our (wide) baseline definition of entrepreneurship. Each outcome is defined such that it takes the value one if entrepreneurship occurred in the year in question, and zero otherwise. Given the large number of estimates involved in this exercise, we present the results graphically; see Fig. 5 (men) and 6 (women). As the number of observations declines when we exceed five years after graduation (since we lose one graduation cohort for each year we extend the outcome period), the statistical uncertainty also becomes larger.

Given the considerable statistical uncertainty associated with many of the 200 unique coefficient estimates reported in Figs. 5 and 6, we focus on the overall pattern of estimated effects here, rather than on specific coefficients. There are in particular two points to note. The first is that the overall structure of estimated peer effects – in terms of the

[9] The acronym originates from the French translation: Nomenclature statistique des Activités économiques dans la Communauté Européenne.

[10] Another potential identification challenge comes from non-random sorting into educational programs, as some educational tracks are clearly more entrepreneur-oriented that others. In our baseline model, we have controlled for education by means of 219 dummy variables, representing both the level, direction, and type of education, using a three digit code based on the international standard classification of education (ISCED). In a previous working paper version of this paper (Markussen and Røed, 2016), we have taken this a step further by employing a five-digit code with 669 categories. This is done at the cost of losing potentially valuable variation in peer group composition, as many (70) of the five-digit education codes are associated with unique peer groups. The results turn out to be very similar, however.

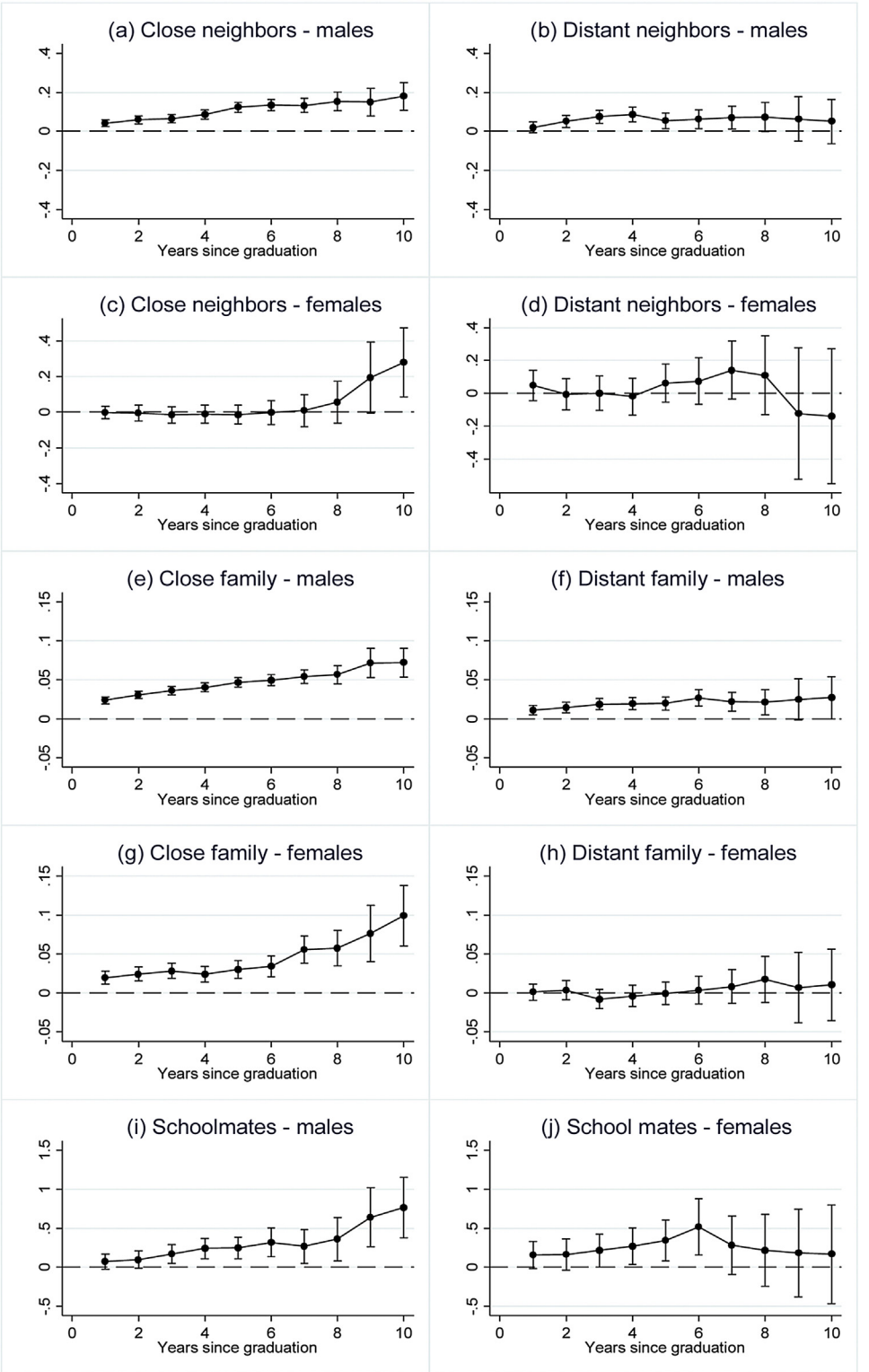

Fig. 5. Estimated peer effects for men by years since graduation (with 95% confidence intervals).
Note: For each year, the outcome is equal to one if some entrepreneurship activity occurred that year, otherwise zero. See also the note to Table 3 for a description of control variables and standard error calculations.

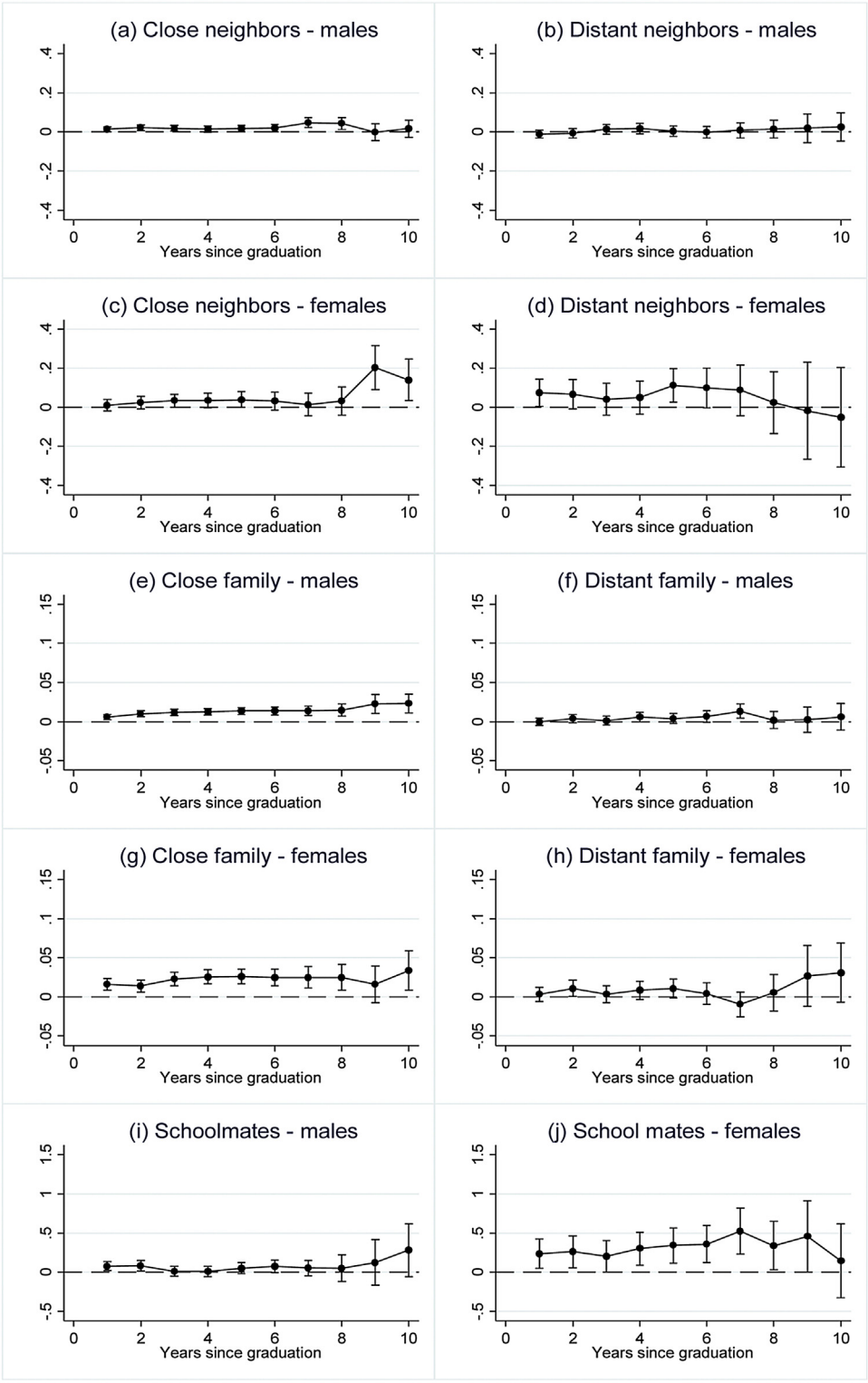

Fig. 6. Estimated peer effects for women by years since graduation (with 95% confidence intervals).
Note: For each year, the outcome is equal to one if some entrepreneurship activity occurred that year, otherwise zero. See also the note to Table 3 for a description of control variables and standard error calculations.

Table 6
Robustness. Second stage 2SLS results (standard errors in parentheses). Dependent variable = Own entrep. within five years after graduation.

	Men			Women		
	I With industry controls	II Excl. peers in same industry	III Excl. schoolm. with parents in same neighbor.	IV With industry controls	V Excl. peers in same industry	VI Excl schoolm. with parents in same neighbor.
Entrep. rate close neighbors						
Male	0.168***	0.160***	0.152***	0.047***	0.043***	0.040***
	(0.015)	(0.015)	(0.014)	(0.011)	(0.011)	(0.009)
Female	0.039	0.047	0.021	0.029	0.005	0.021
	(0.032)	(0.029)	(0.029)	(0.026)	(0.021)	(0.022)
Entrep. rate dist. neighbors						
Male	0.103***	0.101***	0.093***	0.020	0.038**	0.016
	(0.026)	(0.025)	(0.023)	(0.017)	(0.017)	(0.015)
Female	0.072	0.037	0.056	0.137**	0.018	0.110**
	(0.077)	(0.074)	(0.069)	(0.056)	(0.048)	(0.050)
Entrep. rate close family						
Male	0.061***	0.039***	0.059***	0.021***	0.015***	0.020***
	(0.004)	(0.003)	(0.003)	(0.003)	(0.002)	(0.002)
Female	0.043***	0.038***	0.041***	0.044***	0.032***	0.042***
	(0.007)	(0.006)	(0.006)	(0.006)	(0.006)	(0.005)
Entrep. rate dist. family						
Male	0.032***	0.023***	0.032***	0.006	0.010**	0.002
	(0.005)	(0.004)	(0.005)	(0.004)	(0.003)	(0.006)
Female	0.000	0.013*	0.002	0.015*	0.008	0.005
	(0.009)	(0.007)	(0.008)	(0.008)	(0.006)	(0.015)
Entrep. rate schoolmates						
Male	0.238**	0.256***	0.250***	0.082*	0.094*	0.077*
	(0.086)	(0.091)	(0.074)	(0.049)	(0.053)	(0.042)
Female	0.264	0.325*	0.272	0.427***	0.341**	0.500***
	(0.186)	(0.185)	(0.167)	(0.155)	(0.158)	(0.136)
Mean outcome	0.120	0.120	0.105	0.065	0.065	0.056
Overidentifying restrictions test (Sargan Chi-square (2))	2.610 [p = 0.2712]	2.334 [p = 0.3113]	4.061 [0.1313]	1.456 [p = 0.4829]	1.791 [p = 0.4084]	2.030 [p = 0.3624]
Excluded instruments male schoolmates						
F partial	51.96	48.07	61.27	19.57	16.57	23.53
F conditional	70.07	64.68	82.23	23.59	21.56	26.34
Excluded instruments female schoolmates						
F partial	7.89	8.32	8.74	16.85	15.62	20.20
F conditional	10.80	11.35	12.00	22.86	21.37	26.88
Number of observations (N)	111,062	110,961	133,674	98,169	98,062	119,572

Note: All regressions include indicator variables for age-at-graduation (12 categories), graduation school (1166 categories), education type/level (219 categories), travel-to-work area by graduation (460 categories), and origin-region for first- and second generation immigrants (5 categories). The models in columns I, II, IV, and V also contain 88 industry dummy variables. The number of observations is reduced for these models, as we can only use observations for which an industry has been revealed through employment and/or entrepreneurship. Standard errors are computed with a two-way cluster on neighborhood (close neighbors) and schoolmate/co-student peer group. *(**)(***) indicate statistical significance at the 10(5)(1) % levels.

relative influences of gender and closeness – is similar regardless of when we record entrepreneurship outcomes. The second is a tendency for the estimated peer effects to grow as we move further away from the graduation year. This is as expected, as the magnitude of the average outcome also increases considerably with time since graduation; confer Fig. 3, panel (b).

Table 7
Alternative and more restrictive definitions of entrepreneurship as outcome. Second stage 2SLS results (standard errors in parentheses). Dependent variable = Own entrep. within five years after graduation.

	Men			Women		
	I Main activity only	II Main activity and self-employment	III New firm only	IV Main activity only	V Main activity and self-employment	VI New firm only
Entrep. rate close neighbors						
Male	0.050***	0.148***	0.087***	0.018**	0.039***	0.037***
	(0.010)	(0.013)	(0.011)	(0.007)	(0.009)	(0.008)
Female	0.002	0.017	0.009	0.022	0.002	0.003
	(0.022)	(0.027)	(0.024)	(0.018)	(0.021)	(0.018)
Entrep. rate dist. neighbors						
Male	0.023	0.100***	0.066***	−0.007	0.017	0.003
	(0.017)	(0.021)	(0.018)	(0.012)	(0.014)	(0.0003)
Female	0.104**	0.032	0.039	0.068*	0.070	0.027
	(0.052)	(0.065)	(0.056)	(0.037)	(0.048)	(0.005)
Entrep. rate close family						
Male	0.045***	0.042***	0.039***	0.013***	0.016***	0.010***
	(0.003)	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)
Female	0.028***	0.034***	0.030***	0.025***	0.033***	0.027***
	(0.005)	(0.006)	(0.005)	(0.004)	(0.005)	(0.004)
Entrep. rate dist. family						
Male	0.019***	0.026***	0.023***	0.003	0.006*	0.003
	(0.003)	(0.004)	(0.004)	(0.003)	(0.003)	(0.003)
Female	0.011*	0.001	0.006	0.004	0.010	0.005
	(0.006)	(0.007)	(0.007)	(0.005)	(0.007)	(0.005)
Entrep. rate schoolmates						
Male	0.194***	0.224**	0.184***	0.003	0.052	0.035
	(0.058)	(0.070)	(0.062)	(0.034)	(0.038)	(0.033)
Female	0.186	0.237	0.161	0.302***	0.471***	0.296**
	(0.123)	(0.153)	(0.138)	(0.105)	(0.127)	(0.107)
Mean outcome	0.060	0.092	0.065	0.032	0.050	0.034
Overidentifying restrictions test (Sargan Chi-square (2))	0.309 [p = 0.857]	5.828* [p = 0.054]	3.689 [0.158]	1.146 [p = 0.564]	3.277 [p = 0.194]	0.729 [p = 0.695]
Excluded instruments male schoolmates						
F partial	62.62	62.62	62.62	23.58	23.58	23.58
F conditional	84.42	84.42	84.42	26.22	26.22	26.22
Excluded instruments female schoolmates						
F partial	8.70	8.70	8.70	21.01	21.01	21.01
F conditional	11.86	11.86	11.86	27.83	27.83	27.83
Number of observations (N)	133,714	133,714	133,714	119,585	119,585	119,585

Note: All regressions include indicator variables for age-at-graduation (12 categories), graduation school (1166 categories), education type/level (219 categories), travel-to-work area by graduation (460 categories), and origin-region for first- and second generation immigrants (5 categories). Standard errors are computed with a two-way cluster on neighborhood (close neighbors) and schoolmate/co-student peer group. *(**)(***) indicate statistical significance at the 10(5)(1) % levels.

6. Conclusion

The starting point of this paper was that large gender gaps tend to prevail in entrepreneurship rates, despite increased gender equality in labor market participation patterns more generally. Attempts to explain the gender gap by means of observed individual characteristics, such as education, occupation, or industry, have indicated that a considerable gender

gap remains unaccounted for. In this paper, we have examined the empirical relevance of an additional explanation, namely that the gender gap is preserved through the influences of gender-specific networks and peer effects.

Based on administrative registers from Norway, we have indeed found that early career entrepreneurship is strongly affected by existing entrepreneurship activities among family members, neighbors, and schoolmates. We have also found that these influences are heavily gendered, in the sense that men are more influenced by other men and women are more influenced by other women. Since existing entrepreneurship rates are much higher for men than for women, this mechanism represents an important source of gender gap persistence. Females are underrepresented in entrepreneurship today partly because they were underrepresented in the past. Assuming (counterfactually) that male and female peer-groups and (older) family members had exactly the same entrepreneurship rates (equal to the average of the two observed gender-specific rates), our model predicts that the gender gap in early career entrepreneurship would have been cut by 52% (with a 90% confidence interval ranging from 21 to 81%).

Although we will argue that the analysis in this paper convincingly establishes the existence of gendered peer influences, a potential limitation is that we cannot disentangle endogenous social interactions from contextual peer effects (Manski, 1993). While the former (endogenous interactions) represents a situation where some individuals are influenced by other individuals' actual entrepreneurship behavior, the latter (contextual effects) represents a situation where individuals are influenced directly by the characteristics that caused these other persons' behavior in the first place. This distinction may be important from a policy perspective, since endogenous interactions imply the existence of direct knock-on effects in entrepreneurship propensity, while contextual peer effects do not. In practice, the distinction between these two mechanisms is blurred, as a person's own entrepreneurship experiences most likely feed into own preferences and attitudes, which again become the source of additional contextual peer effects. Hence, we interpret the evidence in this paper as suggestive of a considerable social multiplier: Raising the number of female entrepreneurs "now" will make entrepreneurship more tempting and/or more feasible for other women in the future. It should also be noted that the peer groups identified in this paper are imperfect proxies for actual social networks. Hence, our assessment of the overall explanatory power of peer effects in explaining the gender gap is likely to underestimate their true influence.

Appendix A.

Table A1
Correlation matrix for peer variables.

		Close neighbors		Distant neighbors		Close family		Distant family		Schoolmates	
		Men	Women	Men	Women	Men	Women	Men	Women	Men	Women
Close neighbors	Men	1.00									
	Women	0.36	1.00								
Distant neighbors	Men	0.54	0.25	1.00							
	Women	0.31	0.34	0.55	1.00						
Close family	Men	0.12	0.06	0.10	0.06	1.00					
	Women	0.05	0.04	0.04	0.04	0.07	1.00				
Distant family	Men	0.08	0.04	0.08	0.04	0.10	0.04	1.00			
	Women	0.03	0.03	0.03	0.03	0.04	0.04	0.05	1.00		
Schoolmates	Men	0.02	0.04	0.01	0.06	0.03	0.02	0.01	0.01	1.00	
	Women	0.00	0.03	−0.01	0.05	0.01	0.02	0.00	0.00	0.45	1.00

Table A2
Estimated peer effects (standard errors in parentheses). Second stage 2SLS and second stage logit. Dependent variable = Own entrepreneurship within five years after graduation.

	Men		Women	
	I 2SLS Coefficient estimate	II IV-Logit Average marginal effect	III 2SLS Coefficient estimate	IV IV-Logit Average marginal effect
Entrep. rate close neighbors				
Male	0.150***	0.129***	0.040***	0.039***
	(0.011)	(0.014)	(0.009)	(0.009)
Female	0.021	0.018	0.025	0.016
	(0.027)	(0.029)	(0.021)	(0.020)

Table A2 (*Continued*)

	Men		Women	
	I 2SLS Coefficient estimate	II IV-Logit Average marginal effect	III 2SLS Coefficient estimate	IV IV-Logit Average marginal effect
Entrep. rate dist. neighbors				
Male	0.079***	0.079***	0.009	0.020
	(0.019)	(0.018)	(0.015)	(0.015)
Female	0.063	0.050	0.107**	0.068
	(0.058)	(0.055)	(0.044)	(0.042)
Entrep. rate close family				
Male	0.060***	0.050***	0.020***	0.016***
	(0.003)	(0.002)	(0.002)	(0.002)
Female	0.040***	0.032***	0.043***	0.029***
	(0.006)	(0.004)	(0.004)	(0.003)
Entrep. rate dist. family				
Male	0.031***	0.027***	0.007	0.006*
	(0.004)	(0.004)	(0.003)	(0.003)
Female	0.003	0.003	0.014**	0.011**
	(0.008)	(0.008)	(0.006)	(0.005)
Entrep. rate schoolmates				
Male	0.328***	0.344***	0.071**	0.069**
	(0.062)	(0.061)	(0.035)	(0.035)
Female	0.279**	0.258*	0.551***	0.488***
	(0.120)	(0.116)	(0.083)	(0.078)

Note: The estimates in this table are based on the model reported in Table 3, but without school fixed effects and with the travel-to-work area by graduation-semester fixed effects replaced by separate dummy variables for travel-to-work area and graduation semester. The average marginal effects reported in Columns II and IV are based on a logit model with a linear first step (as in the 2SLS model). Standard errors are not adjusted for the first step estimation. *(**)(***) indicate statistical significance at the 10(5)(1) % levels.

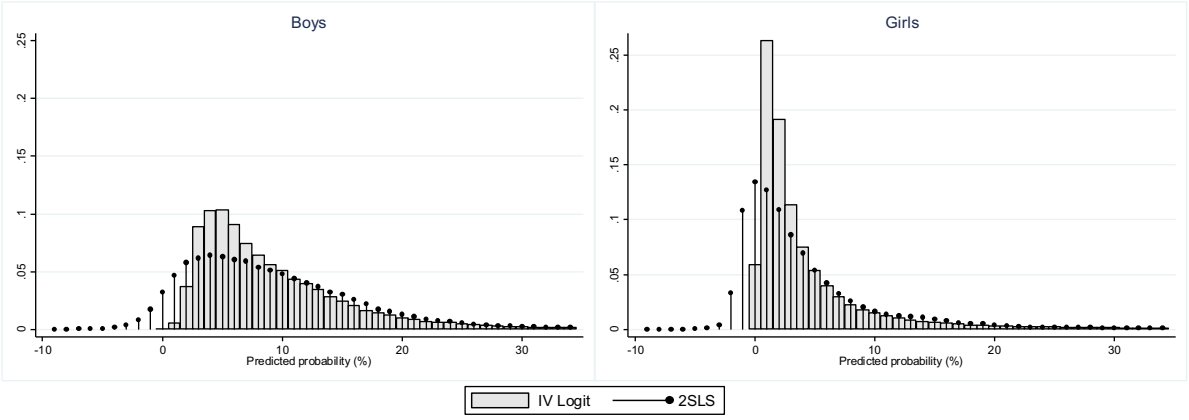

Fig. A1. The distribution of predicted entrepreneurship probabilities based on the simplified model reported in Table A2.

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