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Socially-Embedded Investments: Explaining Gender Differences in Job-Specific Skills

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ABSTRACT

Gender-differences in post-schooling skill investments play a central role in stratification processes. Yet little research has been devoted to explaining how these differences come about. This paper helps to fill this gap by proposing and testing a job-investment model with social-interaction effects that melds substantive ideas of sociology and economics. Firms use strategic compensation profiles in order to protect their job-specific skill investments and this shifts the weight of the investment decision to the supply side. Employees consider the tenure-reward profiles of different job-specific investment options and chose rationally on the basis of their expected survival probabilities in each of them. Given uncertainty, actors are likely to inform their job-survival expectations by observing their social context. Three different forms of social influence are distinguished: social-learning, social norms and role identification. It is further argued that social influences on job-survival expectations can be identified empirically by blocking individuals' work and family preferences. Several hypotheses are derived and tested to a subsample of approximately 2,700 young single wage-earners nested in 261 different European regions and 24 different European countries. Results show that young women's job-investment decisions are significantly correlated with 1) the social visibility of women in highly specialized jobs in the preceding generation; 2) the proportion of men who do housework in their potential marriage markets, and 3) the existing fertility norms.

KEYWORDS: Gender; Job-Specific Investments; Social Interactions; Strategic Compensation; Social Learning; Social Norms; Role Identification; Prefrences; European Social Survey

JEL CODES: D8; D13 J10; J16; J22; J24; M52; M53; Z10; Z13

"*The study of the labor market is divided by theory rather than by discipline*"

Aage Sorensen (1990:312)

1. INTRODUCTION[1]

Throughout much of the twentieth century, neoclassic models in economics have depicted actors as atomized utility-maximizing individuals operating largely in isolation from their social context —or more accurately, from any social context other than the market (Manski 2000:118). Sociologists have always opposed this "undersocialized" conception of human action since nothing seems more alien to sociological thinking than individuals deprived of social relations. The central tenet in economic sociology is that micro-level economic behavior is embedded in —and hence influenced by— the social structure (see e.g. Granovetter 1985; 2005). This idea has for long marked a clear point of departure between sociology and economics.

In recent times, however, the undersocialized conception of economic action has also become increasingly questioned by scholars from within the very ranks of mainstream economics. As the scope of the economic discipline broadened, a number of contributions have sought to incorporate social interactions, social norms and the effect of culture into the study of economic behavior (see e.g. Akerloff 1997; Akerloff and Kranton 2000; Bisin and Verdier 2000; Durlauf 2001; Manski 2000; Fernandez 2007; Fernandez and Fogli 2009; Fogli and Veldkamp 2007; Guiso, Sapienza and Zingales 2006). Durlauf (2001:49) has been particularly explicit in defining the overall objective of this enterprise as one of "melding [...] substantive ideas of economics and sociology in such a way as to produce more powerful models of social behavior".

This unprecedented rapprochement from economics to sociology mirrors earlier theoretical approximations made from the sociological camp (see, in particular, Coleman 1964; 1986; 1988; 1990; for a review see Winship and Rosen 1988; Swedberg 1990). The connection between social-interaction models in economics and the core principles of

analytical sociology is apparent (see e.g.: Hedström and Swedberg 1998; Hedström and Bearman 2009). As a result of both of these converging theoretical shifts, the emergence of a reunified socio-economic framework for the study of social-interactions seems at hand — possibly for the first time in a century (Durlauf 2001).

The main goal of this paper is to contribute to this emerging interdisciplinary enterprise by addressing what seems to be a central, and yet largely unexplored, question in the gender stratification literature, namely that of the social "embeddedness" of job-specific investments.

Although there is substantive body of literature investigating social influences on educational attainment both in sociology (see e.g. Brooks-Gunn et al. 1993; Crane 1991; DeLuca and Dayton 2009; Sampson, Morenoff and Earls 1999) and in economics (see e.g. Datcher 1982; Katz, Kling and Liebman 2001; Zax and Reese 2002), very little research has been actually devoted to analyzing social influences on post-schooling skill investments, least of all from a gender stratification perspective —for a review of policy and welfare-regime effects on women's employment see van der Lippe and van Dijk (2002). The dearth of theorizing and empirical research on gender-differences in post-schooling skill acquisition constitutes a somewhat striking gap in the gender stratification literature given the central role that post-schooling skill investments play in producing gender inequality.

Despite the rather impressive gains in women's educational attainment achieved in the last few decades throughout the industrialized world (see e.g. Breen et al. 2010; Buchmann, DiPrete and McDaniel 2008), today female workers continue to be overrepresented in jobs that offer comparatively fewer opportunities for skill-advancement (Estevez-Abe 2005; Felstead et al. 2007, chap.3; Royalty 1996; Tomaskovic-Devey and Skaggs 2002). This turns out to be extremely consequential for wage attainment processes. Gender differences in the skills that are effectively learnt and employed in the job —in what follows, job-specific skills— seem to account for a significant part of the gender wage gap (see e.g. Macpherson and Hirsch 1995; Manning and Swaffield 2008; Polavieja 2005). According to several estimations, these differences in job-specific skills could explain most of the statistical effect of occupational sex-composition on earnings (Tam 1997; Tomaskovic-Devey and Skaggs 2002; Polavieja 2008; 2009). In sum, there is mounting evidence that job-specific

skills are a powerful predictor of sex-differences in rewards amongst workers of similar age, experience and schooling and yet we still know very little about the processes leading to such differences. Why are women less likely to acquire job-specific skills than men of similar characteristics?

In this paper I argue that the processes responsible for the observed gender differences in job-specific skills are processes of social interaction. That is, they involve purposive individual actions (operating at the micro-level) that are themselves influenced by the social structure in which individuals are embedded —i.e. by the actions and the outcomes experienced by other actors. The main contribution of this paper is to link social-contextual effects to individual investment choices by connecting substantive ideas of economics and sociology. My argument rests on the following five theoretical propositions: 1) job-specific investments create contractual hazard for both employers and employees; 2) in order to minimize contractual hazard firms can either draw on statistical discrimination or on strategic compensation, yet the latter option is a more efficient strategy as it forces employees to act on their private information when pondering different investment paths; 3) strategic compensation profiles defer wage-gains to the end of the employment career and this makes rational job-investment decision on the supply side highly dependent on job-survival expectations; 4) in a context of uncertainty, individuals assess their own job-survival expectations by observing their social context and this is how the social structure enters in the individual investment decision; 5) social influences on job-survival expectations can affect women's job investments even when their schooling levels, their preferences and their tastes converge with men's. Such social influences net of preferences capture the structural properties of the gendered system.

The rest of the paper is divided as follows. First, I place the theoretical contribution of this paper in the larger context of the sociological literature. I argue that this model can help to bridge the existing gap between human capital and socio-cultural explanations of gender differences in allocation and pay. Next I outline a working theoretical framework for the study of gender-differences in job-specific investments. I start by defining job-specific skills, then I discuss employers and employees investment strategies in a context of uncertainty and, finally, I define social-interaction effects by distinguishing between social-learning, role identification and social norms. I argue that social-learning and —what,

following Elster (1989:Chap. XII), I call— the external component of social norms can affect rational job-survival expectations, whereas my definition of role identification and internalized norms exert their influence on individuals' preferences and tastes. Social influences on rational job-survival expectations are labeled *cold* effects, following Hedström (1998). I argue that *cold* effects are particularly important channels for the reproduction of gender inequality as they can operate in the face of preference convergence between the genders. I further argue that *cold* effects can be identified empirically by blocking individuals' preferences and tastes. These are the building-blocks of the theoretical model. Section 4 presents three different testable hypotheses on the association between the social context and job-specific investment and discusses the methodology applied to contrast them. These hypotheses concern 1) learning from peers in the past, 2) learning from relevant others in the present and 3) the effect of social norms. Section 5 presents the data and the model specification, Section 6 reviews the empirical findings and Section 7 concludes.

2. PREVIOUS LITERATURE

Several papers in economics have applied Bayesian learning to the analysis of gender differences in labor-market outcomes. Fernandez (2007), Fernandez and Fogli (2007) and Fogli and Veldkamp (2008) investigate the effect of social learning from previous generations on women's supply of labor, whilst Breen and Garcia-Penalosa (2002) develop a Bayesian-learning model for the analysis of occupational gender segregation. The latter paper has a clear connection to the present study. In Breen and Garcia-Penalosa's model, each generation learns about their own possibility of occupational success by drawing on the experiences of the previous cohorts. Occupational segregation in one generation produces biased beliefs about the role that agents' own effort plays in determining a successful career in the next generation. This results in lower levels of occupational integration than would otherwise occur if women had perfect information about the determinants of their occupational success. Breen and Garcia-Penalosa's provide a social-interaction explanation of the persistence of gender segregation that focuses on the supply-side. Theirs is, however, a purely theoretical model.

Studies of social influences on sex-specific labor-market outcomes are particularly scant in the sociological literature. An exception is found in Cotter *et al.*'s empirical analysis of the effect of macro-level occupational integration on individual-level earnings (see: Cotter *et al.* 1997). Integration is calculated at the level of metropolitan area, which is interpreted as reflecting the conditions of local labor markets. The authors find a very strong effect of occupational integration in local labor markets on individual earnings net of a host of metropolitan area controls. They show that all men benefit from segregated markets, whilst all women benefit from greater integration, including those in predominately female occupations. Cotter and his colleagues argue that the benefits of macro-level integration are transmitted to the individual level through occupational de-crowding, changes in people's "expectations" induced by the increasing visibility of women in previously male-dominated occupations and the raise in women's managerial power —supposedly leading to more egalitarian promotion decisions within firms (Cotter et al. 1997:715). Yet the authors cannot test these paths empirically and are forced to conclude that "for whatever reason, all women benefit from occupational integration" (Cotter *et al.* 1997:729).

The present study builds on this incipient literature and expands it in the following directions. First, I focus on how social influences affect job-specific investment decisions. Job-specific skills are directly linked to individual earnings and constitute a crucial determinant of vertical segregation. Secondly, I consider not only learning from the past, but also learning from significant others as well as the effect of social norms as two further forms of social influence; Third, I provide a detailed theoretical account of the mechanisms through which these sources of social influence affect job-specific investment decisions; and, finally, I test the model empirically using multilevel data.

2.1. Social-interaction models as a bridge in the gender-stratification literature

By stressing the role of contextual influences on investment decisions, the model proposed in this paper can also help to bridge the existing theoretical divide that has for long separated the sociological literature on gender stratification into two main competing views: human-capital models and socio-cultural approaches (for a review see e.g. Reskin 1993; Reskin and Bielby 2005; Polavieja 2008).

The main thrust of human capital theory is the assertion that women face higher opportunity costs for investing in specialized training (see, e.g., Becker 1981; 1985; Goldin and Polachek 1987; Mincer and Polachek 1974; Polachek 1981; Zellner 1975). Faced with these costs, women will rationally choose jobs that require lower specific investments but produce lower returns to seniority. In a seminal paper, Tam (1997) showed that the impact of occupational sex-composition on wages disappeared entirely once information on the average length of specific training required in respondents' occupations was introduced in the wage equations together with industry dummies. He interpreted this finding as supportive of the standard human capital explanation but fully at odds with the so-called cultural devaluation theory, according to which female-dominated occupations are socially under-valued and hence poorly paid (for a discussion see England et al. 2000; Tam 2000; Tomaskovic-Devey and Skaggs 2002; Polavieja 2008).

Socio-cultural explanations tend to question the undersocialized conception of human behavior that lies at the heart of most human capital approaches, and which leads to what Tomaskovic-Devey and Skaggs (2002:123) have called the "*typical human capital imagery of voluntary investment strategies*". According to socio-cultural models, gender differences in job-allocation and earnings are ultimately the product of socialization processes that transmit sex-specific values, norms, orientations and stereotypes regarding men and women's roles in society (see e.g. Corcoran et al. 1984; England 1982; 1984; England et al. 1988; 2000; Marini 1989; Marini et al. 1996. For a review see Cohen and Huffman 2003). These values and stereotypes are carried over into the labor market by employers and employees alike, producing biased assessments regarding men and women's respective levels of ability and occupational competence. Biased assessments would lead in turn to sex-differences in job-allocation, training, promotion and pay (see, e.g. Corell 2001; Corell et al. 2007; Crompton and Harris 1997, 1998; England et al. 1994, 2000; Lovaglia et al. 1998; Ridgeway 2004; Shu and Marini 1998). Socio-cultural theories tend to view the process of status categorization leading to gender-biased evaluations as an expression of patriarchy, which is a form of male domination reproduced through socialization and interactional processes[2] (see: Ridgeway 1997; Ridgeway and Erickson 2000).

Sociological theories of action have been criticized for being notably weak in explaining the actual processes involved in the formation of people's beliefs (Boudon 1996). It has been argued that the theories of socialization and norm internalization are rather vague when it comes to specifying the actual mechanisms involved in the transmission/acquisition of values, tastes and orientations (see Breen 1999) as well as the interplay between cognitive processes and social interactions (see Reskin 2003; Ridgeway 1997; Ridgeway and Erickson 2000). On the other hand, human capital approaches depict agents largely as atomized individuals operating in isolation from their social contexts and treat preference heterogeneity as exogenous to the model.

My approach can help to complement both human capital and socio-cultural theories, as well as to conciliate these seemingly opposing approaches, by emphasizing the socially-embedded nature of job investments[3]. As in the economic literature, my theoretical model emphasizes the importance of cost-benefit calculations at the micro-level and claims that perceived opportunity costs can in effect hinder women's investments in the job (see, e.g., Becker 1981; 1985; Goldin and Polachek 1987; Mincer and Polachek 1974; Polachek 1981; see also Chiswick 2003; Erosa, Fuster and Restuccia 2005). Yet, in line with the sociological literature, I am particularly concerned with the social construction of expectations and preferences through interactional processes (see Ridgeway 1997; Ridgeway and Smith-Lovin 1999; Ridgeway and Correll 2004; Cohen and Huffman 2003; Polavieja 2008). The analytical emphasis of this paper is on *how* social structures at the macro-level affect individuals' behavior at the micro-level, that is, on the socially embedded nature of economic behavior. I therefore focus on what Coleman (1986) defined as situational mechanisms. The model offers new insights on interactional processes by identifying and testing different channels of social influence on post-schooling skill-investments. This is an innovative approach that can further our understanding of gender differences in labor-market rewards.

3. JOB-SPECIFIC INVESTMENTS AND THE SOCIAL CONTEXT

Job-specific skills (JSKs) capture the knowledge needed to perform the tasks that define a given job and which workers do not posses prior to entering the employment relation. JSKs are therefore directly linked to job complexity. From this standpoint, jobs can be

viewed as "skill-packages" or "training slots" (as in Thurow 1975). In other words, jobs can be defined by their specific skill content. This means that when workers are matched to different jobs they are actually placed in different skill-investment paths. High JSK-investment paths often take the form of a job ladder where the bulk of JSK investments is concentrated on the first slots and job-complexity increases as workers move up.

In accordance with new training models in economics, my definition of JSK encompasses all the new skills that are learnt in the job including both firm-specific and transferable skills[4]. JSKs can be acquired through both formal and informal training schemes provided by the firm, or simply via learning-by-doing. In all cases, learning JSKs is costly for both workers and their firms and constitutes and important source of contractual hazard. The right to manage gives employers the benefit to act as primary movers.

3.1. Employers decisions: discrimination or strategic compensation

Firms face contractual hazard because if, after been trained in JSKs, workers leave the firm, employers will have to incur training costs again. Moreover, since new workers typically learn specific skills from their previously trained peers, losing workers with JSK provokes a loss of productivity at lower levels of the job hierarchy (Hassink and Russo 2010). Workers' skill interdependence thus amplifies the costs of losing trained employees for firms. In order to minimize this skill-related risk, rational employers need to foretell employees' future performance. To this end, they can either draw on statistical discrimination (SD) or on incentive-compatible compensation design[5] (CD). The former option consists of inferring the future performance of a given worker by observing the aggregate outcomes of all workers with whom s/he shares a particular ascriptive characteristic that is considered relevant by the employer —typically, gender or race (see Arrow 1973; Cain 1986; Norman 2003). SD is thus a form of social learning involving aggregate information by which employers aim to safeguard their investments in JSKs by forecasting the "quality" of their employees (Manski 2000). As other forms of social-learning, SD can produce biased assessments about workers' future performance. Forecasting on the average can be both costly and inefficient. Given its discriminatory nature, it is also often illegal.

A more efficient strategy for employers is to shift the investment decision to workers themselves and to force them to act on their own private information. This can be achieved via strategic compensation. SC is an alternative means to safeguard employers' investments in JSKs using the incentive properties of the reward structure. Both economists (see e.g. Lazear 1995, chap. IV; Lazear and Rosen 1990; Williamson 1985:240-72) and sociologists (see e.g. Breen 1997; Goldthorpe 2000:206-29; Sorensen 1994; 2000; Polavieja, 2005; 2008; 2009) have argued that the use of steep tenure-earning profiles provides a solution to contractual hazard problems generated by skill specificity and monitoring costs. The optimum incentive-compatible compensation scheme is one where workers receive below-productivity wages at the beginning of the employment relation — which is when most of JSK training takes place— in exchange for above-productivity wages at the end (Lazear 1995). Strategic compensation schemes of this kind increase the costs of job-quitting for workers, whilst at the same time reducing their incentives to shirk. In so doing, they minimize contractual hazard (see Lazear 1995:239-42; Sorensen 1994).

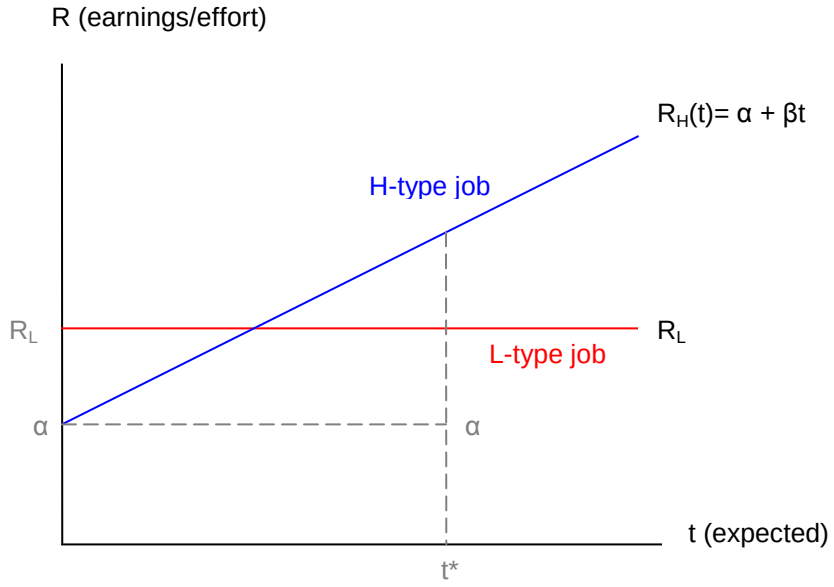
Tilted compensation liberates employers from the costs of statistical forecasting and, I would argue, should produce better job-matches than SD. This is because, by shifting the weight of the investment decision to job incumbents themselves, SC capitalizes on employees' private information, whereas SD must rely on inferences from the social average. There is ample evidence that deferred compensation schemes are widely used in employment relations characterized by high specific skill investments (see e.g. Topel 1991 and Buchinsky *et al.* 2010 for the US; Barth 1997 for Norway; Dustmann and Meghir 2005, Pischke 2001 and Zwick 2009 for Germany; Bayo-Moriones et al. 2010 and Polavieja 2005 for Spain).

2.2. Supply-side investment decisions

For simplicity, let us assume that there are only two types of jobs in the economy: jobs that require no (or very low) skill investments (L) and jobs that require high skill investments (H). In the former type, individuals are employed to use their general pre-market skills acquired through schooling, whilst in the latter type employees are trained to learn new skills that are specific to the job —although not necessarily to the firm. Training in H-type jobs can be formal or informal. In all instances learning new skills requires some amount of

effort. Skill-related effort will decrease over time as individuals acquire JSKs. The expected returns over effort for these two types of jobs are represented graphically in figure 1.

Figure 1. Compensation Profiles over Tenure for High-Specialization (H) and Low-Specialization (L) Investment Paths Represented as Job Types



Individual *i* will choose job H over job L if his/her expected returns (defined as monetary gains over exerted effort) in job H (R_H) are greater than his/her expected returns in job L (R_L). Individuals calculate expected returns on the basis of the observed tenure-earnings profiles of each type of job and their expected job-survival probability in the firm or expected tenure (t). For ease of exposition, we assume that returns over tenure in L jobs are 0, whilst returns over tenure in job H increase at a constant rate (β). Formally, individual *i* will choose job H if:

$$t \cdot R_L < t \cdot \alpha + \tfrac{1}{2}\beta t^2 \qquad [1]$$

where each side of expression [1] is the reward profile of each type of job as defined by the areas shown in figure 1.[6] It is now easy to demonstrate that rational individuals will only

choose job H if their expected probability of survival in the job (t) exceeds value t^*, as in any value below t^* returns over tenure will be greater in job L. Formally, individuals will choose H over L if $t>t^*$, where:[7]

$$t^*=2(R_L-\alpha)/\beta \qquad [2]$$

By deferring the returns to early investments in JSK, firms make employees' investment choices highly dependent on their expected duration in the firm. Those workers prone to shirk will now be put off by the reward structure since the probability of being caught shirking increases with time of service. Similarly discouraged will be those who plan job interruptions for they will also be unable to reap the benefits of their job-specific investments if they leave the firm too soon —i.e. at $t<t^*$. The power of strategic compensation lies in making this private information relevant for the investment decision.

Yet SC may also dispirit those who, not having any intention to underperform nor to interrupt their employment careers, might nevertheless feel it is likely that they might eventually experience any of such risks. When employers use compensation profiles strategically, questions of the type "will I last in the firm?" or "will I perform well in the job?" will dominate workers' investment decisions. Job-performance and job-disruption expectations will be crucially affected by the anticipation of childbearing, housework and family obligations, which fall disproportionally on women's shoulders (see e.g. Evertsson and Nermo 2004; Fuwa 2004; Hersch and Stratton 2002; Hsueh and Tienda 1996; Maume 2006).

In a context of uncertainty these expectations —which are ultimately expectations about the probability of job-survival— are likely to be crucially affected by the social context in which individuals are embedded. By strengthening the role of self-forecasting in the decision-making process, strategic compensation redirects social influences to the supply-side. This means that the impact of tilted compensation schemes is not gender-neutral —even if employers were. This is a central idea of this model.

3.3. Social interactions and job-specific investments

Individual agents are "decision-makers endowed with preferences, forming expectations and facing constraints" (Manski 2000:118). Interaction occurs because the actions chosen by a given agent are influenced by the actions chosen by others. Social influences can operate either by imposing constraints on the agent's available choice set, by influencing her expectations and/or by shaping her preferences. It is assumed that present-day women face the same job-investment choice-sets as men[8], but I posit that their job-survival expectation and their preferences and tastes can differ markedly depending on their social context. I further contend that social effects on expectations capture the *structural* properties of any stratified social system —i.e. the influence that the social structure has on all rational agents, regardless of their preferences and tastes. Following Hedström (1998), I call these influences *cold* effects.

I now turn to discuss three possible channels of social influence on JSK investments on the supply side: social learning, role-identification and social norms.

Social learning

Social learning is the process whereby agents form expectations by drawing lessons from observation of the actions chosen by others (Breen 1999; Manski 2000:119). As outlined above, JSK investments will be particularly affected by expectations about job performance and job-survival risks —note that the latter actually encompasses the former since, in the context of strategic compensation schemes, underperformance only affects economic pay-offs insofar as it increases the odds of involuntary job-termination.

Research by cognitive psychologists shows that a person's sex is the first category that people sort self and others into in relational contexts (Brewer and Lui 1989 in Reskin and Bielby 2005:72; Ridgeway and Correll 2004:514). Women will therefore be likely to observe other women's experiences as a means to assess their own chances of success in different investment paths. This is a purely rational strategy under uncertainty. Social learning has

been typically modeled as a process whereby the members of a given cohort extract information from preceding generations according to a given information-updating rule that is specified by the theory[9]. This is social learning from the past.

Yet, when assessing their own risks of job disruption, individuals might also draw on the observation of the experiences of a given reference group at the present. Note also that reference groups need not be made of peers. In fact, often the behavior of non-peers can convey very relevant information for actors. Still today, the main cause of job-disruptions and reduced work supply for women is the unequal distribution of family responsibilities and domestic work inside households (see e.g. Cunningham 2008; Evertsson and Nermo 2004; Fuwa 2004; Han and Moen 1999; Hersch and Stratton 2002; Maume 2006). Men's domestic/family behavior could thus be highly consequential for women's investment decisions, insofar as it affects their job-disruption and job-performance expectations —i.e. their expectations regarding job-survival probabilities (t). This would be a prototypical case where individuals learn from the actions of *relevant others*. In sum, social learning might involve observing the actions of both peers and non-peers, both at present or in the past. In all instances, however, social learning refers to the process whereby a given individual agent informs his/her goal-oriented expectations by observing his/her social context (see more precise working hypotheses in section 3).

Role identification

Social-learning concerns contextual effects on expectations. But macro-level distributions may also affect individuals' preferences by providing behavioral examples that stimulate positive identification —i.e. the intrinsic psychological desire to behave as others (Durlauf 2004). I use the term role identification to define only this latter type of social-effect on individuals' subjective preferences, aspirations and tastes —somewhat restricting the classical sociological definition of role modeling (see Merton and Rossi 1950). This is deliberately a *thin* definition that only taps on social influences on non-goal-oriented subjective identification.

Social Norms

Norms are shared ideas about the proper way to behave (Granovetter 2005:34). When norms are internalized by individuals they become part of their preferences (see Akerlof and Kranton 2000). As other preferences, internalized norms may be captured via standard attitudinal survey research. But social norms have also an *external* component, that is they can affect agents' behavior even when they are not internalized (Elster 1989, chap. XII). This is because existing social norms convey consequential information about the probability of social sanctions (rewards) and hence the costs (benefits) of each given route of action. In other words, the external component of social norms can affect job-investment expectation even when norms are not internalized. Regardless of their own preferences, individuals might consider these costs (benefits) when making their investment decisions.

The distinction between social effects on expectations (be it via social learning or through the external component of norms) and social effects on preferences (via role-identification or internalized norms) bears great theoretical importance. By distinguishing between these two different channels of social influence, I am actually positing that social-influences on expectations can operate even regardless of individuals' own preferences. Both social learning and what has been termed the external component of social norms would thus capture a crucial structural property of the gender system, namely, its capacity to reproduce itself even in the face of preference convergence between the genders. In contrast, role-identification and internalized norms can only affect gender inequality via the reproduction of gender preferences. Explanations of gender differences that stress the role of preferences (see e.g. Hakim 1996; 2000) tend to disregard the crucial role that the structures of gender inequality at the macro-level play in influencing rational expectations, and consequently the behavior, of women who are otherwise fully committed to their careers. These *cold* social influences are powerful mechanisms of gender inequality.

Separating out the effect of social influences on expectations from their effect on preferences thus constitutes a crucial analytical task for the identification of the structural drivers of gender-differences in JSKs —i.e. all those social influences that could operate even if all agents held gender neutral preferences. Finding evidence that the social structure

has an effect on job-investment expectations that is independent from individuals' own gender preferences poses particular methodological challenges, which are discussed in the next section.[10]

4. HYPOTHESES AND METHODOLOGY

4.1. Hypotheses

The preceding theoretical discussion allows us to formulate the following three testable hypotheses:

H1. Women can learn from the job-investment choices made by their gender peers in preceding cohorts, as these choices are likely to convey information about the feasibility of different investment options. In making their investment choices, women will extract particularly relevant information from observing what the proportion of employed women in high-JSK jobs is *relative to* the proportion of employed men in such jobs in the preceding generation. This macro-level distribution conveys information about the relative degree of *social visibility* of women working in high-JSK jobs in preceding generations and hence about the extent of gender-specific constraints. Social contexts with a small gender gap in access to high-JSK occupations should increase women's survival expectations in the next generation and, in so doing, favor their JSK investments. In contrast, contexts where there are only very few women represented in high investment occupations (relative to men) will increase the level of uncertainty regarding job-performance and job-survival probabilities and, as a result, discourage JSK investments in the following generation.

H2. It is also expected that, in informing their investment choices, agents observe the experiences of *relevant others*. The unequal distribution of domestic chores and family responsibilities places a particular burden on women. Hence women having —or expecting to have— cooperative partners should be more likely to invest in JSKs than women whose —present or prospective— partners deflect housework. When investment decisions are made before women form their own families, forecasting will be based on the macro-level

distribution of cooperative others. More precisely, it is expected that single women will consider the proportion of housework-cooperative men within their potential marriage/partnership market as a means to assess their chances of eventually partnering a cooperative spouse. The marriage market for an individual woman *i* with an education level *e* and residing in region *r*, can be defined as the pool of men living in *r* with education *e*. Women can extrapolate the probability of partnering a cooperative spouse by looking at the domestic behavior of husbands/male partners in their potential market. The greater (smaller) the chances of partnering a cooperative spouse, the higher (lower) the chances that women invest in JSK. Given the highly skewed distribution of domestic and child care responsibilities, it is not expected that men's investment decisions are influenced by the proportion of cooperative women in their marriage markets.

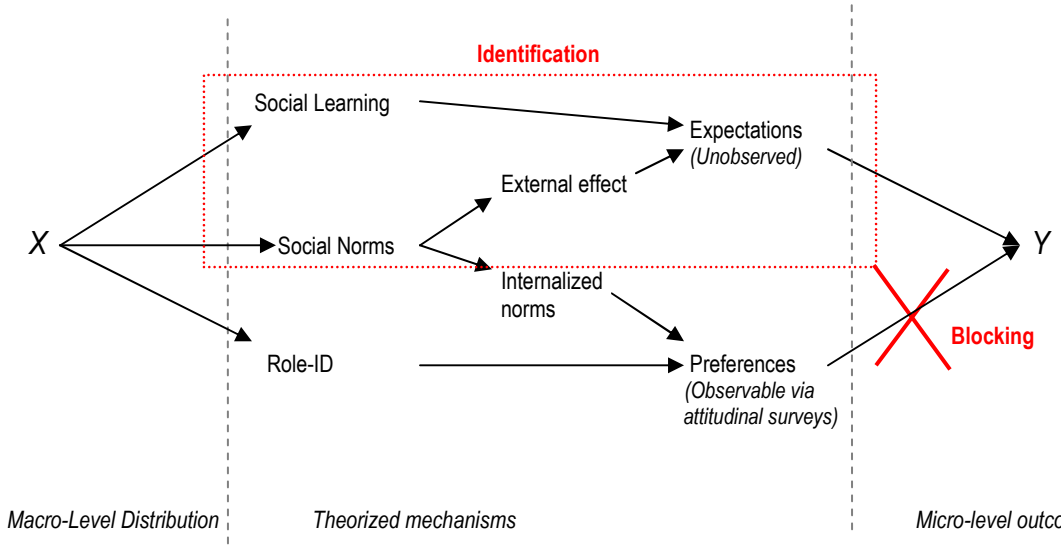
H3. Given the existing work-family trade-offs, women might anticipate that investing in JSKs will negatively affect their future fertility via an eventual reduction of disposable time and energy and, conversely, that having kids will reduce their disposable time and effort for the job (see e.g. Becker, 1991 [1981]: 54-79; Budig and England 2001; Kimura and Yasui 2007; Knowles 2009; Maume 2006; Waldfogel 1998). This is an important opportunity cost to consider when making JSK investments. It is therefore expected that JSKs investments will be less likely in high-fertility social contexts since women in such context will be likely to 1) internalize fertility norms that increase the expected opportunity costs of job-investments and/or 2) fear greater sanctions in the event of deviant fertility behavior (i.e. external normative effect).

4.2. Methodology: Identification by blocking

Identifying social influences empirically poses various methodological problems. To begin with, data on individual job-performance and job-disruption expectations is not always available. This often forces us to work with observed outcomes. But how can we estimate social effects on expectations when we only observe individual outcomes? I propose to use the following strategy. Suppose we are interested in the effect of a given macro-level distribution ($\bar{X}$) on a given individual outcome (y) and that we expect this social aggregate to have both an effect on rational expectations (either via social learning or through the anticipation of normative sanctions) as well as an effect on preferences (via role-

identification or internalized norms). If we had reliable and complete information on the individual preferences that bear on the given outcome, we could *block* role-identification and norm-internalization effects by comparing only individuals with the same preferences (i.e. by controlling for preferences in multivariate models). This is identification by blocking (IbB). IdB seeks to isolate social effects on rational expectations from social effects on preferences in the absence of information on the former, which is the typical situation researchers face (see Figure 2). Note that IbB assumes that individuals' preferences are reflected in their attitudes and hence can be captured using opinion surveys (see, however, Hakim 2003).

Figure 2. Social-Interaction Effects: Identification of Social Influences on (Unobserved) Expectations by Blocking (Observed) Preferences



5. DATA, VARIABLES AND MODEL SPECIFICATION

The existing comparative literature on gender has focused on country-level and Welfare State effects (see, e.g., Chang 2000; Estevez-Abe 2005; Mandel and Semyonov 2005; Polavieja 2009; Stier and Lewin-Epstein 2001). Yet sex-differences in labor-market behavior are also meant to differ markedly *within* countries —between, say, Sicily and Milano, Flanders and Valonia, the Basque Country and Andalusia or the Scottish Highlands

and London. Since the central concern of this study is to investigate how social structures affect individuals' belief-formation, it is important to exploit societal-level variation, whilst keeping country-level effects constant. This way we can net out the informational mechanisms discussed above from the more general institutional and policy effects operating at the national level.

I draw on the first released dataset of the second round of the European Social Survey, ESS, carried out between 2004 an 2005. The ESS constitutes a particularly well-suited dataset for the testing of social-interaction effects on JSK investments for the following reasons. First, in Europe geographical mobility of country nationals is infrequent, particularly in comparison to the US case. Low mobility across regions is an important requirement when testing social influences using cross-sectional data[11]. Secondly, the ESS incorporates sufficient within country macro-level variation so as to test for societal effects net of institutional configurations. The ESS allows us to exploit Europe's great intra-national diversity. Thirdly, the second round of the ESS includes unusually detailed information on job characteristics, including several indicators of the specific skill content of respondents' jobs. Finally, the ESS provides very complete information on individual preferences and tastes regarding both the domestic and the market spheres, which allow for identification by blocking.

The full ESS sample contains information on over 45,600 individuals residing in 24 different European countries[12]. All countries with the exception of Luxemburg and Iceland are subdivided into regional units (261 regions). Most countries are 3-4% of the total sample each. Empirical models capitalize on the cross-country and the cross-region, within-country variation offered by the ESS. The analytical sample at the individual level is restricted to country nationals between 18 and 35 years of age who have been employed for at least one year in their firms and who (still) have no dependent children nor spouses. The resulting individual-level sample contains over 2,700 observations.

Studying only young adult respondents places the analytical focus on the early stages of the employment career, which is when the bulk of post-schooling job-specific investments takes place, whilst further restricting the sample to single youngsters with no children removes various endogeneity issues that would otherwise arise (see Polavieja 2009). To be

more precise, since our sample only includes young individuals without children, the impact of fertility norms on observed job-specific investments cannot reflect the endogenous effect of respondents' realized fertility behavior. Similarly, since our sample only includes single and non-cohabiting individuals, the effect of cooperative men in the region should not be contaminated by the association between regional averages and endogenous household specialization, which would be the case if married or cohabiting respondents were included in the analysis.[13] Roughly 60 per cent of all European respondents between 18 and 35 years of age have no spouse or cohabiting partner (yet) and 70 per cent of them have no dependent children (yet).

Note that restricting the observation window to the early stages of employment career could result in the underestimation of gender differences in JSK if gender differences JSK increase over time, as it happens with earnings (see e.g. Manning and Swaffield 2008). To the extent that learning JSK is a cumulative process, greater sex-divergence over time is indeed expected[14]. Sample restriction can also reduce the statistical efficiency of our estimators due to small N and could cause selection bias if young adults without children nor partners constitute a particularly career-oriented draw of the population (see e.g. Sevilla Sanz 2010). Yet it must be noted that each and all of these potential sources of bias would work *against* the detection of our hypothesized social effects by dragging the estimates towards zero. In other words, sample restrictions will not increase the chances of finding spurious results.

Although the sample is restricted at the individual-level, all macro-level distributions for all key contextual independent variables are calculated using the full sample size. I use between 20,000 to 45,000 individual observations to compute the aggregate estimates for 261 different regions. The average number of observations per region is 364 and more than 98 per cent of respondents live in regions containing at least 40 observations. Regions containing less than 40 observations are considered unreliable and therefore have been excluded from the analysis. Again small regional sample size could bias macro-level estimates downwardly hence making it harder to detect the hypothesized social effects.

In order to isolate the macro-level effects of interest, from other regional characteristics the models include various regional controls, which are explained below. Models are estimated

both with and without controls for preference heterogeneity —i.e. with and without blocking. I expect to find significant societal-level effects on job-specific human capital investments net of differences in individuals' gender attitudes and career orientations. Such finding would constitute (indirect) evidence that the social structure can shape investment choices by influencing job-survival expectations.

5.1. Variables

In the theoretical section of the paper, job-allocation decisions have been defined as skill-investment decisions over a discrete choice between two ideal types of jobs or investment paths. Yet in practice the skill-content of a particular job includes several dimensions that can be more accurately described and measured using continuous indicators. The ESS includes the following four indicators on the skill-content of jobs: 1) the (respondent-assessed) time required to learn to do respondents' jobs well for someone with the right qualification[15]; 2) whether respondents have attended a job-skill training course in the last 12 months; 3) degree of agreement with the sentence "*my job requires that I keep learning new things*"[16]; and 4) (respondent-assessed) evaluation of the number of years of post-compulsory education that would be optimal for performing respondent's current job. Maximum-likelihood factor analysis can reduce these four indicators to a single and continuous job-skill factor (see table A1 and figure A1 in Appendix). This job-skill factor (JSK) is used as the dependent variable in all our model specifications. The actual form of the regression models fitted to the ESS is explained below. These regressions can be interpreted as modeling a latent continuous variable that underlies the discrete investment decision presented in the theoretical section of this paper (Long 1997: 40-7).

Individual-level variables of interests are age and its squared term, schooling (in number of years), firm's size and industry[17]. To these, two attitudinal scales aimed at capturing preference heterogeneity are used as blockers. These latter type of variables are discussed below.

Contextual indicators are measured at the regional level using the full ESS working sample (N=45,601) as the basis for calculation. Social visibility of women in high JSK jobs is

operationalized as follows. All respondents in the restricted sample are between 18 and 35 years of age and they are considered part of the same generation (g=2) —i.e. the 1969-1986 cohort. It is expected that they learn from the outcomes of their peers in the preceding generation, which is defined as those born between 1949 and 1968 at their respective regions of residence, *r*. I use only two generations in order to maximize the number of observations per regional cell. For the same reason, highly-skilled jobs in generation 1 have been defined as all those occupations included in classes I and II of the so-called Goldthorpe class schema, widely used in Europe and which comprises higher and lower grade professionals, administrators, managers and directors[18] (see Goldthorpe 2000: chap. 10). This occupational definition is highly consistent with the reliability tests performed on the job-skill factor (see figure A2 in Appendix). In accordance with *H1*, it is expected that women extract particularly relevant information from observing how different is the proportion of female professionals relative to that of male professionals in the previous generation. Men's investments are not expected to be affected by this macro-level distribution. The indicator, $V_{c,r}$, is thus simply calculated as the difference in percentage points between the proportion of female professionals out of all employed women and the proportion of male professionals out of all employed men in the generation 1949-1968 (g=1) at respondents' region of residence[19] (see figure A3 in Appendix). Hence:

$$V_{g,r} = \left(\frac{n_{g-1,r}^{Prof^m}}{N_{g-1,r}^{empl^m}}\right) - \left(\frac{n_{g-1,r}^{Prof^w}}{N_{g-1,r}^{empl^w}}\right) \qquad g = \{1,2\};\ r = \{1,\ldots.261\} \qquad [2]$$

The second macro-level indicator that is expected to convey relevant information for women's investment choices is the proportion of potential domestic cooperators in their marriage/partnership markets. Women can only infer such consequential figure from observing the domestic behavior of already married/cohabiting men of similar characteristics to their potentially marriageable pool. For simplicity, only education and region are considered as defining characteristics of marriage markets. It is therefore expected that women will extract information from observing the domestic behavior of educationally-equivalent married men at their regions of residence (r). Again, it is not expected that men's investments be affected by the proportion of cooperative women.

My definition of domestic cooperation that is based on the observed survey distributions. Men are considered cooperative if they do approximately forty per cent or more of the weekly housework, whilst "cooperative" women are defined as those who do at least three quarters of it, as this ensures a symmetric distribution of "cooperators" in both genders.[20] For each sex, the regional proportion of cooperators is calculated against the total number of married/cohabiting peers (s=men, women)[21] ($C^s_{e,r}$) (see figure A4 in Appendix). Educational homogamy is defined by distinguishing three levels of education: primary (e=1), secondary (e=2) and tertiary (e=3), which respectively account for 29 per cent, 51 per cent and 20 per cent of the respondents in the restricted sample[22]. Hence:

$$C^s_{e,r} = \frac{n^{Coop^s}_{e,r}}{N^{Married^s}_{e,r}} \qquad e=\{1,2,3\};\ r=\{1,....261\}\ \ s=\{men, women\} \quad [3]$$

Finally, *H3* is tested by calculating the average number of children of working women with the same educational level as respondents and living in the same region ($F_{e,r}$), as this figure is expected to capture the prevailing fertility norms in respondents' social environment. Again I differentiate between three different levels of education (primary, secondary and tertiary) to identify educational peers. Hence:

$$F_{e,r} = \frac{N\ children^{empl^W}_{e,r}}{N^{empl^W}_{e,r}} \qquad e=\{1,2,3\};\ r=\{1,....261\} \quad [4]$$

All the regional-level distributions of interest could be correlated with other regional attributes possibly affecting JSK, such us the structure of demand, the existing levels of general human capital, regional economic conditions and other institutional influences affecting women's activity rates. In order to net out the effect of the hypothesized mechanisms from these other sources of contextual influence, the models control for the following contextual variables: the regional urbanization rate, the average years of schooling of the typical worker at respondents' region, regional unemployment levels, regional female participation rates and the average score in the job-skill factor in respondents' industry at respondent's region of residence.

5.2. Attitudinal blockers

The ESS includes a host of attitudinal questions that should allow us to control for preference heterogeneity. This is crucial for testing what has been termed *cold* social effects on investments —i.e. those social influences on rational expectations that can affect every actor regardless of their own preferences and tastes. To this end, I use two different computed attitudinal scales that are aimed at capturing individual heterogeneity in gender preferences as well as differences in motivation possibly linked to job-investments.

The first scale (P1) measures gender attitudes by computing respondents' degree of agreement with the following 5 Likert-type items: 1. whether *women should be prepared to cut down on their wages for the sake of their families,* 2. whether *men should have equal domestic responsibilities as women*, 3. whether *men should have preference over scarce jobs*, 4. whether *parents should stick together for children even if they do not get along*, and 5. whether a *person's family should be his/her priority*. The scale shows a Cronbach's alpha of 0.6, it is normally distributed and ranges from 0 to 20, the latter value implying the highest score in "traditional" gender attitudes. Women show significantly less traditional attitudes than men. This scale has already been used as an heterogeneity control in Polavieja (2008; 2009).

The second attitudinal control (P2) measures orientations towards 'social success', a dimension which is clearly different from gender attitudes (Schwartz and Rubel 2005; Schwartz 2006; Polavieja 2009). Such orientations include ambition, competence, self-assertion and the will to be recognized and admired for one's achievements. My measurement is the result of applying factor analysis to a set of attitudinal questions from the *Human Value* module of the ESS. In this module, respondents are presented with several descriptions of fictitious individuals and are asked to evaluate how much alike they consider themselves to be in relation to the examples described (examples are chosen so as to have the same sex as respondents). Factor analysis showed that responses to the following descriptions did actually form part of a single factor (results available on request): 1. *Being very successful is important to her/him. She/he hopes people will recognize her/his achievements*; 2. *It is important to her/him to show her/his abilities. S/he wants people to admire what s/he does*; and 3. *It is important to her/him to get respect from others. S/he wants people to do what s/he says.* Responses to these descriptions were added up in a 6-interval scale ranging from -3 to 2.

Table 1. Description of Key Variables for Full and Restricted Samples, ESS (2004-2005)

Variable	Description	Sample	N	Mean or %	Standard deviation
Job-skill Factor	Scores of Maximum-Likelihood Factor Analysis on several indicators of the skill-content of respondent's job	Full	21,849	0.0073	0.8492
		Restricted	2,675	-0.0271	0.8006
Sex	Male	Full	20,969	45.98	
		Restricted	1,604	59,96	
	Female	Full	24,632	54.02	
		Restricted	1,071	40,04	
Age		Full	45,417	47.53	18.428
		Restricted	2,675	26.73	4.438
Schooling	Years of schooling completed	Full	45,115	11.72	3.886
		Restricted	2,652	13.41	3.234
Regional Gender-Gap in Prof. in previous generation, $V_{g,r}$	(P of professionals amongst employed men in previous generation at respondent's region) – (P of professionals amongst employed women in previous generation at respondent's region)	Full	45,560	0.0598	0.1619
		Restricted	2,675	0.0038	0.1599
P Cooperative Men in Region, $C_{e,r}$	P of educationally homogamous(1) men who do half or more of the household in respondent's region of residence	Full	45,085	0.4872	0.1986
		Restricted	2,649	0.5085	0.1919
Fertility norms, $F_{e,r}$	Average N of children of educationally homogamous employed women at r's region	Full	44,765	1.537	0.515
		Restricted	2,652	1.3709	4.25
Sex-role attitudes (familialism)	Index of (traditional) gender role attitudes. 21-interval scale ranging from 0=less traditional to 20=more traditional	Full	45,601	-0.4368	3.123
		Restricted	2,675	-1.3992	2.900
Ambition Index	Index of social ambition. It is a 6-interval scale ranging from -3=less ambitious to 3=more ambitious	Full	45,681	-0.319	0.887
		Restricted	2,675	0.176	.7553

Notes: (1) Homogamy is defined using 2 educational levels except for the UK, where class is used instead since the ESS UK-sample does not allow detailed educational level distinctions.

Source: European Social Survey, Second Round, All Countries Except Turkey (2004-2005).

The ambition scale showed a Cronbach's alpha of 0.7. This scale can be interpreted as tapping on differences in personal drive.[23] Previous research has shown that men and women differ systematically in their average levels of social ambition (Schwartz and Rubel

2005) and also that ambition, as measured by this scale, has a positive and significant impact on individual earnings (Polavieja 2009). Estimating the effect of the social ambition scale offers an unusual opportunity to control for individual characteristics that are very seldom observed[24].

5.3 Specification

I estimate linear regression models. The dependent variable is the specific skills required in respondents' jobs and it is measured using the scores for the job-skill factor. Specifically, JSK(i,r,c) is the job-skill score of individual *i* living in region *r* and country *c*. My preferred specification models individual variation in JSK employing several models of the form:

$$JSK^{s}_{i,r,c} = \alpha^{s}_{c} + \beta^{s}_{1} X_{i,r,c} + \gamma^{s}_{1_{g,r,c}} V_{g,r,c} + \gamma^{s}_{2_{e,r,c}} C_{e,r,c} + \gamma^{s}_{3_{e,r,c}} F_{e,r,c} + \delta^{s}_{r,c} Z_{r,c} + \theta^{s}_{i,r,c} A_{i,r,c} + \varepsilon^{s}_{i,r,c} \quad [5]$$

where the right-hand side contains country-specific intercepts; a vector of individual controls, $X_{i,r,c}$; the three hypothesized social influences, which are captured by the coefficients γ_1, γ_2 and γ_3; vector $Z_{r,c}$, which contains all the regional controls explained above; and, finally, vector $\theta^{s}_{i,r,c}$ which includes individual-level coefficients for each of the two attitudinal scales used as preference blockers —i.e. gender role attitudes and the degree of social ambition. Models are run separately for each sex with the exception of model 1, which pools men and women together and tests for sex-differences in JSK by including a sex-intercept in vector $X_{i,r,c}$. Models are tested with and without blocking for attitudinal heterogeneity. Finally, I allow the error term to be correlated across individuals living in the same region. Hence equation 5 represents a regression model with country fixed-effects and regional clustering of robust standard errors.

This specification can be viewed as a reduction of a 3-level hierarchical linear model to a 2-dimensional equivalent with no loss of information. The model deals with variation at level 2 via clustering of errors at the region, whilst still accounting for variation at level 3 via country fixed effects[25]. Regional clustering accounts for possible unobserved regional

effects on JSK, whilst country fixed-effects capture larger national influences such as policy and welfare state effects (see Polavieja 2009). The result is a more efficient model that can provide robust estimates for social influences, whilst being less demanding on the data structure than its 3-level HLM counterpart. A further virtue of this model is that it does not require to make any assumption as to whether higher level units are a random draw of a larger hypothetical population of regions and countries (see e.g. Halaby 2004; Rabe-Hesketh and Skrondall 2008: 437-38; Snijders and Bosker 1999).

6. FINDINGS

Table 2 pools male and female young adults together in order to estimate the average gender differences in JSK scores. Model 1 shows that, net of years of schooling, age, size of the firm and industry of activity —the latter two not shown—, young single European working women without children show significantly lower average scores than comparable men (β= -.056; t=-1.76; P>|t| 0.079). Model 2 introduces gender attitudes (P1) and social ambition (P2) to the previous equation. Young adults' gender attitudes are associated to JSK in the expected direction (more traditional attitudes, lower scores) but this association is weak and statistically insignificant.[26] In contrast, the ambition scale shows a strong and very significant association with the outcome variable. These findings are replicated in all the models below. Note that controlling for preference heterogeneity actually strengthens average gender differences in JSK scores (β= -.064; t=-2.12; P>|t| 0.035). The rest of the models are fitted separately by sex.

Table 2: Country Fixed-Effect Regressions on the Job-Skill Factor, Pooled models

Variables	Model 1	Model 2
Female	-0.056*	-0.064**
	(0.032)	(0.030)
Age	0.022***	0.024***
	(0.006)	(0.006)
Age^2	-0.002**	-0.002***
	(0.0007)	(0.0007)
Schooling	0.095***	0.093***
	(0.008)	(0.008)
Gender attitudes (P1)		-0.0086
		(0.006)
Social ambition (P2)		0.103***
		(0.0196)
Cons	-1.196***	-1.227***
	(0.112)	(0.113)
N	2,652	1,054
Log likelihood	-2700.272	-1036.916
R^2	0.298	0.389

Legend: * p<0.10; ** p<0.05; *** p<0.01. Robust standard errors in parenthesis

Notes: Robust standard errors are clustered at the regional level. All models control for firms' size and industry of activity. Only individuals in regions with more than 40 observations and at least one year of tenure.

Source: Calculated by the author from European Social Survey, Second Round, Restricted Sample, Turkey excluded (2004-2005).

Table 3 presents the results of fitting different sequences of equation [5] to women in the restricted sample using our preferred specification. Table 4 presents the same models for men. Social influences are tested both with and without attitudinal blockers, first separately (models 1 to 6) and then simultaneously (models 7 and 8). All models control for the regional characteristics described above. Results are largely consistent with the model expectations.

Table 3: Country Fixed-Effect Regressions on the Job-Skill Factor, Women

Variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Age	0.040***	0.042***	0.041***	0.043***	0.040***	0.042***	0.040***	0.042***
	(0.011)	(0.010)	(0.011)	(0.011)	(0.011)	(0.010)	(0.011)	(0.010)
Age^2	-0.004***	-0.004***	-0.004***	-0.004***	-0.004***	-0.004***	-0.004***	-0.004***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Schooling	0.090***	0.090***	0.088***	0.088***	0.088***	0.088***	0.086***	0.086***
	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)
Gap in profess. in previous generation (V)	-0.334**	-0.347***					-0.277*	-0.290**
	(0.134)	(0.132)					(0.145)	(0.143)
P of cooperators in marriage markets (C)			0.306**	0.298**			0.272*	0.264*
			(0.145)	(0.148)			(0.147)	(0.150)
Fertility norms (F)					-0.140*	-0.135*	-0.125*	-0.120
					(0.072)	(0.073)	(0.075)	(0.076)
Gender attitudes (P1)		-0.004		-0.003		-0.003		-0.004
		(0.008)		(0.008)		(0.008)		(0.008)
Social ambition (P2)		0.098***		0.099***		0.097***		0.098***
		(0.032)		(0.032)		(0.032)		(0.032)
Cons	-1.182***	-1.202***	-1.317***	-1.350***	-1.096***	-1.135***	-0.903***	-0.936*
	(0.450)	(0.449)	(0.447)	(0.448)	(0.467)	(0.470)	(0.480)	(0.480)
N	1,062	1,062	1,054	1,054	1,060	1,060	1,054	1,054
R^2	0.384	0.391	0.385	0.392	0.386	0.393	0.389	0.396

Legend: * p<0.1; ** p<0.05; *** p<0.01. Robust standard errors in parenthesis

Notes: Robust standard errors are clustered at the regional level. Only individuals in regions with more than 40 observations and at least one year of tenure.

All models control for firms' size and industry of activity, regional urbanization rates, regional average years of schooling of the typical worker, regional unemployment levels, the regional activity rate of women and the industry-region skill demand, measured as the average JSK score in respondents' industry at respondent's region of residence.

Source: Calculated by the author from European Social Survey, Second Round, Restricted Sample, Turkey excluded (2004-2005).

Models 1 and 2 in Table 3 show that the degree of social visibility of professional women in the 1949-1968 generation is associated to young women's investments in JSK. The lower it is women's visibility in professional occupations in the former generation —measured as the difference in percentage points between men and women's respective rates of access to professional occupations— the lower young women's average JSK scores are in our sample. This correlation is significant at the 95 per cent level before introducing controls for preference heterogeneity (γ_1=-0.33; t=-2.49; P>|t| 0.014) and it is actually strengthened once gender attitudes and social ambition are accounted for (γ_1=-0.35; t=-2.63; P>|t| 0.009). This suggests that gender differences in preferences are not the path connecting women's past experiences to current JSK scores. Results hold when all the three social influences are tested simultaneously (see models 7 and 8).

The proportion of cooperative men in young women's potential marriage/partnership markets is also positively correlated with women's JSK scores. This correlation is significant at the 95 per cent level both before blocking for attitudinal heterogeneity (model 3: γ_2=0.31; t=2.11; P>|t| 0.036), as well as after (model 4: γ_2=0.30; t=2.02; P>|t|0.044). This effect of potential male cooperators in women's marriage markets also remains significant at the 90 per cent level even when all social influences are tested simultaneously. Note that there is only a very slight reduction in the γ_2 coefficient after blocking for preference heterogeneity (model 7: γ_2=0.27; t=1.85; P>|t| 0.066; model 8: γ_2=0.26; t=1.77; P>|t| 0.079).

The results reported in Table 3 also seem largely consistent with the prediction that women are less likely to invest in JSK if they live in social contexts where other working women display high fertility rates. The effect of fertility norms is significant at just below the 95 per cent level when the variable is tested alone, both before blocking for gender attitudes and the degree of social ambition (model 5: γ_3=-0.14; t=-1.93; P>|t| 0.055) as well as after (model 6: γ_3=-0.13; t=-1.84; P>|t| 0.067). This effect also remains significant at the 90 per cent level when all contextual effects are tested simultaneously without controls for attitudinal heterogeneity (model 7: γ_3=-0.12; t=-1.66; P>|t| 0.098) but loses statistical power in model 8, when all social influences are tested simultaneously with attitudinal

controls (model 8: γ_3=-0.12; t=-1.58; P>|t|0.115). Yet it must be noted that this loss of statistical power of social fertility norms on individual levels of JSKs is not caused by the reduction of the γ_3 coefficient, as one should expect if our attitudinal controls were picking up the effect of internalized fertility preferences, but rather by the reduction of the models' degrees of freedom. If social fertility behavior has an impact on young women's internalized norms, this impact is not captured by our attitudinal scales.

In sharp contrast to the findings for women, none of the social effects considered in this study has any significant impact on young men's levels of JSK, and this regardless of how they enter in the equation (see Table 4). Neither the gender gap in the proportion of professionals in the previous generation, nor the proportion of cooperative women in men's potential marriage markets, nor fertility norms seem to exert any significant influence on men's job-investment behavior. This constitutes a crucial piece of evidence for two reasons. First, because it shows that the contextual variables tested are not picking the effects of unobserved regional characteristics possibly associated to individuals' JSK investments; and secondly, because it lends further support to the interpretation of the findings as reflecting social influences on job-survival expectations in context of uncertainty. Although investing is JSK can be considered always a risky behavior, only women confront the particular uncertainties that stem from the unequal division of family obligation and domestic tasks and only them can face a shortage of successful examples to learn from when pondering different career paths.

In sum, the findings reported in Tables 2, 3 and 4 are largely consistent with the existence of social influences on young women's rational expectations or what has been termed *cold* social effects. Cold effects can be powerful mechanisms for the reproduction of gender inequality even when attitudes and preferences between men and women converge.

Table 4: Country Fixed-Effect Regressions on the Job-Skill Factor, Men

Variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Age	0.010	0.011	0.010	0.012	0.011	0.013*	0.011	0.013*
	(0.007)	(0.007)	(0.007)	(0.007)	(0.008)	(0.008)	(0.008)	(0.008)
Age^2	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Schooling	0.096***	0.092***	0.095***	0.092***	0.093***	0.090***	0.092***	0.089***
	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)
Gap in profess. in previous generation (V)	0.168	0.145					0.187	0.172
	(0.110)	(0.109)					(0.115)	(0.113)
P of cooperators in marriage markets (C)			-0.064	-0.070			-0.073	-0.086
			(0.142)	(0.140)			(0.147)	(0.145)
Fertility norms (F)					-0.054	-0.042	-0.052	-0.039
					(0.051)	(0.048)	(0.052)	(0.049)
Gender attitudes (P1)		-0.012		-0.011		-0.011		-0.011
		(0.008)		(0.008)		(0.008)		(0.008)
Social ambition (P2)		0.104***		0.109***		0.109***		0.110***
		(0.024)		(0.025)		(0.024)		(0.025)
Cons	-1.196***	-1.184***	-1.009**	-1.015**	-0.937*	-0.987**	-1.025**	-1.051**
	(0.443)	(0.442)	(0.451)	(0.444)	(0.476)	(0.467)	(0.487)	(0.479)
N	1,573	1,573	1,557	1,557	1,554	1,554	1,549	1,549
R^2	0.306	0.316	0.304	0.316	0.304	0.316	0.304	0.316

Legend: * p<0.1; ** p<0.05; *** p<0.01. Robust standard errors in parenthesis

Notes: Robust standard errors are clustered at the regional level. Only individuals in regions with more than 40 observations and at least one year of tenure.

All models control for firms' size and industry of activity, regional urbanization rates, regional average years of schooling of the typical worker, regional unemployment levels, the regional activity rate of women and the industry-region skill demand, measured as the average JSK score in respondents' industry at respondent's region of residence.

Source: Calculated by the author from European Social Survey, Second Round, Restricted Sample, Turkey excluded (2004-2005).

6.1. Introducing discrimination and closure effects

In the theoretical section of this paper it has been argued that rational employers will tend to draw on deferred compensation strategies in order to deal with the contractual hazard problems generated by JSK investments. This strategy should be more efficient that drawing on statistical discrimination, since it forces employees to act on their private information. This, however, does not amount to rejecting the possibility that employers' discrimination and social closure mechanisms on the part of male co-workers play a role in hindering women's access to specialized training (see Tomaskovic-Devey and Skaggs 2002; Mun 2008). What has been argued is that gender inequalities can be reproduced through the type of social influences studied in this paper *even in the absence* of employers' discrimination and social closure.

In order to further strengthen this point empirically, Model 9 in Table 5 shows the results of adding information on the sex of respondents' immediate supervisor or boss, as well as information on the proportion of men at the workplace to the full model specification. Alone these variables have no significant effect on JSK and hence they are introduced interactively. Results are presented separated by sex of respondents. This interaction shows that women with female bosses/supervisors score higher in the JSK than women whose bosses/supervisors are male. Moreover, women with female bosses show lower JSK scores the larger the proportion of male coworkers is at their firms. These findings seem consistent with both social closure and discrimination theories (see e.g. Petersen and Saporta 2004; Mun 2008; Tomaskovic-Devey and Skaggs 2002) and are also in line with several reported findings for US firms (see e.g. Castilla 2008; Fernández-Mateo 2009; Fernandez and Sosa 2005). Yet the interaction effect also suggests that the JSK scores of women with male bosses are higher the higher the proportion of male colleagues employed at their firms (see Figure A5 in Appendix for a graphic representation of this interaction). Given the cross-sectional character of the data, it is not possible to gauge the theoretical implications of this latter finding, which could be entirely driven by selection effect. Finally, we find that the gender of bosses/supervisors and co-workers bear no significant consequences for men's JSK scores.

Table 5. FE Regressions on JSK, Controlling for Gender Balance at the Workplace

	Moldel 8		Model 9	
Variable	Women	Men	Women	Men
Age	0.042***	0.013*	0.045***	0.016**
	(0.010)	(0.008)	(0.012)	(0.008)
Age^2	-0.004***	-0.001	-0.004***	-0.002
	(0.001)	(0.001)	(0.001)	(0.001)
Schooling	0.086***	0.089***	0.085***	0.087***
	(0.012)	(0.008)	(0.014	0.010
Gap in profess. in previous generation (V)	-0.290**	0.172	-0.389**	0.197
	(0.143)	(0.113)	(0.161)	(0.122)
P of cooperators in marriage markets (C)	0.264*	-0.086	0.313**	-0.059
	(0.150)	(0.145)	(0.149)	(0.165)
Fertility norms (F)	-0.120	-0.039	-0.115	-0.057
	(0.076)	(0.049)	(0.078)	(0.055)
Gender attitudes (P1)	-0.004	-0.011	-0.008	-0.011
	(0.008)	(0.008)	(0.009)	(0.008)
Social ambition (P2)	0.098***	0.110***	0.105***	0.117***
	(0.032)	(0.025)	(0.034)	(0.028)
Sex of Immediate Boss/ Supervisor [Ref. Boss is male]				
Boss is female [P of men=0]			0.171**	-0.205
			(0.071)	(0.151)
Proportion of Men at the workplace [when boss is male]			0.284***	-0.005
			(0.108)	(0.112)
P of men × Boss is female[(1)]			-0.560***	0.145
			(0.174)	(0.307)
Cons	-0.936*	-1.051**	-0.892*	-0.912
	(0.480)	(0.479)	(0.482)	(0.574)
N	1,054	1,549	981	1,331
R^2	0.396	0.316	0.403	0.310

Legend: * p<0.1; ** p<0.05; *** p<0.01. Robust standard errors in parenthesis

Notes: Robust standard errors are clustered at the regional level.

All models control for firms' size and industry of activity, regional urbanization rates, regional average schooling, regional unemployment levels, regional female activity rates the industry-region skill demand, measured as the average JSK score in respondents' industry at respondent's region of residence.

[(1)]The total effect of P of men at workplace for women with female bosses/supervisors is 0.28-0.56=-0.28; t= -1.87; P>|t|= 0.062.

Source: Calculated by the author from European Social Survey, Second Round, Restricted Sample, Turkey excluded (2004-2005).

In sum, the results reported on Table 5 seem (at least partially) consistent with (at least some of) the predictions of social closure and discrimination theories. But most importantly, model 9 shows that accounting for these organizational factors has no bearing on the social-influences under investigation (compare model 8 and model 9 on Table 5). This adds further empirical support to the interpretation of contextual effects as reflecting distinctive social-influences on supply-side investment decisions.

7. DISCUSSION

Differences in job-specific skills can account for a substantial part of the gender wage-gap (see Tam 1997; Tomaskovic-Devey 2002; Polavieja 2008; 2009). Hence it is crucial to understand the determinants of such differences. I have argued that social-interaction models can bring new insights into this highly consequential question by melding substantive ideas of both sociology and economics.

To my knowledge, this is the first paper to study social-interaction effects on job-specific skill investments and also the first that discusses the gender implications of tilted compensation. By stressing the idea that rational choice under uncertainty brings the social structure into the fore of investment decisions, I have posited that gender differences in job-specific skills can be reproduced in the absence of purposely discrimination. Tilted compensation profiles, which are typical of jobs requiring high specific skills, shift the effect of macro-level distributions to workers themselves and, in so doing, produce a sort of self-inflicted statistical discrimination on the supply side. This is a novel explanation of gender differences in labor-market performance.

Informational effects on job-skill investments have been modeled for a sample of single young adults without children using the regional-level gender gaps in access to professional occupations in the preceding generation, the regional distribution of cooperative partners in their potential marriage markets, and the regional-level average fertility rates of educationally homogamous working women. Sample restriction avoids endogeneity caused by household role specialization but could bias the estimates downwardly. Country FE

regressions with robust standard errors clustered at the regional level show that these three macro-level variables are significantly and positively associated with young women's levels of job-specialization, whilst having no significant impact on men's, and this net of age, schooling, firms' industry, firms' size and a host of regional-level controls. This is interpreted as strong evidence of social-interaction effects.

Social influences can affect both rational expectations as well as subjective preferences, aspirations and tastes. I have argued that the former effect captures the structural properties of the gendered system —i.e. its capacity to reproduce itself in the face of preference convergence between the sexes. I have further argued that such effect can be estimated by blocking individuals' preference heterogeneity. Using unusually rich attitudinal controls, I have attempted to block macro-level effects on preferences. Blocking on these variables only leads to a slight reduction in the coefficient capturing domestic cooperative behavior and an even slighter reduction for fertility norms, whilst actually strengthening the effect of the sex-distribution of JSK investments in the previous generation.

These findings are robust to controls for the sex of respondents' immediate supervisors and the proportion of male co-workers in their organizations (interacted), which is interpreted as a further indication that social-interactions can have a strong and distinctive impact on rational job-survival expectations. The evidence presented seems therefore largely consistent with the existence of *cold* macro-level effects. *Cold* effects can explain why job-specific skill investments continue to be patterned by gender even in the face of marked attitudinal convergence between the sexes and a consolidated corpus of antidiscrimination legislation (see, e.g., Fogli and Veldkamp 2008).

The effects of macro-level structures over micro-level choices considered in this study are situational mechanisms (Coleman 1986). The theoretical model presented in this study explains how situational mechanisms can affect women's JSK investments by influencing their job-survival expectations in a context of gender-specific uncertainty. This explanation is fully compatible with both social-interaction models in economics (see e.g. Durlauf 2001, Manski 2000), as well as with socialization theories in sociology (see also: Ridgeway 1997; Ridgeway and Erickson 2000). At the introductory section I have argued that these two strands of the literature should be bridged to produce a unitary framework for the study of

socially-embedded economic behavior. I believe such enterprise is meant to yield particularly fruitful analytical pay-offs.

REFERENCES

Acemoglu, Daron and Jorn-Steffen Pischke. 1998. "Why Do Firms Train? Theory and Evidence." *The Quarterly Journal of Economics* 113: 79-119.

Achen, Christopher H. and W. Phillips Shively. 1995. *Cross-Level Inference*. Chicago, IL: University of Chicago Press.

Akerlof, George. 1997. "Social Distance and Social Decisions." *Econometrica* 65:1005-28.

Akerlof, George, and Rachel Kranton. 2000. "Identity and Economics." *Quarterly Journal of Economics* 115(3): 715-53.

Arrow, Kenneth. 1973. "The Theory of Discrimination". In Discrimination in O. Ashenfelter and A. Rees (eds.) *Labor Markets*. Princeton, NJ: Princeton University Press.

Barth, Erling. 1997. "Firm-Specific Seniority and Wages". *Journal of Labor Economics*, 15(3): 495-506.

Bayo-Moriones, Alberto, Jose E. Galdon-Sanchez and Maia Guell. 2010. "Is Seniority-Based Pay Used as a Motivational Device? Evidence from Plant-Level Data". *Research in Labor Economics*, 30: 155 - 187

Becker, Gary. 1991 [1981]. *A Treatise on the Family*. Enlarged Edition. Cambridge, Mass.: Harvard University Press.

Becker, Gary. 1985. "Human Capital, Effort and the Sexual Division of Labor." *Journal of Labor Economics* 3: S33-S58.

Bianchi, Suzanne, Melissa A. Milkie, Liana C. Sayer and John P. Robinson. 2000. "Is Anyone Doing the Housework? Trends in the Gender Division of Household Labor." *Social Forces,* 79: 191–228.

Bisin, Alberto and Thierry Verdier. 2000. "Beyond the Melting Pot": Cultural Transmission, Marriage, and the Evolution of Ethnic and Religious Traits". *The Quarterly Journal of Economics*, 115(3):955-988

Blalock, Herbert. 1984. "Contextual-Effects Models: Theoretical and Methodological Issues." *Annual Review of Sociology*, 10:353-72.

Boudon, Raimond. 1996. "The "Cognitivist Model": A Generalised "Rational-Choice Model"". *Rationality and Society,* 8:123-150.

Breen, Richard. 1997. "Risk, Recommodification and Stratification." *Sociology,* 31: 473-89.

Breen, Richard. 1999. "Beliefs, Rational Choice and Bayesian Learning". *Rationality and Society*, 11(4):463-479.

Breen, Richard and Cecilia Garcia-Penalosa. 2002. "Bayesian Learning and Gender Segregation". *Journal of Labor Economics*, 20: 899-922.

Breen, Richard, Ruud Luijkx, Walter Müller and Reinhard Pollak. 2010. "Long-term Trends in Educational Inequality in Europe: Class Inequalities and Gender Differences". *European Sociological Review,* 26(1):31-48

Brewer, Marilynn B. and Layton N. Lui. 1989. "The Primacy of Age and Sex in the Structure of Person Categories." *Social Cognition*. 7: 262-74.

Brooks-Gunn, Jeanne, Greg Duncan, P. Klebanov, and N. Sealand. 1993. "Do Neighborhoods Affect Child and Adolescent Development?" *American Journal of Sociology,* 99:353-95.

Buchinsky, Moshe, Denis Fougère, Francis Kramarz and Rusty Tchernis. 2010. "Interfirm Mobility, Wages and the Returns to Seniority and Experience in the United States." *Review of Economic Studies,* 77(3):972-1001

Buchmann, C., DiPrete, T. A. and McDaniel, A. 2008. "Gender Inequalities in Education". *Annual Review of Sociology*, 34, 319–337.

Budig, Michelle J, and Paula England 2001. "The Wage penalty for Motherhood". *American Sociological Review*, 66:204-25.

Cain, Glen. 1986. "The Economic Analysis of Labor Market Discrimilnation: A Survey." In O. Ashenfelter and R. Layard (eds.) *Handbook of Labor Economics, Volume 1*. New York: Elsevier

Castilla, Emilio, J. 2008. "Gender, Race and Meritocracy in organizational Careers." *American Journal of Sociology,* 113(6):1479-1526.

Chang, Mariko Ling. 2000. "The Evolution of Sex-Segregation Regimes." *The American Journal of Sociology*, 105: 1658-701.

Chiswick, Barry R. 2003. "Jacob Mincer, Experience and the Distribution of Earnings". IZA Discussion Paper No. 847. Available at: ftp://repec.iza.org/RePEc/Discussionpaper/dp847.pdf

Cohen, Philip N. and Matt L. Huffman. 2003."Individuals, Jobs, and Labor Markets: The Devaluation of Women's work." *American Sociological Review*, 68(3):443-63.

Coleman, James. 1964. *Introduction to Mathematical Sociology*. New York: Free Press.

Coleman, James. 1986. "Social Theory, Social Research and a Theory of Action". *American Journal of Sociology*, 91: 1309-35.

Coleman, James. 1988. "Social Capital in the Creation of Human Capital". *American Journal of Sociology*, 94:S95-S120.

Coleman, James. 1990. *Foundations of Social Theory*. Cambridge, MA: Harvard University Press.

Cotter, David A., JoAnn DeFiore, Joan M. Hermsen, Brenda Martseller Kowalewski and Ree Vanneman. 1997. "All Women Benefit: The Macro-Level Effect of Occupational Integration on Gender Earnings Equality". *American Sociological Review*, 62:714-734.

Crane, Jonathan. 1991. "The Epidemic Theory of Ghettos and Neighborhood Effects on Dropping Out and Teenage Childbearing." *American Journal of Sociology,* 96:1226-59.

Cunningham, Mick. 2008. "Influences of gender ideology and housework allocation on women's employment over the life course". *Social Science Research*, 37:254–267

Datcher, Linda. 1982. "Effects of Community and Family Background on Achievement". *The Review of Economics and Statistics*, 64(1): 32-41.

DeLuca, Stefanie and Elizabeth Dayton. 2009. "Switching Social Contexts: The Effects of Housing Mobility and School Choice Programs on Youth Outcomes". *Annual Review of Sociology*, 35:457-491

DiPrete, Thomas A. and Jerry D. Forristal. 1994. "Multilevel Models: Methods and Substance". *Annual Review of Sociology,* 20:331-357.

Durlauf, Steven. 2001. "A Framework for the Study of Individual Behavior and Social Interactions." *Social Methodology,* 31:47-87.

Durlauf, Steven. 2004. "Neighborhood Effects". In J. Vernon Henderson and Jacques Françoise Thisse (Eds.) *Handbook for Regional and Urban Economics, Volume 4*. Amsterdam: Elsevier

Dustmann, Christian and Costas Meghir. 2005. "Wages, Experience and Seniority". *Review of Economic Studies*, 72(1):77–108.

Elster, Jon. 1989. *Nuts and Bolts for the Social Sciences*. Cambridge: Cambridge University Press.

England, Paula, Joan M. Hermsen and David A. Cotter. 2000. "The Devaluation of Women's Work: A Comment on Tam." *American Journal of Sociology*, 105: 1741-60.

Erosa, Andrés, Luisa Fuster and Diego Restuccia, 2005. "A Quantitative Theory of the Gender Gap in Wages," *Working Papers tecipa-199*, University of Toronto, Department of Economics.

Estevez-Abe, Margarita. 2005. "Gender Bias in Skills and Social Policies: The Varieties of Capitalism Perspective on Sex Segregation." *Social Politics,* 12:180-215.

Evertsson, Marie and Magnus Nermo. 2004. "Dependence within Families and the Division of Labor: Comparing Sweden and the United States". *Journal of Marriage and Family* 66(5): 1272-1286.

Felstead, Alan, Duncan Gallie, Francis Green and Ying Zhou. 2007. *Skills at Work, 1986 to 2006*. Oxford & Cardiff: ESRC Centre on Skills, Knowledge and Organisational Performance SKOPE.

Fernández, Raquel. 2007. "Women, Work, and Culture". *NBER Working Paper Series,* No.12888. Available at: http://www.nber.org/papers/w12888.

Fernández, Raquel and Alessandra Fogli. 2009. "Culture: An Empirical Investigation of Beliefs, Work, and Fertility". *American Economic Journal: Macroeconomics* 1(1): 146–177.

Fernandez, Roberto and Lourdes Sosa. 2005. "Gendering the Job: Networks and Recruitment at a Call Center." *American Journal of Sociology*, 111(3):859-904.

Fernandez-Mateo, Isabel. 2009. "Cumulative Gender Disadvantage in Contract Employment." *American Journal of Sociology*, 114(4):871-923.

Fogli, Alessandra and , Laura Veldkam. 2008. "Nature or Nurture? Learning and Female Labour Force Dynamics". *CEPR Discussion Paper No. DP6324*. Available at SSRN: http://ssrn.com/abstract=1136650.

Fuller, Sylvia "Job Mobility and Wage Trajectories for Men and Women in the United States". *American Sociological Review*, 73:158-183.

Fuwa, M. 2004. "Macro-level Gender Inequality and the Division of Household Labor in 22 Countries". *American Sociological Review*, 69, 751-767.

Gathmann, Christina and Uta Schönberg. 2010. "How General Is Human Capital? A Task-Based Approach." *Journal of Labor Economics*, 28(1):1-49.

Goldin, Claudia and Solomon Polachek. 1987. "Residual Differences by Sex: Perspectives on the gender Gap in Earnings." *The American Economic Review*, 77:143-151.

Goldthorpe, John. 2000. *On Sociology*. Oxford: Oxford University Press.

Granovetter, Mark. 1981. "Toward a Sociological Theory of Income Differences". Pp. 11-47 in *Sociological Perspectives on Labor Markets*. Edited by Ivar Berg. New York: Academic Press.

Granovetter, Mark. 1985. "Economic Action and Social Structure: The Problem of Embeddedness." *American Journal of Sociology*, 91: 481-510.

Granovetter, Mark. 2005. "The Impact of Social Structure on Economic Outcomes". *Journal of Economic Perspectives,* 19(1):33-50.

Guiso, Luigi, Paola Sapienza and Luigi Zingales. 2006. "Does Culture Affect Economic Outcomes?" *NBER Working Paper Series,* Vol. w11999. Available at SSRN: http://ssrn.com/abstract=881233

Hakim, Catherine. 1996. "Labor Mobility and Employment Stability: Rhetoric and Reality in the Sex Differential in Labor Market Behavior." *European Sociological Review* 12: 45-69.

Hakim, Catherine. 2000. *Work-Lifestyle Choices in the 21st Century: Preference Theory*. Oxford: Oxford University Press.

Han, Shin-Kap and Phyllis Moen. 1999. "Work and Family over Time: A Life Course Approach." *Annals of the American Academy of Political Social Science*, 562:98-110.

Hannan, Michael T. 1992. *Aggregation and Disaggregation in the Social Sciences*. Rev. ed. Lexington, MA: Lexington Books.

Hassink, Wolter H. J. and Giovanni Russo. 2010. "The Glass Door: The Gender Composition of Newly Hired Workers Accross Hierarchical Job Levels" *IZA Discussion Paper No. 4858*.

Hedström, Peter. 1998. "Rational Immitation." In Peter Hedström and Richard Swedberg (Eds.) *Social Mechanisms: An Analytical Approach to Social Theory*. Cambridge: Cambridge University Press.

Hedström, Peter and Richard Swedberg. 1998. "Social Mechanisms: An Introductory Essay". In Peter Hedström and Richard Swedberg (Eds.) *Social Mechanisms: An Analytical Approach to Social Theory*. Cambridge: Cambridge University Press.

Hedström, Peter. and Peter Bearman. 2009. "What is Analytical Sociology all About". In Peter Hedström and Peter Bearman (Eds.) *The Oxford Handbook of Analytical Sociology*. Oxford: Oxford University Press.

Hersch, J and L. S. Stratton. 2002. "Housework and Wages". *Journal of Human Resources,* 37(1):217-229.

Hsueh, Sheri and Marta Tienda. 1996. "Gender, Ethnicity and Labor Force Instability." *Social Science Research, 25:73-94*.

Katz, Lawrence, Jeffrey Kling, and Jeffrey Liebman. 2001. "Moving to Opportunity in Boston: Early Impacts of a Randomized Mobility Experiment." *Quarterly Journal of Economics*, 116: 607-54.

Kessler, Anke S. and Christoph Lülfesmann. 2006. "The Theory of Human Capital Revisited: on the Interaction of General and Specific Investments." *The Economic Journal* 116: 903–23.

Kimura, Masako and Daishin Yasui. 2007. "Occupational choice, educational attainment, and fertility". *Economic Letters*, 94(2): 228-234

Lazear, E.P. 2003. "Firm-Specific Human Capital: A Skill-Weights Approach". *NBER Working Paper,* W9679.

Lazear, Edward P. 1995. *Personnel Economics*. Cambridge, Mass: The MIT Press.

Lazear, Edward P. and Sherwin Rosen. 1990. "Male-Female Wage Differentials in Job Ladders." *Journal of Labor Economics*, 8: S106-S123.

Leuven, Edwin. 2005. "The Economics of Private-Sector Training: A Survey of the Literature." *Journal of Economic Surveys* 19:91-119.

Loewenstein, Mark A. and James R. Spletzer. 1998. "Dividing the Costs and Returns to General Training." *Journal of Labor Economics* 16: 142-71.

Shelly Lundberg and Robert A. Pollak. 1996. "Bargaining and Distribution in Marriage." *The Journal of Economic Perspectives*, 10: 139–158

Macpherson, David and Barry T. Hirsch. 1995. "Wages and Gender Composition: Why do Women Jobs Pay Less?." *Journal of Labor Economics,* 13:426-471.

Mandel, Hadas and Moshe Semyonov. 2005. "Family Policies, Wage Structures, and Gender Gaps: Sources of Earnings Inequality in 20 Countries." *American Sociological Review* 70: 949-67.

Manning, Alan and Joanna Swaffield. 2008. "The Gender Gap in Early-Career Wage Growth". *The Economic Journal*, 118:983–1024.

Manski, Charles F. 1993. "Identification of Endogenous Social Effects: The Reflection Problem." *Review of Economic Studies,* 60: 531-42.

Manski, Charles F. 2000. "Economic Analysis of Social Interactions" *Journal of Economic Perspectives*, 14.3:115-36.

Manski, Charles F. 2004. "Social Learning from Private Experiences: The Dynamics of the Selection Problem". *The Review of Economic Studies*, 71(2):443-458

Maume, D. J. 2006. "Gender Differences in Restricting Work Efforts because of Family Responsibilities". *Journal of Marriage and the Family*, 68(4):859-869.

Merton, Robert K. and Alice Kitt Rossi. 1950. "Contributions to the Theory of Reference Group Behavior"). In Robert K. Merton and Paul F. Lazarsfeld, eds. *Continuities in Social Research*. New York: The Free Press, 40-105.

Mincer, Jacob and Solomon Polachek. 1974. "Family investments in human capital: earnings of women." *Journal of Political Economy,* 82: S76-S108.

Mun, Eunmi. 2008. "Sex Segregation and Social Closure: Evidence from Japan." Paper delivered at the *American Sociological Association Conference*, Boston, 2008.

Norman, Peter. 2003. "Statistical Discrimination and Efficiency". *Review of Economic Studies*, 70:615-27.

Knowles, John. 2009. "Birth Control and the Rise in Female LFP: What Can We Learn from Women's Occupational Choices?" Paper presented at Madrid Economics Seminars, CEMFI November 12, 2009. Available at: ftp://ftp.cemfi.es/pdf/papers/Seminar/Knowles%20CEMFI%20Paper.pdf

Parent, Daniel. 2000. "Industry-Specific Capital and the Wage Profile: Evidence from the National Longitudinal Survey of Youth and the Panel Study of Income Dynamics." *Journal of Labor Economics*, 18(2): 306-23.

Petersen, Trond and Ishak Saporta. 2004. "The Opportunity Striucture for Discrimination." *American Journal of Sociology,* 109:852-901.

Pischke, Jorn-Steffen. 2001. "Continuous Training in Germany." *Journal of Population Economics*, 14(3):523–548.

Polachek, Solomon W. 1981. "Occupational Self-Selection: A Human-Capital Approach to Sex Differences in Occupational Structure." *Review of Economics and Statistics,* 58: 60-69.

Polavieja, Javier G. 2005. "Task Specificity and the Gender Wage Gap: Theoretical Considerations and Empirical Analysis of the Spanish Survey on Wage Structure." *European Sociological Review,* 21: 165-81.

Polavieja, Javier G. 2008. "The Effect of Occupational Sex-Composition on Earnings: Job-Specialization, Sex-Role Attitudes and the Division of Domestic Labor in Spain." *European Sociological Review,* 24: 199-213.

Polavieja, Javier G. 2009. "Domestic Supply, Job-Specialization and Sex-Differences in Pay." *Social Indicators Research,* 93(3): 587-605.

Reskin, Barbara F. 1993. "Sex Segregation in the Workplace." *Annual Review of Sociology*, 19: 241-270.

Reskin, Barbara F. 2003. "Including Mechanisms in Our Models of Ascriptive Inequality: 2002 Presidential Address." *American Sociological Review*, 68(1): 1-21.

Reskin, Barbara F. and Denise D. Bielby. 2005. "A Sociological Perspective on Gender and Career Outcomes". *Journal of Economic Perspectives*, 19(1):71-86

Ridgeway, Cecilia L. 1997. "Interaction and the Conservation of Gender Inequality: Considering Employment." *American Sociological Review*, 62: 218-235.

Ridgeway, Cecilia L and Shelley J. Correll. 2004. "Unpacking the Gender System: A Theoretical Perspective on Gender Beliefs and Social Relations". *Gender & Society*, 18(4): 510-531.

Ridgeway, Cecilia and Lynn Smith-Lovin.1999. "The Gender System and Interaction." *Annual Review of Sociology*, 25: 191-216.

Royalty, Anne Beeson. 1996. " The Effects of Job Turnover on the Training of Men And Women "*Industrial and Labor Relations Review,* 49(3):506-521.

Sampson, Robert, Jeffrey Morenoff, and Felton Earls. 1999. "Beyond Social Capital: Collective Efficacy for Children." *American Sociological Review,* 64: 633-60.

Sevilla-Sanz, Almudena. 2010. "Household Division of Labor and Cross-Country Differences in Household Formation Rates." *Journal of Population Economics*, 23(1):225-249.

Snijders, Tom A. B. and Roel J. Bosker. 1999. *Multilevel Analysis: An Introduction to Basic and Advanced Multilevel Modeling*. London, Thousand Oaks and New Dehli: Sage Publications.

Sorensen, Aage B. 1990. "Aage B. Sorensen". In R. Swedberg, *Economics and Sociology: Redefining their Boundaries, Conversations with Economists and Sociologists*. Princeton, NJ: Princeton University Press.

Sorensen, A. B. 1994. "Firms, Wages and Incentives". In N. J. Smelser and R. Swedberg (eds.) *The Handbook of Economic Sociology*. Princeton, N.J.: Princeton University Press.

Sorensen, Aage B. 2000. "Toward a Sounder Basis for Class Analysis." *American Journal of Sociology*, 105:1523-1558.

Stier, Haya and Noah Lewin-Epstein. 2001. "Welfare Regimes, Family-Supportive Policies, and Women's Employment along the Life Course." *American Journal of Sociology* 106: 1731-60.

Swedberg, Richard. 1990. *Economics and Sociology: Redefining their Boundaries, Conversations with Economists and Sociologists* Princeton, NJ: Princeton University Press.

Tam, Tony. 1997. "Sex Segregation and Occupational Gender Inequality in the United States: Devaluation or Specialized Training?." *American Journal of Sociology*, 102: 1652-92.

Tam, Tony. 2000. "Occupational Wage Inequality and Devaluation: A Cautionary Tale of Measurement Error." *American Journal of Sociology*, 105: 1752-60.

Thurow, Lester. 1975. Generating Inequality. New York: Basic Books.

Tilly, Charles. 1998. *Durable Inequality*. Berkeley and Los Angeles: University of California Press.

Tomaskovic-Devey, Donald and Sheryl Skaggs. 2002. "Sex Segregation, Labor Process Organization, and Gender Earnings Inequality." *American Journal of Sociology,* 108: 102-28.

Topel, Robert. 1991. "Specific Capital, Mobility, and Wages: Wages Rise with Job Seniority". *Journal of Political Economy*, 99(1):145-176.

van der Lippe, Tanja and Liset van Dijk. 2002. "Comparative Research on Women's Employment", *Annual Review of Sociology*, 28: 221-241

Waldfogel, Jane. 1998. "Understanding the Family Gap in Pay for Women with Children". *Journal of Economic Perspectives*,12:137-56.

Williamson, Oliver E. 1985. *The Economic Institutions of Capitalism*. New York: Free Press.

Winship, Christopher and Shewin Rosen. 1988. "Introduction: Sociological and Economic Approaches to the Analysis of Social Structure". *American Journal of Sociology,* 94:S1-S16.

Zax, Jeffrey and Daniel I. Reese. 2002. "IQ, Academic Performance, Environment, and Earnings". *The Review of Economics and Statistics*, 84(4): 600-616

Zwick, Thomas. 2009. "Why Pay Seniority Wages?" *ZEW - Centre for European Economic Research* Discussion Paper No. 09-005. Available at SSRN: http://ssrn.com/abstract=1394351.

APPENDIX

Table A1. Maximum Likelihood Factor Analysis on the Skill-Content of Jobs

(Maximum likelihood factors; 1 factor retained)

Factor	Variance	Difference	Proportion	Cumulative
1	1.53848		1.0000	1.0000

LR test: Independent vs. saturated: chi2(6) = 1.5e+04 Prob>chi2 = 0.0000
LR test: 1 factor vs. saturated: chi2(2) = 160.09 Prob>chi2 = 0.0000

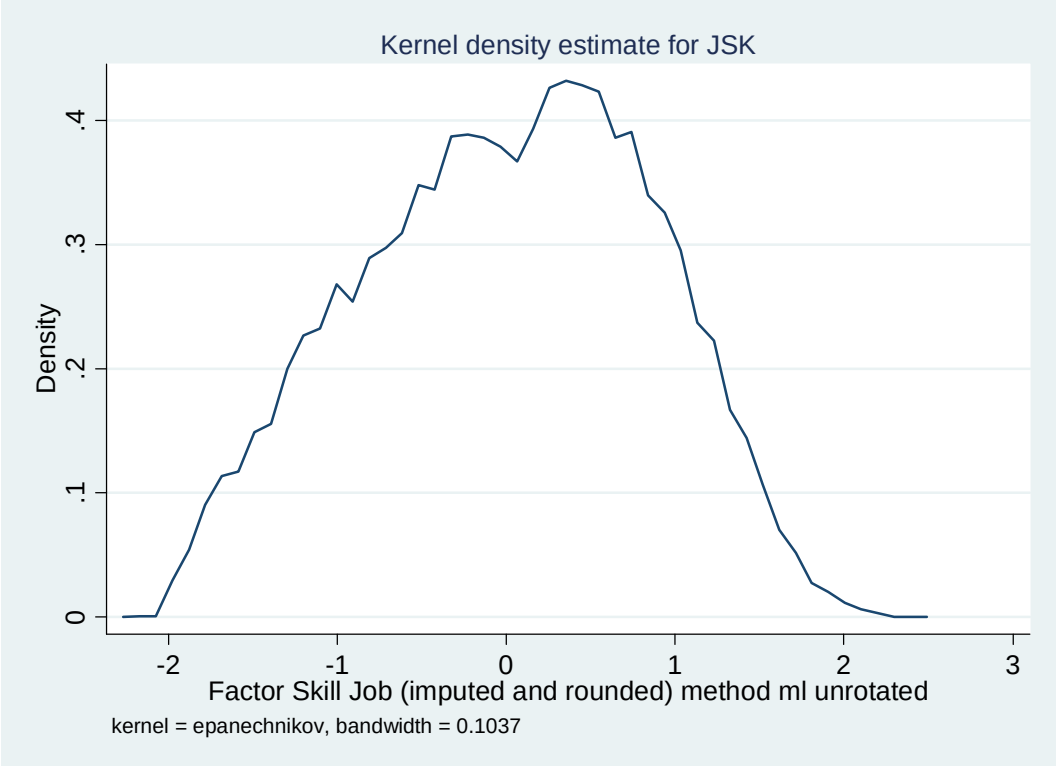
		Factor Loadings	
Variable	Description	1	Uniqueness
learning	Degree of agreement with: "*My job requires that I keep learning new things*". 4-interval Likert Scale	0.6494	0.5782
svpr	Self-assessed time required to learn to do respondents' jobs well for someone with the right qualification. 8-interval Likert Scale	0.5833	0.6598
skillc	Has Rs' attended a job-skill training course in the last 12 months?	0.5331	0.7158
jobedu	Self-assessed evaluation of the number of years of post-compulsory education needed for the job.	0.7016	0.5078

N= 21,849
Schwarz's BIC = 200.076
Log likelihood = -80.05435
(Akaike's) AIC = 168.109

Notes: Missing values for each variable have been imputed separately by sex using responses from the other variables, country FE, tenure and firm's size

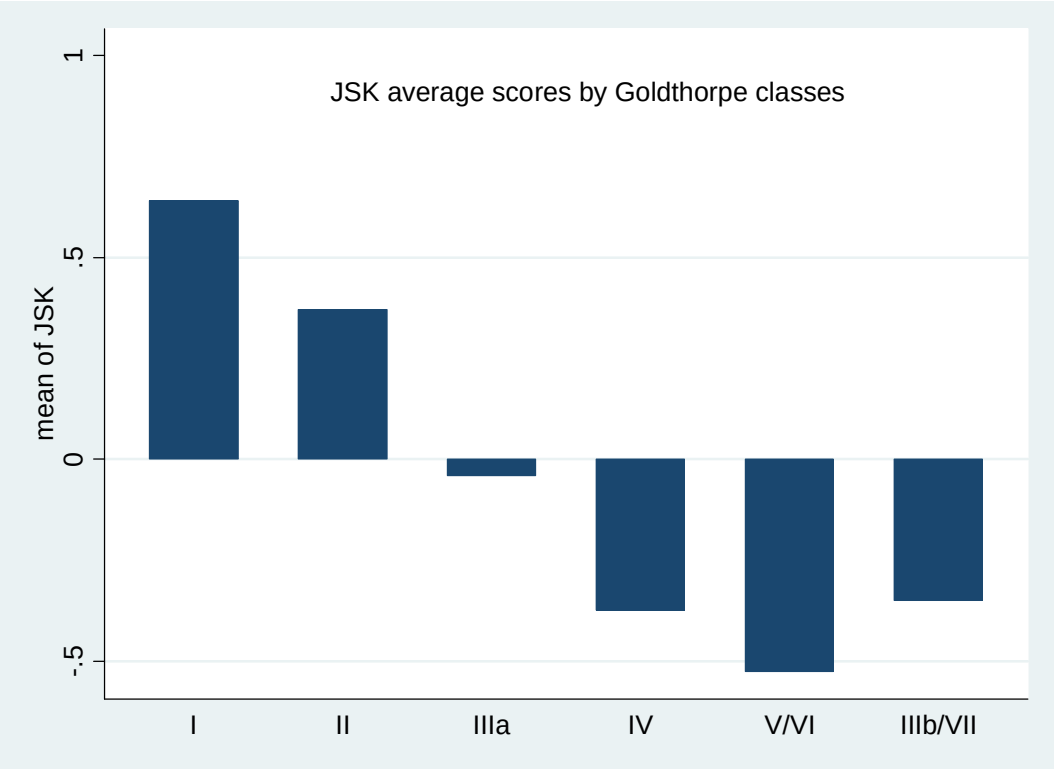
Source: Calculated by the author from European Social Survey, Second Round, Restricted Sample, Turkey excluded (2004-2005).

Figure A1. The Density Function of the Job-Skill Factor, ESS (2004-2005)



Source: ESS, Second Round, Turkey excluded (2004-2005).

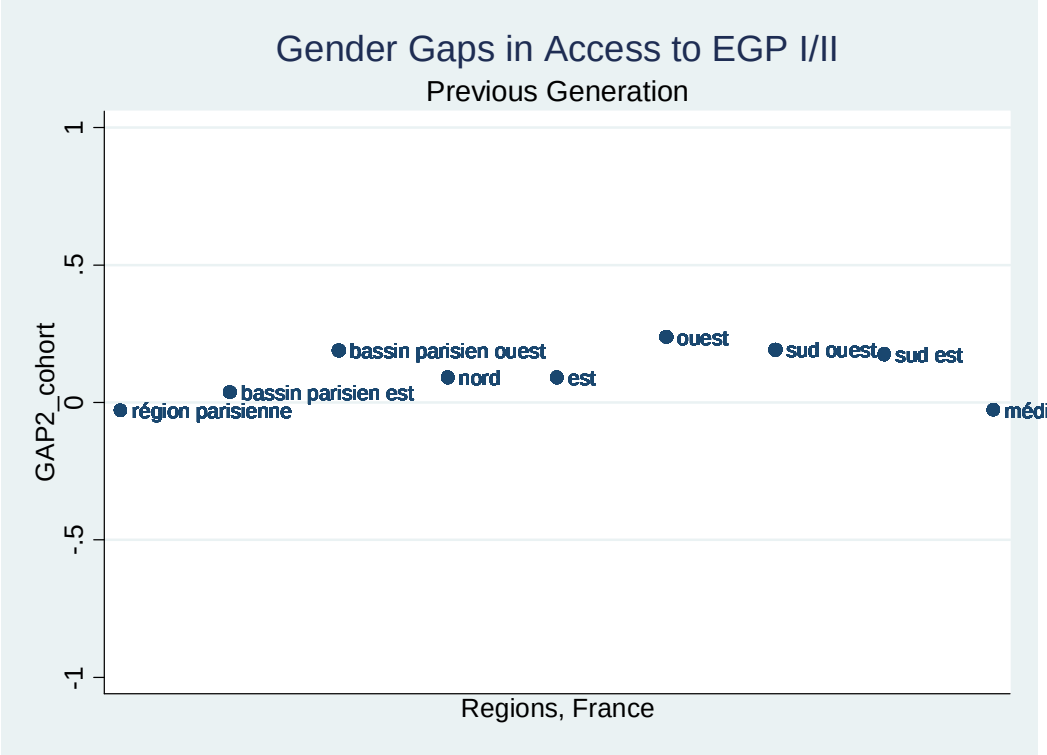
Figure A2. Job-Skill Factor Scores by Class, ESS (2004-2005)



Notes: I: Higher-grade professionals, administrators and managers; II: Lowe-grade professionals, administrators and managers and higher-grade technicians; IIIa: Higher-grade routine non-manual employees; IV: Small proprietors and employers and self-employed workers; V/VI: Lower-grade technicians, skilled manual workers and supervisors of manual workers; IIIb/VII: Unskilled service, manual and agricultural workers.

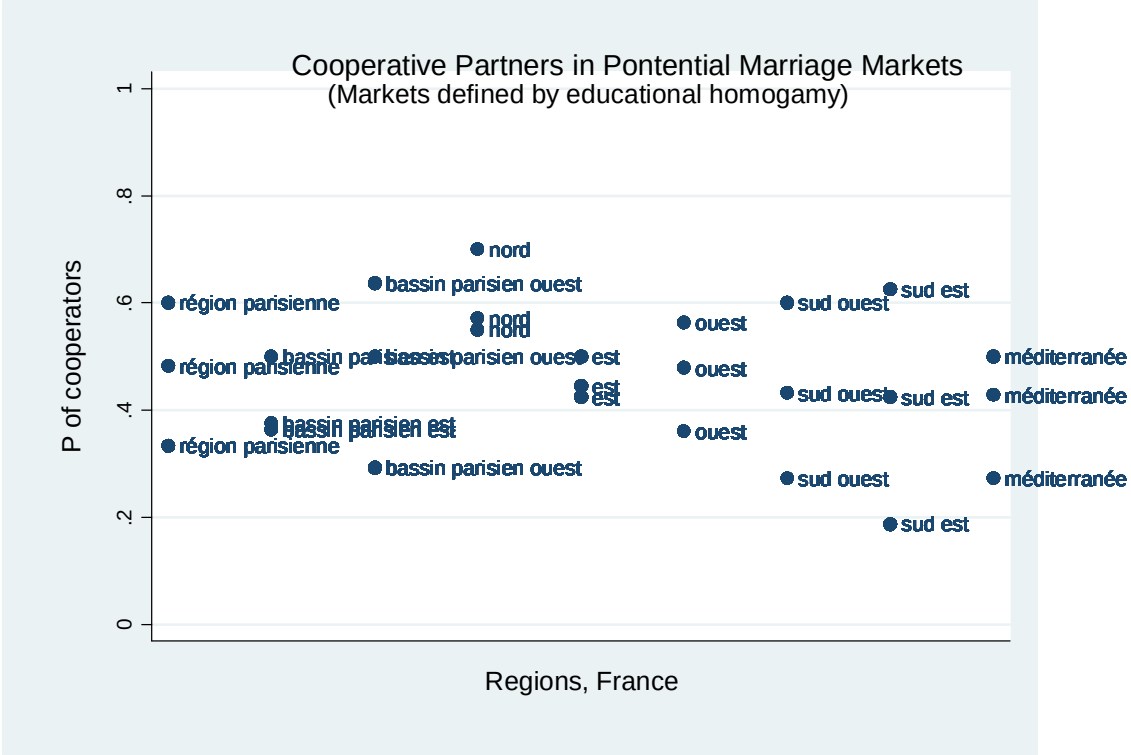
Source: ESS, Second Round, Turkey excluded (2004-2005).

Figure A3. The Regional Visibility of High-Skilled Women in the Previous Generation (1949-1968), The French Case, ESS (2004-2005)



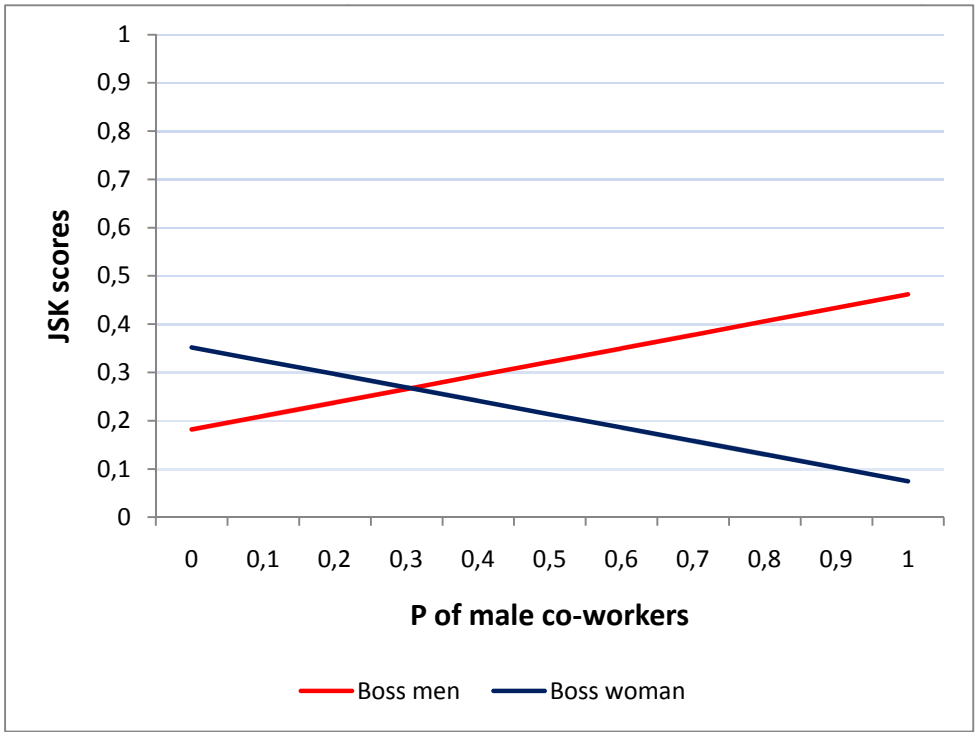
Source: ESS, Second Round, France (2004-2005).

Figure A4. The Distribution of Cooperative Men in Potential Marriage/Partnership Markets: The French Case, ESS (2004-2005)



Source: ESS, Second Round, France (2004-2005).

Figure A5. Women's Predicted JSK Scores by Gender of Boss or Immediate Supervisor and Proportion of Male Co-Workers at their Firms According to Model 9, Table 5.



Notes: Predicted values are for Austrian women of 25 years of age and 10 years of schooling with a proportion of cooperative men at their regions of 0.2, a regional gap in professionals in their preceding generation of 0.10 and a social-ambition score of 0.

Source: Estimated by the author (Model 8, Table 5) using data from the European Social Survey, Second Round, All Countries Except Turkey (2004-2005).

NOTES

[1] The author wishes to thank the Norwegian Social Science Data Services (NSD) as the data archive and distributor of the European Social Survey Data (ESS). The ESS Central Co-ordinating Team (CCT) and the producers bear no responsibility for the uses of the data, or for interpretations or inferences based on these uses. I would like to thank Michel Biggs, Maria Luengo-Prado, Leire Salazar and Ernesto Villanueva for their valuable input. All errors are my own.

[2] The importance of gender preferences as determinants of labor-market behavior have also been stressed by Hakim (2000; 2003). Yet Hakim's *preference theory* treats differences in core-preferences as reflecting personal agency to a much greater extent than socialization approaches would concede. Hakim's theory does not explain the origin of core preferences but rather the conditions under which these preferences, which are treated as exogenous, translate into outcomes.

[3] Our literature review does not intend to be exhaustive. There are obviously other approaches that do not fit so nicely into neither of these two competing views. In particular, there is a whole body of research focusing on discrimination and social closure processes operating inside organizations that the twofold classification presented above fails to represent (see e.g. Castilla 2008, Fernández-Mateo 2009; Fernandez and Sosa 2005; Mun 2008; Petersen and Saporta 2004; Tomaskovic-Devey and Skaggs 2002). Yet I would argue that this twofold classification captures the two poles of what constitutes an entrenched debate in the literature on gender stratification (see England et al. 2000; Tam 2000).

[4] New training models in economics question the theoretical usefulness of distinguishing between general and firm-specific skills —a distinction that was central in the early formulations of human capital theory (see Becker 1993[1964]: 33-49). Accumulated evidence shows that firms are very frequently willing to provide training in general skills, even when such skills are by definition transferable to potential competitors (see, e.g. Acemoglu and Pischke 1998; Kessler and Lülfesmann 2006; Loewenstein and Spletzer 1998; Parent 2000). Furthermore, it could be argued that often neither firms nor workers can accurately assess the degree of transferability of the skills provided/learnt in the job so that the distinction between general and firm-specific human capital is blurred in practice. What all parties know for sure is that some jobs require learning a considerable amount of new skills, whereas others do not (see also: Gathmann and Schönberg 2010; Lazear 2003; Leuven 2005).

[5] Discrimination by taste is not considered a viable profit-maximizing strategy for employers and hence it is not discussed here. See, however, Section 6.1.

[6] Note that $\frac{1}{2}\beta i^2 = [(\alpha + \beta t - \alpha) \cdot i] / 2$

[7] Expression [2] follows from:

$$0 < t(\alpha - R_L) + \tfrac{1}{2}\beta t^2$$

$$0 < (\alpha - R_L) + \tfrac{1}{2}\beta t$$

$$R_L - \alpha < \tfrac{1}{2}\beta t$$

$$t > 2(R_L - \alpha)/\beta$$

[8] Social-closure theories in sociology would constitute an example of constraining social-interactions. According to these theories, gender differences in job training would be the result of the active role that more powerful individual actors (particularly male coworkers and male supervisors) play in excluding status inferiors (i.e. women) from the best and most desired jobs, which tend to be those requiring specific training (Tomaskovic-Devey and Skaggs 2002:109). Sex-differences in job-allocation are therefore seen as the result of the monopolization of privileged positions at the workplace, which would be a micro-level manifestation of gender politics (Tilly 1998). I do not discuss peer closure effects in this paper, yet it must be noted that the proposed model could be easily extended to incorporate such effects. See further Section 6.1.

[9] Information updating models typically use the maximin rule, the Hurwicz rule or, most commonly, Bayes rule (for a discussion see e.g. Breen 1999; Manski 2004).

[10] For a more general discussion of the methodological difficulties inherent to the estimation of contextual effects see Achen and Shively (1995), Blalock (1984), Cotter et al (1997:728-29), DiPrete and Forristal 1994, Hannan (1992) and Manski (1993; 2000).

[11] Low geographical mobility reduces aggregation bias —i.e. the possibility that individuals are attracted to particular social context due to certain macro-level characteristics associated to the dependent variable. Geographical immobility is a particularly important condition in the case of social-learning where the regional distribution of given characteristics in preceding generations is used to predict the JSK investments of individuals currently residing in those regions.

[12] My dataset does not include Turkey nor Italy, which are however available in the latest versions of the ESS. The Italian dataset does not include information on several crucial variables for testing the model. See: http://www.europeansocialsurvey.org/

[13] Endogenous household specialization is expected since spouses' labor-market power, which is correlated with JSK, influences the distribution of household chores (see e.g. Bianchi *et al.* 2000; Evertsson and Nermo 2004; Lundberg and Pollak 1996).

[14] Gender differences in JSK net of age, education, industry and firm's size are indeed significantly larger in the unrestricted sample than they are in the restricted one. For instance, the country FE estimate for the female dummy in the full sample is -0.16 (t=-11.56; P>|t| 0.000), whereas in the restricted sample is -.056 (t=-1.76; P>|t| 0.079). This suggests that sample restriction minimizes gender differences in JSK.

[15] This is measured using an interval scale that ranges from 1 (*less than a week*) to 8 (*more than 2 years*).

[16] This is measured using a 4-interval Likert scale ranging from 1 (*not at all true*) to 4 (*very true*).

[17] Training opportunities are likely to increase in larger firms. Also specific skill requirements are likely to vary according to firms' activity. Empirical analyses show that respondents' employed in finances, business & real estate; administration; and research, education & health have higher average scores in the JSK factor. In order to account for these differences, whilst optimizing on the models' degrees of freedom, a dummy variable separates these industries from the rest.

[18] Using direct information from the job-skill factor to compute regional sex-distributions reduces the sample size as the response rate for occupations is higher than the rate for the variables that form the JSK factor. Also, it could be argued, that agents do not observe specific skill investments directly but only people's actual occupations.

[19] V is positive for almost 70 per cent of all respondents in the full sample. That is, for the majority of respondents the previous generation showed a larger proportion of professionals amongst men than amongst women. If we only considered higher professionals (class I of the Goldthorpe class schema), this figure would go up to roughly 80 per cent in both the full and the restricted samples.

[20] Different definitions of cooperative women have been tested but none of them has significant effects on men's observed levels of JSK (results available on request).

[21] The ESS asks respondents what proportion of the total time devoted to weekly housework is spent by themselves but clusters responses into six categories (% for men in parenthesis): 1) *none or almost none* (27%) 2) *up to a quarter* (29%) 3) *more than a quarter, up to a half* (30%) 4) *more than a half, up to three quarters* (8%) 5) *more than three quarters, less than all of the time* (2%) 6) *all of the time* (3%). Answers 4, 5 and 6 are considered cooperative men.

[22] 63 per cent of men in the full sample are married or cohabiting, 44 per cent of them (claim to) do more than 1/4, up to 1/2 of the weekly housework or more. This figure goes down to 37 per cent for husbands with primary education, 46 per cent for those with secondary education and 52 per cent for those with tertiary education.

[23] All the indicators that form this scale are part of what Schwartz (2006) identifies as "mastery cultures", which are more prevalent in developed societies. Yet in the context of this paper I favor an interpretation of the scale as capturing individuals' heterogeneity in values, orientations and traits possibly leading to differences in skill-investment choices amongst individuals of any given national/cultural context.

[24] These attitudinal indicators could be endogenous to JSK (see Polavieja 2009). Yet this problem is irrelevant for the purposes of the current analysis, as these controls are only used as blockers of preference heterogeneity and blocking can be efficiently achieved with endogenous indicators. A more serious and intractable problem is that there is no statistical way of assessing full blocking unless the blockers used absorb all the statistical effect of a given independent variable on the analyzed outcome. In all other instances full blocking can only be assumed. The credibility of such an assumption will rest on the validity, the reliability and the scope of the attitudinal indicators used.

[25] The estimates obtained using a 3-level HLM are however highly comparable to those obtained using the preferred specification —results available on request.

[26] If the same model is fitted to the full sample, the coefficient for gender attitudes becomes highly significant (β=-.020; t=-7.88; P>|t| 0.000), which suggests a different correlation pattern by age.