

# Essays on the Economics of Work and Non-Traditional Families

by

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## CHAPTER I

### Introduction

Economists have long recognized a connection between outcomes in the home and outcomes in the labor market. A large theoretical and empirical literature has explored the implications of this connection for men and women in traditional families – primarily heterosexual, married couples who live together, often with their children. Families have evolved considerably in the last half-century, however, and traditional families comprise a declining proportion of households in the United States. This dissertation contributes to a broader scope for family economics with essays that examine the work-family trade-offs of two groups of non-traditional couples: same-sex couples and committed couples who live apart. The results presented in the dissertation show that families are innovative in the face of changing constraints and suggest that those in the vanguard of family change have much to teach us, not just about their own family lives, but about family life in general.

The first essay shows that marriage-market incentives can motivate observed differences in work and family arrangements between sexual minorities and heterosexual men and women. Empirical studies have identified a sex-asymmetric relationship between sexual orientation and labor-market outcomes: gay men earn less and work less in the market than heterosexual men, while lesbians earn more and work more than heterosexual women. Empirical studies have also found that same-sex couples share

household and market work more equally than different-sex couples and are less likely to have children. Existing theoretical explanations for the impact of sexual orientation on labor-market outcomes reference theories developed with different-sex couples in mind and do not offer clear predictions about the division of labor in same-sex households. I show that marriage markets, which are important determinants of marital outcomes for heterosexual men and women, can also shape differences between sexual minorities and their heterosexual peers.

I develop the first formal model of a same-sex marriage market and identify a consequential structural difference between this market and the different-sex marriage markets economists have traditionally studied. In light of this structural difference, I argue that same-sex marriage markets engender stronger incentives than different-sex marriage markets for both men and women to prepare for work in both the home and the market. In addition, I describe conditions under which the specialization patterns of same-sex couples are likely to resemble those of different-sex couples and conditions under which they are likely to diverge. Finally, I argue that, because specialized investments are more difficult to coordinate in same-sex marriage markets, the relative scarcity of children in same-sex households may be a consequence, as well as a cause, of less extensive specialization.

The second essay, which is collaborative work with Uniko Chen, Brooke Helpie McFall, and Robert J. Willis, describes the surveys and dataset for the third essay and provides context for the discussion in that essay. In particular, the second essay uses results from the Job Seekers Project, a longitudinal survey project tracking the personal and professional lives of early-career economists, to provide a current, comprehensive summary of the job-market outcomes of new entrants to the junior PhD job market in economics. We provide the first description of experiences with applications, interviews, fly-outs, and job offers based on a representative sample of new entrants to the job market, and we demonstrate a correspondence between job-market

outcomes and pre-market preferences and expectations using unique prospective measures. We find some evidence that some job candidates from countries in Asia and job candidates from lower-ranked departments fare worse than job candidates from the United States and job candidates from top-ten departments. On the whole, however, the Job Seekers survey suggests that job candidates are optimistic about their prospects when they enter the job market and satisfied with their results when they leave it.

The third essay, which is collaborative work with Brooke Helppe McFall, uses data from the Job Seekers project to assess the impact of dual-career location constraints on the initial job placements and relationship outcomes of new economists. We provide the first estimates of the prevalence of *tied migration* (moving with a partner to an individually sub-optimal location) and *non-cohabitation* (living apart from a partner for purposes of moving to an individually optimal location) based on representative data from a known sub-population of dual-career couples. In addition, we describe the career and relationship costs associated with each outcome. We find that non-cohabitation is a surprisingly common margin of adjustment for couples facing joint migration constraints. New economists in our sample were as likely to live apart from their spouse or partner in the year after the job market as to sacrifice a first-choice job in order to live together. Because the standard economic model of joint migration does not allow for non-cohabitation, it cannot account for these results. We develop a simple extension of the model and identify, theoretically and empirically, the conditions under which couples are most likely to live apart. We argue that, for couples who have invested heavily in the human capital of both partners and whose career opportunities are geographically diffuse, moving up sometimes means moving out.

## CHAPTER II

### Same Sex, Same Skills?

#### 2.1 Introduction

The family lives of lesbians and gay men have recently been the focus of significant social and legal controversies. In the United States, between 2000 and 2005, the number of self-identified same-sex couples grew five times faster than the general population (Gates, 2006). As the visibility of sexual minorities has grown, public opinion has divided over the meaning and value of same-sex marriage and parenting (Herek, 2002; Avery et al., 2007). In some states, courts, legislators, or voters have moved to limit opportunities for family formation by same-sex couples; in other states, they have moved to expand opportunities (Polikoff, 2009; Meyer, 2010). Across the country, battles are ongoing over the rights of sexual minorities to legal recognition for their partnerships and support in their roles as parents.

In part, concerns about sexual minorities and their families reflect anxieties about changing gender norms and the evolving roles of men and women at home and in the workplace (Appleton, 2005; Polikoff, 2005; McVeigh and Diaz, 2009; Gaines and Garand, 2010). Questions about gender, work, and family, are central to debates about same-sex marriage and parenting: How do men and women perform as spouses and parents? Do husbands and wives, or fathers and mothers, play distinctive roles? To the extent that work and family roles differ by sex, are the differences rooted in

innate differences between men and women, or are they a product of cultural norms and expectations? Do families function best when they are headed by one man and one woman?

Empirical evidence suggests that gay and lesbian families differ from heterosexual families in some respects. Studies using data from several countries have found that gay men earn less than heterosexual men, while lesbians earn more than heterosexual women (Badgett, 1995; Klawitter and Flatt, 1998; Allegretto and Arthur, 2001; Clain and Leppel, 2001; Berg and Lien, 2002; Black et al., 2003; Blandford, 2003; Plug and Berkhout, 2004; Arabsheibani, Marin and Wadsworth, 2005; Carpenter, 2005, 2007; Jepsen, 2007; Antecol, Jong and Steinberger, 2008).<sup>1</sup> Similarly, a small group of studies have found that gay men work less in the labor market than heterosexual men, while lesbians work more than heterosexual women. (Antecol and Steinberger, 2009; Leppel, 2009; Tebaldi and Elmslie, 2006). Descriptive analyses of labor-force participation and work hours suggest that same-sex couples share market work more equally than different-sex couples (Black, Sanders and Taylor, 2007). Finally, same-sex couples and are less likely than different-sex couples to have children (Black et al., 2000; Black, Sanders and Taylor, 2007).

The most prominent economic theory of household specialization explains differences between sexual-minority families and heterosexual families as outcomes of biological differences between men and women (Becker, 1991). In this theory, heterosexual women specialize in home production, and heterosexual men specialize in market work, because biological differences between the sexes give women a comparative advantage at home and men a comparative advantage in the market. Same-sex

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<sup>1</sup>Depending on the data source, studies identify sexual minorities using reports of attraction to same-sex others; desire for sex with same-sex partners; sexual experience with same-sex partners; self-identification as gay, lesbian or bisexual; or cohabitation with a same-sex partner. Some studies treat sexual minorities as a single group. Others conduct separate analyses for gay men, lesbians, and bisexual men and women.

The finding that lesbians earn more than similar heterosexual women is not without exception. Badgett (1995) and Carpenter (2005) do not find evidence of a lesbian earnings premium.

partners do not have an innate difference in comparative advantage, so they gain less than different-sex partners from specialization.

This paper argues that marriage markets provide a stronger theoretical basis than biology for the stylized facts about work, family, and sexual orientation.<sup>2</sup> In a compelling criticism of the biological theory of household specialization, [Hadfield \(1999\)](#) shows that biological differences in comparative advantage are not necessary to motivate a division of labor between heterosexual men and women. Instead, cultural norms conditioning work and family roles on sex may arise in heterosexual marriage markets because young men and women who are intrinsically identical seek to coordinate specialized human capital investments with wives and husbands they have not yet met. I extend Hadfield's coordination theory of household specialization to show that marriage-market incentives can motivate the differences we observe between sexual minorities and their heterosexual peers. The central insight of this paper is that, because gay and lesbian marriage markets are not divided by sex, sexual minorities cannot use sex as a signal for optimal human capital accumulation before marriage.

I analyze the accumulation of specialized human capital in the context of same-sex and different-sex marriage markets when couples benefit from specialization and people make human capital investments before they know whom they will marry. For each marriage market, I describe the equilibrium assignment of partners, conditional on the distribution of pre-marital human capital investments in the market. I then characterize the returns to pre-marital human capital investments; the equilibrium investment distributions of gay men, lesbians, heterosexual men, and heterosexual women; and the human capital profiles of same-sex and different-sex couples. I show that, because gay men and lesbians, but not heterosexual men and women, compete with their prospective partners in the marriage market, optimal human capital accumulation differs by sexual orientation: gay men accumulate less market-oriented

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<sup>2</sup>Throughout the paper, I treat marriage and unmarried cohabitation as equivalent.

human capital than heterosexual men, and lesbians accumulate more market-oriented human capital than heterosexual women. I also show that, when marital matching is random, same-sex partners are less likely than different-sex partners to have complementary human capital.

This paper makes two contributions. First, I present a theory of marital matching and pre-marital human capital accumulation that includes both sexual minorities and heterosexual men and women. I develop a formal model of a same-sex marriage market and identify a consequential structural difference between same-sex marriage markets and the different-sex marriage markets economists have traditionally studied. Second, I provide a clear theoretical rationale for several stylized facts about sexual minorities. The finding that same-sex marriage markets encourage balanced human capital investments provides a rationale for the fact that the earnings and work hours of gay men and lesbians fall between those of heterosexual men and heterosexual women. The finding that same-sex partners are less likely than different-sex partners to have complementary human capital provides a rationale for the fact that same-sex couples share market work more equally than different-sex couples and are less likely to have children.

While I focus on differences between sexual minorities and heterosexual men and women, this paper highlights issues of broad importance for family economists. Recent decades have seen dramatic changes in the structure of families and households in the United States. Beyond the growing number of same-sex couples, there are more different-sex couples cohabiting outside of marriage ([Bumpass and Lu, 2000](#)), more people living alone ([Hobbs and Stoops, 2002](#)), more single-parent families ([Bianchi and Casper, 2000](#)), and more families that cross household boundaries ([Cherlin, 2010](#)) than there were fifty years ago. Models developed to predict or explain the behavior of heterosexual married couples may not apply to these or other non-traditional groupings because they contain assumptions that do not generally hold. To understand

the full range of modern families and households, economists will have to revisit their fundamental assumptions and rebuild models on more general foundations.

## 2.2 Theoretical framework

In his foundational theory of household specialization, [Becker \(1991\)](#) argues that the specialization patterns of couples reflect the comparative advantage of the partners. Partners with large endowments of market-oriented human capital earn significant rewards in the labor market and pay a high opportunity cost for time spent at home. Partners with smaller endowments of market-oriented human capital face contrasting incentives. To the extent that couples consume goods and services produced at home, Becker indicates that they assign primary responsibility for those goods and services to the partner with less market-oriented human capital. As a result of this division of labor, men and women who invest heavily in market-oriented human capital are likely to spend more time in the labor market and less time at home than those who limit their acquisition of market-oriented human capital.

The human capital endowments that partners bring to marriage depend on the investments they make in their education and training before marriage. Before they form partnerships and establish joint households, young men and women know that the investments they are making will shape the opportunities of their future households. Accordingly, they tailor their investments to suit the roles they expect to play in those households ([Mincer and Polachek, 1974](#); [Becker, 1991](#)). Young people who expect to spend most of their time working in the labor market invest heavily in market-oriented human capital; those who expect to spend substantial time working at home limit their market-oriented investments.

Because people begin accumulating human capital before they form partnerships, the signals young men and women receive about their future roles are a key link between the time allocation of couples and the human capital investments of individ-

uals. [Becker \(1991\)](#) identifies sex as the most important of these signals. Women, Becker maintains, have a comparative advantage in household work because they bear and nurse children. Men have a comparative advantage in market work because they are less biologically committed to children. Women who expect to marry men know that almost all men have a comparative advantage in market work, relative to almost all women, so they accurately expect that their future partners will have a comparative advantage in market work, relative to themselves. Women respond to these expectations by preparing to specialize in home production and by limiting their accumulation of market-oriented human capital. The reverse is true for men.

Recently, several papers have argued that marriage markets, and not biology, imbue sex with information about work and family roles. [Hadfield \(1999\)](#) shows that, even when men and women are intrinsically identical, a desire to coordinate specialized human capital investments before marriage can prompt them to adopt traditional gender roles. When people make human capital investments before they know whom they will marry, and frictions in the marriage market interfere with assortative matching, unmarried men and women face uncertainty about the human capital endowments of their future partners. Fixed gender roles eliminate this uncertainty by requiring that people of the same sex make the same investments. When men are homogenous with respect to pre-marital human capital, a woman need not know which man she will marry to choose human capital investments that will complement his. When women are homogenous, a man need not know which woman he will marry to choose human capital investments that will complement hers.

In a similar vein, [Engineer and Welling \(1999\)](#) show that the problem of coordinating specialized human capital investments can prompt men and women to adopt traditional gender roles even when some women are more talented at market work and some men are more talented at household work. Like Hadfield, Engineer and Welling assume that frictions in the marriage market cause uncertainty about the

human capital endowments of future partners. They find that, when training is sufficiently important, relative to ability, sex can trump ability as a guide to optimal human capital accumulation before marriage. [Lommerud and Vagstad \(2006\)](#) obtain results that parallel those of Engineer and Welling in a model where employers, rather than workers, control human capital accumulation. They show that employers may direct men and women with identical abilities to different tasks because they anticipate household specialization and expect future husbands and future wives to play different roles.

Finally, [Baker and Jacobsen \(2007\)](#) show that, when partners bargain over their marital surplus, and frictions in the marriage market force some people to spend time unmarried, strategic considerations can induce men and women to over-invest in human capital that improves their well-being outside of marriage. Baker and Jacobsen argue that a sexual division of labor that prescribes some tasks for each sex and proscribes other tasks can reduce incentives for strategic over-investment and may increase social welfare. These papers are part of a growing theoretical literature that explores the implications of market incentives for pre-match investments in different-sex matching markets, including heterosexual marriage markets ([Echevarria and Merlo, 1999](#); [Engineer and Welling, 1999](#); [Hadfield, 1999](#); [Cole, Mailath and Postlewaite, 2001](#); [Cole, J. Mailath and Postlewaite, 2001](#); [Felli and Roberts, 2002](#); [Peters and Siow, 2002](#); [Lommerud and Vagstad, 2006](#); [Baker and Jacobsen, 2007](#); [Iyigun and Walsh, 2007](#); [Nosaka, 2007](#); [Chiappori, Iyigun and Weiss, 2009](#)).

Gay men and lesbians, like heterosexual men and women, meet and match in marriage markets.<sup>3</sup> Economists, however, have not developed formal models of these markets. Empirical economists have turned to the biological theory of household

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<sup>3</sup>By “gay men” and “lesbians” I mean men who seek male partners and women who seek female partners. In my theoretical analysis, I abstract away from the true complexity of sexual behavior and identity and assume that sexual orientation is binary and exogenous. Throughout the theoretical exposition, I use “gay men” to refer to men who seek *only* male partners and “lesbians” to refer to women who seek *only* female partners.

specialization to explain the sex-asymmetric relationship between sexual orientation and labor-market outcomes. Following Becker, some have attributed differences between sexual minorities and heterosexual men and women to the biological similarity of same-sex partners (Plug and Berkhout, 2004; Black, Sanders and Taylor, 2007). Others have simply observed that same-sex couples cannot adopt a sexual division of labor and have posited that gay men and lesbians specialize less intensively than heterosexual men and women in the tasks members of their sex have traditionally performed (Allegretto and Arthur, 2001; Black et al., 2003; Jepsen, 2007).

While the biological theory of household specialization can account for the average differences researchers have found between sexual minorities and their heterosexual peers, it does not make clear predictions about the distribution of human capital and work hours among sexual minorities. Nor does the biological theory make clear predictions about the specialization patterns of same-sex couples. On its own, the absence of a sexual division of labor between same-sex partners tells us little about the actual division of labor in same-sex households. In one scenario that is consistent with the empirical evidence, same-sex partners share home and market work more equally than different-sex partners, and the moderate average outcomes of sexual minorities approximate the experiences of individual gay men and lesbians. I call this scenario *egalitarianism*. In an alternative scenario, same-sex partners adopt household roles that resemble those of different-sex couples. One partner acts as a traditional man, the other acts as a traditional woman, and the moderate average outcomes of sexual minorities mask polarization among individual gay men and lesbians. I call this scenario *specialization*.

While Becker (1991) asserts that same-sex couples adopt a less extensive division of labor than different-sex couples, his theory does not unambiguously support his assertion. The biological theory of household specialization supplies reasons that same-sex couples might practice either egalitarianism or specialization. On one hand,

if Becker is right that biological differences between men and women drive the division of labor between different-sex partners, same-sex couples might be more egalitarian than different-sex couples because they have more similar biological endowments. To the extent that gains from specialization are larger when couples have children, same-sex couples might also be more egalitarian because they are less likely to be parents.

On the other hand, same-sex couples might adopt specialized roles because investments in specific human capital yield higher returns when the human capital is used more intensively. Although Becker invokes biology to explain the *sexual* division of labor between men and women, he argues that increasing returns to specific human capital make *some* division of labor efficient even when household members are intrinsically identical. It is not obvious why, if gains from specialization are available to all households, same-sex couples would choose to forgo these gains. There is, in principle, no reason why same-sex couples could not assign one partner to focus on market work and the other to focus on home production. In keeping with these observations, [Antecol and Steinberger \(2009\)](#) report that lesbians they classify as secondary earners spend less time in market work overall and reduce work hours more in response to children than do lesbians they classify as primary earners.

This paper extends the coordination model of household specialization to sexual minorities and uses the model to identify conditions under which same-sex couples are likely to practice egalitarianism. My analysis shows that, because gay and lesbian marriage markets are structured differently than heterosexual marriage markets, sexual orientation conditions the value of sex as a signal for optimal human capital accumulation. In heterosexual marriage markets, gender roles can facilitate specialized human capital investments before marriage because every married couple contains one man and one woman. No matter how heterosexual couples form – even if they form randomly – complementary investment norms for men and women guarantee

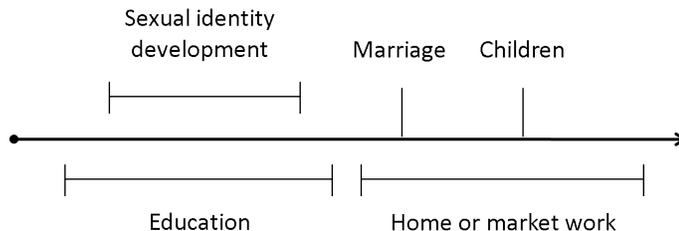
that partners will have complementary human capital. Thus, when there are frictions in heterosexual marriage markets, sex contains valuable information about the roles of men and women. On the basis of their sex alone, heterosexual men and women who have not yet met their partners can determine whether they or their partners will be the market specialists in their future households.

Gender roles cannot facilitate specialized human capital investments for same-sex couples because gay and lesbian marriage markets are not divided by sex. Every gay couple contains two men, and every lesbian couple contains two women. While complementary investment norms for men and women might ensure that the human capital of gay men complements the human capital of lesbians, they are of little help to same-sex couples. Indeed, I posit that gay men and lesbians transgress traditional gender norms because these norms do not promote their interests. Since gay and lesbian marriage markets are same-sex markets, there is no coordinating mechanism that sexual minorities can substitute for sex. Thus, when there are frictions in the gay and lesbian marriage markets, same-sex couples are less likely than different-sex couples to have complementary human capital and are more likely to be egalitarian.

The essential argument of this paper is that sex and sexual orientation interact to shape expectations about work and family roles. Because they shape expectations about work and family roles, sex and sexual orientation also shape the investment decisions of unmarried men and women, and the consumption and time allocation decisions of couples. Human capital accumulation and family formation unfold in tandem, with decisions and outcomes in each realm influencing decisions and outcomes in the other. Figure 3.1 presents stylized timeline of this process. The figure shows, and I will assume, that some human capital investments are made after gay men and lesbians adopt minority identities, but before men and women form partnerships and establish joint households.

The assumption that couples benefit from specialization is central to my analysis

Figure 2.1: Stylized timeline of human capital accumulation and family formation



and merits elaboration. Both the biological and coordination theories of household specialization present specialization as the primary source of marital surplus. [Becker \(1991\)](#) suggests that men and women form joint households to exploit biological differences in comparative advantage. Proponents of the coordination theory question Becker’s emphasis on biology, but retain his emphasis on specialization. Whether specialization models of marriage are germane in an era of low fertility and dual-earner couples is an important question. My analysis does not require that men and women live in separate spheres or that couples embrace gender roles reminiscent of the 1950s. The conclusions I present hold as long as optimal human capital accumulation entails some degree of differentiation between partners.

Empirical evidence suggests that, even in the contemporary United States, heterosexual couples allocate tasks on the basis of sex. While it is now common for both husbands and wives to work outside the home, married women continue to spend more on household work and less time on market work than married men ([Sayer, 2005](#); [Bonke et al., 2008](#)). Thus, while there may be fewer breadwinners and homemakers than there were fifty years ago, there are still primary and secondary earners. The human capital investments in my model should be understood in this context, as investments that are optimal for primary earners or for secondary earners.

## 2.3 Stylized facts

For sexual orientation to influence human capital accumulation, young men and women must know their orientation before their human capital investments are complete. [Savin-Williams and Diamond \(2000\)](#) present evidence that key milestones in the development of minority sexual identities do, in fact, occur while young people are still acquiring education and training. The researchers interviewed men and women between the ages of 17 and 25 who expressed physical or romantic interest in members of their own sex. On average, these young people had experienced their first same-sex attractions before the age of 10 and their first same-sex sexual contact before the age of 17. By the end of high school, the average interviewee identified as a sexual minority and had disclosed that identity to others.

The findings of [Savin-Williams and Diamond](#), which are summarized in [Table 2.1](#), are broadly consistent with the findings of other studies of young adults. This body of research has not used probability samples and does not provide information about the developmental trajectories of older gay men and lesbians. Nevertheless, the studies indicate that some sexual minorities are aware of their minority status at an early age. It is sexual minorities with an early awareness of difference whose investment choices are most likely to be influenced by expectations of entering a same-sex marriage market. While there are certainly gay men and lesbians who develop minority identities later in life, the insights of this paper should be understood as applying to sexual minorities who come out as adolescents or young adults.

Whatever their sexual orientation, young men and women will be responsive to marriage-market incentives only if they expect to form partnerships. This paper argues that gay men and lesbians make different human capital investments than heterosexual men and women because they expect their partners to have made different investments. It is possible, however that sexual minorities have different expectations than their heterosexual peers, not just about whom they will marry, but also about

Table 2.1: Mean ages at sexual identity milestones

	Men	Women
First same-sex attractions	7.7	9.0
First same-sex sexual contact	14.1	16.4
First self-labeling	16.4	17.6
First disclosure	17.9	17.9

*Source:* [Savin-Williams and Diamond \(2000\)](#)

*Notes:* Data are from interviews with 78 men and 86 women between the ages of 17 and 25 who expressed physical or romantic interest in members of their own sex.

whether they will marry. If sexual minorities believe, for example, that they are less likely to find partners, they may invest more heavily than heterosexual men and women in human capital that improves the well-being of single people.

[Black, Sanders and Taylor \(2007\)](#) present evidence that the likelihood of partnering is not substantially different for gay men or lesbians than it is for heterosexual men and women. Using data from the General Social Survey, a nationally representative sample of United States households, they identify gay and lesbian households as households in which the person interviewed had only same-sex sexual partners in the year before the survey and partnered households as households in which the person interviewed had a “regular” partner and lived with at least one other adult. [Black, Sanders and Taylor](#) report that 49 percent of gay households and 63 percent of lesbian households are partnered. The comparable figure for heterosexual households is 59 percent. Table 2.2 summarizes these results. While gay households are slightly less likely than heterosexual households to be partnered, and lesbian households are slightly more likely to be partnered, the findings of [Black, Sanders and Taylor \(2007\)](#) do not suggest that sexual orientation should have a dramatic impact on expectations about partnership formation.

With respect to work and family outcomes, sexual minorities differ from heterosexual men and women in several important ways. In the remainder of this section, I use

Table 2.2: Prevalence of partnerships

	Partnered
Gay men	49%
Lesbians	63%
Heterosexuals	59%

*Source:* [Black, Sanders and Taylor \(2007\)](#)

*Notes:* Data are from the General Social Survey between 1989 and 2004. Gay men and lesbians are men and women who had only same-sex sexual partners in year before the survey. Partnered people are people who had a “regular partner” and lived with at least one other adult. The sample includes 212 households in which the person interviewed was a gay man, 156 households in which the person interviewed was a lesbian, and 18,707 households in which the person interviewed was a heterosexual man or woman.

data from the 2006-08 three-year sample of the American Community Survey, accessed through the Integrated Public Use Microdata Series (IPUMS), to illustrate differences in time allocation and household production between same-sex and different-sex couples ([Ruggles et al., 2010](#)). The American Community Survey identifies couples on the basis of relationships between household heads and other household members. Married couples are men and women who are classified on the survey form as the spouse of the household head and the different-sex household heads with whom they are linked. Unmarried couples are men and women who are classified on the survey form as the unmarried partner of the household head and the same-sex or different-sex household heads with whom they are linked.<sup>4</sup> I construct a sample of couples that includes all of the same-sex couples and 10 percent each of the different-sex married and unmarried couples in the American Community Survey sample.

For each work and family outcome I consider, I plot means for groups defined by sex and sexual orientation against age, starting at age 20 and ending at age 60. For

<sup>4</sup>The American Community Survey form includes several additional categories for men and women who live with household heads to whom they are not related by blood or a federally recognized marriage: roomer or boarder, housemate or roommate, foster child, and other non-relative. Consequently, household respondents are not likely to classify household members who fall into these categories as unmarried partners. Because the federal government does not recognize same-sex marriages, the Census Bureau reclassifies same-sex spouses as same-sex unmarried partners.

individual-level outcomes, I plot means for gay men, lesbians, heterosexual men, and heterosexual women. For couple-level outcomes I plot means for gay couples, lesbian couples, and heterosexual couples. In each case, I apply the person-level or household-level sample weights provided by IPUMS. With the exception of the residuals from an earnings regression that includes these variables as covariates, I also weight the means to account for differences in race, ethnicity, urbanicity, and region across groups.<sup>5</sup>

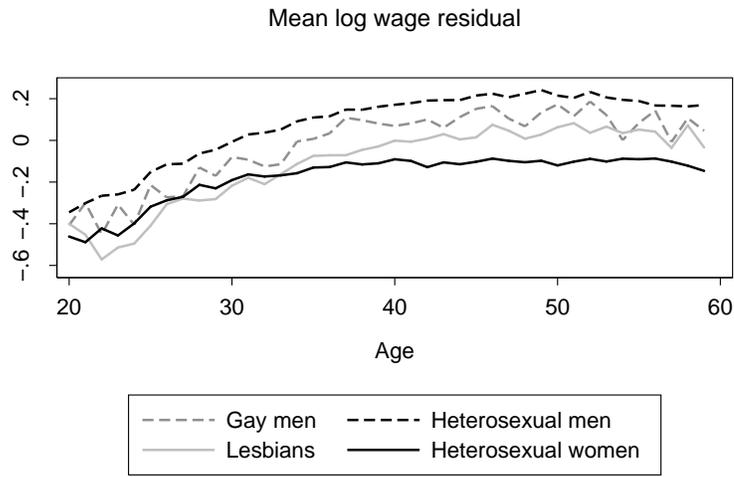
To start, Figure 2.2 presents a graphical illustration of the stylized facts about sexual orientation and earnings. As discussed above, empirical studies in labor economics have found that gay men earn less than similar heterosexual men and that lesbians earn more than similar heterosexual women. I illustrate these patterns by plotting mean residuals from a log wage regression in which race, ethnicity, urbanicity, region, and educational attainment enter as covariates. The patterns in Figure 2.2 broadly corroborate the findings of earlier studies. Gay men earn less than heterosexual men at all ages, and lesbians earn more than heterosexual women after early adulthood.

To the extent that differences in earnings between men and women with the same observable characteristics, including the same educational attainment and potential labor-market experience, reflect differences in unobservable human capital, Figure 2.2 suggests that gay men invest less in market-oriented human capital than heterosexual men and that lesbians invest more than heterosexual women. The finding that lesbians earn less than heterosexual women at young ages appears to contradict the general pattern. It is worth noting, however, that lesbians have a steeper age-earnings profile than heterosexual women. Human capital theory predicts that people who expect to work continuously make larger human capital investments early in their careers than people who expect to take breaks from the labor force (Mincer and Polachek, 1974). In a standard human capital framework, the rapid earnings growth of young lesbians, relative to young heterosexual women, may reflect a stronger commitment

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<sup>5</sup>Within each single-year age group, I standardize the weights for subgroups defined by race, ethnicity, urbanicity, and region to be identical across groups defined by sex and sexual orientation.

Figure 2.2: Unobservable human capital



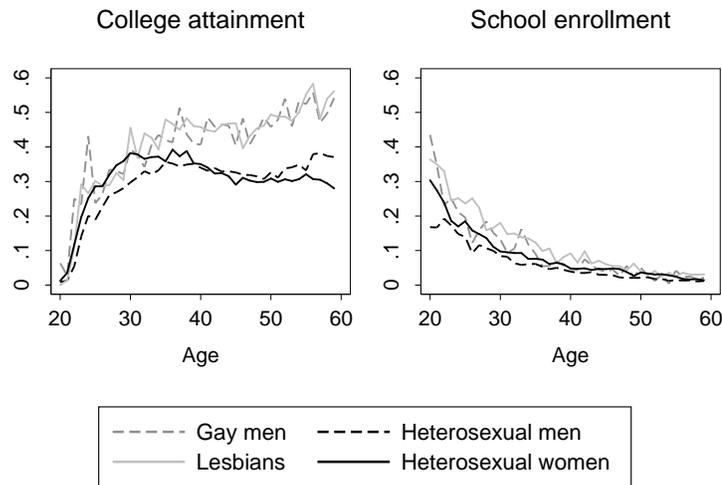
*Source:* American Community Survey, 2006-08 three-year sample, IPUMS (Ruggles et al., 2010)

*Notes:* Covariates are race, ethnicity, urbanicity, region, and educational attainment. Regression sample excludes students and self-employed workers. Estimates were computed using person-level sample weights. Sample excludes men and women without a spouse or unmarried partner because the American Community Survey does not contain a measure of their sexual orientation. Following Gates and Steinberger (2010), I exclude from the sample same-sex couples who submitted their Census responses by mail and had the marital status of one or both partners allocated by the Census Bureau.

of lesbians to market work.

Investments in observable human capital follow a slightly different pattern. Both gay men and lesbians acquire more education than their heterosexual peers. Figure 2.3 shows that, as young adults, sexual minorities are more likely than heterosexual men, and about as likely as heterosexual women, to have a college degree. By their early thirties, sexual minorities are more likely than both heterosexual men and women to have a college degree. While it is not clear from these cross-sectional data whether young gay men and lesbians will ultimately surpass their heterosexual peers in educational attainment, Figure 2.3 presents evidence that they might. Until at least their forties, sexual minorities are more likely than heterosexual men and

Figure 2.3: Observable human capital



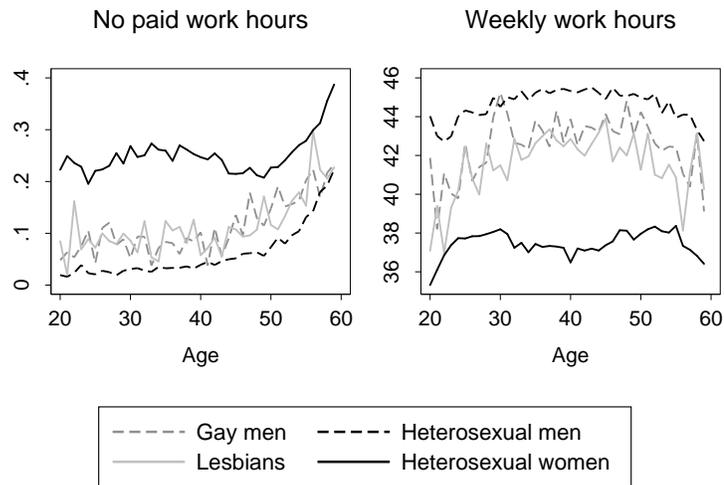
*Source:* American Community Survey, 2006-08 three-year sample, IPUMS ([Ruggles et al., 2010](#))

*Notes:* Means are weighted averages, with weights for subgroups defined by race, ethnicity, urbanicity, and region standardized across groups. Estimates were computed using person-level sample weights. Sample excludes men and women without a spouse or unmarried partner because the American Community Survey does not contain a measure of their sexual orientation. Following [Gates and Steinberger \(2010\)](#), I exclude from the sample same-sex couples who submitted their Census responses by mail and had the marital status of one or both partners allocated by the Census Bureau.

women to be enrolled in school. The finding that, on average, gay men and lesbians are more educated than heterosexual men and women is consistent with results from previous studies and obtains for single men and women as well as for couples ([Black et al., 2000](#); [Black, Sanders and Taylor, 2007](#)).

As discussed above, the results from empirical studies of labor supply have paralleled the results from studies of earnings. Gay men work less in the labor market than heterosexual men, and lesbians work more than heterosexual women. Figure 2.4 presents graphical illustrations of these findings. Of the groups defined by sex and sexual orientation, heterosexual women are the most likely to do no work in the market, and heterosexual men are the least likely. The outcomes for gay men and

Figure 2.4: Labor supply



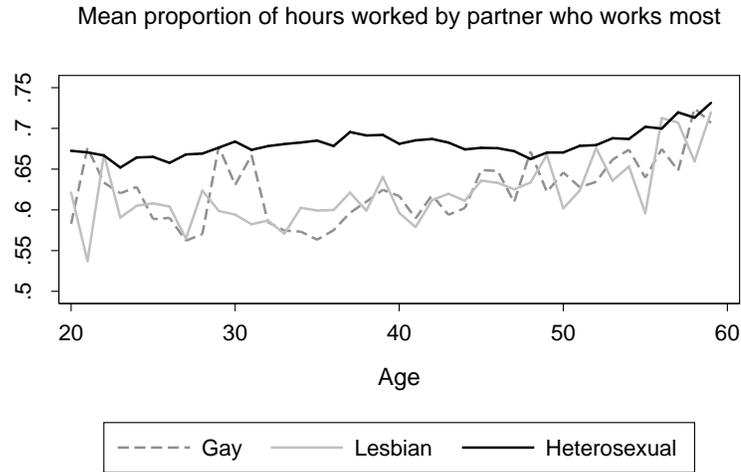
*Source:* American Community Survey, 2006-08 three-year sample, IPUMS ([Ruggles et al., 2010](#))

*Notes:* Sample for left panel excludes students and self-employed workers. Sample for right panel excludes students, self-employed workers and people who do not work for pay. Means are weighted averages, with weights for subgroups defined by race, ethnicity, urbanicity, and region standardized across groups. Estimates were computed using person-level sample weights. Sample excludes men and women without a spouse or unmarried partner because the American Community Survey does not contain a measure of their sexual orientation. Following [Gates and Steinberger \(2010\)](#), I exclude from the sample same-sex couples who submitted their Census responses by mail and had the marital status of one or both partners allocated by the Census Bureau.

lesbians fall between those for heterosexual men and heterosexual women. The same pattern holds for weekly work hours. Conditional on doing some work in the labor market, heterosexual men work the longest hours each week, and heterosexual women work the shortest hours. The weekly work hours of gay men and lesbians fall between those of heterosexual men and heterosexual women. Interestingly, the labor supply of sexual minorities does not differ substantially by sex and more closely resembles the labor supply of heterosexual men than that of heterosexual women.

Turning to the specialization patterns of couples, [Figure 2.5](#) indicates that same-sex couples share market work more equally than different-sex couples. Of the total

Figure 2.5: Division of labor



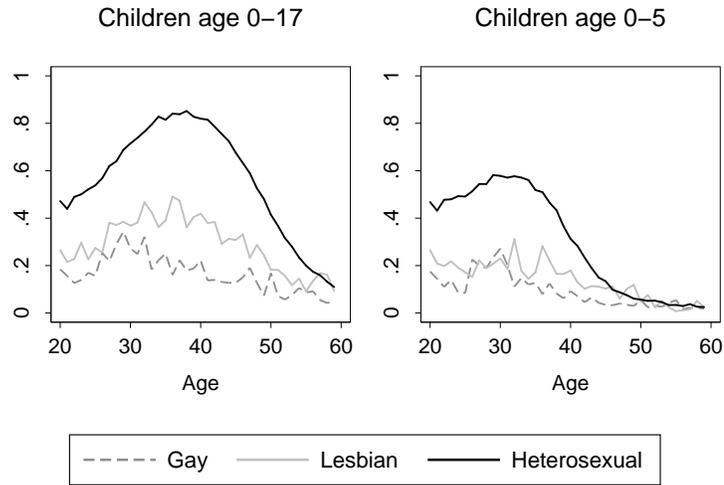
*Source:* American Community Survey, 2006-08 three-year sample, IPUMS (Ruggles et al., 2010)

*Notes:* Sample excludes couples in which either partner was a student or a self-employed worker. Means are weighted averages, with weights for subgroups defined by race, ethnicity, urbanicity, and region standardized across groups. Estimates were computed using household-level sample weights. Sample excludes men and women without a spouse or unmarried partner because the American Community Survey does not contain a measure of their sexual orientation. Following Gates and Steinberger (2010), I exclude from the sample same-sex couples who submitted their Census responses by mail and had the marital status of one or both partners allocated by the Census Bureau.

hours a couple supplies to the labor market, the proportion supplied by the partner who works the longest hours is larger among different-sex couples than same-sex couples. Put differently, the primary worker in a different-sex couple – most often the man – works a larger share of the couple’s total market hours than the primary worker in a same-sex couple. This pattern suggests that same-sex couples specialize less extensively than different-sex couples.

Finally, and perhaps not surprisingly, same-sex couples are less likely than different-sex couples to have children. Figure 2.6 shows that, at the peak ages for parenting, over 80 percent of households headed by different-sex couples contain children, and almost 60 percent contain children under the age of six. At the same ages, less than

Figure 2.6: Households with children



*Source:* American Community Survey, 2006-08 three-year sample, IPUMS ([Ruggles et al., 2010](#))

*Notes:* Means are weighted averages, with weights for subgroups defined by race, ethnicity, urbanicity, and region standardized across groups. Estimates were computed using household-level sample weights. Sample excludes men and women without a spouse or unmarried partner because the American Community Survey does not contain a measure of their sexual orientation. Following [Gates and Steinberger \(2010\)](#), I exclude from the sample same-sex couples who submitted their Census responses by mail and had the marital status of one or both partners allocated by the Census Bureau.

50 percent of households headed by same-sex couples contain children, and less than 30 percent contain children under the age of six.

In the remainder of this paper, I show that a model of marital matching and pre-marital human capital accumulation in gay, lesbian, and heterosexual marriage markets can account for most of the empirical differences between same-sex and different-sex couples. I characterize the human capital investments of individuals, and the human capital profiles of couples, under two opposing scenarios. First, I assume that matching in the marriage markets is frictionless. In this scenario, marital matching is driven by human capital endowments. Next, I assume that matching in the marriage markets is random. In this scenario, marital matching is driven by

non-economic concerns. I show that outcomes at the individual level are similar in the two scenarios. Whether matching is frictionless or random, gay and lesbian marriage markets engender stronger incentives than heterosexual marriage markets for people of each sex to prepare for work both at home and in the market. In contrast, outcomes at the couple level turn on the matching process. When matching is frictionless, both same-sex and different-sex couples adopt a specialized division of labor. When matching is random, same-sex couples specialize less extensively than different-sex couples.

## 2.4 Model

### 2.4.1 Assumptions

#### Choices and timing

There are two marriage markets: a same-sex market and a different-sex market. The different-sex marriage market matches men from a large population with women from an equally large population. The same-sex marriage market matches men or women from a large population with partners from the same population. People live for two periods. In the first period, they make human capital investments. In the second period, they enter the appropriate marriage market, decide whether and whom to marry, and produce and consume in their chosen household.

#### Investments

People choose one of two investments: high or low. The cost of the high investment is  $c_H$  and the cost of the low investment is  $c_L$ , where  $c_H > c_L$ .

## Household production

People have one unit of time to allocate between the home and the market. High investors are more productive than low investors in the market. Accordingly, they earn a higher wage:  $w_H > w_L$ . High investors and low investors are equally productive in the home.

People obtain utility from housing, children, and market goods. Housing and children are public goods for married couples and private goods for single people. All households, whether married or single, must spend a fixed amount,  $h \in (0, w_L)$ , on housing. Parental status is binary: either a household has children, or it does not. Children are produced at home using inputs of parental time. If a household has children, it must devote a fixed amount of time,  $t \in (0, 1)$ , to their care.

The utility of single person  $i$  is

$$u_i(x_i, I_i, h) = x_i(h + I_i b),$$

where  $x_i$  represents market goods consumed by person  $i$ ,  $h$  represents the fixed expenditure on housing,  $I_i$  is an indicator variable that takes a value of one if person  $i$  has children, and  $b$  is a benefit from children that is the same for all people. If person  $i$  marries person  $j$ , the utility of married person  $i$  is

$$u_i(x_i, I_{ij}, h) = x_i(h + I_{ij}b),$$

where  $I_{ij} \equiv I_i = I_j$  takes a value of one if the couple has children, and the other inputs are defined as before. The utility of married person  $j$  is defined symmetrically. The form of these utility functions guarantees that, when married, person  $i$  and person  $j$  can transfer utility between them at a constant rate ([Bergstrom and Cornes, 1983](#)). To verify that utility is transferable within marriage, observe that married person  $i$

and married person  $j$  have the same marginal utility of market consumption,  $h + I_{ij}b$ , no matter how market consumption is allocated within the household.

Households maximize utility subject to the constraint that expenditures equal market income. Because utility is transferable within marriage, married couples maximize the sum of their utilities (Lam, 1988):

$$u_{ij}(x_i, x_j, I_{ij}, h) = (x_i + x_j)(h + I_{ij}b).$$

The budget constraint of single person  $i$  is

$$x_i + h = (1 - I_i t) w_i.$$

The budget constraint of couple  $ij$  is

$$x_i + x_j + h = (1 - I_{ij}d_i) w_i + [1 - I_{ij}(t - d_i)] w_j,$$

where  $w_i \geq w_j$  and  $d_i$  is the time married person  $i$  spends caring for children. While married parents can, in principle, share responsibility for childcare, their budget constraint shows that efficient households assign all of the time at home to the partner with the lower wage. The budget constraint for couple  $ij$  can thus be written as

$$x_i + x_j + h = w_i + (1 - t) w_j.$$

Households have children if parenthood is feasible and utility-improving. Parenthood is feasible for single person  $i$  if housing remains affordable when person  $i$  spends time caring for children:  $h < (1 - t) w_i$ . Parenthood is always feasible for married couples. Conditional on parenthood being feasible, households gain utility from having children if the common benefit from children exceeds a threshold benefit that

depends on household composition. Specifically, single person  $i$  gains utility from having children if

$$b > \bar{b}_i(w_i) \equiv \frac{thw_i}{(1-t)w_i - h},$$

and married couple  $ij$  gains utility from having children if

$$b > \bar{b}_{ij}(w_i, w_j) \equiv \frac{thw_j}{w_i + (1-t)w_j - h}.$$

For married couples, the threshold benefit from children, above which parenthood is utility-improving, is highest when both partners are low earners and lowest when the partners earn different wages. Letting  $\bar{b}_{xy} \equiv \bar{b}_{ij}(w_x, w_y)$  be the threshold benefit for a couple with wages  $w_x$  and  $w_y$ , it can be shown that  $\bar{b}_{HL} < \bar{b}_{HH} < \bar{b}_{LL}$ . If it is optimal for two low earners to have children, then it is optimal for two high earners to have children; and if it is optimal for two high earners to have children, then it is optimal for a high earner and a low earner to have children. These results are consistent with the idea that children are a normal good whose price increases with the opportunity cost of parental time (Becker, 1991). I assume that the common benefit from children exceeds the threshold benefit for couples with unequal earnings, but not for couples with equal earnings:

$$\bar{b}_{HL} < b < \bar{b}_{HH} < \bar{b}_{LL}.$$

Under this assumption, couples have children if and only if the partners earn different wages. A comparison of the threshold benefits for single people and married couples reveals that, if it is not optimal for two high earners or two low earners to have children together, then it is not optimal for anyone to have children alone.

Using the budget constraints to express private consumption in terms of market income and expenditures on housing, and recalling that only couples with unequal

earnings have children, the maximal utility of a single earner is

$$U_L \equiv u_i^*(w_L) = (w_L - h)h, \quad (2.1)$$

$$U_H \equiv u_i^*(w_H) = (w_H - h)h \quad (2.2)$$

for a low earner and a high earner, respectively. The maximal utility of a couple with equal earners is

$$U_{LL} \equiv u_{ij}^*(w_L, w_L) = (2w_L - h)h, \quad (2.3)$$

$$U_{HH} \equiv u_{ij}^*(w_H, w_H) = (2w_H - h)h \quad (2.4)$$

for two low earners and two high earners, and the maximal utility of a couple with unequal earners is

$$U_{HL} \equiv u_{ij}^*(w_H, w_L) = [w_H + (1 - t)w_L - h](h + b). \quad (2.5)$$

Let  $\tilde{b} \equiv b[w_H + (1 - t)w_L - h] - thw_L$  be the utility a couple with unequal earners gains from having from having children, and let  $Z_{xy} \equiv U_{xy} - (U_x + U_y)$  be the surplus output from a marriage between an  $x$ -investor and a  $y$ -investor. Then,

$$Z_{HL} = h^2 + \tilde{b}, \quad (2.6)$$

$$Z_{HH} = h^2, \quad (2.7)$$

$$Z_{LL} = h^2. \quad (2.8)$$

When equal earners marry, they gain  $h^2$  in utility to divide between them. When unequal earners marry, they gain  $h^2 + \tilde{b}$ . Whatever their own wages and the wages of their prospective partners, all people are better off married. Table 2.3 summarizes the time allocation, parental status, income, and marital surplus of married couples

Table 2.3: Optimal household production

Human capital	Market work	Children	Income <sup>a</sup>	Surplus <sup>b</sup>
High / Low	Full-time / Part-time	Yes	Lower	Larger
High / High	Full-time / Full-time	No	Higher	Smaller
Low / Low	Full-time / Full-time	No	Lower	Smaller

<sup>a</sup> Couples with one high earner and one low earner have income  $w_H + (1 - t)w_L$ , where  $t$  is the proportion of time the part-time worker spends at home. Couples with two high earners have income  $2w_H$ , and couples with two low earners have income  $2w_L$ .

<sup>b</sup> Couples with one high earner and one low earner produce a surplus of  $h^2 + \tilde{b}$ , where  $h$  is expenditures on housing and  $\tilde{b}$  is the utility gain from children. Couples with two high earners or two low earners produce a surplus of  $h^2$ . Marital surplus is distinct from marital output, which is highest for couples with two high earners.

with each human capital profile when they maximize the sum of their utilities.

High earners are more productive than low earners in any marriage. Comparing the maximal utilities of couples with each human capital profile, and remembering that couples have children only when children make them better off, we find that

$$U_{HH} > U_{HL} > U_{LL}.$$

The substitution of a high-earning partner for a low-earning partner adds to the utility of a couple no matter what wage the second partner earns.

A related, but less obvious result, is that high earners are more productive, relative to low earners, in marriages with low earners. The substitution of a high-earning partner for a low-earning partner adds more to the utility of a couple when the second partner earns a low wage than it does when the second partner earns a high wage:

$$U_{HL} - U_{LL} > U_{HH} - U_{HL}. \quad (2.9)$$

Intuitively, high earners make a larger marginal contribution to marriages with low earners because partners with unequal earnings realize gains from specialization in

addition to gains from household public goods. As we saw in the preceding discussion, the surplus output – as opposed to the total output – from marriages between unequal earners exceeds the surplus output from marriages between equal earners, including marriages between high earners. I assume, further, that

$$U_{HL} - U_{LL} > c_H - c_L > U_{HH} - U_{HL}. \quad (2.10)$$

This assumption says that the marginal gain in marital output from the high wage exceeds the marginal cost of the high investment if the high earner is married to a low earner, but not if the high earner is married to another high earner. Put differently, the high investment pays off, in terms of social welfare, if and only if the high investor marries a low investor.

#### 2.4.2 Frictionless marriage markets

I characterize matches in the frictionless marriage markets using the concept of a stable assignment. An assignment of men to women in the different-sex marriage market, or of men to men or women to women in the same-sex marriage market, is stable if the following conditions hold: No married person would rather be single, and no two people, married or single, would rather marry each other than remain in their current situations. Because all marriages generate a strictly positive surplus, all men and women marry in any stable assignment.

Stable assignments in the different-sex marriage market maximize the total output from all marriages (Shapley and Shubik, 1972). When they exist, stable assignments in the same-sex marriage market also maximize the total output (Quint, 1997).<sup>6</sup> Given my assumptions about household production, the requirement that stable assignments

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<sup>6</sup>See his Theorem 4.3. Quint (1997) proves this result for restricted house-swapping games with transferable utility, a class of games that includes the roommate problem with transferable utility as a special case. The same-sex marriage market, as I have described it, is equivalent to the roommate problem with transferable utility.

maximize the total output implies that a stable assignment can include marriages between high earners or marriages between low earners, but not both. Suppose, to the contrary, that a stable assignment includes a marriage between high earners and a marriage between low earners. Then, since stable assignments maximize the total output,  $U_{HH} + U_{LL} \geq 2U_{HL}$ . But this result contradicts (2.9), which follows from optimal household production.

Although stable assignments maximize the total output from all marriages, their implementation need not be centralized. In fact, any stable assignment can be supported as a competitive equilibrium by a vector of reservation utilities for marriage (Shapley and Shubik, 1972; Quint, 1997). People agree to marry only if they receive their reservation utility and each person chooses the partner whose reservation utility, once paid from their marital output, leaves the largest share of utility remaining. In the stable assignment, the sum of the reservation utilities in each marriage exhausts the marital output, and people consume their reservation utilities. Let  $S_i$  and  $S_j$  be the reservation utilities of person  $i$  and person  $j$ . Formally, the reservation utilities satisfy

$$S_i + S_j = U_{ij} \tag{2.11}$$

if person  $i$  and person  $j$  are married and

$$S_i + S_j \geq U_{ij} \tag{2.12}$$

if they could be married but are not.

Because the output of a marriage depends only on the wages of the partners, people who earn the same wage are perfect substitutes from the perspective of their prospective partners. A person who demands more than competitors with the same wage can be replaced in his or her marriage by a competitor who is less expensive but equally productive. In this way, competition in the marriage markets ensures

that identical characteristics command identical prices. Heterosexual men who earn the same wage obtain the same utility in a stable assignment, no matter whom they marry, because the market prices their characteristics uniformly. The same is true for heterosexual women, gay men, and lesbians. I use  $S_x^M$ ,  $S_x^F$ , and  $S_x^S$  to denote the common reservation utilities and equilibrium consumption levels of heterosexual men, heterosexual women, and sexual minorities who earn wage  $w_x$ .

Given that marriages between high earners and marriages between low earners cannot coexist in a stable assignment, the human capital profiles of stable couples can be distributed in three ways. I consider each case in turn.

**Case 1** Some marriages are between high earners and low earners, and some marriages are between low earners. In this case, (2.11) and (2.12) imply that consumption levels in the stable assignment satisfy

$$\begin{aligned} S_H^M + S_H^F &\geq U_{HH}, & S_L^M + S_L^F &= U_{LL}, \\ S_H^M + S_L^F &= U_{HL}, & S_L^M + S_H^F &= U_{HL} \end{aligned} \quad (2.13)$$

for heterosexual men and women and

$$2S_H^S \geq U_{HH}, \quad 2S_L^S = U_{LL}, \quad S_H^S + S_L^S = U_{HL} \quad (2.14)$$

for sexual minorities. These equations imply that

$$S_H^g - S_L^g = U_{HL} - U_{LL},$$

where  $g \in \{M, F, S\}$ . When there are more low earners than high earners in a marriage market, high earners in every market group receive a utility bonus that equals their marginal contribution to marriages with low earners. Intuitively, competition

for high earners in the marriage market bids their marginal cost up to the marginal value of a high-earning partner to the last person who “wins” one. Both high earners and low earners are willing to pay a premium for a high-earning partner, but low earners are willing to pay a larger premium than high earners. When low earners compete against high earners for high-earning partners, low earners win. But when low earners outnumber high earners in the marriage market, it is not possible for every low earner to marry a high earner. In that situation, the last low earner to win a high-earning partner must win that partner from another low earner. Then, because competition for high earners occurs between low earners on the margin, high earners receive a bonus equal to the largest premium low earners are willing to pay.

**Case 2** Some marriages are between high earners and low earners, and some marriages are between high earners. Now, (2.11) and (2.12) imply that consumption levels in the stable assignment satisfy

$$\begin{aligned} S_H^M + S_H^F &= U_{HH}, & S_L^M + S_L^F &\geq U_{LL}, & (2.15) \\ S_H^M + S_L^F &= U_{HL}, & S_L^M + S_H^F &= U_{HL} \end{aligned}$$

for heterosexual men and women and

$$2S_H^S = U_{HH}, \quad 2S_L^S \geq U_{LL}, \quad S_H^S + S_L^S = U_{HL} \quad (2.16)$$

for sexual minorities. These equations imply that

$$S_H^g - S_L^g = U_{HH} - U_{HL}.$$

When there are more high earners than low earners in a marriage market, high earners in every market group receive a utility bonus that equals their marginal contribution

to marriages with high earners. This bonus is smaller than the bonus high earners received in Case 1 because, when high earners outnumber low earners in the marriage market, competition for high earners occurs between high earners on the margin. In that situation, high earners receive a bonus equal to the largest premium high earners are willing to pay – and less than the largest premium low earners are willing to pay.

**Case 3** All marriages are between high earners and low earners. In this case, (2.11) and (2.12) imply that consumption levels in the stable assignment satisfy

$$\begin{aligned} S_H^M + S_H^F &\geq U_{HH}, & S_L^M + S_L^F &\geq U_{LL}, & (2.17) \\ S_H^M + S_L^F &= U_{HL}, & S_L^M + S_H^F &= U_{HL} \end{aligned}$$

for heterosexual men and women and

$$2S_H^S \geq U_{HH}, \quad 2S_L^S \geq U_{LL}, \quad S_H^S + S_L^S = U_{HL} \quad (2.18)$$

for sexual minorities. These equations imply that

$$U_{HL} - U_{LL} \geq S_H^g - S_L^g \geq U_{HH} - U_{HL}.$$

When the numbers of high and low earners in the marriage market are equal, the utility bonus of high earners in every market group is bounded between their marginal contribution to marriages with high earners and their marginal contribution to marriages with low earners.

The stable assignments I have characterized determine the distribution of utility in the second period, conditional on the distribution of investments in the marriage market. In the first period, people choose investments to maximize their expected utility from marriage, net of investment costs. They take the choices of their competitors

and prospective partners, and the resulting returns to the high and low investments in the marriage market, as given. If the high investment yields a higher net return than the low investment for the members of a market group, then everyone in that group chooses the high investment. If the low investment yields a higher net return, then everyone chooses the low investment. People in the same market group will choose different investments only if the net returns to the high and low investments are equal.

Reviewing the payoffs in the stable assignments, we find that the marginal return to the high investment depends on the supply of high and low earners in the marriage market. In Case 1, when there are more low earners than high earners in the market, high earners receive a utility bonus of  $U_{HL} - U_{LL}$ , relative to low earners. In Case 2, when there are more high earners than low earners, high earners receive a smaller bonus of  $U_{HH} - U_{HL}$ . In Case 3, when there are equal numbers of high earners and low earners in the market, high earners receive a utility bonus that is bounded above by the bonus from Case 1 and below by the bonus from Case 2. The remainder of this section shows that the marriage-market returns in Case 1 and Case 2 cannot support the underlying investment distributions as equilibria. When the returns to pre-marital investments are determined in frictionless marriage markets, every investment equilibrium contains equal numbers of high and low investors.

Let  $\pi^M$ ,  $\pi^F$ , and  $\pi^S$  be the proportions of heterosexual men, heterosexual women, and sexual minorities who choose the high investment in the first period. When low earners outnumber high earners in the second period, the investment distributions satisfy  $\pi^M < 1 - \pi^F$  and  $\pi^S < \frac{1}{2}$ , and the stable assignments are as described in Case 1. But when the stable assignments are as described in Case 1, (2.10) implies that the marginal return to the high investment exceeds its marginal cost for everyone in the marriage markets. In that situation, people who choose the low investment can improve their payoffs by switching to the high investment. Since low investors

have an incentive to change their strategy when they outnumber high investors in a marriage market,  $\pi^M < 1 - \pi^F$  and  $\pi^S < \frac{1}{2}$  cannot be investment equilibria.

When high earners outnumber low earners in the second period, a parallel analysis applies. The investment distributions satisfy  $\pi^M > 1 - \pi^F$  and  $\pi^S > \frac{1}{2}$ , and the stable assignments are as described in Case 2. But when the stable assignments are as described in Case 2, (2.10) implies that the marginal cost of the high investment exceeds its marginal return for everyone in the marriage markets. In that situation, people who choose the high investment can improve their payoffs by switching to the low investment. Since high investors have an incentive to change their strategy when they outnumber low investors in a marriage market,  $\pi^M > 1 - \pi^F$  and  $\pi^S > \frac{1}{2}$  cannot be investment equilibria.

Finally, when there are equal numbers of high and low earners in the second period, the investment distributions satisfy  $\pi^M = 1 - \pi^F$  and  $\pi^S = \frac{1}{2}$ , and the stable assignments are as described in Case 3. These investment distributions highlight a crucial difference between the same-sex and different-sex marriage markets. In the same-sex marriage market, equal representation of high and low earners in the second period requires that people of the same sex – gay men or lesbians – choose different investments in the first period. In the different-sex marriage market, in contrast, equal representation of high and low earners can be achieved with people of the same sex choosing different investments, or it can be achieved with all men choosing one investment and all women choosing the other. To characterize the equilibrium investments the marriage markets, it will be useful to consider these these possibilities separately.

First, suppose that all men in the different-sex marriage market choose the high investment, and all women choose the low investment. This distribution of investments is an equilibrium in the first period if and only if the marginal return to the high investment in the second period is at least its marginal cost for men and no more

than its marginal cost for women. Consulting (2.10), we find that these conditions can be met by marriage-market payoffs satisfying

$$U_{HL} - U_{LL} \geq S_H^M - S_L^M \geq c_H - c_L \geq S_H^F - S_L^F \geq U_{HH} - U_{HL}. \quad (2.19)$$

By parallel reasoning, an equilibrium in which all men choose the low investment and all women choose the high investment can be supported by marriage-market payoffs satisfying

$$U_{HL} - U_{LL} \geq S_H^F - S_L^F \geq c_H - c_L \geq S_H^M - S_L^M \geq U_{HH} - U_{HL}. \quad (2.20)$$

Now, suppose that some heterosexual men and some heterosexual women choose each investment. We have already observed that people in the same market group will choose different investments only if the net returns to the high and low investments are equal. Furthermore, we know that the net returns to the investments are equal if and only if the payoffs in the marriage market satisfy  $S_H^M - S_L^M = S_H^F - S_L^F = c_H - c_L$ . This requirement is consistent with (2.10), so  $0 < \pi^M = 1 - \pi^F < 1$  can be supported as an investment equilibrium in the different-sex marriage market. By the same argument,  $\pi^S = \frac{1}{2}$  can be supported as an investment equilibrium in the same-sex marriage by marriage-market payoffs satisfying  $S_H^S - S_L^S = c_H - c_L$ . Figure 2.7 depicts the investment equilibria of the frictionless marriage markets.

We are now ready to describe the human capital profiles of the couples in each marriage market. When matching in the marriage markets is frictionless, every investment equilibrium corresponds to a stable assignment of the kind described in Case 3. These stable assignments are characterized by perfect negative assortative matching: every low earner marries a high earner, and every high earner marries a low earner. Thus, in both the same-sex and different-sex marriage markets, frictionless matching facilitates specialization. Every couple, whether same-sex or different-sex,

Figure 2.7: Investment equilibria of the frictionless marriage markets

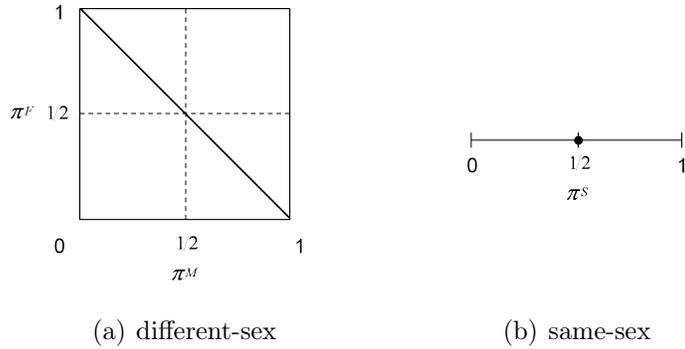


Table 2.4: Human capital profiles of couples in the frictionless marriage markets

	Proportion of couples	
	Different-sex	Same-sex
High / Low	1	1
High / High	0	0
Low / Low	0	0

contains partners with complementary human capital. Every couple allocates time to both the home and the market and, every couple has children. Table 2.4 summarizes the human capital profiles of same-sex and different-sex couples in the frictionless marriage markets.

As Hadfield (1999) observes in a similar analysis of pre-marital investments by heterosexual men and women, frictionless marriage markets produce household specialization, but not necessarily sex-based specialization. An equilibrium in which all heterosexual men choose the high investment and all heterosexual women choose the low investment is possible in such markets, but it is just one possibility on a continuum of equilibria that includes complete differentiation in the opposite direction and complete non-differentiation of human capital by sex. The average heterosexual man or woman may be a high investor, a low investor, or a moderate investor. Further-

more, while all heterosexual couples are specialized, the partner who spends time at home may be either the man or the woman.

In contrast to the wide range of outcomes that are possible in the different-sex marriage market, there is only one investment equilibrium in the same-sex market: half of the people in the market choose the high investment, and half choose the low investment. Thus, when matching is frictionless, the investments of gay men and lesbians may be identical to, or very different from, the investments of their heterosexual peers. We have seen that the average heterosexual man or woman may be a high investor, a low investor, or a moderate investor. The average gay man or lesbian is always a moderate investor.

While the frictionless marriage markets shape human capital accumulation differently for individual gay men and lesbians, compared with individual heterosexual men and women, they produce identical outcomes for same-sex and different-sex couples. Every couple matched in a frictionless marriage market contains partners with complementary human capital. As a result, every couple finds it optimal to specialize, and every couple has children. Nothing in my analysis so far has suggested that household arrangements will differ by sexual orientation.

In the next section, I characterize the pre-marital investments of individuals and the human capital profiles of couples when there are frictions in the marriage markets. At the individual level, I show that the possibility of mismatches encourages sex-based investment choices in the different-sex marriage market but does not substantially alter investment choices in the same-sex marriage market. At the couple level, I show that same-sex couples, but not different sex couples, are less likely to be specialized when they meet in marriage markets with frictions.

### 2.4.3 Random marriage markets

To explore the impact of marriage-market frictions on the pre-marital investments and human capital profiles of same-sex and different-sex couples, I consider the polar case to frictionless matching: random matching. The most plausible interpretation of random matching, in marriage markets where people differ only in their human capital endowments, is that the value of prospective partners depends primarily on factors outside the model – for example, emotional compatibility, shared interests, or common values. I assume that, holding these outside factors constant, people prefer partners with human capital that complements their own. At the same time, I assume that people are sufficiently heterogeneous with respect to the outside factors – true love strikes sufficiently rarely – that human capital is never decisive.

When matching is random, the likelihood that a person marries a high or low investor in the second period depends only on the distribution of investments among the person’s prospective partners. It does not depend, as it did when matching was frictionless, on the distribution of investments among the person’s competitors or the person’s own investment. Because all marriages generate a strictly positive surplus, all men and women marry the partner with whom they are randomly matched in the second period. I assume that, due to social norms, couples share their marital surplus evenly.<sup>7</sup>

As before, people choose investments to maximize their expected utility from marriage, net of investment costs. Using  $v_x^y$  to denote the utility of an  $x$ -investor who marries a  $y$ -investor, recalling that  $\tilde{b} \equiv b[w_H + (1 - t)w_L - h] - thw_L$  is the utility a couple with unequal earners gains from having from having children, and consulting

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<sup>7</sup>When utility is transferable and remaining single is the outside option that defines the threat points for bargaining within marriage, even sharing of the surplus is also the Nash bargaining solution.

(2.6)-(2.8), the ex post utilities from the high and low investments are

$$\begin{aligned} v_H^H &= U_H + \frac{1}{2}h^2, \\ v_H^L &= U_H + \frac{1}{2}h^2 + \frac{1}{2}\tilde{b}, \\ v_L^H &= U_L + \frac{1}{2}h^2 + \frac{1}{2}\tilde{b}, \\ v_L^L &= U_L + \frac{1}{2}h^2. \end{aligned}$$

Before people know whom they will marry, the expected utilities from the high and low investments are

$$\begin{aligned} V_H(\pi^p) &= \pi^p v_H^H + (1 - \pi^p) v_H^L, \\ V_L(\pi^p) &= \pi^p v_L^H + (1 - \pi^p) v_L^L, \end{aligned}$$

where  $\pi^p$  is the proportion of prospective partners who choose the high investment. For both high and low investors, expected utility is increasing in the proportion of prospective partners whose human capital complements their own.

People in the same market group will choose different investments only if the net returns to the high and low investments are equal. Otherwise, people choose the investment that yields the higher net return for their group. Setting  $V_H(\pi^p) - V_L(\pi^p) = c_H - c_L$  and solving for  $\pi^p$  yields the proportion of prospective partners,

$$\pi^p = \bar{\pi} \equiv \frac{(v_H^L - v_L^L) - (c_H - c_L)}{(v_H^L - v_L^L) - (v_H^H - v_L^H)},$$

who must choose the high investment to equalize the expected utilities of high and low investors. Substituting the values of the ex post utilities, we have

$$\bar{\pi} = \frac{(U_H - U_L) - (c_H - c_L) + \frac{1}{2}\tilde{b}}{\tilde{b}}.$$

When  $\pi^p < \bar{\pi}$ , high investors obtain greater expected utility than low investors. When  $\pi^p > \bar{\pi}$ , low investors obtain greater expected utility.

Relative to frictionless matching, random matching narrows the conditions under which investment choice is an interesting problem. People will choose the high investment only if  $\bar{\pi} \geq 0$  and the low investment only if  $\bar{\pi} \leq 1$ . Examining the expression for  $\bar{\pi}$ , we find that people will choose the high investment only if  $c_H - c_L \leq U_H - U_L + \frac{1}{2}\tilde{b}$  and the low investment only if  $c_H - c_L \geq U_H - U_L - \frac{1}{2}\tilde{b}$ . These bounds on the marginal cost of the high investment are tighter than the comparable bounds under frictionless matching. From (2.1)-(2.5) and (2.19)-(2.20), we know that people in the frictionless marriage markets will choose the high investment only if  $c_H - c_L \leq U_H - U_L + \tilde{b}$  and the low investment only if  $c_H - c_L \geq U_H - U_L - \tilde{b}$ . Intuitively, random matching weakens the link between investment choices and marriage-market payoffs. Because couples in the random marriage markets share their marital surplus evenly, high investors stand to gain less from complementary matches and stand to lose less from non-complementary matches than they do when the marriage markets are competitive. To ensure that  $0 < \bar{\pi} < 1$  in the random marriage markets, I assume that  $U_H - U_L + \frac{1}{2}\tilde{b} \geq c_H - c_L \geq U_H - U_L - \frac{1}{2}\tilde{b}$ .

When matching in the marriage markets is random, there is one internal investment equilibrium in each marriage market. In the different-sex marriage market, the internal investment equilibrium is  $\pi^M = \pi^F = \bar{\pi}$ . In the same-sex marriage market, it is  $\pi^S = \bar{\pi}$ . To confirm that these proportions constitute equilibria, recall that  $\bar{\pi}$  is the proportion of high-investing prospective partners that equalizes the expected utilities from the high and low investments. When the members of each market group choose the high investment in this proportion, no person can obtain greater utility by switching investments. I will refer to the internal investment equilibria of the random marriage markets as the *egalitarian* equilibria.

The egalitarian equilibria of the random marriage markets, unlike the internal

investment equilibria of the frictionless marriage markets, need not contain equal numbers of high and low investors. When the marginal return to the high investment exceeds its marginal cost for single men and women,  $U_H - U_L > c_H - c_L$  and  $\bar{\pi} > \frac{1}{2}$ , which means there are more high investors in the egalitarian equilibria of the random marriage markets than in the internal investment equilibria of the frictionless marriage markets. When the marginal cost of the high investment exceeds its marginal return for single men and women, the inequalities are reversed.

These shifts in the proportion of high investors reflect the non-competitive allocation of marital surplus in the random marriage markets. In large, frictionless marriage markets, competition for partners internalizes the social benefits of pre-marital investments for individual men and women and induces efficient levels of investment (Peters and Siow, 2002; Iyigun and Walsh, 2007). In marriage markets with frictions, pre-marital investments may be inefficient. When men and women in the random marriage markets choose the high investment rather than the low investment, they generate a positive externality for prospective partners who are low earners and a negative externality for prospective partners who are high earners. Because people do not take these externalities into account when they choose investments in the first period, the proportion of high investors in the egalitarian equilibria of the random marriage markets may be higher or lower than the proportion that maximizes the total welfare in the markets.

In addition to the egalitarian equilibrium that it shares with the same-sex marriage market, the different-sex marriage market has two corner investment equilibria. These equilibria are characterized by sex-based investment choices. In each corner investment equilibrium of the different-sex marriage market, all men choose one investment, and all women choose the other. Sex-based specialization is an equilibrium arrangement in the different-sex marriage market because, if all members of one sex choose the high investment, all members of the other sex can guarantee themselves a

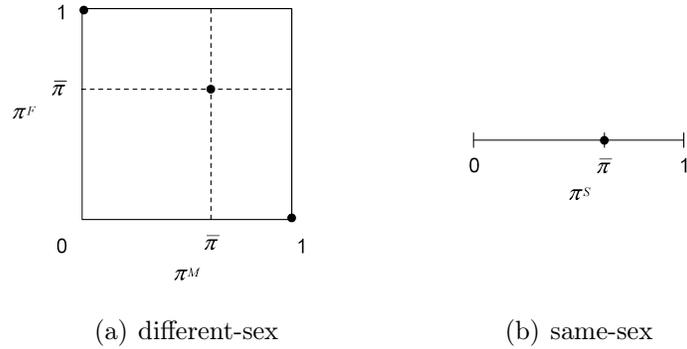
complementary match by choosing the low investment. There is no corner investment equilibrium in the same-sex marriage market because, were all gay men or lesbians to choose the same investment, they would guarantee themselves a non-complementary match and would have an incentive to choose differently. I will refer to the corner equilibria of the different-sex marriage market as the *specialized* equilibria.

Formally, investment equilibria other than the egalitarian and specialized equilibria characterized above do not exist because alternative distributions of pre-marital investments present opportunities for utility-improving deviations. To rule out other investment equilibria in the same-sex marriage market, suppose that  $\pi^{S^*} < \bar{\pi}$ . Then, high investors obtain greater expected utility than low investors and all sexual minorities choose the high investment, which contradicts that  $\pi^{S^*} < \bar{\pi}$ . By the same reasoning,  $\pi^{S^*} > \bar{\pi}$  cannot be part of an investment equilibrium in the same-sex marriage market.

To rule out other investment equilibria in the different-sex marriage market, suppose that  $0 < \pi^{M^*} < \bar{\pi}$ . Then, high-investing women obtain greater expected utility than low-investing women and all women choose the high investment. But when all women choose the high investment, low-investing men obtain greater expected utility than high-investing men and all men choose the low investment, which contradicts that  $\pi^{M^*} > 0$ . By the same reasoning,  $\bar{\pi} < \pi^{M^*} < 1$ , cannot be part of an investment equilibrium in the different-sex marriage market. A parallel argument rules out  $0 < \pi^{F^*} < \bar{\pi}$  and  $\bar{\pi} < \pi^{F^*} < 1$ . Figure 2.8 depicts the investment equilibria of the random marriage markets when  $U_H - U_L > c_H - c_L$ . Changes in the marginal return to the high investment, relative to its marginal cost, would shift the locations of the egalitarian equilibria in the figure but would not alter its qualitative properties.

Turning from the investment choices of individuals to the human capital profiles of couples, random matching opens the possibility that different-sex couples have non-complementary human capital. In the internal equilibrium of the different-sex

Figure 2.8: Investment equilibria of the random marriage markets



marriage market, there is a positive probability,  $\bar{\pi}^2$ , that a randomly matched couple contains two high investors. There is also a positive probability,  $(1 - \bar{\pi})^2$ , that a randomly matched couple contains two low investors. At the same time, random matching increases the likelihood that different-sex couples with complementary human capital adopt fixed gender roles. In the specialized equilibria of the different-sex marriage market, biology is destiny. People of the same sex always choose the same investment. It is not possible, as it was when matching was frictionless, for the sex of the high-investing partner to vary across couples. Either high investors are always men, or they are always women.

In the same-sex marriage market, the move to random matching has dramatic consequences for the human capital profiles of couples. When matching is frictionless, every same-sex couple, like every different-sex couple, contains one high investor and one low investor. When matching is random, the proportion of same-sex couples with complementary human capital drops to  $2\bar{\pi}(1 - \bar{\pi})$  and never exceeds one-half. Table 2.5 summarizes the human capital profiles of same-sex and different-sex couples in the random marriage markets.

The essential result of this section is that, relative to frictionless matching, random matching amplifies the differences between sexual minorities and heterosexual

Table 2.5: Human capital profiles of couples in the random marriage markets

	Proportion of couples		
	Different-sex specialized	Different-sex egalitarian	Same-sex
High / Low	1	$2\bar{\pi}(1 - \bar{\pi})^a$	$2\bar{\pi}(1 - \bar{\pi})^a$
High / High	0	$\bar{\pi}^2$	$\bar{\pi}^2$
Low / Low	0	$(1 - \bar{\pi})$	$(1 - \bar{\pi})$

<sup>a</sup> The value of this expression and, hence, the proportion of high-low couples in the egalitarian equilibria never exceeds one-half.

men and women. At the individual level, random matching maintains incentives for sexual minorities of the same sex to choose different investments but encourages heterosexual people of the same sex to choose the same investment. At the couple level, random matching preserves specialization as a likely outcome for different-sex couples but renders specialization much less likely for same-sex couples. By increasing the likelihood of fixed gender roles for heterosexual men and women, and by reducing the likelihood of specialization for same-sex couples, the random marriage markets generate outcomes that more closely approximate the stylized facts.

The changes in investment and specialization patterns that attend the move from frictionless to random matching reflect the introduction of uncertainty to the marriage markets. When matching is frictionless, competition in the markets allocates human capital to the partners who value it most and assigns identical prices to equally productive people. Within each market group, people who choose the same investment enjoy the same utility in the second period, no matter whom they marry. That is, conditional on the distribution of investments in a person's marriage market, the person's return to each investment is certain. When matching is random, in contrast, a person's return to each investment depends on the human capital of a particular future partner whose identity is not known at the time the investment is chosen. If the partner turns out to be a low investor, the marginal return to the high investment,

net of investment costs, will be positive; if the partner turns out to be a high investor, it will be negative. People in the random marriage markets cannot condition their investment choices on the choices of their unknown future partners. Thus, random matching gives rise to a coordination problem.

In the different-sex marriage market, the structural separation of competitors from prospective partners provides a means by which the coordination problem can be solved. While they cannot condition their investment choices on the choices of their future partners, heterosexual men and women can condition their investment choices on sex. When all heterosexual men choose the same investment, all heterosexual women know with certainty what human capital their partner will bring to marriage. By choosing the other investment, they can ensure that their human capital will be complementary. This solution to the coordination problem is not possible in the same-sex marriage market for the obvious reason that the market is not divided by sex. As we saw in the preceding discussion, sexual minorities do worse, not better, when everyone of a given sex chooses the same investment.

A second way to understand the divergence in outcomes between the same-sex and different-sex marriage markets is to examine the sources of within-couple differences in each market. In the different-sex marriage market, partners may have different levels of human capital because matching is negatively assortative, or they may have different levels of human capital because they are drawn from populations with different investment distributions. If matching is not negatively assortative in the different-sex marriage market – for example, because there are frictions in the market – different-sex couples can still achieve specialization by shifting the location of the male or female investment distribution. In the same-sex marriage market, on the other hand, partners are drawn from the same population and, hence, from the same investment distribution. Because they are drawn from the same investment distribution, same-sex couples can achieve specialization only if matching is nega-

tively assortative.<sup>8</sup> In sum, the different-sex marriage market has a degree of freedom the same-sex market does not have: the relative locations of the male and female investment distributions. As a result of this difference, matching patterns matter considerably more in the same-sex marriage market.

While my analysis to this point suggests that same-sex couples will be less specialized than different-sex couples under random matching, the prediction is tentative because there are multiple equilibria in the different-sex marriage market. In the next section, I use the tools of evolutionary game theory to sharpen my predictions about the different-sex marriage market and, by extension, about the differences between the same-sex and different-sex markets. I show that, although the egalitarian equilibrium is possible in both marriage markets, it is stable only in the same-sex market. In the different-sex market, evolutionary pressures on investment choices make a specialized equilibrium the overwhelmingly likely outcome.

#### **2.4.4 Evolution and stability of investment norms**

Large populations strain the plausibility of a key assumption underlying the Nash equilibrium concept: that the players in a game know the strategies of the other players.<sup>9</sup> In large marriage markets like those considered here, it is not clear how men and women can learn which equilibrium the market is playing. And if they do not know how many of their competitors and prospective partners are choosing each investment, men and women cannot determine the expected return to either investment. Rationality assumptions motivate the requirement that, in a Nash equilibrium, players choose best responses to the choices they believe their opponents are mak-

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<sup>8</sup>Matching need not be perfectly negatively assortative. Partners drawn from populations with identical investment distributions may have different levels of human capital as long as matching is not perfectly positively assortative.

<sup>9</sup>The problem is not limited to games with many players. [Samuelson \(2002\)](#) observes that, in general, the notion that players know what others are doing does not follow from standard rationality assumptions. But large populations dramatize the issue because, to apply the Nash criterion to such populations, we would have to believe that people know the strategies of innumerable others.

ing. But rationality assumptions do not explain how players arrive at accurate beliefs (Samuelson, 2002).

Evolutionary game theory offers a solution to this problem. Rather than assuming that people are perfectly rational and all-knowing, evolutionary models assume that they are “myopic and unsophisticated” (Mailath, 1992, p. 261). Specifically, evolutionary models assume that members of a large population meet randomly and repeatedly to play a game. In each round, people observe what has happened in the past – the strategies previous players have used and the payoffs those strategies have produced – and repeat behavior that has been successful. They do not know what others are doing in the current round, do not imagine that others are re-optimizing in response to the past, and do not consider the impact of their behavior on their own future payoffs. Over time, play of this kind converges to a stationary state.<sup>10</sup> As it happens, every Nash equilibrium of a non-cooperative game is a stationary state of the corresponding evolutionary model. What is more, every *stable* stationary state of an evolutionary model is a Nash equilibrium of the corresponding non-cooperative game. In this way, evolutionary game theory provides a motivation for the Nash criterion.

Although they originated in biology, evolutionary models provide a natural framework for analyzing the evolution and persistence of social norms. In culture, as in biology, evolutionary pressures reinforce adaptive behavior. Successful people may have more children who inherit their beneficial habits. Or they may serve as role models for their peers, with others imitating their behavior. Evolutionary game theory makes explicit the dynamic process through which adaptive behaviors may be established as norms. In the context of marriage markets, it describes a process through which pre-marital investments consistent with Nash equilibrium behavior in each marriage market may emerge as investment norms for men and women in that

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<sup>10</sup>There exist evolutionary models in which the dynamics never converge to a stationary state. In the models presented here, however, the dynamics always converge.

market.

Evolutionary game theory offers an additional benefit in the present setting: it generates sharper predictions than the Nash criterion about outcomes in the different-sex marriage market. We saw, in the preceding section, that random matching without evolutionary pressures gave rise to two specialized equilibria and one egalitarian equilibrium in the different-sex marriage market. Because the egalitarian equilibrium was also the unique equilibrium of the same-sex marriage market, we were left with the prediction that outcomes in the two markets might diverge or coincide – and we had no way to choose between these outcomes.<sup>11</sup> By placing the marriage markets in an evolutionary framework, we can use the dynamic concept of stability to rule out implausible equilibria. In particular, we can rule out investment equilibria that are not robust to evolutionary pressures.

Intuition suggests that the egalitarian equilibrium of the different-sex marriage market is fragile. The equality of payoffs to people of the same sex who choose different investments depends on a precise balance of the investments on each side of the market. A marginal shift away from that balance on one side of the marriage market effects a discrete shift in payoffs on the other side of the market. What is more, movements of heterosexual men and women toward specialization are mutually reinforcing. A marginal increase, above the equilibrium level, in the proportion of heterosexual men who are high investors induces all heterosexual women to choose the low investment. This change in the behavior of women, in turn, induces all heterosexual men to choose the high investment. In this way, any movement – even a very small movement – away from the egalitarian equilibrium is sufficient to propel

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<sup>11</sup>The standard, rationality-based refinements of non-cooperative game theory do not help us. For example, trembling-hand perfection requires that the equilibrium in question be robust with respect to some low-probability trembles in the strategies played. Strict perfection, a more stringent refinement that implies trembling-hand perfection, requires robustness with respect to all trembles. [Weibull \(1995\)](#) shows an equilibrium is strictly perfect if it is interior. [Okada \(1981\)](#) shows that an equilibrium is strictly perfect if the strategy of each player is the unique best response to the strategies of the other players. Taken together, these results imply that all of the equilibria in the different-sex marriage market are both trembling-hand perfect and strictly perfect.

the different-sex marriage market to a specialized equilibrium.

To formalize the intuition that egalitarianism is unstable in the different-sex marriage market, I model the evolution of pre-marital investment norms using the baseline dynamic model of evolutionary game theory: the *replicator dynamics*. Suppose that, rather than choosing an investment as a best response to the choices of their prospective partners, individuals in each marriage market are pre-programmed to choose either the high investment or the low investment. Suppose, also, that the marriage markets arrange random matches repeatedly, in continuous time. If we interpret the payoff to each matched partner as an incremental gain in his or her reproductive fitness, and if children inherit the investment strategy of their single parent, then the distribution of investments in the marriage markets evolves according to the replicator dynamics (Weibull, 1995).

The replicator dynamics capture the idea that successful behavior reproduces itself at a faster rate than unsuccessful behavior. In a population that evolves according to these dynamics, the proportion of individuals programmed to a given strategy increases at a rate equal to the difference between the payoff to that strategy and the average payoff in the population:

$$\dot{\pi}_x = \pi_x \{u_x(\pi^p) - \sum_y \pi_y u_y(\pi^p)\},$$

where  $x$  represents the strategy of interest,  $y$  indexes all of the strategies in the game, including  $x$ , and  $p$  represents the population of prospective partners. In the model we have been considering, the replicator equation simplifies to

$$\dot{\pi} = \pi(1 - \pi) \{[U_H(\pi^p) - c_H] - [U_L(\pi^p) - c_L]\}.$$

The intuition behind this equation is straightforward. In a game with two strategies, the first strategy earns a higher payoff than the average payoff in the population if

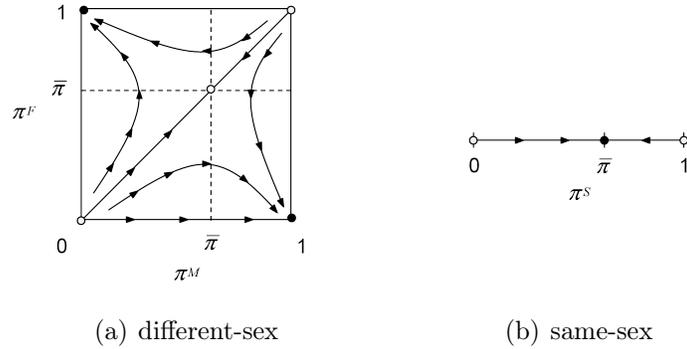
and only if it earns a higher payoff than the second strategy. We know from the previous section that, in the same-sex and different-sex marriage markets, the high investment earns a higher net payoff than the low investment when  $\pi^p < \bar{\pi}$  and vice versa when  $\pi^p > \bar{\pi}$ . Thus, the proportion of high investors in each market group increases when the proportion of high investors among their prospective partners is below  $\bar{\pi}$  and decreases when it is above  $\bar{\pi}$ .

These dynamics have starkly different implications for the same-sex and different-sex marriage markets. In the different-sex marriage market, the prospective partners whose behavior determines the payoffs in the replicator equation are distinct from the group whose evolution is described by the equation. Heterosexual men respond to the behavior of heterosexual women, and heterosexual women respond to the behavior of heterosexual men:

$$\begin{aligned}\dot{\pi}^M &= \pi^M (1 - \pi^M) \{ [U_H(\pi^F) - c_H] - [U_L(\pi^F) - c_L] \}, \\ \dot{\pi}^F &= \pi^F (1 - \pi^F) \{ [U_H(\pi^M) - c_H] - [U_L(\pi^M) - c_L] \}.\end{aligned}$$

This dynamic system has five stationary states:  $\pi^M = \pi^F = \bar{\pi}$ ;  $\pi^M = \pi^F \in \{0, 1\}$ ; and  $1 - \pi^M = \pi^F \in \{0, 1\}$ . When the different-sex marriage market is not in a stationary state, its separation of competitors and prospective partners tends to pull men and women apart. Figure 2.9a illustrates the evolution of the male and female investment distributions in the different-sex marriage market. The figure shows that, from almost any initial state, the populations of heterosexual men and women converge to investment distributions that are heterogeneous within sex and complementary between the sexes – that is, to one of the specialized equilibria of the marriage market. The corollary to this result is that the egalitarian equilibrium in the different-sex marriage market breaks down under evolutionary pressures. Small perturbations of the market from the egalitarian equilibrium can set it on a dynamic path toward a

Figure 2.9: Stable investment equilibria under the replicator dynamics



specialized equilibrium.

In the same-sex marriage market, in contrast, the prospective partners whose behavior determines the payoffs in the replicator equation are the same group whose evolution is described by the equation. Gay men respond to the behavior of other gay men, and lesbians respond to behavior of other lesbians:

$$\dot{\pi}^S = \pi^S (1 - \pi^S) \{ [U_H(\pi^S) - c_H] - [U_L(\pi^S) - c_L] \}.$$

This dynamic system has three stationary states:  $\pi^S = \bar{\pi}$ ;  $\pi^S = 0$ ; and  $\pi^S = 1$ . Because evolutionary pressures reward investments that are rare among a person's prospective partners, the equivalence of competitors and prospective partners in the same-sex marriage market encourages sexual minorities of the same sex to make different human capital investments. Figure 2.9b illustrates the evolution of the investment distribution in the same-sex marriage market under the replicator dynamics. When there are many high investors in the market, the population share of low investors grows; when there are many low investors, the population share of high investors grows. In light of these dynamics, small perturbations of the gay or lesbian population do not disrupt the egalitarian equilibrium of the same-sex marriage market. To

Table 2.6: Human capital profiles of couples under the replicator dynamics

	Proportion of couples	
	Different-sex	Same-sex
High / Low	1	$2\bar{\pi}(1 - \bar{\pi})^a$
High / High	0	$\bar{\pi}^2$
Low / Low	0	$(1 - \bar{\pi})$

<sup>a</sup> The value of this expression and, hence, the proportion of high-low couples in the egalitarian equilibria never exceeds one-half.

the contrary, from almost any initial state, the replicator dynamics pull the population toward the egalitarian equilibrium.

As promised, the application of evolutionary game theory to the marriage markets has yielded clear predictions about the impact of sexual orientation on human capital investments and specialization patterns. At the individual level, heterosexual men and women make sex-based investment choices. All heterosexual women choose one investment and all heterosexual men choose the other. Gay men and lesbians do not make sex-based investment choices. Some sexual minorities of each sex choose each investment. Because sex is destiny for heterosexual men and women, but not for gay men and lesbians, the average gay man or lesbian is a more moderate investor than the average heterosexual man or woman.

At the couple level, same-sex partners are less likely than different-sex partners to have complementary human capital. As a result, same-sex couples practice egalitarianism, while different-sex couples practice specialization. Table 2.6 summarizes the human capital profiles of same-sex and different-sex couples in the equilibria that are robust to evolutionary pressures.

## 2.5 Discussion

The preceding analysis shows that marriage-market incentives can motivate behavior that is consistent with the stylized facts about work, family, and sexual orientation. Results from both the frictionless and random models indicate that same-sex marriage markets encourage gay men and lesbians to make moderate human capital investments. If heterosexual men act as primary earners and heterosexual women act as secondary earners, then the intermediate roles of gay men and lesbians provide an explanation for their intermediate labor-market outcomes. Gay men earn less than heterosexual men and spend less time working in the market because some do not act as primary earners. Lesbians earn more than heterosexual women and spend more time working in the market because some do not act as secondary earners.

At the couple level, outcomes in the frictionless marriage markets suggest that same-sex couples will adopt specialized roles under some conditions. In particular, same-sex couples will adopt household roles that resemble those of different-sex couples when marriage markets are competitive. The intuition for this result is [Becker's \(1991\)](#) observation that, whatever the composition of a household, its members obtain higher returns to their specific human capital investments when they use their human capital more intensively. Importantly, this result also assumes that same-sex couples incur no special costs from specialization. In reality, same-sex couples probably do incur special costs because they are excluded from many of the institutional supports, such as family health plans, Social Security spousal benefits, and joint income tax filing, that facilitate specialization for different-sex couples.

Outcomes in the random marriage markets suggest that, when unmarried men and women face uncertainty about their future partners, same-sex couples share household and market work more equally than different-sex couples. This result is especially pronounced when investment norms are subject to evolutionary pressures. The prediction that same-sex couples are more egalitarian than different-sex couples is

consistent with the stylized facts about sexual orientation and time allocation. Compared with primary workers in heterosexual households, primary workers in gay and lesbian households are responsible for a smaller proportion of the total household labor supply.

Intuitively, the specialization patterns of same-sex and different-sex couples diverge under random matching because participants in gay and lesbian marriage markets cannot use sex to coordinate specialized human capital investments with partners they have not yet met. For heterosexual men and women, fixed gender roles and their corresponding investment strategies can eliminate uncertainty about the returns to pre-marital human capital investments. For gay men and lesbians, gender roles have no value as a coordinating mechanism. Cultural evolution reflects this difference, promoting gender roles for heterosexual men and women and discouraging them for sexual minorities.

While the theoretical predictions in this paper match the stylized facts about sexual minorities in most domains, educational attainment is a notable exception. Both gay men and lesbians obtain more education than their heterosexual peers. While the incentives for moderate human capital investments in same-sex marriage markets predict this result for lesbians, they predict the opposite for gay men. My analysis suggests that gay men are less likely than heterosexual men to be primary earners. Thus, to the extent that education represents preparation for market work, my analysis implies that gay men should obtain less education than heterosexual men. I do not have an explanation for the “puzzle” of highly educated gay men. I will note, however, that a similar puzzle exists for heterosexual men and women. Young women are now more likely to graduate from college than young men, even though they are less likely to be primary earners. The sex gap in educational attainment is an active area of research and has attracted the attention of marriage-market theorists ([Iyigun and Walsh, 2007](#); [Chiappori, Iyigun and Weiss, 2009](#)).

The finding that frictions in the marriage market diminish specialization in same-sex households has novel implications for the fertility of gay men and lesbians. Economists have argued that same-sex couples specialize less extensively than different-sex couples because they are less likely to have children. For [Becker \(1991\)](#), children are a primary motivation for the division of labor between heterosexual men and women. It is because couples have children that they allocate significant time to household work, and it is because women have a comparative advantage in caring for children that couples allocate household work to women. In one of his few explicit mentions of sexual minorities, Becker says the following: “Homosexual unions do not result in children, and generally they have a less extensive division of labor and less marital-specific capital than heterosexual marriages” (p. 330). Building on Becker, [Black, Sanders and Taylor \(2007\)](#) argue that same-sex couples have fewer children than different-sex couples because adoption is expensive and because sexual minorities may face discrimination in the adoption process. Black et al. also observe that same-sex couples are less likely to have a stay-at-home partner when they do not have children.

The analysis in this paper suggests that the causal relationship between children and household specialization may run, not just from children to specialization, but also from specialization to children. When investment norms evolve according to evolutionary pressures, heterosexual men and women can coordinate their pre-marital investments by adopting sex-based investment strategies. In the resulting specialized equilibria of the different-sex marriage market, all different-sex couples have complementary human capital. Then, because they have made specialized human capital investments, all different-sex couples have children. Gay men and lesbians cannot use sex-based investment strategies to coordinate their pre-marital investments. Consequently, same-sex couples are less likely than different-sex couples to have complementary human capital. Then, because many same-sex couples have not made specialized human capital investments, many do not have children.

The message of this discussion is that gay men and lesbians may become parents less often than heterosexual men and women *because* they specialize less often. If children are a normal good, then couples in which both partners have low earnings may have relatively few children. At the same time, if child rearing is time-intensive, then couples in which both partners have high earnings may have relatively few children. To the extent that gay men and lesbians have trouble coordinating complementary human capital investments before marriage, they may be more likely than heterosexual men and women to marry partners with equal earnings. And to the extent that they are more likely to marry partners with equal earnings, gay men and lesbians may be more likely to find children prohibitively expensive. In this way, marriage-market incentives contribute the pattern we observe: fewer children in gay and lesbian households.

To provide a theoretical basis for empirical differences between sexual minorities and their heterosexual peers, this paper develops the first formal model of same-sex marriage market. Economists have produced a substantial and insightful theoretical literature exploring the operation and outcomes of different-sex marriage markets. As should be clear from my discussion, however, the conclusions from this literature may not go through in analyses of same-sex marriage markets. Unlike heterosexual men and women, gay men and lesbians compete for partners with their prospective partners. This lack of structural separation between competitors and prospective partners in same-sex marriage markets carries important implications. Accordingly, a complete economic theory of marriage markets must include gay men and lesbians alongside their heterosexual peers.

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## CHAPTER III

# New Economists on the Job Market

With Uniko Chen, Brooke Helppie McFall, and Robert J. Willis

### 3.1 Introduction

The primary job market for new economists unfolds in stages around the annual meetings of the Allied Social Science Associations (ASSA).<sup>1</sup> Each year, in the months leading up to the meetings, hundreds of recent and soon-to-be graduates of doctoral programs in North America and Europe submit thousands of applications for jobs throughout the world. In early January, job candidates and employers travel to the meetings to complete first-round job interviews, and in the months following the meetings, job candidates travel to prospective job sites to complete second-round interviews and to give presentations of their research. Within three months of the meetings, most employers have extended job offers and most job candidates have accepted an offer or made alternate plans for the following year. Because a majority of graduates from the most prestigious doctoral programs participate in the job market organized around the ASSA meetings, many hiring institutions that do not interview at the meetings also conform to this schedule.

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<sup>1</sup>This paper focuses on the largest job market based in the United States. Active job markets for new economists exist elsewhere and may follow different timelines.

Many new economists find the job market stressful, and most seek information about what they can expect. Informal resources and anecdotal information abound. Job candidates may follow postings on websites that track the job market, such as the *Economics Job Market Rumors* website and the *Economics Job Market* wiki, or they may seek advice from “how-to” guides to the job market (Cawley, 2009).<sup>2</sup> In addition, most job candidates learn about the experiences of their department in placing graduates, and most consult with their advisors or with peers who preceded them on the market.

Formal studies of the economics job market have illuminated several aspects of the job-market experience. A number of studies have described the employment outcomes of recent job-market participants and identified characteristics of the job candidates that predict successful outcomes (Barbezat, 1992; Siegfried and Stock, 1999; Duncan, Yandell and Kokila, 2000; Stock, Alston and Milkman, 2000; Stock and Alston, 2000; Siegfried and Stock, 2004; Hilmer and Hilmer, 2007). Other studies have incorporated information about outcomes during the job market, including experiences with applications, interviews, fly-outs, and job offers (Duncan, Yandell and Kokila, 2000; List, 2000; Stock, Alston and Milkman, 2000; Stock and Alston, 2000). Finally, at least one study has examined the preferences of job candidates with respect to different employment outcomes and the association between preferences and outcomes (Barbezat, 1992).

This paper extends research on the economics job market in several ways. First, we provide the first summary of outcomes during the job market, including outcomes related to applications, interviews, fly-outs, and job offers, using a representative sample of new entrants to the job market. Second, we provide comprehensive information about the job-market experiences and outcomes of job candidates in three recent job-market cohorts. Prior studies characterized the job-market experiences of

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<sup>2</sup>Websites are accessible at <http://www.econjobrumors.com/> and <http://bluwiki.com/go/Econjobmarket>.

job candidates through the 2001-02 job-market cohort (Siegfried and Stock, 2004); this study characterizes the experiences of job candidates in the 2007-10 job-market cohorts using a slightly different, but largely comparable sample. Finally, we exploit the structured timing of the economics job market to assess the preferences of job candidates *before* they know what their job placements will be, and we corroborate findings from research that relied on retrospective measures of preferences.

### 3.2 Overview of the economics job market

The application stage of the economics job market takes place in fall and early winter. Beginning in September and continuing through December, hiring institutions advertise their job openings. Most institutions advertise their openings on the *Job Openings for Economists* website maintained by the American Economic Association, and a growing number advertise their openings on the website of *EconJobMarket.org*.<sup>3</sup> At the same time, some hiring institutions solicit applications from job candidates who come to their attention through informational packets and job-placement websites maintained by graduate departments. The deadlines for applications during this stage of the job market range from October to December, with most deadlines falling in the latter half of November.

The interview stage of the job market takes place in midwinter. From late November through the end of December, hiring institutions contact job candidates to schedule interviews at the ASSA meetings. In early January, job candidates travel to the meetings, where they meet with hiring committees for interviews lasting from 30 to 60 minutes.

The fly-out stage of the job market takes place in late winter and early spring. Beginning after the ASSA meetings and continuing through the end of March, hiring

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<sup>3</sup>The *Job Openings for Economists* website can be accessed at <http://www.aeaweb.org/joe>. The *EconJobMarket* websites can be accessed at <https://econjobmarket.org>.

institutions invite job candidates to visit their work site, meet with prospective colleagues, and give a research presentation. Some job candidates receive invitations for fly-outs almost immediately after the meetings; others wait weeks or months to hear from prospective employers. In some cases, variation in the timing of fly-outs reflects the preferences of hiring institutions for some job candidates over others. Institutions may invite their top candidates for fly-outs and wait for decisions from those candidates before they extend offers to their less preferred candidates. In other cases, variation in the timing of fly-outs reflects differences between hiring institutions with respect to such matters as budgetary concerns, bureaucratic procedures, or scheduling constraints.

The job-offer stage of the job market overlaps considerably with the fly-out stage. Most job candidates receive job offers and accept a job between early January and late March. Sometimes, job candidates hear from a prospective employer within days of returning from a fly-out; sometimes, they wait weeks to learn the outcome of the fly-out. Many hiring institutions schedule fly-outs with several job candidates before they extend an offer to any candidate. Hiring institutions with a small number of openings, and institutions hoping to fill particular needs, may offer positions to job candidates successively, waiting for each offer to be refused before extending an offer to the next candidate on the list. Because hiring institutions generally wait until an offer has been made and accepted before officially closing their search, job candidates may wait for months after an interview or fly-out for confirmation that they will not be hired.

While the economics job market is thickest in job seekers and open positions between January and March, the matching process continues for several months after the ASSA meetings. The *job-market scramble*, a secondary job market organized by the American Economic Association, provides an opportunity for job candidates who have not accepted an offer and hiring institutions who have not filled their positions

to connect after the primary job market closes. By the time new economists graduate with their PhDs, most have plans for employment or further study (Siegfried and Stock, 1999, 2004).

### 3.3 Data

#### 3.3.1 Overview

The standardized timing of the economics job market, together with the nearly universal practice of job candidates posting their contact information and CVs on publicly accessible job-placement websites, presents an opportunity to study the job searches of new economists as they unfold. To leverage this opportunity, the data collection procedures for the Job Seekers project parallel the timeline of the job market (Figure 3.1). In late November and early December, as job candidates submit their applications, the project compiles a sample list using information from the job-placement websites. In late December, just before job candidates travel to their first-round interviews at the ASSA meetings, the project sends invitations for the pre-market survey. Finally, in August, as job candidates prepare for or settle into their new jobs, the project sends invitations for the post-market survey.<sup>4</sup>

We believe that the Job Seekers sample comprises nearly the universe of job candidates who expected to participate in first-round job interviews at the ASSA meetings between 2008 and 2010. The sampling frame for the project comprises job candidates whose names and contact information appear on the job-placement websites of their graduate departments. In 2007-08 and 2008-09, the sampling frame included job candidates from graduate departments in the United States and Canada whose departments were listed on the *Job Candidates* website of the National Bureau of Economic Research (NBER).<sup>5</sup> In 2009-10, we expanded the sampling frame to include

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<sup>4</sup>The project sent invitations for the 2008-09 post-market survey in November rather than August.

<sup>5</sup>The *Job Candidates* website of the National Bureau of Economic Research is accessible at

job candidates from graduate departments in Europe whose departments were listed on the website of the NBER, as well as job candidates from several departments in the United States and Canada whose departments were not listed on the website of the NBER. As a result of this expansion, the number of institutions included in the project increased from 105 in 2007-08 to 134 in 2009-10.

In November and early December of each year, our study team visits the job-placement websites of graduate departments and gathers the names, e-mail addresses, mailing addresses and CVs of all of the job candidates in our sampling frame. We use information from the websites and the CVs to code a number of background characteristics of the job candidates. First, we identify the graduate departments with which job candidates are affiliated and assess the prestige of the departments using the [U.S. News and World Report \(2009\)](#) rankings of graduate programs in economics. Second, we identify the gender of job candidates using the photographs they post on the job-placement websites and coding based on their first names. Third, we classify the location of the institutions from which job candidates received their undergraduate degrees using the educational histories from their CVs.<sup>6</sup> Finally, we obtain information about the doctoral training of job candidates, including their research fields, research productivity, and teaching experience, using the relevant sections of their CVs.

Since the 2008-09 job market year, we have mailed pre-notification letters to job candidates in mid-December. The purpose of these letters is to introduce the study and alert candidates that they will soon receive an e-mail invitation to complete the pre-market survey. We invite job candidates to participate in the pre-market survey in late December, just before most begin their first-round job interviews. The survey is available for job candidates to complete online during the period leading

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<http://www.nber.org/candidates/>.

<sup>6</sup>Data from the web surveys indicate the the location of a job candidate's undergraduate institution is a good proxy for the job candidate's country of origin.

up to the annual meetings of the ASSA and remains available for several months after the meetings. While the fielding window for the pre-market survey is long, most respondents complete the survey in a timely manner. Between 2007-08 and 2009-10, 63 percent of the job candidates who completed the pre-market survey submitted their responses before the meetings. Eighty-eight percent submitted their responses within one month of receiving the invitation to participate. The pre-market surveys gather information about demographic characteristics; relationship and cohabitation status; educational background and careers of partners; preferences regarding the attributes and location of their future jobs; decisions during the application stage of their job search and the influence of preferences and personal constraints on these decisions; and dates of survey login and completion.

Approximately six months after the job market closes, we invite job candidates to participate in the post-market survey. By this time, most job candidates have concluded their job search and know whether and where they will be working in the coming year. In 2007-08 and 2009-10, we sent the invitation to the post-market survey in August; in 2008-09, we sent the invitation in November. Like the pre-market survey, the post-market survey is available for job candidates to complete online over a period of several months. Also like pre-market respondents, most post-market respondents complete the survey in a timely manner. Between 2007-08 and 2009-10, 79 percent of the job candidates who completed the post-market survey submitted their responses within one month of receiving the invitation to participate. The post-market surveys gather information about decisions during the later stages of the job search, including interviews, fly-outs, offers and job acceptance stages; extremely detailed information about accepted jobs and other job offers, including satisfaction and the likelihood of achieving particular career outcomes; the influence of partners and family constraints on job market decisions; some information about the early stages of the market, for candidates who had not responded to the pre-market survey; and expectations about

both career and personal life.

### 3.3.2 Sample selectivity and weighting

Response rates for the Job Seekers surveys are comparable or superior to the response rate for a typical web survey. Between 2007-08 and 2009-10, the response rate for the pre-market survey was 53 percent, and the response rate for the post-market survey was 39 percent. By way of comparison, a meta-analysis of response rates to web and internet surveys found a mean response rate of 39 percent (Cook, Heath and Thompson, 2000).

While the response rates to our surveys are reasonable, the fact that our response rates are not 100 percent means that sample selection could bias inference based on the raw data. For example, if candidates with poorer job outcomes are less likely to respond to our post-market survey than those with better outcomes, inference from our analyses of job placements and satisfaction may be biased. A unique strength of this project is that our combination of data from web surveys and publicly-accessible websites allows us to create weights to adjust for sample selectivity.

To illustrate the importance of weighting, Table 3.1 presents statistics comparing respondents to both the pre-market and post-market surveys with the full sample of job candidates for whom we have CV data. The proportion of female respondents is similar to the proportion of female job market candidates in the full sample. The composition of the samples by rank of PhD institution also does not differ much between respondents and the full sample, nor are there differences between the two groups in the proportion of candidates with any journal publications. However, undergraduate location seems to be related to response rate: candidates with undergraduate degrees from the United States are over-represented among respondents, relative to the full sample, while those with undergraduate degrees from Asia are under-represented.

Based on an examination of the variables available in data from CVs (and from

websites, in the case of gender), we have concluded that response propensity appears to be primarily related to socio-demographic characteristics. Using the information available for both respondents and non-respondents from the CV data, we have generated weights based on the information from CVs to adjust for non-response.

We have developed weights based on estimated response propensities from regression models. Regression-based weighting allows us to fit the marginal distributions along multiple dimensions in a simpler way than would be required using the post-stratification method. Additionally, population distribution has to be known when using post-stratification. Because the CVs of the job market candidates are not standardized, not all candidates provided the same information in their CVs, making post-stratification less appropriate. Regression-based estimation allows us to avoid this issue. For example, even though most candidates specified the location of their undergraduate studies, not all did so. Using regression-based estimation of propensity to respond, we can add one more category, “did not indicate,” for those who did not indicate their undergraduate locations if we think whether undergraduate location is indicated might be related to the propensity to respond or survey responses themselves. Therefore, in the regressions estimating the propensity to respond, we have four dummies for undergraduate location: indicated undergraduate location as “US,” “Asia,” “Other,” and “did not indicate undergraduate location.” Dummy variables for other categorical variables are similarly defined.

To create weights, we first identified variables from the CV (and website) data that might be related to survey results and response rates. Next, we ran logistic regressions to estimate the probabilities of response for respondents and non-respondents. The dependent variables in these logistic regressions were dummy variables, taking the value of 1 for respondents, and 0 for non-respondents. The independent variables are from the CV data. We chose variables that we believe are related to both response propensity and the variables of interest in our study. These include: gen-

der, rank of PhD institution, citizenship (US, Asian countries, other countries, or not indicated), location of undergraduate education (US, Asia, other countries or not indicated), year completed undergraduate studies (2000 and earlier, or 2001 and later), whether candidate held any postgraduate degree before the PhD (excludes MA and MS degrees in the PhD field awarded while working toward the PhD), whether candidate had taught as a primary instructor, whether candidate had taught as a teaching assistant, whether candidate had presented papers during graduate school, publication history (any papers published, any papers published in recognized journals, any papers published without reference as co-authors, any papers published as single-authored, any papers forthcoming for publication, any papers forthcoming for publication in recognized journals, any papers forthcoming for publication without reference as co-authors, or any papers forthcoming for publication as single-authored), whether candidate majored economics in undergraduate studies, whether candidate majored in STEM subjects (science, technology, engineering, and mathematics) in undergraduate studies, whether candidate made CV available on the internet, whether candidate would/did receive PhD from a US institution, whether candidate would/did receive PhD from an economics department, cohort, and research fields (econometrics, economic history, economics of education, environmental economic, experimental economics, financial economics, game theory, international macroeconomics, labor economics, microeconomics, and public economics).

The inverse of the predicted response probability as estimated from the logistic regression would be the “raw” inverse probability weight. However, such raw weights are highly dependent on regression model specification, and prone to extreme values. To avoid inflation of the variance due to extreme weights, we “smooth” them to make them less sensitive to the specification of our logistic regressions. Specifically, we first order respondents and non-respondents together by their estimated probability of response. Next, we group them by deciles of estimated probability of response.

We then calculate the true response rates within each decile group. The inverse of these true response rates are the smoothed weights. Based on comparisons of the raw inverse weights with the smoothed weights and goodness-of-fit tests, there is no evidence that our weights are misspecified.

We use three different sets of smoothed weights throughout the rest of this paper. For analyses using variables from only the CV data or the pre-market surveys, we use the weights developed to correct for non-response to the pre-market survey; for those using data from only the CV data or the post-market surveys, we use the weights developed to correct for non-response to the post-market survey. For analyses using variables from both surveys, we use weights developed to weight respondents to both surveys to mirror the full sample.

### 3.4 Characteristics of job candidates

The job-placement websites that comprise the sampling frame for the Job Seekers project, along with the CVs that job candidates post on those websites, provide detailed background information about job candidates in the Job Seekers sample. Table 3.2 presents means and standard errors of key demographic, educational, and professional variables coded from the websites and CVs. The table includes data from all of the job candidates in the 2007-10 Job Seekers sample for whom we obtained complete background information, whether or not they responded to the surveys.

Just under one third (32 percent) of job candidates in the sample were women. Approximately one third had obtained their undergraduate education in each of the three locations we coded: the United States (36 percent), countries in Asia (34 percent), and countries in the rest of the world (31 percent).<sup>7</sup> A large majority of job candidates had obtained their doctoral training in the United States (91 percent) and

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<sup>7</sup>Results from the surveys indicate that location of undergraduate institution is a good proxy for citizenship. We identify Asian countries following the classification scheme of the [Population Reference Bureau \(2008\)](#).

from departments of economics (91 percent).

The distribution of job candidates across graduate departments indicates that job-market participants come disproportionately from highly ranked departments. More than one quarter (29 percent) of the job candidates in the Job Seekers sample had obtained their doctoral training from economics departments ranked in the top ten by [U.S. News and World Report \(2009\)](#). Another quarter had obtained their doctoral training from departments ranked in the second ten (13 percent) or third ten (12 percent). Just under 20 percent of job candidates had obtained their doctoral training from departments ranked in the fourth ten (9 percent) or fifth ten (8 percent). Finally, more than one quarter of job candidates had obtained their doctoral training in departments not ranked by [U.S. News and World Report \(2009\)](#).<sup>8</sup>

Job candidates listed a wide range of fields on their CVs. We classified the fields into 28 categories, using listings that appeared frequently on the CVs as the category names and grouping listings that appeared less frequently with the larger categories whenever possible. The average job candidate listed 3 of the 28 fields on his or her CV. Fields listed by more than 20 percent of job candidates included applied econometrics (21 percent), applied microeconomics (21 percent), industrial organization (22 percent), labor economics (23 percent), and macroeconomics (23 percent). Fields listed by between 10 and 20 percent of job candidates included development economics (19 percent), econometrics (17 percent), financial economics (17 percent), and public economics (17 percent).

Most job candidates used their CVs to convey extensive information about their teaching and research accomplishments. Information from the CVs suggests that job candidates are more likely to enter the job market with teaching experience than a publication record. The average job candidate in the Job Seekers sample had served as

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<sup>8</sup>Most (66 percent) job candidates from unranked departments were from lower-ranked economics departments in the United States. A sizable minority (30 percent) were from departments outside the United States, and a small number (4 percent) were from departments in fields closely related to economics, such as business or public policy.

a teaching assistant for more than three courses and had served as a primary instructor for between one and two courses. In contrast, just 28 percent of job candidates had published an article in a journal by the time they entered the job market, and most of those who had published an article had published only one.

### **3.5 Applications, interviews, fly-outs, and job offers**

Results from the Job Seekers survey suggest that new economists apply to a large number of jobs, but that most of the applications they submit do not yield results at subsequent stages of the job market. Table 3.3 presents the mean number of applications job candidates submitted, the mean number of invitations they received for interviews and fly-outs, and the mean number of job offers they received. The table also summarizes the success rate of applications, interviews, and fly-out, or the proportion of potential jobs at each stage of the job market that remained in play at subsequent stages. Between 2007-08 and 2009-10, the average job candidate submitted 107 applications. By the time the job candidate traveled to first-round interviews, just 19 percent of the jobs to which he or she had applied remained in play. Just 8 percent of the jobs to which the average job candidate applied resulted in a fly-out, and just 4 percent resulted in a job offer.

While most of the applications new economists submit do not yield results at subsequent stages of the job market, the subset of applications that result in an interview are reasonably likely to result in a fly-out and, eventually, a job offer. The average job candidate received 17 invitations for interviews. Of the interviews to which the average job candidate was invited, 37 percent resulted in a fly-out, and 20 percent resulted in a job offer. By the time the average job candidate reached the fly-out stage of the job market, his or her choice set contained a small number of promising options. The average job candidate received 6 invitations for fly-outs, 57 percent of which resulted in a job offer. The average job candidate received 3 job

offers.

At each stage of the job market, some job candidates enjoy larger choice sets than others. Table 3.4 presents results from regressions of the number of applications, interviews, fly-outs, and job offers on the background characteristics of job candidates. With respect to demographic characteristics, the most notable pattern in Table 3.4 is the negative association between the size of the choice sets and receipt of an undergraduate degree from an institution outside the United States. Job candidates who received their undergraduate degree from an institution in Asia obtain particularly small choice sets. In the final stage of the job market, receipt of an undergraduate degree from an institution in Asia rather than the United States is associated with a reduction in job offers equivalent to 16 percent of the average job-offer set.

Turning to characteristics of doctoral programs, Table 3.4 presents evidence that, at each stage of the job market, job candidates from lower-ranked programs obtain smaller choice sets than those from higher-ranked programs. The estimates in the table indicate that, in the final stage of the job market, graduating from a department ranked in the second ten rather than the top ten is associated with a reduction in job offers equivalent to 19 percent of the average job-offer set. Graduating from a department ranked outside the top twenty is associated with a reduction in job offers equivalent to between 45 and 58 percent of the average job-offer set.

Interestingly, the number of articles a job candidate has published is not statistically related to the number of interviews, fly-outs, or job offers the job candidate receives. On the other hand, we find modest evidence that teaching experience is negatively related to the number of interviews and fly-outs a job candidate receives. In the final stage of the job market, serving as the primary instructor for an additional course is associated with a reduction in job offers equivalent to 3 percent of the average job-offer set. We do not believe that employers penalize job candidates for their teaching experience. Rather, we suspect that teaching experience is correlated with

other characteristics that influence success on the job market – for example, because time spent teaching harms research productivity or because job candidates who enjoy teaching find success with a relatively small number of employers for whom teaching is a priority.

The size of an interview, fly-out, or job-offer set depends on the size of the application, interview, or fly-out set at the preceding stage of the job market, and on the proportion of potential jobs from the preceding stage that remain in play at the current stage. Table 3.5 presents results from regressions of the success rate of applications, interviews, and fly-outs on the background characteristics of job candidates. The estimates in Table 3.5 suggest that characteristics associated with smaller choice sets throughout the job market need not be associated with lower success rates in the final stage of the job market. In particular, the fly-outs of job candidates from lower-ranked departments and job candidates with more teaching experience are no less likely than the fly-outs of job candidates from top-ten departments and job candidates with less teaching experience to result in a job offer.

Job candidates may wonder whether larger application, interview, or fly-out sets yield more job offers. Data from the Job Seekers project suggest that they do, but that the marginal return to an additional application, interview, or fly-out decreases with the size of the existing set. Table 3.6 presents results from regressions of the number of job offers on quadratics in the number of applications, interviews, and fly-outs. The regressions include the background characteristics of job candidates as control variables. In each column of Table 3.6, the estimated coefficient on the quadratic term is negative and statistically significant, consistent with decreasing marginal returns in job offers to prospective jobs at earlier stages of the market. To take a concrete example, the estimates in Table 3.6 suggest that increasing the number of applications from 50 to 100 yields additional job offers equivalent to 13 percent of the average job-offer set, while increasing the number of applications from 100 to

150 yields additional job offers equivalent to 9 percent of the average job-offer set. A similar pattern obtains for interviews and fly-outs.

While the results in Table 3.6 show a positive association between the number of job offers and the number of applications, interviews, and fly-outs in the cross section of new economists, they do not imply that individual job candidates can obtain more job offers by submitting more applications. The number of applications a job candidate submits may reflect idiosyncratic strategies for success on the job market, but is almost certainly responsive to demand-side factors as well. Job candidates who submit a large number of applications, and who receive a correspondingly large number of interviews, fly-outs, and job offers, may be job candidates whose skills are in demand by many employers. For example, if the job postings in a given year disproportionately seek health economists, health economists are likely to respond by applying to a large number of jobs. Then, because demand for their skills is high, the applications of health economists are likely to be successful.

The Job Seekers project is unique among studies of the economics job market in measuring the preferences and expectations of job candidates before they know what their job-market outcomes will be. The 2009-10 pre-market survey asked job candidates how impressive they expected their initial placement to be, relative to the placements of their peers in the same graduate department. In particular, the survey asked job candidates to place themselves in the appropriate decile of the placement distribution under the following scenario: “Imagine that, next year, the faculty in your department compile a list of the job placements of their graduation over the last five years. They put the placements they consider to be most impressive at the top of the list. Thinking about the kind of job you expect to obtain, where do you think you would fall in this list?” On average, job candidates are optimistic about their prospects on the job market. More than 80 percent of the job candidates who answered this question expected to place in the top half of the distribution for their

graduate department (Table 3.7).

Table 3.8 presents results from regressions of the number of job offers on the expected placement rankings and background characteristics of job candidates. The estimates in the table indicate that the expectations of job candidates when they enter the job market contain information about their outcomes throughout the job market. Compared with job candidates who expected to place in the top decile of the distribution for their graduate department, those who expected to place in lower deciles received fewer invitations for interviews and fly-outs, as well as fewer job offers.

The economics job market places new economists in a wide range of academic and non-academic jobs. To understand the value to job candidates of choice sets with different compositions, the 2007-10 pre-market surveys asked job candidates to characterize their preferences over jobs in several categories. The 2009-10 pre-market survey asked job candidates to rank jobs in the following categories in order of their preference: assistant professor at a university; assistant professor at a four-year college; postdoctoral fellow; researcher at a non-profit, governmental, or quasi-governmental organization; and researcher at a business or industry establishment. The 2007-09 pre-market surveys asked parallel questions using slightly different category descriptions. The complete text of the questions and the category descriptions from all survey years is available in the appendix.

Table 3.9 reports the percentage of job candidates who ranked jobs in each category as their most preferred outcome. A large majority (72 percent) of job candidates preferred assistant professorships at universities over jobs in all other categories. Relatively few job candidates preferred research positions at non-profit, governmental, or quasi-governmental organizations (11 percent), assistant professorships at four-year colleges (8 percent), research positions at business or industry establishments (7 percent), or postdoctoral fellowships (2 percent).

In addition to information about the preferences of job candidates over jobs in dif-

ferent categories, the Job Seekers project gathers information about the composition of their application, interview, fly-out, and job-offer sets. The 2009-10 post-market survey asked job candidates how many of their applications, interviews, fly-outs, and job offers fell into each of the categories enumerated above: assistant professor at a university; assistant professor at a four-year college; postdoctoral fellow; researcher at a non-profit, governmental, or quasi-governmental organization; and researcher at a business or industry establishment. The 2007-09 post-market surveys asked parallel questions using slightly different category descriptions. Again, the complete text of the questions and the category descriptions from all survey years is available in the appendix.

The composition of the average application, interview, fly-out, and job-offer sets roughly mirrors the preferences of job candidates. Table 3.10 summarizes these results. A notable feature of Table 3.10 is the strong representation of university jobs. At each stage of the job market, over half of the potential jobs in the average choice set were assistant professorships at universities. Assistant professorships at four-year colleges and research positions at non-profit, governmental, and quasi-governmental organizations were considerably less common, with each representing between 10 and 20 percent of the potential jobs in the average choice set at each stage of the job market. Postdoctoral fellowships and research positions at business and industry establishments were relatively rare. Job in each of these categories represented less than 10 percent of the potential jobs in the average choice set at each stage of the job market.

A second notable feature of Table 3.10 is the evolution of the average choice sets over the course of the job market. In particular, the representation of academic jobs is stronger at the beginning of the job market than the end, while the representation of non-academic jobs is stronger at the end of the job market than the beginning. Assistant professorships at universities and four-year colleges represented 80 percent

of the average application set, but just 64 percent of the average job-offer set. In contrast, research positions at non-profit, governmental, or quasi-governmental organizations and research positions at business or industry establishments represented 29 percent of the average job-offer set, but just 15 percent of the average application set.

When we consider job candidates with different preferences separately, we find an even closer correspondence between the types of placements job candidates seek and the composition of their choice sets. Table 3.11 shows that the proportion of job offers in each job category was larger among job candidates who preferred jobs in that category than among other job candidates. The differences, moreover, were not small. To take an example, job candidates who preferred assistant professorships at universities received 62 percent of their job offers from universities, while job candidates who preferred jobs in other categories received between 22 and 45 percent of their job offers from universities. The pattern was similar for the remaining four job categories. Table 3.11 also indicates that, with the exception of those who preferred jobs at business or industry establishments, job candidates were more likely than not to receive at least one job offer in their preferred category.

### **3.6 Job placements**

The placements of job candidates, like their application, interview, fly-out, and job-offer sets, mirror their preferences. Table 3.12 displays the percentage of job placements by type, reported by job candidates at the post-market survey. The most common outcomes were assistant professorships at universities (62 percent), followed by research positions at non-profit, governmental, or quasi-governmental organizations (19 percent), assistant professorships at four-year colleges (8 percent), research positions in business or industry establishments (6 percent) and postdoctoral fellowships (5 percent). Most jobs reported by job candidates were also on the tenure

track (Table 3.14). Comparing the preferences of job candidates to their job outcomes, we show in Table 3.13 that almost two-thirds of job candidates placed into their first-choice job types (64 percent), while 20 percent placed into their second-choice job types and 9 percent placed into their third-choice job types. Just 7 percent of job candidates placed into job types that they had ranked as least- or second-least preferred.

To examine the predictors of job type, we conducted multinomial logistic regressions with job types as the outcome variables. Assistant professorships at universities, being the modal preferred and actual outcomes, are the base category against which the relative risk ratios for other outcomes are estimated. Column 1 of Table 3.17 displays the relative risk ratio estimates (that is, the exponentiated coefficient,  $e^{\beta_i}$ ), of assistant professorships at four-year colleges over assistant professorships at universities. For example, the estimate on the indicator variable for whether job candidates completed their undergraduate education in a country outside the United States and Asia is statistically different from zero at the 5 percent level, and indicates that job candidates from these countries are 1.5 times less likely than otherwise comparable candidates to have a job at a college over a job at a university. The estimates show that candidates from PhD programs in economics are more likely than others to end up at colleges over universities, as are job candidates who have been primary instructors, and job candidates who preferred non-university jobs relative to university jobs. Institution rank is not a statistically significant predictor of having college jobs over university jobs.

Estimates in Column 2 reflect the relative risk ratios of jobs at non-profits, governmental, and quasi-governmental organizations over university job outcomes. These show that job candidates who completed their undergraduate education outside the United States are less likely to be hired into jobs in these non-academic settings than university jobs, relative to otherwise comparable candidates from the United States.

In this column, the relative risk ratio estimates show that a preference for jobs in non-profit, governmental, or quasi-governmental organizations and a preference for jobs at business or industry establishments are associated with a greater likelihood of the former job over a university. A preference for a postdoctoral fellowship relative to other types of jobs is associated with a reduced chance of a job at a non-profit, governmental, or quasi-governmental organization over a university job.

Column 3 displays the relative risk ratios of research positions at business or industry establishments over assistant professorships at universities. Here, the estimates show that a preference to end up in any type of job other than a university job is associated with a greater chance of ending up in job at a business or industry establishment over a university job. In Column 4, preferring postdoctoral fellowships relative to other types of jobs increases the relative risk of a postdoctoral fellowship, relative to a university job.

Overall, Table 3.17 highlights the importance of preferences in predicting job outcomes. With respect to job-type preferences, job candidates who do not prefer university jobs are more likely to end up with other types of jobs. Additionally, measures of teaching experience, which might be thought of as providing measures of revealed preference or aptitude for teaching versus research activities, are related to job outcomes in expected ways. Candidates who were primary instructors during graduate school revealed a strong preference to teach or aptitude for teaching, and, indeed were more likely to end up at teaching-oriented colleges over universities, and less likely to end up in business or industry establishments over university jobs, relative to candidates without primary instruction experience. Candidates whose graduate studies were funded by teaching assistantships, presumably an alternative to research assistantships, are less likely to end up in research-oriented academia.

In addition to gathering information about the types of positions job candidates accept as a result of their job searches, the Job Seekers surveys measure other ob-

jective characteristics of job outcomes. One such outcome is salary. Table 3.15 displays means and other statistics about reported base salaries from all cohorts, in 2010 dollars. Both the weighted<sup>9</sup> and unweighted mean base salaries are around \$93,000. The median base salary (unweighted) is quite close to the mean and almost exactly at the midpoint of the interquartile range, indicating a distribution that is relatively symmetric. Salaries vary dramatically by job type. Jobs at business and industry establishments, such as consulting and banking, tend to pay the most and have the widest interquartile range; postdoctoral fellowships pay the least and have the narrowest interquartile range. Universities and jobs at non-profit, governmental, and quasi-governmental organizations have similar means and medians, though the interquartile range for university salaries is larger.

Table 3.18 presents estimates from linear regressions of salary on our base set of covariates and additional predictors of salary. In Column 1, only the base set of covariates are included in the regression. It can be seen that an undergraduate education outside the United States is associated with a significantly lower salary, compared to an undergraduate education in the United States. This finding may reflect two effects. First, job candidates from outside the United States may be more likely to accept jobs outside of the United States, where salaries are lower. Second, lower English fluency is likely correlated with having pursued undergraduate studies outside the United States, and may therefore be associated with poorer job outcomes. Candidates whose job-market information was posted on the website of an economics department earn around \$25,000 less than other candidates, probably because a large proportion of the other candidates graduated from business schools. Rank of PhD program is also strongly associated with salary. Holding all else constant, job candidates from programs ranked in the top ten reported the highest salaries. Compared with job candidates from programs ranked in the top ten, job candidates

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<sup>9</sup>Mean is calculated using post-market sampling weights.

from programs ranked in the second ten reported salaries that were almost \$10,000 lower, on average; job candidates from programs ranked in the third ten reported salaries that were \$17,000 lower; and job candidates from programs ranked below the third ten reported salaries that were between \$25,000 and \$30,000 lower.

Based on Table 3.18, it is clear that job type is associated with salary. In Column 2, we have added indicators of job type as additional explanatory variables. While the coefficients on most of the base regressors are similar, job type is clearly also an important predictor of salary. Compared with assistant professorships at universities, postdoctoral fellowships are associated with salaries that are \$30,000 lower, on average, and college jobs are associated with salaries that are \$11,000 lower. In contrast, jobs at business or industry establishments are associated with salaries that are \$15,000 higher.

In addition to job type, the number of job offers a job candidate receives may influence salary for several reasons. First, receiving more job offers increases the chance of a particularly good job outcome. If a high salary is desirable, a larger choice set should be associated with increased salary. Second, the number of job offers a job candidate receives is likely a strong indicator of quality, so should be associated with better job outcomes, including higher salary. Third, job candidates with multiple job offers have more bargaining power with which to negotiate higher salary offers, and so more job offers may actually result in higher salary offers.

In Column 3 of Table 3.18, we have regressed salary on the base set of covariates plus the number of job offers and the number of job offers squared. The coefficients on the number of job offers indicate that the greater the number of job offers, the higher the salary. However, the negative coefficient on the number of job offers squared indicates that the marginal effect of job offers on salary is largest for the first few job offers. The average marginal effect of an additional job offer is \$5,705 (s.e. \$648). At the second job offer, the average marginal effect of an offer is \$6,425

(s.e. \$854), while at the fifth job offer the average marginal effect is \$4,592 (s.e. \$525). In this regression, the coefficients on country of undergraduate education are somewhat reduced, while the coefficient on the indicator for a PhD program in the United States is now statistically significantly different from zero. The coefficients on PhD program rank indicators are also somewhat reduced in magnitude, though still large and statistically significant.

Column 4 presents results from a regression including the base set of covariates, job type and the number of job offers and job offers squared. The coefficients on the job type indicator variables and the job offer variables show similar magnitudes and statistical significance as in Columns 2 and 3, and the R-squared statistic (0.50) reveals surprisingly good predictive power of the regression.

Salary is not the most important job characteristic for most job candidates, however. In the post-market surveys fielded to the 2008-09 and 2009-10 job-market cohorts, we asked respondents to rate the importance of achieving several different career-related goals over their lives: having a high personal income, being successful in the respondent's line of work, making a contribution to society, and having plenty of time for recreation and hobbies. Respondents rated the importance of achieving each goal on a five-point scale where 0 is *not important* and 4 is *extremely important*. Figure 3.2 displays the proportions of respondents giving each rating for each of these outcomes. The modal response to the importance of having a high personal outcome was just *moderately important*, and each of the other goals had modal responses of *very important* or *extremely important*.

Because salary is not the only characteristic job candidates care about, nor even the characteristic that is most important to them, we have also measured several subjective characteristics of job outcomes. Specifically, in 2007-08 and 2008-09, the post-market survey asked directly about job candidates' satisfaction with several aspects of their jobs. Job candidates were asked to provide a rating on a six-point scale,

with 1 indicating that they were *extremely dissatisfied* and 6 indicating that they were *extremely satisfied*, for their overall satisfaction with the characteristics of their jobs, satisfaction with their intellectual fit with colleagues, satisfaction with their social fit with colleagues, satisfaction with their salary or compensation, and satisfaction with their workload or work/life balance. Table 3.16 presents the mean ratings for each measure.<sup>10</sup> In each case, the mean rating is between 4, *somewhat satisfied*, and 5, *very satisfied*. Figure 3.3 displays the ratings in histogram form. For each satisfaction category, *very satisfied* is the modal rating. It is clear that most job candidates are satisfied with most aspects of their jobs.

Column 1 of Table 3.19 presents the results from ordered probit regressions of overall satisfaction ratings on the base set of covariates. Women tend to rate their satisfaction higher than men, while job candidates from undergraduate institutions in Asia rate themselves as less satisfied than do others. Additionally, candidates from lower-ranked programs indicate lower satisfaction with their job placements, with the coefficients on PhD programs ranked between 11 and 20, and those ranked between 41 and 50, being statistically different from zero. In Column 2, we add the number of job offers to the set of covariates. We expect the number of job offers to be positively related to satisfaction, since a larger number of offers may include better draws from the distribution of jobs. As expected, the number of job offers is positively and statistically significantly associated with satisfaction.

Column 3 reports the results from a regression of overall satisfaction on the base covariates plus indicators for whether job candidates accepted their second-, third-, fourth-, or fifth-choice job type (first-choice job type is the excluded category). We expect that candidates who accepted jobs of types they ranked more highly will be more satisfied with their jobs. All coefficients on these variables are negative, but only

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<sup>10</sup>The ratings we summarize in this table are ordinal data. While means do not have a clear interpretation in the context of the questions, we present means as a simple summary measure that shows that candidates tend to be quite satisfied with their jobs.

the coefficient on the fourth-choice job type is statistically significantly different from zero. Column 4 includes both the number of job offers and the job-type preference indicators. The estimators are similar to those in Columns 2 and 3.

Overall, the descriptive analysis of satisfaction, together with these regressions, show that most job candidates are satisfied with their job outcomes. Women report greater satisfaction than do men, and candidates from Asia report lower levels of satisfaction, holding all else constant. Additionally, lower rank of the PhD-granting institution may be negatively related to satisfaction, while the number of job offers received is positively related to candidates' overall satisfaction with their job outcomes. Preference rating of the accepted job type is not statistically associated with overall job satisfaction, possibly because most job candidates obtain the type of job they most want.

### **3.7 Conclusions**

New economists entering the job market seek accurate, up-to-date information about what they can expect. Results from the Job Seekers project suggest that, on the whole, they can expect to be successful. While several characteristics of job candidates – receipt of undergraduate training in Asia, receipt of doctoral training at a lower-ranked departments, and lower expectations about results on the job market – were associated with smaller choice sets, lower salaries, and lower levels of satisfaction, job candidates generally achieved positive outcomes. The composition of application, interview, fly-out, and job offer sets was consistent with the preferences of job candidates, and the job candidates who most wanted a given type of job were more likely than others to secure that type of job. Nearly two thirds of job candidates secured jobs of their first-choice type. At the beginning of the job market, few job candidates reported that they expected to do poorly; at the end, few reported that they were dissatisfied with key aspects of their placement. We hope that these results

enhance the optimism that is already apparent among new entrants to the economics job market.

### 3.8 Tables and figures

Figure 3.1: Timeline: Job candidate and survey project activities

<b>Job Candidate Activities</b>		<b>Survey Activities</b>
Prepare CV and job market materials	<b>Oct</b>	
Submit job applications	<b>Nov</b>	Gather sample list and CVs
Schedule interviews for ASSA meetings	<b>Dec</b>	Field pre-market survey
Interview at ASSA meetings, begin fly-outs	<b>Jan</b>	
Continue fly-outs, receive offers, accept job	<b>Feb</b>	
Continue fly-outs, receive offers, accept job	<b>Mar</b>	
	—	
Move to new job location	<b>Aug</b>	Field post-market survey

Table 3.1: Comparison of survey respondents and all job candidates for whom CV data are available

	Respondents only		Respondents and non-respondents	
	Frequency	%	Frequency	%
Observations	706	100	2756	100
Female	215	30.45	858	31.13
Undergraduate location				
US	342	48.44	916	33.24
Asia	123	17.42	871	31.60
Other	210	29.75	789	28.63
Unknown	31	4.39	180	6.53
Rank of PhD Institution				
1-10	201	28.47	797	28.92
11-20	114	16.15	336	12.19
21-30	76	10.76	330	11.97
31-40	68	9.63	243	8.82
41-50	63	8.92	223	8.09
Unranked	184	26.06	827	30.01
Has journal publication	202	28.61	733	26.60

*Notes:* Respondents are job candidates who submitted both the pre-market and post-market surveys. Beginning in 2009-10, we recorded up to three undergraduate degrees. For the small number of job candidates with degrees from institutions in multiple locations, we prioritize the locations as follows: (1) Asia, (2) Other, (3) United States. Rank of PhD institution is from the ([U.S. News and World Report, 2009](#)) ranking of graduate programs in economics.

Table 3.2: Means and standard errors of CV background variables

	Mean	Standard error
Female	0.321	0.009
Undergraduate location <sup>a</sup>		
US	0.356	0.010
Asia <sup>b</sup>	0.336	0.009
Other	0.308	0.009
PhD program in US	0.912	0.006
PhD program in economics	0.908	0.006
Rank of PhD program <sup>c</sup>		
1-10	0.292	0.009
11-20	0.126	0.007
21-30	0.122	0.007
31-40	0.090	0.006
41-50	0.082	0.005
Unranked	0.288	0.009
PhD fields <sup>d</sup>		
Applied econometrics	0.206	0.008
Applied microeconomics	0.213	0.008
Behavioral economics	0.054	0.005
Computational economics	0.024	0.003
Development economics	0.187	0.008
Econometrics	0.171	0.007
Economic history	0.024	0.003
Economic theory	0.024	0.003
Economics of education	0.039	0.004
Environmental economics	0.059	0.005
Experimental economics	0.049	0.004
Financial economics	0.165	0.007
Game theory	0.079	0.005
Health economics	0.088	0.006
Industrial organization	0.221	0.008
International economics	0.090	0.006
International finance	0.058	0.005
International macroeconomics	0.034	0.004
International trade	0.063	0.005

	Mean	Standard error
Labor economics	0.228	0.008
Law and economics	0.024	0.003
Macroeconomics	0.229	0.008
Microeconomic theory	0.086	0.006
Microeconomics	0.058	0.005
Monetary economics	0.069	0.005
Political economy	0.073	0.005
Public economics	0.166	0.007
Urban economics	0.032	0.003
Journal publications		
0	0.725	0.009
1	0.162	0.007
2	0.062	0.005
3+	0.051	0.004
Number of courses as TA <sup>e</sup>	3.763	0.048
Number of courses as primary instructor <sup>f</sup>	1.329	0.030

*Notes:* Number of observations is 2,539. Estimation sample includes job candidates who posted CVs on the job-placement websites of their graduate departments.

<sup>a</sup> Results from the surveys indicate that location of undergraduate institution is a good proxy for citizenship.

<sup>b</sup> Asian countries as identified by the [Population Reference Bureau \(2008\)](#).

<sup>c</sup> Rankings are from [U.S. News and World Report \(2009\)](#).

<sup>d</sup> Field indicators are not mutually exclusive, so there is no omitted category.

<sup>e</sup> Number of courses as TA is topcoded to 10.

<sup>f</sup> Number of courses as primary instructor is topcoded to 5.

Table 3.3: Mean number and success rate of applications, interviews, fly-outs, and job offers

	Applications	Interviews	Fly-outs	Job offers
Mean number	107.2	16.8	5.7	2.9
	(2.7)	(0.4)	(0.2)	(0.1)
Observations	904	904	904	904
Mean proportion resulting in interview	0.192	-	-	-
	(0.006)	-	-	-
Mean proportion resulting in fly-out	0.076	0.365	-	-
	(0.004)	(0.009)	-	-
Mean proportion resulting in job offer	0.040	0.199	0.573	-
	(0.002)	(0.006)	(0.011)	-
Observations	903	897	862	-

*Notes:* Standard errors in parentheses. Mean number of applications, interviews, fly-outs, and job offers are estimated for respondents who provided information about outcomes at all four stages. Mean success rates are estimated for respondents who provided information about outcomes at all four stages and had at least one potential job at the current stage. Estimates are weighted to correct for non-response bias.

Table 3.4: Linear regressions: Background characteristics that predict the number of applications, interviews, fly-outs and job offers

	(1)	(2)	(3)	(4)
	Applications	Interviews	Fly-outs	Job offers
Female	10.673*	1.182	0.496	0.122
	(6.013)	(0.888)	(0.331)	(0.181)
Undergraduate location <sup>a</sup>				
US	—	—	—	—
Asia <sup>b</sup>	-2.773	-3.465***	-1.565***	-0.456**
	(6.111)	(0.956)	(0.386)	(0.208)
Other	-0.308	-2.460***	-0.650*	-0.305
	(6.158)	(0.923)	(0.373)	(0.195)
PhD program in US	14.223	-0.573	-0.340	-0.229
	(12.876)	(1.402)	(0.532)	(0.301)
PhD program in economics	32.271***	1.247	0.109	0.153
	(6.378)	(1.571)	(0.624)	(0.324)
Rank of PhD program <sup>c</sup>				
1-10	—	—	—	—
11-20	0.706	-1.089	-0.895	-0.550**
	(6.275)	(1.160)	(0.545)	(0.275)
21-30	14.738*	-2.253*	-2.482***	-1.318***
	(8.629)	(1.307)	(0.549)	(0.285)
31-40	-12.210	-5.898***	-3.317***	-1.320***
	(7.794)	(1.408)	(0.550)	(0.304)
41-50	7.550	-6.491***	-3.461***	-1.532***
	(12.041)	(1.739)	(0.604)	(0.298)
Unranked	9.378	-7.331***	-3.514***	-1.673***
	(11.083)	(1.187)	(0.454)	(0.239)
PhD fields <sup>d</sup>				
Applied econometrics	12.952*	2.339**	0.768*	0.342
	(7.670)	(1.038)	(0.428)	(0.212)

	(1)	(2)	(3)	(4)
	Applications	Interviews	Fly-outs	Job offers
Applied microeconomics	7.948 (7.219)	0.388 (0.849)	0.238 (0.350)	0.249 (0.197)
Behavioral economics	-3.914 (8.258)	-0.894 (1.559)	0.070 (0.641)	-0.339 (0.319)
Computational economics	-4.055 (11.604)	0.340 (2.014)	1.826* (1.096)	0.934* (0.531)
Development economics	-2.177 (7.602)	-0.853 (0.942)	-0.498 (0.372)	-0.043 (0.195)
Econometrics	6.518 (7.473)	1.124 (1.103)	0.435 (0.453)	0.091 (0.214)
Economic history	-3.441 (7.813)	-2.286 (1.570)	-0.738 (0.812)	-0.695** (0.335)
Economic theory	-1.300 (11.288)	0.908 (2.306)	0.247 (1.024)	0.988 (0.739)
Economics of education	-9.747 (12.082)	-1.728 (1.260)	-0.740 (0.640)	0.280 (0.423)
Environmental economics	-16.917** (7.891)	0.006 (1.300)	-0.212 (0.481)	-0.187 (0.263)
Experimental economics	7.721 (9.136)	-0.735 (1.566)	0.027 (0.627)	0.317 (0.322)
Financial economics	13.488** (6.504)	3.688*** (1.194)	0.457 (0.442)	0.098 (0.229)
Game theory	2.443 (7.709)	-0.691 (1.166)	-0.273 (0.515)	-0.238 (0.261)
Health economics	18.227 (12.959)	2.570* (1.416)	1.677** (0.657)	1.074*** (0.342)
Industrial organization	-5.239 (6.046)	-0.234 (0.873)	-0.232 (0.360)	-0.018 (0.193)
International economics	10.774 (9.155)	1.265 (1.261)	0.399 (0.467)	0.300 (0.282)
International finance	11.511 (9.465)	2.201 (1.901)	0.373 (0.671)	0.430 (0.344)
International macroeconomics	19.403 (14.204)	0.511 (2.666)	0.275 (0.969)	-0.156 (0.431)
International trade	19.134**	2.535	0.911*	0.186

	(1)	(2)	(3)	(4)
	Applications	Interviews	Fly-outs	Job offers
	(8.352)	(1.573)	(0.528)	(0.273)
Labor economics	14.954**	1.102	0.562	0.349*
	(7.051)	(0.902)	(0.376)	(0.197)
Law and economics	35.118***	-0.691	-1.027	-0.680*
	(10.225)	(2.011)	(0.815)	(0.351)
Macroeconomics	18.120***	2.627**	0.186	0.023
	(6.903)	(1.149)	(0.454)	(0.228)
Microeconomic theory	26.469***	0.091	-0.327	0.101
	(6.886)	(1.111)	(0.448)	(0.266)
Microeconomics	1.961	-1.721	-0.039	-0.023
	(11.339)	(1.400)	(0.585)	(0.338)
Monetary economics	-4.113	3.051	0.329	-0.111
	(9.511)	(1.945)	(0.708)	(0.391)
Political economy	-3.947	0.587	0.664	0.466*
	(7.818)	(1.272)	(0.508)	(0.251)
Public economics	11.833*	2.878***	0.360	0.185
	(6.318)	(0.907)	(0.354)	(0.204)
Urban economics	3.536	1.120	0.685	0.238
	(12.498)	(1.935)	(0.738)	(0.429)
Journal publications				
0	-	-	-	-
	-	-	-	-
1	-8.036	0.870	0.025	-0.021
	(6.894)	(1.074)	(0.426)	(0.204)
2	-11.802	0.730	0.091	-0.024
	(8.469)	(1.303)	(0.580)	(0.277)
3+	-10.787	0.302	0.716	0.610
	(14.038)	(2.065)	(0.668)	(0.428)
Number of courses as TA <sup>e</sup>	3.827***	0.006	-0.109*	-0.039
	(1.392)	(0.159)	(0.056)	(0.032)
Number of courses as primary instructor <sup>f</sup>	0.506	-0.094	-0.206**	-0.089*
	(2.248)	(0.264)	(0.094)	(0.050)

	(1)	(2)	(3)	(4)
	Applications	Interviews	Fly-outs	Job offers
Observations	858	858	858	858
R-squared	0.173	0.198	0.219	0.185

*Notes:* Standard errors in parentheses, \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ . Dependent variable is the number of applications, interviews, fly-outs, or job offers. Regression sample includes job candidates who provided information about outcomes at all four stages. Estimates are weighted to correct for non-response bias.

<sup>a</sup> Results from the surveys indicate that location of undergraduate institution is a good proxy for citizenship.

<sup>b</sup> Asian countries as identified by the [Population Reference Bureau \(2008\)](#).

<sup>c</sup> Rankings are from [U.S. News and World Report \(2009\)](#).

<sup>d</sup> Field indicators are not mutually exclusive, so there is no omitted category.

<sup>e</sup> Number of courses as TA is topcoded to 10.

<sup>f</sup> Number of courses as primary instructor is topcoded to 5.

Table 3.5: Linear regressions: Background characteristics that predict the success rate of applications, interviews and fly-outs

	(1) Applications to interviews	(2) Interviews to fly-outs	(3) Fly-outs to job offers
Female	-0.312 (1.193)	2.425 (1.769)	-2.882 (2.396)
Undergraduate location <sup>a</sup>			
US	-	-	-
Asia <sup>b</sup>	-1.260 (1.668)	0.184 (2.487)	8.960 (2.940)
Other	-2.191* (1.153)	2.082 (1.896)	2.464 (2.567)
PhD program in US	2.558 (2.760)	-3.507 (4.361)	3.798 (4.580)
PhD program in economics	-6.416** (2.781)	-6.021 (3.994)	-1.273 (4.960)
Rank of PhD program <sup>c</sup>			
1-10	-	-	-
11-20	-2.017 (1.593)	-1.253 (2.409)	-1.069 (2.877)
21-30	-4.425*** (1.439)	-9.674*** (2.562)	-4.146 (3.929)
31-40	-3.398* (2.059)	-8.822*** (2.881)	7.759* (4.373)
41-50	-7.537*** (1.777)	-3.799 (3.828)	2.765 (4.497)
Unranked	-4.143* (2.495)	-4.149 (2.656)	4.149 (3.755)
PhD fields <sup>d</sup>			
Applied econometrics	0.372	-0.373	3.243

	(1) Applications to interviews	(2) Interviews to fly-outs	(3) Fly-outs to job offers
Applied microeconomics	(1.436) -2.085*	(2.177) 3.342	(2.739) -0.161
Behavioral economics	(1.100) 1.318	(2.229) 5.926	(2.645) -2.340
Computational economics	(2.988) 0.346	(3.885) 7.962*	(4.651) 3.008
Development economics	(2.219) -1.201	(4.323) -2.264	(5.842) 5.519*
Econometrics	(1.491) -0.388	(2.353) -2.233	(2.914) 1.600
Economic history	(1.407) -4.595**	(2.129) -0.078	(3.104) -5.473
Economic theory	(1.931) -1.633	(5.001) -0.211	(6.584) 11.760**
Economics of education	(2.235) 1.107	(5.406) 2.076	(5.738) 10.887**
Environmental economics	(3.841) 3.916*	(5.033) 0.703	(4.314) -1.295
Experimental economics	(2.214) -3.022	(3.592) 2.719	(4.190) 5.853
Financial economics	(2.251) 1.511	(3.594) -5.297**	(4.938) -5.976*
Game theory	(1.465) 0.047	(2.491) -0.501	(3.387) 2.781
Health economics	(1.975) -0.527	(3.204) 3.788	(4.674) 6.192
Industrial organization	(1.470) -1.620	(2.698) -3.085	(3.789) 1.995
International economics	(1.233) -0.840	(2.201) -2.636	(2.761) -3.248
International finance	(1.605) -2.612	(2.736) -1.653	(4.008) -0.566
	(2.042)	(2.997)	(4.220)

	(1) Applications to interviews	(2) Interviews to fly-outs	(3) Fly-outs to job offers
International macroeconomics	0.354 (4.467)	3.433 (5.572)	-6.276 (5.447)
International trade	-2.483 (1.852)	0.530 (3.186)	-3.798 (3.627)
Labor economics	-1.667 (1.207)	-0.724 (1.971)	-1.361 (2.628)
Law and economics	-7.144*** (2.190)	-9.915*** (2.850)	2.886 (6.702)
Macroeconomics	0.303 (1.530)	-5.126** (2.312)	5.712* (3.242)
Microeconomic theory	-4.530*** (1.451)	-4.161 (2.744)	1.249 (4.020)
Microeconomics	2.594 (2.700)	4.744 (3.616)	-1.890 (5.210)
Monetary economics	0.401 (2.124)	-7.187** (3.041)	-12.026** (4.692)
Political economy	1.547 (1.532)	3.833 (3.244)	4.149 (3.567)
Public economics	-0.909 (1.166)	-2.985 (2.089)	-0.240 (2.668)
Urban economics	-2.553 (1.856)	-0.861 (3.341)	2.415 (6.186)
Journal publications			
0	— —	— —	— —
1	0.824 (1.141)	-2.765 (2.120)	4.124 (2.781)
2	4.814 (4.333)	-0.755 (3.283)	-4.282 (5.647)
3+	5.530** (2.773)	1.433 (3.289)	1.406 (4.574)
Number of courses as TA <sup>e</sup>	-0.421*	-0.928**	-0.170

	(1)	(2)	(3)
	Applications to interviews	Interviews to fly-outs	Fly-outs to job offers
	(0.217)	(0.372)	(0.473)
Number of courses as primary instructor <sup>f</sup>	-1.042**	-0.450	1.410
	(0.467)	(0.719)	(0.875)
Observations	857	852	819
R-squared	0.175	0.125	0.088

*Notes:* Standard errors in parentheses, \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ . Dependent variable is the percentage of applications that resulted in interviews, the percentage of interviews that resulted in fly-outs, or the percentage of fly-outs that resulted in job offers. Regression sample includes job candidates who provided information about outcomes at all four stages and had at least one potential job offer at the current stage. Estimates are weighted to correct for non-response bias.

<sup>a</sup> Results from the surveys indicate that location of undergraduate institution is a good proxy for citizenship.

<sup>b</sup> Asian countries as identified by the [Population Reference Bureau \(2008\)](#).

<sup>c</sup> Rankings are from [U.S. News and World Report \(2009\)](#).

<sup>d</sup> Field indicators are not mutually exclusive, so there is no omitted category.

<sup>e</sup> Number of courses as TA is topcoded to 10.

<sup>f</sup> Number of courses as primary instructor is topcoded to 5.

Table 3.6: Linear regressions: Marginal return in job offers from an additional application, interview, and fly-out

	(1)	(2)	(3)
	Applications	Interviews	Fly-outs
Number	0.01303*** (0.00269)	0.18059*** (0.02192)	0.50878*** (0.03938)
Number squared	-0.00003*** (0.00001)	-0.00153*** (0.00057)	-0.00628** (0.00264)
Observations	858	858	858
R-squared	0.208	0.424	0.668

*Notes:* Standard errors in parentheses, \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ . Dependent variable is the number of job offers. Regressors are the number and number squared of applications, interviews, or fly-outs, and all of the regressors from Table 3.4: gender, location of undergraduate institution, indicator for PhD program in the United States, indicator for PhD program in economics, rank of PhD program, PhD fields, number of journal publications, number of courses as taught as TA, and number of courses taught as primary instructor. Regression sample includes job candidates who provided information about outcomes at all four stages. Estimates are weighted to correct for non-response bias.

Table 3.7: Expected placement ranking, relative to peers in same graduate department

	Mean	Standard error
1st decile	0.164	0.028
2nd decile	0.241	0.030
3rd decile	0.194	0.028
4th decile	0.084	0.018
5th decile	0.141	0.026
6th decile	0.053	0.015
7th decile	0.042	0.013
8th decile	0.018	0.008
9th decile	0.027	0.012
10th decile	0.037	0.013

*Notes:* Number of observations is 253. Expected placement rankings are responses to the following question from the 2009-10 post-market survey: “Imagine that, next year, the faculty in your department compile a list of the job placements of their graduates over the last five years. They put the placements they consider to be most impressive at the top of the list. Thinking about the kind of job you expect to obtain, where do you think you would fall in this list?” Estimation sample includes job candidates from the 2009-10 job-market cohort who provided information about outcomes at all four stages of the job market. Estimates are weighted to correct for non-response bias.

Table 3.8: Linear regressions: Association between expected placement ranking, relative to peers in same graduate department, and the number of applications, interviews, fly-outs, and job offers

	(1)	(2)	(3)	(4)
	Applications	Interviews	Fly-outs	Job offers
1st decile (most impressive)	–	–	–	–
	–	–	–	–
2nd decile	–19.943 (12.719)	–2.082 (1.733)	–2.108*** (0.776)	–0.398 (0.496)
3rd decile	–13.659 (13.470)	–2.744 (1.686)	–3.496*** (0.731)	–1.117** (0.431)
4th decile	–3.828 (16.972)	–5.814*** (2.209)	–3.963*** (0.932)	–1.419*** (0.472)
5th decile	–12.435 (13.553)	–3.046 (1.899)	–2.724*** (0.884)	–0.773 (0.475)
6th decile or below	–11.111 (15.687)	–7.971*** (1.721)	–3.776*** (0.771)	–1.270*** (0.473)
Observations	253	253	253	253
R-squared	0.383	0.502	0.555	0.452

*Notes:* Standard errors in parentheses, \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ . Dependent variable is the number of applications, interviews, fly-outs, or job offers. Expected placement rankings are responses to the following question from the 2009-10 post-market survey: “Imagine that, next year, the faculty in your department compile a list of the job placements of their graduates over the last five years. They put the placements they consider to be most impressive at the top of the list. Thinking about the kind of job you expect to obtain, where do you think you would fall in this list?” Rankings in the bottom five deciles are combined to ensure adequate cell sizes. Regressions include all of the regressors from Table 3.4: gender, location of undergraduate institution, indicator for PhD program in the United States, indicator for PhD program in economics, rank of PhD program, PhD fields, number of journal publications, number of courses as taught as TA, and number of courses taught as primary instructor. Regression sample includes job candidates from the 2009-10 job-market cohort who provided information about outcomes at all four stages. Estimates are weighted to correct for non-response bias.

Table 3.9: Preferred job types of job candidates

	Percentage ranking as most preferred
Assistant professor at a university	72.4%
Assistant professor at a four-year college	8.2%
Postdoctoral fellow	2.1%
Researcher at a non-profit, governmental, or quasi-governmental organization	10.6%
Researcher at a business or industry establishment	6.8%
Observations	1333

*Notes:* Table pools observations from respondents from the 2007-10 job-market cohorts and uses pre-market survey sampling weights. Respondents reported preferences at the time of the pre-market survey. Descriptions of job categories varied over time. Descriptions in the table are from the 2009-10 pre-market survey. Descriptions from other surveys are available in the appendix.

Table 3.10: Composition of application, interview, fly-out, and job-offer sets

	Applications	Interviews	Fly-outs	Job offers
Assistant professor at a university	0.623 (0.013)	0.608 (0.014)	0.567 (0.017)	0.540 (0.018)
Assistant professor at a four-year college	0.167 (0.009)	0.133 (0.009)	0.114 (0.010)	0.103 (0.011)
Postdoctoral fellow	0.056 (0.006)	0.032 (0.003)	0.046 (0.006)	0.070 (0.008)
Researcher at an NGQO <sup>a</sup>	0.096 (0.006)	0.142 (0.008)	0.177 (0.011)	0.188 (0.013)
Researcher at a business or industry establishment	0.058 (0.005)	0.085 (0.008)	0.097 (0.010)	0.098 (0.012)
Observations	707	705	702	701

*Notes:* Standard errors in parentheses. Columns present the mean over job candidates of the proportion of potential jobs at the given job-market stage that fell into each job category. The estimation sample for each stage includes job candidates who provided information about outcomes at all four stages and had at least one potential job at the current stage. Estimates are weighted to correct for non-response bias. Wording of survey questions and descriptions of job categories varied over time. Wording and descriptions in the table are from the 2009-10 post-market survey. Wording and descriptions from other surveys are available in the appendix. In most (but not all) surveys, questions included a residual category for jobs not otherwise classified. Jobs in the residual category comprise less than 2 percent of the applications, interviews, and fly-outs, and less than 3 percent of the job offers reported in response to questions that included the category. Proportions in the table exclude jobs in the residual category from both the numerator and the denominator.

<sup>a</sup> NGQO refers to a non-profit, governmental, or quasi-governmental organization.

Table 3.11: Composition of job-offer set by preferred job type

	Prefers university	Prefers college	Prefers postdoc	Prefers NGQO <sup>a</sup>	Prefers business
Assistant professor at a university	0.620 (0.020)	0.366 (0.052)	0.453 (0.117)	0.215 (0.045)	0.278 (0.071)
Assistant professor at a four-year college	0.076 (0.010)	0.372 (0.052)	0.093 (0.060)	0.097 (0.040)	0.105 (0.060)
Postdoctoral fellow	0.077 (0.010)	0.061 (0.026)	0.231 (0.068)	0.059 (0.027)	0.034 (0.022)
Researcher at an NGQO <sup>a</sup>	0.164 (0.014)	0.124 (0.028)	0.063 (0.045)	0.451 (0.057)	0.200 (0.065)
Researcher at a business or industry establishment	0.063 (0.010)	0.077 (0.027)	0.160 (0.122)	0.178 (0.051)	0.383 (0.085)
Observations	525	70	12	73	35
Received at least one offer of preferred type	0.742 (0.022)	0.509 (0.063)	0.552 (0.155)	0.586 (0.068)	0.482 (0.094)
Observations	555	75	13	77	38

*Notes:* Standard errors in parentheses. Preferred job type is the job type the respondent ranked as his or her first choice at the time of the pre-market survey. Columns in the top panel present the mean, over job candidates with the given preference, of the proportion of job offers that fell into each job category. Columns in the bottom panel present the proportion of job candidates with the given preference who received at least one job offer of their preferred type. The estimation samples in the top panel exclude job candidates who did not report any job offers in the categories listed in the table. Estimates are weighted to correct for non-response bias. Wording of survey questions and descriptions of job categories varied over time. Wording and descriptions in the table are from the 2009-10 post-market survey. Wording and descriptions from other surveys are available in the appendix. In most (but not all) surveys, questions included a residual category for jobs not otherwise classified. Jobs in the residual category comprise less than 2 percent of the applications, interviews, and fly-outs, and less than 3 percent of the job offers reported in response to questions that included the category. Proportions in the table exclude jobs in the residual category from both the numerator and the denominator.

<sup>a</sup> NGQO refers to a non-profit, governmental, or quasi-governmental organization.

Table 3.12: Classification of job placements

	Percentage of job placements
Assistant professor at a university	61.9%
Assistant professor at a four-year college	8.2%
Postdoctoral fellow	4.5%
Researcher at a non-profit, governmental, or quasi-governmental organization	19.1%
Researcher at a business or industry establishment	6.4%
Observations	934

*Notes:* Table pools observations from 2007-10 post-market respondents and uses post-market survey sampling weights. Job placements are classified using information from several questions in the post-market survey. Job candidates who accepted both a temporary position, such as a postdoctoral fellowship, and a permanent position are classified according to their permanent position.

Table 3.13: Preference ranking of accepted job type

Percentage of job candidates accepting a job of their...	
1st-choice type	64.3%
2nd-choice type	19.9%
3rd-choice type	8.7%
4th-choice type	4.2%
5th-choice type	2.8%
Observations	704

*Notes:* Table pools observations from 2007-10 respondents who completed both the pre-market and post-market surveys and uses longitudinal survey sampling weights. Table combines pre-market information about preference ranking over jobs in different categories with post-market information about job placements.

Table 3.14: Prevalence of tenure track jobs

	Percentage on tenure track	Obs
Respondents with a job in any setting	59.0%	940
Respondents with a job at a four-year college <sup>a</sup>	76.2%	82
Respondents with a job at a university <sup>a</sup>	85.4%	569

*Notes:* Table pools observations from 2007-10 post-market respondents and uses post-market survey sampling weights.

<sup>a</sup> Excludes respondents with postdoctoral fellowships.

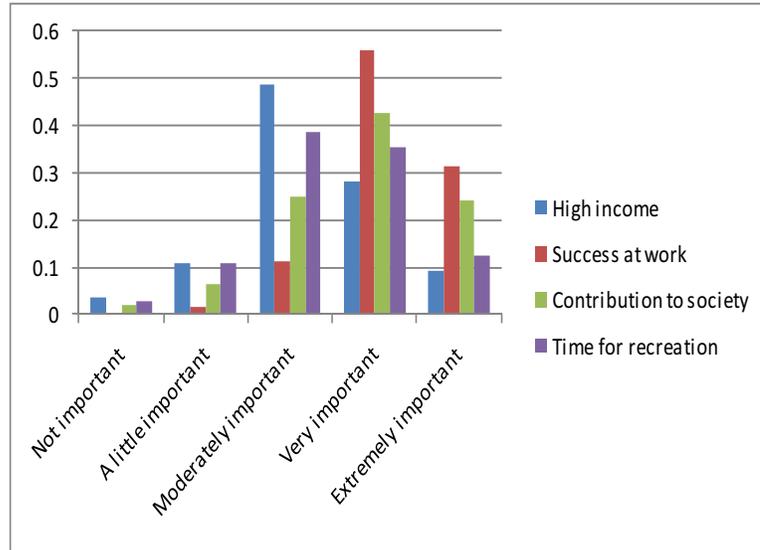
Table 3.15: Base salary (in 2010 dollars)

	Mean	25th Percentile	Median	75th Percentile	Obs
All jobs (weighted)	\$92,775				858
All jobs (unweighted)	\$93,097	\$70,569	\$90,732	\$109,887	850
Assistant professor at a university	\$96,132	\$71,021	\$91,313	\$111,605	514
Assistant professor at a four-year college	\$73,105	\$59,868	\$71,059	\$79,067	76
Postdoctoral fellow	\$58,270	\$47,398	\$55,447	\$67,545	41
Researcher at an NGQO <sup>a</sup>	\$95,478	\$80,651	\$95,778	\$108,620	170
Researcher at a business or industry establishment	\$113,154	\$90,732	\$106,532	\$142,043	49

*Notes:* Table pools observations from 2007-10 post-market respondents. "All jobs (weighted)" is calculated using post-market survey sampling weights. All other statistics are calculated using unweighted data.

<sup>a</sup> NGQO refers to a non-profit, governmental, or quasi-governmental organization.

Figure 3.2: Importance ratings of career-related outcomes



*Notes:* Figure pools observations from 2008-10 post-market respondents and uses post-market survey sampling weights. Respondents rated the importance of the following outcomes: having a high personal income, being successful in their line of work, making a contribution to society, and having plenty of time for recreation and hobbies. The number of observations for these measures is 692, 691, 688 and 692, respectively.

Table 3.16: Satisfaction with accepted job

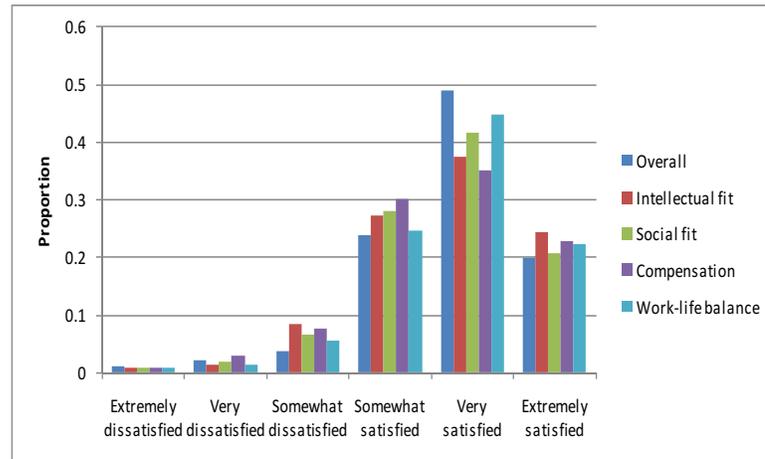
	Mean rating	Obs
Overall	4.77	580
Intellectual fit	4.72	602
Social fit	4.70	592
Compensation <sup>a</sup>	4.64	604
Work-life balance <sup>b</sup>	4.78	601

*Notes:* Table pools observations from 2007-09 post-market respondents and uses post-market survey sampling weights. Respondents rated their satisfaction with the job they accepted on a six-point scale where 1 was *extremely dissatisfied*, 2 was *very dissatisfied*, 3 was *somewhat dissatisfied*, 4 was *somewhat satisfied*, 5 was *very satisfied*, and 6 was *extremely satisfied*.

<sup>a</sup> The 2007-08 survey asked about salary, while the 2008-09 survey asked about compensation.

<sup>b</sup> The 2007-08, asked about work load, while the 2008-09 survey asked about work/life balance.

Figure 3.3: Satisfaction ratings



*Notes:* Histogram pools observations from 2007-09 post-market respondents and uses post-market survey sampling weights. Wording of the compensation and work/life balance questions varied slightly over time. The 2007-08 survey asked about salary and work load, while the 2008-09 survey asked about compensation and work/life balance.

Table 3.17: Multinomial logistic regression: Predictors of accepted job type

	(1) College	(2) NGQO <sup>g</sup>	(3) Business	(4) Postdoc
Female	0.047 (0.412)	0.252 (0.320)	0.587 (0.572)	0.377 (0.618)
Undergraduate location <sup>a</sup>				
US	— —	— —	— —	— —
Asia <sup>b</sup>	0.112 (0.447)	-0.617* (0.362)	-0.142 (0.816)	-1.363 (1.001)
Other	-1.475** (0.670)	-1.325*** (0.411)	0.382 (0.700)	0.799 (0.634)
PhD program in US	0.851 (1.028)	-0.917 (0.669)	1.083 (1.271)	-2.960*** (0.955)
PhD program in economics	2.201* (1.273)	0.990 (0.649)	0.235 (0.891)	-0.401 (0.655)
Rank of PhD program <sup>c</sup>				
1-10	— —	— —	— —	— —
11-20	-0.912 (0.815)	0.265 (0.414)	-1.670* (0.918)	2.263*** (0.776)
21-30	0.152 (0.631)	0.986** (0.498)	0.396 (0.681)	0.204 (0.996)
31-40	0.453 (0.719)	0.854 (0.545)	-0.554 (1.352)	3.183*** (0.756)
41-50	-0.421 (0.861)	0.830 (0.566)	0.807 (0.857)	0.795 (1.030)
Unranked	0.975 (0.598)	0.298 (0.523)	0.688 (0.707)	0.689 (0.932)
PhD fields <sup>d</sup>				
Applied econometrics	-0.787 (0.485)	-0.691* (0.372)	-0.488 (0.677)	0.007 (0.619)
Applied microeconomics	-0.039	-0.123	0.075	-0.762

	(1) College	(2) NGQO <sup>g</sup>	(3) Business	(4) Postdoc
	(0.510)	(0.356)	(0.547)	(0.664)
Behavioral economics	0.935 (1.078)	-1.552 (1.020)	-1.494 (1.633)	-2.161 (1.347)
Computational economics	0.727 (1.654)	-1.934 (1.227)	3.353*** (0.868)	-17.188*** (0.789)
Development economics	0.197 (0.503)	-0.089 (0.403)	-0.359 (0.616)	0.147 (0.652)
Econometrics	1.062** (0.507)	-0.025 (0.400)	-0.116 (0.833)	-0.013 (0.652)
Economic history	0.983 (0.790)	-0.398 (0.754)	1.006 (1.290)	-16.286*** (0.964)
Economic theory	-17.034*** (0.852)	-18.137*** (0.913)	-18.323*** (1.500)	0.986 (1.582)
Economics of education	-0.906 (0.875)	0.328 (0.504)	-1.127 (1.145)	1.703 (1.362)
Environmental economics	0.961 (0.591)	-0.131 (0.473)	-0.875 (0.832)	1.986** (0.823)
Experimental economics	-0.349 (0.846)	-1.231 (0.813)	-0.139 (1.118)	1.285 (0.955)
Financial economics	-1.467 (0.926)	0.080 (0.483)	1.350* (0.765)	0.218 (0.875)
Game theory	-17.107*** (0.620)	0.100 (0.565)	0.814 (0.855)	-1.689* (0.890)
Health economics	-0.118 (0.642)	-0.270 (0.409)	0.177 (0.661)	1.092 (0.997)
Industrial organization	-1.379** (0.580)	-0.311 (0.383)	0.090 (0.615)	0.887 (0.676)
International economics	0.299 (0.596)	0.340 (0.487)	-0.040 (0.716)	0.996 (0.843)
International finance	0.376 (0.847)	0.747 (0.575)	-0.637 (1.610)	0.189 (0.785)
International macroeconomics	0.815 (0.968)	-0.231 (0.750)	-14.408*** (1.243)	0.746 (1.115)
International trade	0.226 (0.697)	0.146 (0.449)	-1.439 (0.884)	-0.798 (1.228)

	(1) College	(2) NGQO <sup>g</sup>	(3) Business	(4) Postdoc
Labor economics	-0.158 (0.480)	0.368 (0.337)	-0.110 (0.700)	-0.341 (0.758)
Law and economics	-18.315*** (0.934)	-1.189 (1.231)	-0.519 (0.895)	2.802*** (0.896)
Macroeconomics	-0.259 (0.525)	0.245 (0.404)	-2.120*** (0.722)	0.753 (0.651)
Microeconomic theory	-0.495 (0.708)	-0.945 (0.589)	-17.749*** (0.792)	0.581 (0.816)
Microeconomics	1.040 (0.780)	0.949 (0.680)	1.501** (0.760)	1.188 (0.857)
Monetary economics	-0.192 (1.095)	-0.325 (0.578)	-15.503*** (1.484)	-0.424 (1.116)
Political economy	0.089 (0.748)	-2.816*** (0.959)	-0.681 (0.992)	0.804 (1.114)
Public economics	0.687 (0.505)	-0.067 (0.333)	0.594 (0.581)	-1.071 (0.886)
Urban economics	-0.456 (0.990)	-0.596 (0.730)	0.773 (0.965)	-15.511*** (1.008)
Journal publications				
0	— —	— —	— —	— —
1	-0.043 (0.509)	-0.180 (0.416)	-0.918 (0.927)	0.419 (0.625)
2	0.047 (0.740)	-0.076 (0.548)	-1.791 (1.089)	-1.663 (1.015)
3+	-0.909 (1.217)	-0.590 (0.579)	0.149 (1.873)	-0.399 (0.972)
Number of courses as TA <sup>e</sup>	0.019 (0.080)	0.125** (0.060)	0.284*** (0.097)	0.038 (0.106)
Number of courses as primary instructor <sup>f</sup>	0.330** (0.138)	-0.072 (0.101)	-0.311* (0.189)	0.209 (0.146)

	(1)	(2)	(3)	(4)
	College	NGQO <sup>g</sup>	Business	Postdoc
Preferred job type				
University	—	—	—	—
College	1.501*** (0.530)	0.199 (0.459)	1.899** (0.918)	0.358 (0.849)
NGQO <sup>g</sup>	2.160*** (0.613)	2.844*** (0.415)	3.812*** (0.810)	0.152 (1.001)
Business	2.593*** (0.878)	2.142*** (0.605)	3.546*** (0.755)	0.586 (1.164)
Postdoc	1.948* (1.030)	−19.026*** (0.821)	2.942** (1.292)	2.931** (1.206)
Observations	668	668	668	668

*Notes:* Outcome categories are university, college, non-academic research, private sector, and postdoctoral fellowship placements. Estimates are weighted to correct for non-response bias. Standard errors in parentheses, \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

<sup>a</sup> Results from the surveys indicate that location of undergraduate institution is a good proxy for citizenship.

<sup>b</sup> Asian countries as identified by the [Population Reference Bureau \(2008\)](#).

<sup>c</sup> Rankings are from [U.S. News and World Report \(2009\)](#).

<sup>d</sup> Field indicators are not mutually exclusive, so there is no omitted category.

<sup>e</sup> Number of courses as TA is topcoded to 10.

<sup>f</sup> Number of courses as primary instructor is topcoded to 5.

<sup>g</sup> NGQO refers to a non-profit, governmental, or quasi-governmental organization.

Table 3.18: Linear regressions: Predictors of salary (in 2010 dollars)

	(1) Base	(2) + Job type	(3) + Job offers	(4) All
Female	92 (2, 284)	77 (2, 179)	-989 (2, 139)	-1, 083 (2, 035)
Undergraduate location <sup>a</sup>				
US	-	-	-	-
Asia <sup>b</sup>	-15, 115*** (2, 958)	-16, 559*** (2, 852)	-13, 006*** (2, 749)	-14, 386*** (2, 674)
Other	-6, 331** (2, 888)	-5, 954** (2, 851)	-4, 503* (2, 686)	-4, 372 (2, 666)
PhD program in US	5, 879 (4, 459)	1, 341 (4, 366)	7, 950* (4, 116)	3, 793 (4, 061)
PhD program in economics	-24, 965*** (5, 632)	-24, 405*** (5, 670)	-24, 768*** (5, 073)	-24, 255*** (5, 099)
Rank of PhD program <sup>c</sup>				
1-10	-	-	-	-
11-20	-9, 707** (4, 248)	-8, 996** (4, 104)	-5, 827 (4, 146)	-5, 232 (4, 022)
21-30	-17, 423*** (4, 256)	-17, 582*** (4, 130)	-11, 890*** (3, 941)	-12, 160*** (3, 851)
31-40	-29, 810*** (4, 428)	-26, 935*** (4, 187)	-22, 092*** (3, 986)	-20, 023*** (3, 762)
41-50	-25, 618*** (3, 986)	-24, 959*** (3, 877)	-18, 465*** (3, 918)	-18, 336*** (3, 830)
Unranked	-27, 448*** (3, 500)	-26, 881*** (3, 440)	-18, 856*** (3, 459)	-18, 915*** (3, 419)
PhD fields <sup>d</sup>				
Applied econometrics	-1, 185 (2, 738)	-2, 306 (2, 629)	-2, 537 (2, 539)	-3, 602 (2, 454)

	(1) Base	(2) + Job type	(3) + Job offers	(4) All
Applied microeconomics	240 (2, 657)	-94 (2, 520)	-1, 170 (2, 495)	-1, 580 (2, 376)
Behavioral economics	4, 384 (5, 761)	4, 519 (5, 843)	7, 106 (5, 113)	7, 159 (5, 213)
Computational economics	11, 223 (8, 497)	7, 447 (7, 872)	9, 557 (8, 374)	5, 783 (7, 606)
Development economics	-3, 951 (3, 023)	-3, 806 (2, 952)	-3, 895 (2, 795)	-3, 737 (2, 733)
Econometrics	-2, 735 (3, 150)	-2, 298 (3, 078)	-4, 319 (2, 865)	-3, 849 (2, 778)
Economic history	-6, 792 (6, 539)	-6, 177 (6, 155)	-2, 267 (5, 816)	-2, 216 (5, 474)
Economic theory	-6, 954 (7, 775)	-5, 981 (7, 493)	-8, 859 (6, 864)	-8, 072 (6, 636)
Economics of education	-8, 030** (3, 793)	-5, 934 (3, 719)	-10, 130*** (3, 879)	-8, 046** (3, 745)
Environmental economics	-10, 776*** (3, 350)	-6, 378** (3, 058)	-10, 606*** (3, 224)	-6, 859** (2, 939)
Experimental economics	-5, 385 (4, 840)	-5, 247 (4, 762)	-5, 730 (4, 413)	-5, 501 (4, 393)
Financial economics	20, 000*** (4, 194)	18, 757*** (4, 136)	19, 132*** (3, 805)	17, 923*** (3, 776)
Game theory	-906 (4, 888)	-1, 662 (4, 798)	1, 067 (4, 792)	274 (4, 698)
Health economics	-4, 315 (4, 122)	-3, 984 (3, 854)	-7, 727** (3, 759)	-7, 492** (3, 514)
Industrial organization	-0 (2, 646)	-89 (2, 563)	717 (2, 484)	498 (2, 432)
International economics	2, 405 (4, 235)	4, 002 (4, 183)	664 (3, 698)	2, 238 (3, 669)
International finance	10, 781* (6, 144)	9, 383 (6, 057)	9, 960 (6, 111)	8, 348 (6, 053)
International macroeconomics	-15, 822** (6, 334)	-14, 158** (6, 126)	-15, 041** (6, 067)	-13, 319** (5, 789)

	(1) Base	(2) + Job type	(3) + Job offers	(4) All
International trade	5,249 (4,293)	4,961 (4,223)	3,052 (4,366)	2,882 (4,344)
Labor economics	-2,895 (2,595)	-3,527 (2,522)	-4,205* (2,519)	-4,707* (2,459)
Law and economics	1,079 (6,879)	3,896 (6,081)	4,826 (6,843)	6,870 (6,413)
Macroeconomics	-3,358 (3,437)	-3,479 (3,401)	-2,357 (3,222)	-2,541 (3,230)
Microeconomic theory	-4,083 (4,167)	-2,956 (4,046)	-5,940 (3,710)	-4,736 (3,611)
Microeconomics	-5,826 (4,360)	-4,587 (4,329)	-6,489* (3,851)	-5,403 (3,683)
Monetary economics	-8,313* (4,736)	-7,672 (4,660)	-9,470** (4,253)	-8,674** (4,212)
Political economy	-3,516 (3,973)	-4,024 (4,012)	-5,844 (3,831)	-6,090 (3,863)
Public economics	3,375 (2,884)	2,303 (2,793)	2,745 (2,667)	1,679 (2,622)
Urban economics	-2,438 (4,449)	-1,962 (4,590)	-2,596 (4,194)	-2,087 (4,421)
Journal publications				
0	— —	— —	— —	— —
1	-3,511 (3,469)	-2,358 (3,382)	-2,518 (3,134)	-1,358 (3,047)
2	568 (3,723)	1,225 (3,644)	605 (3,416)	1,423 (3,348)
3+	-4,042 (4,568)	-3,921 (4,720)	-4,083 (4,131)	-3,877 (4,291)
Number of courses as TA <sup>e</sup>	52 (463)	-75 (466)	192 (446)	49 (451)
Number of courses as primary instructor <sup>f</sup>	-1,150 (800)	-633 (811)	-884 (762)	-386 (773)

	(1) Base	(2) + Job type	(3) + Job offers	(4) All
Job type				
University		—		—
		—		—
College		−11,402*** (3,048)		−9,634*** (2,939)
NGQO <sup>g</sup>		2,168 (2,674)		2,246 (2,592)
Business or industry		15,335*** (4,831)		16,984*** (4,402)
Postdoc		−30,330*** (3,874)		−25,455*** (3,338)
Number of job offers			7,817*** (1,225)	7,277*** (1,215)
Number of job offers squared			−315*** (113)	−279** (111)
Constant	135,008*** (7,097)	139,091*** (7,059)	107,889*** (7,193)	112,881*** (7,149)
Observations	815	809	815	809
R-squared	0.381	0.428	0.465	0.504

*Notes:* Standard errors in parentheses, \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ . Dependent variable is salary in 2010 dollars. Estimates are weighted to correct for non-response bias.

<sup>a</sup> Results from the surveys indicate that location of undergraduate institution is a good proxy for citizenship.

<sup>b</sup> Asian countries as identified by the [Population Reference Bureau \(2008\)](#).

<sup>c</sup> Rankings are from [U.S. News and World Report \(2009\)](#).

<sup>d</sup> Field indicators are not mutually exclusive, so there is no omitted category.

<sup>e</sup> Number of courses as TA is topcoded to 10.

<sup>f</sup> Number of courses as primary instructor is topcoded to 5.

<sup>g</sup> NGQO refers to a non-profit, governmental, or quasi-governmental organization.

Table 3.19: Ordered probits: Predictors of overall satisfaction with accepted job

Covariates:	(1) Base	(2) + Job offers	(3) + Pref- erences	(4) All
Female	0.280 (0.124)	0.258** (0.126)	0.109 (0.152)	0.089 (0.151)
Undergraduate location <sup>a</sup>				
US	— —	— —	— —	— —
Asia <sup>b</sup>	-0.627*** (0.140)	-0.583*** (0.142)	-0.532*** (0.165)	-0.475*** (0.163)
Other	-0.138 (0.128)	-0.118 (0.126)	-0.005 (0.147)	0.039 (0.146)
PhD program in US	0.402 (0.279)	0.452 (0.281)	0.088 (0.280)	0.147 (0.273)
PhD program in economics	0.248 (0.211)	0.306 (0.212)	0.231 (0.274)	0.210 (0.272)
Rank of PhD program <sup>c</sup>				
1-10	— —	— —	— —	— —
11-20	-0.289* (0.161)	-0.269* (0.162)	-0.102 (0.197)	-0.087 (0.193)
21-30	-0.215 (0.184)	-0.168 (0.186)	-0.384* (0.207)	-0.339 (0.211)
31-40	0.097 (0.227)	0.154 (0.229)	-0.428* (0.257)	-0.386 (0.256)
41-50	-0.438** (0.211)	-0.349* (0.211)	-0.372 (0.239)	-0.310 (0.239)
Unranked	-0.159 (0.194)	-0.067 (0.205)	-0.222 (0.217)	-0.127 (0.222)
PhD fields <sup>d</sup>				
Applied econometrics	-0.208 (0.151)	-0.238 (0.150)	-0.065 (0.174)	-0.092 (0.171)

Covariates:	(1) Base	(2) + Job offers	(3) + Pref- erences	(4) All
Applied microeconomics	0.033 (0.134)	0.018 (0.135)	0.220 (0.161)	0.208 (0.162)
Behavioral economics	-0.208 (0.228)	-0.238 (0.239)	-0.027 (0.305)	-0.089 (0.326)
Computational economics	0.197 (0.308)	0.178 (0.304)	0.542 (0.377)	0.532 (0.360)
Development economics	-0.085 (0.148)	-0.102 (0.149)	-0.118 (0.157)	-0.130 (0.157)
Econometrics	-0.178 (0.164)	-0.186 (0.161)	-0.151 (0.191)	-0.127 (0.186)
Economic history	-0.558* (0.309)	-0.520* (0.313)	-0.480 (0.383)	-0.423 (0.386)
Economic theory	-0.217 (0.291)	-0.315 (0.252)	-0.534 (0.368)	-0.552 (0.339)
Economics of education	-0.352 (0.338)	-0.402 (0.366)	0.291 (0.268)	0.263 (0.276)
Environmental economics	-0.084 (0.231)	-0.088 (0.235)	-0.262 (0.270)	-0.231 (0.272)
Experimental economics	0.291 (0.211)	0.298 (0.215)	0.606* (0.318)	0.605* (0.328)
Financial economics	-0.162 (0.171)	-0.147 (0.170)	0.101 (0.215)	0.105 (0.214)
Game theory	0.159 (0.212)	0.187 (0.211)	0.296 (0.218)	0.298 (0.211)
Health economics	-0.003 (0.230)	-0.049 (0.227)	0.516* (0.269)	0.427 (0.276)
Industrial organization	-0.249* (0.146)	-0.249* (0.146)	-0.286* (0.170)	-0.265 (0.170)
International economics	-0.056 (0.211)	-0.053 (0.214)	0.240 (0.248)	0.240 (0.254)
International finance	-0.199 (0.279)	-0.206 (0.286)	-0.079 (0.366)	-0.088 (0.370)
International macroeconomics	0.394 (0.324)	0.384 (0.334)	0.566 (0.413)	0.550 (0.401)

Covariates:	(1) Base	(2) + Job offers	(3) + Pref- erences	(4) All
International trade	-0.132 (0.167)	-0.156 (0.167)	0.189 (0.228)	0.170 (0.225)
Labor economics	-0.092 (0.142)	-0.101 (0.142)	-0.015 (0.165)	0.002 (0.166)
Law and economics	0.080 (0.207)	0.126 (0.221)	0.119 (0.275)	0.217 (0.305)
Macroeconomics	-0.278* (0.158)	-0.269* (0.157)	-0.464** (0.192)	-0.435** (0.192)
Microeconomic theory	-0.273 (0.197)	-0.327 (0.205)	-0.178 (0.220)	-0.127 (0.219)
Microeconomics	-0.178 (0.279)	-0.102 (0.279)	0.028 (0.348)	0.071 (0.358)
Monetary economics	-0.173 (0.244)	-0.192 (0.248)	0.009 (0.292)	-0.005 (0.288)
Political economy	-0.128 (0.196)	-0.143 (0.192)	0.182 (0.265)	0.171 (0.265)
Public economics	0.020 (0.141)	0.033 (0.142)	0.115 (0.155)	0.132 (0.158)
Urban economics	0.575 (0.367)	0.590 (0.363)	0.454 (0.343)	0.456 (0.332)
Journal publications				
0	— —	— —	— —	— —
1	0.133 (0.178)	0.143 (0.177)	-0.010 (0.188)	0.000 (0.188)
2	-0.089 (0.206)	-0.079 (0.207)	0.034 (0.211)	0.004 (0.217)
3+	-0.232 (0.215)	-0.195 (0.212)	-0.529* (0.274)	-0.507* (0.272)
Number of courses as TA <sup>e</sup>	-0.007 (0.023)	-0.004 (0.022)	-0.045* (0.026)	-0.044* (0.026)
Number of courses as primary instructor <sup>f</sup>	0.040 (0.040)	0.048 (0.040)	0.069 (0.042)	0.078* (0.043)

Covariates:	(1) Base	(2) + Job offers	(3) + Pref- erences	(4) All
Preference rank of job type				
1st-choice job type			–	–
			–	–
2nd-choice job type			–0.133 (0.166)	–0.078 (0.167)
3rd-choice job type			–0.191 (0.227)	–0.189 (0.230)
4th-choice job type			–0.659* (0.365)	–0.597 (0.366)
5th-choice job type			–0.260 (0.564)	–0.123 (0.570)
Number of job offers		0.072*** (0.024)		0.083*** (0.029)
Cutpoints				
1st cutpoint	–2.509*** (0.437)	–2.122*** (0.458)	–3.248*** (0.570)	–2.89*** (0.573)
2nd cutpoint	–2.072*** (0.392)	–1.683*** (0.407)	–2.654*** (0.489)	–2.278*** (0.484)
3rd cutpoint	–1.622*** (0.402)	–1.232*** (0.421)	–2.052*** (0.476)	–1.666*** (0.476)
4th cutpoint	–0.494 (0.386)	–0.09 (0.406)	–0.746 (0.465)	–0.335 (0.461)
5th cutpoint	0.96** (0.378)	1.38*** (0.403)	0.823** (0.458)	1.248*** (0.457)

	(1)	(2)	(3)	(4)
Covariates:	Base	+ Job offers	+ Preferences	All
Observations	546	546	402	402

*Notes:* Standard errors in parentheses, \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ . Dependent variable is overall satisfaction with accepted job. Respondents rated their satisfaction on a six-point scale where 1 was *extremely dissatisfied*, 2 was *very dissatisfied*, 3 was *somewhat dissatisfied*, 4 was *somewhat satisfied*, 5 was *very satisfied*, and 6 was *extremely satisfied*. Estimates are weighted to correct for non-response bias.

<sup>a</sup> Results from the surveys indicate that location of undergraduate institution is a good proxy for citizenship.

<sup>b</sup> Asian countries as identified by the [Population Reference Bureau \(2008\)](#).

<sup>c</sup> Rankings are from [U.S. News and World Report \(2009\)](#).

<sup>d</sup> Field indicators are not mutually exclusive, so there is no omitted category.

<sup>e</sup> Number of courses as TA is topcoded to 10.

<sup>f</sup> Number of courses as primary instructor is topcoded to 5.

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## CHAPTER IV

# Moving Out to Move Up

With Brooke Helppie McFall

### 4.1 Introduction

In the past half century, historic increases in women's labor-force participation have prompted growing interest in the migration decisions of dual-career couples. In 1970, 41 percent of married women in the United States were in the labor force. By 2009, 61 percent of married women were in the labor force, and married couples with two earners outnumbered married couples with a single earner ([United States Census Bureau, 2010](#)). Unlike couples in which only the husband or, less frequently, only the wife works for pay, couples in which both partners work must balance the potentially competing demands of two careers. Career-related migration opportunities, which can arise for partners at different times and in different locations, may be a source of conflict for these couples.

How couples respond to conflicting locational preferences has implications for their well-being. On one hand, living together may harm the career prospects of one or both partners ([Sandell, 1977](#); [Mincer, 1978](#)); on the other hand, living apart may harm their relationship. Empirical studies suggest that living together constrains the

location choices of married workers (Costa and Kahn, 2000; Gemici, 2008; McKinnish, 2008; Mincer, 1978) and lowers their earnings relative to what they could obtain in their individually optimal locations (Sandell, 1977; Lichter, 1983; Jacobson and Levin, 1997; Gemici, 2008; Boyle et al., 2001). Because many studies have found that the negative impact of living together falls disproportionately on women (Mincer, 1978; Sandell, 1977; Jacobson and Levin, 1997; Compton and Pollak, 2007; Cooke, 2008; Boyle et al., 2001), some researchers have also suggested that the migration decisions of couples contribute to the gender gap in earnings and career attainment (Bielby and Bielby, 1992). On the relationship side of the trade-off, one study found that career-motivated migration is associated with higher divorce rates (Gemici, 2008).

Implicit in early theories of family migration was an assumption that couples who remain together live together (Sandell, 1977; Mincer, 1978). Subsequent empirical work has shown that this assumption is unwarranted. A number of qualitative studies outside of economics have identified long-distance relationships as an alternative to career sacrifices or relationship dissolution for couples with conflicting locational preferences (Gerstel and Gross, 1982; Magnuson and Norem, 1999; Gross, 1980; Rhodes, 2002). These studies have explored the circumstances under which dual-career couples live apart and have assessed the implications of living apart for the careers and relationships of couples who choose the arrangement. Because they have relied on non-representative samples, however, studies of long-distance relationships have not estimated the prevalence of living apart in the population of dual-career couples. Nor can we be confident that the results of these studies generalize to the population.

This paper uses data from original surveys of new economists – all of whom have invested heavily in their human capital, most of whom will move for their first job, and many of whom have highly educated partners – to assess the impact of conflicting locational preferences on a group for whom the problem is likely to be severe. The surveys combine questions about the job-market decisions and outcomes of new entrants

to the junior PhD job market in economics with questions about their partners and living arrangements. In addition, the surveys contain direct counterfactual questions about the job-market outcomes the economists think they would have had if they had responded differently to conflicts over location. Using data from the surveys, we are able to characterize the impact of conflicting locational preferences on the career outcomes of new economists who live with their partner. We are also able to estimate, for the first time, the prevalence and predictors of long-distance relationships in a known sub-population of dual-career couples.

Our results indicate that the impact of conflicting locational preferences on the job choices of new economists is modest. Just 14 percent of the partnered economists we surveyed had rejected their first-choice job offer for the benefit of their relationship, and those who had rejected their first-choice job offer did not anticipate severe damage to their long-term career trajectories. At the same time, 16 percent of the partnered economists we surveyed expected to be living apart from their partner in the year after the economists entered the job market. Economists who faced large career costs if they lived with their partner were the most likely to live apart. In light of these patterns, we argue that long-distance relationships attenuate the impact of conflicting locational preferences on the career outcomes of new economists.

Our results corroborate several findings from the qualitative literature on long-distance relationships. Dual-career couples are motivated to live apart when the benefits of the arrangement to their careers are large, but they are not primarily concerned with financial compensation ([Gerstel and Gross, 1982](#); [Gross, 1980](#); [Magnuson and Norem, 1999](#)). The economists we surveyed were more likely to live apart when they believed that the arrangement would increase their likelihood of publishing in top journals and of having opportunities to move to different kinds of jobs; they were not more likely to live apart when they believed that the arrangement would increase their lifetime income. Our results also corroborate the finding that couples are less

likely to live apart when they are parents or expect to become parents (Gerstel and Gross, 1982; Gross, 1980).

While this paper assesses the impact of conflicting locational preferences on the careers and relationships of new economists, our results have relevance for specialized professionals more generally. In the contemporary United States, highly educated men and women tend to marry highly educated partners (Schwartz and Mare, 2005). Because educational attainment is positively associated with occupational mobility (McKinnish, 2008), the pairing of highly educated partners is likely to complicate migration decisions for dual-career couples across the professions.

## 4.2 Theoretical predictors of living apart

The seminal theoretical work of Jacob Mincer (1978) is the point of departure for our analysis. Although he ignored the possibility that couples with conflicting locational preferences live apart, Mincer characterized the circumstances under which they live together and the circumstances under which they break up. Couples in the Mincer model solve

$$\underset{x_A, x_B}{\text{maximize}} \quad G_A^{x_A} + G_B^{x_B} + I_{x_A=x_B} \cdot (M_A + M_B),$$

where  $x_i$  is the location of partner  $i$ ;  $G_i^{x_i}$  is the utility gain of partner  $i$  from locational amenities and career opportunities in location  $x_i$ , net of the cost of moving to that location;  $M_i$  is the utility gain of partner  $i$  from the couple's relationship; and  $I_{x_A=x_B}$  is an indicator variable for the relationship.

Let  $G_A^I$  and  $G_B^I$  be the net utility gains of the partners from locational amenities and career opportunities in the locations that solve

$$\underset{x_i}{\text{maximize}} \quad G_i^{x_i}$$

for  $i = A, B$ . Let  $G_A^F$  and  $G_B^F$  be the utility gains of the partners in the location that solves

$$\underset{x_A=x_B}{\text{maximize}} \quad G_A^{x_A} + G_B^{x_B}.$$

Mincer defines the *migration tie* of partner  $i$  as the difference between the net utility gain of partner  $i$  from locational amenities and career opportunities in the location he or she would choose as a single person,  $G_i^I$ , and the utility gain of partner  $i$  in the location that maximizes the joint utility of the couple,  $G_i^F$ :

$$T_i = G_i^I - G_i^F.$$

He predicts that couples live together when the sum of their gains from their relationship exceeds the sum of their migration ties:

$$M_A + M_B > T_A + T_B. \tag{4.1}$$

When the sum of their migration ties exceeds the sum of their gains from their relationship, Mincer predicts that couples break up.

As discussed above, evidence from qualitative studies suggests that some couples neither move together nor break up. Instead, these couples reconcile conflicts between relationship commitments and career opportunities by maintaining long-distance relationships. To explore the implications of long-distance relationships for relationship and career outcomes, we develop a simple extension of the Mincer model. We decompose the gain from a relationship,  $M_i$ , into a component that accrues to every person in a relationship,  $K_i$  and a component that accrues only to people who live with their partners,  $H_i$ :

$$M_i = K_i + H_i.$$

Because we are interested in relationship stability only to the extent that it is influenced by conflicting migration opportunities, we assume that couples maintain their relationships in the absence of conflicting migration opportunities:

$$M_A + M_B > 0.$$

We also assume that couples prefer cohabiting relationships to long-distance relationships. Given a choice between living together and living apart in separate but otherwise identical locations, couples choose to live together:

$$H_A + H_B > 0.$$

Finally, we allow for the possibility that some couples would rather live apart than break up and for the possibility that some would rather break up:

$$-H_A - H_B < K_A + K_B < M_A + M_B.$$

In our extension of the Mincer model, couples solve

$$\underset{x_A, x_B}{\text{Maximize}} \quad G_A^{x_A} + G_B^{x_B} + I_{r=1} (K_A + K_B) + I_{r=1} I_{x_A=x_B} \cdot (H_A + H_B),$$

where  $I_{r=1}$  is an indicator variable for a relationship, either long-distance or cohabiting;  $I_{x_A=x_B}$  is an indicator variable for cohabitation; and the other variables are defined as above.

For couples who would rather break up than live apart, the predictions of the extended model coincide with the predictions of the Mincer model. These couples live together when the sum of their gains from their relationship exceeds the sum of their migration ties and break up when the reverse is true. Formally, couples with

$K_A + K_B < 0$  live together when Equation (4.1) holds, and break up otherwise.

In contrast, for couples who would rather live apart than break up, the predictions of the extended model and the predictions of the Mincer model diverge. By maintaining long-distance relationships, these couples can enjoy utility from their relationships without sacrificing utility to migration ties. Consequently, it is never optimal for them to break up. Instead, these couples live together when the sum of their gains from *cohabitation* exceeds the sum of their migration ties and *live apart* when the reverse is true. Formally, couples with  $K_A + K_B > 0$  live together when

$$H_A + H_B > T_A + T_B \tag{4.2}$$

and live apart otherwise.

A comparison of Equations (4.1) and (4.2) indicates that, if there are couples who would rather live apart than break up, the Mincer model makes inaccurate predictions about their responses to conflicting migration opportunities. While the extended model predicts that couples with

$$M_A + M_B > T_A + T_B > H_A + H_B \tag{4.3}$$

and

$$T_A + T_B > M_A + M_B > H_A + H_B \tag{4.4}$$

live apart, the Mincer model predicts that the former live together and the latter break up. Thus, relative to the extended model, the Mincer model posits a stark trade-off between personal relationships and professional success. As a result of this simplification, the Mincer model overstates the negative impact of migration ties on careers. Depending on the distribution of couples between the circumstances described in Equations (4.3) and (4.4), the Mincer model may overstate or understate

the negative impact of migration ties on relationships.

### 4.3 Data

This paper is a product of the Job Seekers Project, a longitudinal survey project that tracks the professional and personal trajectories of recent entrants to the junior PhD job market in economics. The project combines information from original web surveys with information from job-placement and professional websites to create a uniquely rich dataset for the study of work-family trade-offs. Since the 2007-08 job-market season, the project has contacted graduating cohorts of economists as they enter the job market and has followed up with them several months later to learn about their professional and personal circumstances. At the same time, the project has gathered detailed background information about the economists, including their demographic characteristics, educational credentials, and professional accomplishments, from the CVs they post on the job-placement websites of their graduate departments.

The sampling frame for the Job Seekers Project is comprehensive. We use publicly available information to compile a list sample of a clearly defined population: job candidates whose names and contact information appear on job-placement websites linked by the National Bureau of Economic Research.<sup>1</sup> Between the 2007-08 and 2009-10 academic years, the Job Seekers sample included 2,756 job candidates from 134 job-placement websites. A large majority of the job candidates in the sample posted information on websites maintained by departments of economics (90 percent) and departments in the United States (91 percent); a minority posted information on websites maintained by departments of business, public policy, or other fields closely related to economics, or departments in Canada or Europe.<sup>2</sup> We believe that the

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<sup>1</sup>The National Bureau of Economic Research posts links to job-placement websites of graduate departments on their own job-market website: <http://www.nber.org/candidates/>.

<sup>2</sup>The sample did not include job candidates from European departments until 2009-10. Prior to 2009-10, 95 percent of the job candidates in the sample were from departments in the United States; in 2009-10, 84 percent were from departments in the United States.

Job Seekers sample comprises nearly the universe of job candidates who expected to participate in first-round job interviews at the annual meetings of the American Economic Association between 2008 and 2010.

We invite job candidates to participate in the pre-market survey in late December, just before most begin their first-round job interviews. The survey is available for job candidates to complete online during the period leading up to the annual meetings of the American Economic Association and remains available for several months after the meetings. While the fielding window for the pre-market survey is long, most respondents complete the survey in a timely manner. Between 2007-08 and 2009-10, 63 percent of the job candidates who completed the pre-market survey submitted their responses before the meetings. Eighty-eight percent submitted their responses within one month of receiving the invitation to participate.

We invite job candidates to participate in the post-market survey approximately six months after the job market closes, when most have concluded their job search and know whether and where they will be working in the coming year. In 2007-08 and 2009-10, we sent the invitation to the post-market survey in August; in 2008-09, we sent the invitation in November. Like the pre-market survey, the post-market survey is available for job candidates to complete online over a period of several months, and like pre-market respondents, most post-market respondents complete the survey in a timely manner. Between 2007-08 and 2009-10, 79 percent of the job candidates who completed the post-market survey submitted their responses within one month of receiving the invitation to participate.

The data sources compiled by the Job Seekers project have a number of desirable features. First, the project's combination of data from web surveys and job placement websites allows for a detailed analysis of sample selectivity. We are confident that the estimates derived from this data are reasonably representative of the population of new entrants to the new PhD job market in economics. Response rates for the Job

Seekers surveys are comparable or superior to response the response rate for a typical web survey. Between 2007-08 and 2009-10, the response rate for the pre-market survey was 53 percent, and the response rate for the post-market survey was 39 percent. By way of comparison, a meta-analysis of response rates to web and internet surveys found a mean response rate of 39 percent (Cook, Heath and Thompson, 2000).

Complementing data from the Job Seekers surveys is publicly available information from the job placement websites of graduate departments. Between 2007-08 and 2009-10, using the US News and World Report rankings of graduate programs in economics, we obtained rankings for the departments of 70 percent of the job candidates in the Job Seekers sample.<sup>3</sup> Using the photographs and CVs that job candidates posted on the job placement websites, and supplementing with coding based on first names, we identified the gender of 97 percent of the job candidates. From the CVs, we identified the location of the undergraduate institutions attended by 93 percent of the job candidates.<sup>4</sup> Finally, also from the CVs, we obtained information about the doctoral training of job candidates, including their research fields, teaching experience, and research productivity, as well as information about their previous education.

Probit analyses predicting the probability of completing the Job Seekers surveys indicate that, with respect to these background characteristics, respondents are generally representative of the population of job candidates. The primary exception to this finding is an under-representation among respondents of job candidates from outside the United States, especially from countries in Asia. The application of weights to correct for non-response bias does not substantially alter the results from the analyses presented in this paper.

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<sup>3</sup>The US News rankings are available at <http://grad-schools.usnews.rankingsandreviews.com/best-graduate-schools/top-humanities-schools/economics-rankings>. Most (66 percent) of job candidates from unranked departments were from lower-ranked economics departments in the United States. A sizable minority (30 percent) were from departments outside the United States, and a small number (4 percent) were from departments in fields closely related to economics, such as business or public policy.

<sup>4</sup>Data from the web surveys indicate the the location of a job candidate's undergraduate institution is a good proxy for the job candidate's country of origin.

A second feature of the Job Seekers data is the availability of information about a wide range of job-market outcomes and expectations regarding future career trajectories. Previous studies of family migration have focused on the current employment status and earnings of couples likely to face migration ties. This narrow focus is largely attributable to data limitations; the large-scale datasets most studies have used do not contain other measures of career attainment. The narrow focus of previous studies is also unfortunate. It is likely that specialized professionals – the group most vulnerable to migration ties – care a great deal about career outcomes beyond their employment and earnings. Especially at the beginning of their careers, they are likely to value less tangible aspects of their jobs, such as prestige, and more forward-looking aspects, such as access to career ladders. To the extent that previous studies have neglected these other outcomes, they may have misrepresented or understated the impact of migration ties on highly educated workers. In contrast, the Job Seekers surveys contain detailed questions about a comprehensive list of career outcomes and expectations.

A third feature of the Job Seekers data is the combination of information about relationship status with information about household composition. Previous studies of family migration have assessed its impact on couples who live together but have largely ignored couples who live apart. Again, the narrow focus of previous studies is understandable but unfortunate. Many large-scale datasets contain information about household composition but not about family members who live outside the household. Other datasets contain information about spouses or partners but assume that couples live in the same household. Despite the possibility that dual-career concerns induce couples to live apart, few datasets contain the information that would be necessary to study living arrangements as a margin of adjustment to conflicting migration opportunities. In contrast, the Job Seekers surveys contain questions both about the partners of new economists and about the living arrangements of couples

in the year after the job market.

A fourth feature of the Job Seekers data, and a key innovation of the project relative to other studies of family migration, is our use of individual-specific measures of counterfactual job-market outcomes. The structure of the junior PhD job market in economics, where most job candidates submit applications, complete interviews, travel to fly-outs, and receive job offers during narrow, pre-determined windows of time, provides job candidates with well-defined choice sets, including well-defined counterfactual outcomes. The structure of the job market also allows us to survey job candidates about their choices while their memories of the job market are fresh. To this end, the post-market survey includes a series of questions about the outcomes respondents actually had on the job market and the outcomes they think they would have had under counterfactual scenarios where their responses to migration ties were different.

To determine whether respondents made individually optimal choices on the job market, and to assess the impact of migration ties on the job placements of those who did not make individually preferred choices, the post-market survey asks respondents to consider the following counterfactual scenario: “Suppose your [husband/wife/significant other] could have an equally satisfying professional and personal life in any location – that is, suppose it would not be a sacrifice for [him/her] to move with you anywhere.”<sup>5</sup> The survey then asks respondents to describe the decisions they would have made and the outcomes they think would have had at each stage of the job market under this scenario. For the remainder of the paper, we refer to options the respondent would have chosen in the absence of migration ties as *individually preferred*, or *IP*, options.

To determine whether respondents forwent living with their partner to accept their

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<sup>5</sup>This is the text that introduced the counterfactual questions in the 2009-10 post-market survey. The wording of the counterfactual questions has varied slightly over time, but the changes do not appear to have affected response patterns. The text of the questions from other survey years is available in the appendix.

individually preferred job, the post-market survey asked respondents who expected to be living apart the following March to consider a second counterfactual scenario: “Please imagine the life you would have had if you and your [husband\wife\significant other] were constrained to live together next March (i.e., share your primary residence or live close enough to each other that you could see each other after work on weeknights).” To assess the impact migration ties *would have had* on the job placements of respondents who rejected their jointly preferred option, had they instead decided to accept it and live with their partner, the survey asks respondents to describe the outcomes they think they would have had if living apart were not an option. We refer to options the respondent would have chosen if living apart were not an option as *jointly preferred*, or *JP*, options.<sup>6</sup>

Each analysis presented in this paper uses slightly different sample restriction criteria. We have endeavored to use the largest sample possible for each analysis, while ensuring that the results are not biased due to changes over time in the survey questions and skip logic. Column headers and footnotes in each table describe the samples used in each analysis, while the appendix provides detail about changes in question wording and response scales between cohorts.

## 4.4 Results

The Mincer model provides strong reasons to believe that family migration harms the career prospects of new economists. Like other specialized professionals, economists participate in national and international labor markets. Their career opportunities are geographically dispersed. Most economists move for their first job, and many move for subsequent jobs.

At the same time, the Job Seekers data indicate that many new economists

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<sup>6</sup>We added questions about jointly preferred options to the post-market survey in 2009-10. We do not have information about the jointly preferred options of job candidates in the 2007-08 and 2008-09 job-market cohorts.

are in relationships with highly educated partners. A majority (73 percent) of the economists who responded to the Job Seekers surveys were in a relationship at the beginning of their job-market year (Table 4.1). Almost half (48 percent) were married; another fifth (20 percent) characterized their relationship as marriage-like or committed. The partners of the economists, like the economists themselves, had strong educational credentials. More than three quarters (76 percent) of the partners had earned or were pursuing a graduate degree, and more than one third (40 percent) had earned or were pursuing a PhD (Table 4.2).

While both male and female economists reported personal circumstances that made them vulnerable to migration ties, we observe gender differences in two domains. On one hand, male economists were more likely than female economists to be in a relationship during their job-market year. At the time they entered the job market, 76 percent of the men who responded to the Job Seekers surveys were in a relationship, and 51 percent were married. The comparable figures for women were 67 percent and 40 percent. On the other hand, conditional on being in a relationship, female economists were more likely than male economists to have a partner whose educational attainment equaled their own. More than half (57 percent) of the women who were in a relationship during their job-market year had a partner who had earned or was pursuing a PhD. The same was true of less than one third (32 percent) of the men.

#### **4.4.1 Impact of migration ties on career outcomes**

In light of the Mincer model, the impact of migration ties on the job choices of economists in the Job Seekers sample was surprisingly small. Of 631 respondents who received at least one job offer and had a relationship that spanned the job-market months, a large majority (85 percent) reported that they had accepted their individually preferred job from their final choice set. A small number (1 percent) reported

that their individually preferred option had been to reject all of their job offers and that they had, in fact, rejected all of their offers. Unexpectedly, in a population theoretically vulnerable to severe migration ties, just 14 percent of respondents reported that their job choice would have been different in the absence of relationship-related constraints. These results are summarized in Table 4.3.

Both the Mincer model and the extended model predict that job candidates are more likely to forgo their individually preferred job for the benefit of their relationship when the career sacrifices involved are small. The 2009-10 post-market survey assessed the career costs of forgoing an individually preferred job with respect to eight long-term career outcomes a typical economist might value: earning tenure at a research university, earning tenure at a four-year college, publishing regularly in top journals, having opportunities to move to more prestigious jobs, having opportunities to move to different kinds of jobs, having a lifetime income higher than average for their field, finding their everyday work satisfying, and having plenty of time for life outside of work. Respondents rated their likelihood of realizing each outcome, in light of the job they accepted, using a six-point scale that ranged from 1 (*extremely unlikely*) to 6 (*extremely likely*).

When respondents faced a trade-off between their individually preferred job and their jointly preferred job, the survey also asked them to rate their likelihood of realizing the long-term career outcomes under a counterfactual scenario where their response to the trade-off was different. Respondents who rejected their individually preferred job rated their likelihood of realizing each outcome under the counterfactual scenario where they accepted it. Respondents who accepted their individually preferred job rated their likelihood of realizing each outcome under the counterfactual scenario where they rejected it in favor of their jointly preferred job.

Finally, to assess the overall impact of rejecting an individually preferred job on the expected career outcomes of new economists, the survey asked respondents who

faced a tradeoff between their individually preferred job and their jointly preferred job to compare their overall career prospects with the prospects they would have had under the relevant counterfactual scenario. Respondents who rejected their individually preferred job rated their career prospects at that job, relative to the job they accepted, using a five-point scale that ranged from 1 (*much better*) to 5 (*much worse*). Respondents who accepted their individually preferred job rated their career prospects at that job, relative to their jointly preferred job, using the same scale.

Table 4.4 presents mean ratings for the eight specific outcome measures and the overall outcome measure, for both the individually preferred job and the jointly preferred job.<sup>7</sup> For each measure, results are presented separately for each of three groups: partnered job candidates for whom the individually preferred job coincided with the jointly preferred job (*not constrained*), partnered job candidates who were constrained by their partners and accepted the individually preferred job over the jointly preferred alternative (*constrained, accepted IP job*), and partnered job candidates who were constrained by their partners and accepted the jointly preferred job over the individually preferred alternative (*constrained, rejected IP job*).

On the whole, job candidates in all three groups believed that both their individually preferred jobs and their jointly preferred jobs would position them to succeed in their careers. Mean ratings for all of the specific outcome measures exceed the scale value corresponding to *somewhat unlikely* for each group. For job candidates in the unconstrained group, ratings for the individually preferred job and the jointly preferred job are, by definition, identical. For job candidates in the constrained groups, the results in Table 4.4 are consistent with the definition of *individually preferred job* as the job that maximizes career-related utility: on average, job candidates believed that their individually preferred jobs were more likely than their jointly preferred jobs

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<sup>7</sup>The ratings we summarize in this table are ordinal data. We present means rather than ordinal measures of central tendency, such as medians or modes, because the ratings for most outcomes cluster at the high end of the scale, and the ordinal measures obscure important variation within that range.

to produce most of the specific outcomes we assessed. Job candidates also believed that their individually preferred jobs offered better overall career prospects than their jointly preferred jobs. Mean ratings of career prospects with the individually preferred job, relative to career prospects with the jointly preferred job, fell between the scale value corresponding to *about the same* and the scale value corresponding to *somewhat better* for both constrained groups.

Tables 4.5 and 4.6 apply sign tests to assess the statistical significance of differences between the individually preferred and jointly preferred jobs of job candidates in the constrained groups. Table 4.5 indicates that, among job candidates who rejected their individually preferred job, the number who reported that their career prospects would suffer from the decision statistically exceeds the number who reported that their career prospects would improve. Differences with respect to the specific career outcomes are not statistically significant for this group.

Table 4.6 indicates that, among job candidates who accepted their individually preferred job, the number who reported that their career prospects would have suffered from rejecting it statistically exceeds the number who reported that their career prospects would have improved. Job candidates who accepted their individually preferred job also reported a statistically significant preponderance of differences favoring that job in the likelihood of realizing five specific career outcomes: earning tenure at a research university, publishing regularly in top journals, having opportunities to move to more prestigious jobs, having opportunities to move to different kinds of jobs, and finding everyday work satisfying. Taken together, the results in Tables 4.5 and 4.6 show that migration ties are a salient issue for some new economists.

Consistent with the predictions of the Mincer model and the extended model, job candidates who rejected their individually preferred job – and who therefore endured the career sacrifices associated with their migration ties – described the decision as less costly than did respondents who accepted their individually preferred

job. While job candidates in both constrained groups believed that their individually preferred jobs were more likely than their jointly preferred jobs to produce most of the long-term career outcomes we assessed, the differences tend to be smaller among job candidates who rejected their individually preferred job. Returning to Table 4.4, for most career outcomes, job candidates who rejected their individually preferred job reported that their individually and jointly preferred jobs were more similar, on average, than did job candidates who accepted their individually preferred job. Returning to Tables 4.5 and 4.6, results from the sign tests tell a similar story. Six of the tests show a statistically significant difference between the individually preferred and jointly preferred jobs for job candidates who accepted their individually preferred job. Despite a larger number of observations and correspondingly greater power, just one test shows a statistically significant difference for job candidates who rejected their individually preferred job.

While the evidence we have presented to this point suggests that the impact of migration ties on the career prospects of new economists is modest, two caveats are in order. First, even if migration ties do not shape outcomes substantially in the final stage of the job market, they may shape outcomes at earlier stages, when job candidates make decisions about which applications to submit and which interviews and fly-outs to accept. To the extent that job candidates alter their application, interview, or fly-outs sets in response to relationship commitments, the job offers from which they choose in the final stage of the job market may differ from the offers they would have obtained in the absence of migration ties.

Table 4.7 presents evidence that migration ties do, in fact, influence the decisions of job candidates with respect to applications, interviews, and fly-outs. A sizable minority (44 percent) of Job Seekers respondents with partners reported that they would have applied to a different set of jobs if they had not been constrained by relationship commitments. Twelve percent reported that they would have accepted a

different set of interviews, and 14 percent reported that they would have accepted a different set of fly-outs. By the time they reached the offer stage of the job market, almost half (49 percent) of job candidates with partners had altered their choices in some way in response to migration ties.

These results suggest that our measure of counterfactual job outcomes is not accurate in every case. The magnitude of the results, however, suggests that our measure is accurate in most cases. Even at the application stage, where the influence of migration ties was most prevalent, respondents were more likely than not to have made individually optimal choices. What is more, among respondents who altered their application set in response to migration ties, the median change in the size of the set was just five applications withheld. Given that the the median application set contained 100 applications, changes of this magnitude are unlikely to have shaped the offer sets of respondents in dramatic ways.

The second caveat is that the migration ties of new economists may influence their job-market outcomes through another indirect channel: the behavior of employers in the job market. Even if the choices of job candidates are unaffected by their relationship commitments, employers may consider family circumstances when deciding which candidates to interview, invite for fly-outs, or hire. Employers may learn about the relationships of job candidates in at least two ways. First, job candidates may tell employers about their relationships when they meet for interviews or fly-outs. Second, academic advisors and other members of the academic community may discuss the relationships of job candidates in an attempt to facilitate good job matches.

Table 4.7 indicates that, whatever the source of the information, employers are likely to learn about the relationships of job candidates before they extend job offers. Seventy-two percent of Job Seekers respondents with partners said that some or all of their prospective employers knew about their relationship by the time they completed their interviews. Eighty-four percent said that some or all of their prospective em-

employers knew about their relationship by the time they completed their fly-outs. To the extent that employers learn about the relationships of job candidates from third parties, without the knowledge of the job candidates, these results may understate the amount of information available to employers.

Because the Job Seekers surveys focus on the supply side of the job market, we do not know how employers incorporate information about relationships into their decision making and cannot rule out the possibility that employer responses shape the offer sets of job candidates in meaningful ways. In particular, we cannot rule out the possibility that the individually and jointly preferred jobs we observe are more similar – and the impact of migration ties we infer less pronounced – than they would be in the true counterfactual situation. Despite this limitation, we argue in the remainder of the paper that the supply-side phenomenon of long-distance relationships plays an important role in attenuating the impact of migration ties on the job placements of new economists.

Previous studies of family migration have not had access to direct measures of migration ties. Consequently, previous tests of the Mincer model have relied on proxies. Most often, studies have assumed the migration ties are more severe among married men and women, and among men and women with highly educated partners. These studies have shown that career outcomes theoretically related to being a tied migrant (for example, reduced earnings or labor supply after a move) are more likely for married couples – especially married women – and for men and women whose partners have college or graduate degrees.

The Job Seekers dataset contains uniquely detailed information about the responses of new economists to migration ties. This information allows us to examine the association between the proxies previous studies have used and direct measures of migration-induced career sacrifices. Both the Mincer model and the extended model predict that job candidates are more likely to reject their individually preferred job

when their migration ties are large and when the value of their relationship is low. Because previous studies have suggested that migration ties increase with educational attainment, we expect that new economists whose partners have graduate degrees are more likely to alter their job-market choices in response to migration than new economists whose partners have lower levels of education. Because we hypothesize that the value of relationships usually increases with commitment, we also expect that new economists in less committed relationships are less likely to alter their job-market choices than new economists in more committed relationships.

Table 4.8 presents results from probit regressions examining the association between the probability that job candidates altered their job-market choices in response to migration ties and the proxies for migration ties that previous studies have used. In Column 1, the dependent variable takes a value of one for respondents who rejected their individually preferred job and a value of zero otherwise. In Column 2, the dependent variable takes a value of one for respondents who altered their choice set at the application, interview, or fly-out stage of the job market and a value of zero otherwise. In Column 3, the dependent variable takes a value of one for respondents who rejected their individually preferred job, altered their choice set at an intermediate stage of the job market, or did both, and a value of zero otherwise.

Consistent with our expectations, the results in Table 4.8 suggest that new economists whose partners have graduate degrees are more likely to reject their individually preferred job than new economists whose partners have college degrees or less. The estimates in Columns 2 and 3 are similar in sign and magnitude to the results in Column 1 but are not statistically different from zero. Also consistent with our expectations, the negative coefficients on the relationship status indicators for committed and dating relationships suggest that new economists who are in less formal relationship are less likely than new economists who are married to reject their individually preferred job or to alter their application, interview, or fly-outs sets in response to migration

ties.

In contrast to the large number of studies finding that family migration imposes larger costs on women than on men, we observe only minor gender differences in the impact of migration ties on new economists. Of 631 job candidates who provided information about their counterfactual job choices, 17 percent of women and 12 percent of men reported that they had rejected their individually preferred and had chosen an option more favorable to their partner. This difference is not statistically significant,  $\chi^2(1, N = 631) = 2.07, p = 0.15$ .

On the other hand, women were somewhat more likely than men to report that migration ties had influenced their decisions at intermediate stages of the job market. Fifty-seven percent of women, but just 45 percent of men, reported that migration ties had shaped the set of applications they submitted, or the set of interviews or fly-outs they accepted,  $\chi^2(1, N = 631) = 5.51, p = 0.02$ . Results from the probit regressions suggest that gender differences in relationship status and the educational attainment of respondents' partners do not explain women's greater likelihood of altering job-market choices in response to migration ties. Controlling for these characteristics, women were still 9 percentage points more likely than men to report that migration ties had shaped their application, interview, or fly-out sets (Table 4.8).

#### **4.4.2 Living apart to avoid career sacrifices**

Results from the Job Seekers surveys indicate that living arrangements are an important margin of adjustment for couples facing migration ties. Of 454 respondents who described their expectations for their relationship in the year after the job market, 16 percent reported that a long-distance relationship was the most likely outcome. The prevalence of long-distance relationships among Job Seekers respondents equaled or exceeded the prevalence of sacrifices migration ties can induce in the Mincer model: we saw, in the previous section, that 14 percent of respondents

rejected their individually preferred job for the benefit of their relationship, and just 7 percent of respondents reported that a break-up was the most likely outcome for their relationship.

To be clear, the finding that economists were as likely to forgo living with their partner as to reject their individually preferred job does not imply that couples were as likely to live apart as to live together. Table 4.10 presents summary results from adjustment along both the relationship and career outcome margins. Of 360 respondents who were still in their relationships at the time of the post-market survey and who provided information about both their counterfactual job outcomes and their expected relationship outcomes, 73 percent accepted their individually preferred job and expected to be living with their partner in the year after the job market. (See right panel of Table 4.10.) That economists were likely to obtain optimal outcomes in both their careers and their relationships suggests that many couples did not face migration ties or, more likely, that the migration ties of the economists dominated the migration ties of their partners. In the latter situation, it would be the partners rather than the economists who rejected their individually preferred job.

Table 4.11 presents evidence that, as suggested in the previous section, the economists most likely to live apart from their partners are those who believe their careers will suffer the most if they live together. Specifically, the table presents results from ordinary least squares regressions of the subjective probability of living apart in the year after the job market on a series of indicator variables for perceived benefits of the individually preferred job over the jointly preferred job. We examine the association between living apart and the belief that the individually preferred job is more likely than the jointly preferred job to produce each of the long-term career outcomes enumerated in the previous section: better overall career prospects, tenure at a research university, tenure at a four-year college, regular publication in top journals, opportunities to move to more prestigious jobs, opportunities to move to different kinds

of jobs, a lifetime income higher than average for their field, everyday work that is satisfying, and plenty of time for life outside of work.

Column 1 of Table 4.11 presents results from regressions in which each of the career outcomes enters as the sole regressor. Consistent with the extended model, the coefficient on overall career prospects, as well as a majority of the coefficients on other specific career outcomes, are positive. Respondents who believed that their individually preferred job was more likely to produce a desirable outcome were more likely to live apart than respondents who believed that their jointly preferred job was as likely or more likely to produce the outcome. The two exceptions to this pattern were a higher-than-average lifetime income and time for life outside of work. Respondents who believed that their individually preferred job was more likely than their jointly preferred job to produce these outcomes were no more likely than other respondents to live apart. The finding that responses to migration ties were not sensitive to changes in expected lifetime income is consistent with evidence from previous studies that couples who choose long-distance relationships pursue career opportunities not primarily as a source of income, but rather as a “central life interest” (Gerstel and Gross, 1982).

Column 2 of Table 4.11 presents results from a regression in which all of the specific career outcomes enter together. In contrast to the coefficients estimated for these variables in Column 1, most of the estimates in Column 2 are statistically indistinguishable from zero. The estimates that remain statistically significant in the combined regression model suggest that perceived superiority of the individually preferred job with respect to two specific career outcomes, publishing regularly in top journals and having opportunities to move to different kinds of jobs, is associated with a substantially greater likelihood of living apart.

The change in the pattern of estimates between Columns 1 and 2 probably indicates that the eight outcome measures we use tap a smaller number of underlying job

characteristics. Chi-square tests show that, among respondents whose individually and jointly preferred jobs were different, those who believed that their individually preferred job was more likely to help them publish regularly in top journals also tended to believe that it was more likely to help them earn tenure at a research university, to facilitate moving to more prestigious jobs, and to offer satisfying work (Table 4.12). Similarly, respondents who believed that their individually preferred job was more likely to facilitate moving to different kinds of jobs also tended to believe that it was more likely to facilitate moving to more prestigious jobs and to offer satisfying work.

#### 4.4.3 When does it pay to live apart?

Our extension of the Mincer model, which allows for the possibility that couples with conflicting locational preferences live apart, carries predictions that are testable using data from the Job Seekers project. In the remainder of this section, we assess the extent to which circumstances in which Job Seekers respondents live apart correspond to circumstances in which the model predicts that couples live apart. In particular we estimate ordinary least squares regression models of the form

$$SPAPART_i = X_i'\beta + \epsilon_i,$$

where  $SPAPART_i$  is the job candidate's subjective probability of living apart in the year after the job market and  $X_i$  contains characteristics of the job candidate, his or her partner, and their relationship that are theoretically likely to influence the couple's response to migration ties. Our focus in these analyses is the choice of living arrangements by couples who expect to maintain their relationship. Accordingly, we focus on predictions from Equation (4.2) and exclude from the regression sample respondents who reported that they were more likely than not to break up with their partner in the year after the job market.

## Role of partner's career-related utility

Our extended Mincer model assumes that couples consider the migration ties of both partners when deciding where to live and work. Accordingly, the model predicts that economists are more likely to live apart from their partner not just when their own migration tie is large, but also when their partner's migration tie is large. This prediction is consistent with findings from qualitative studies of long-distance relationships, which indicate that the ability of dual-career couples to preserve their relationship while pursuing desirable career opportunities in separate locations is their primary impetus for living apart (Gerstel and Gross, 1982).

The Job Seekers data contain several measures of partner migration ties. First, like most studies of family migration, we use the educational attainment of the partner as a proxy for labor-force attachment and the possession of specialized human capital. Second, we ask about the school enrollment of the partner in the year after the respondent was on the job market. Third, we ask respondents what they think is the percent chance that their partner will work at least 20, 40, and 60 hours per week over most of the next ten years. Fourth, we ask respondents how good they thought their partner's job opportunities would be in the location of their new job, at the time they accepted the job. Finally, we assess agreement with the following statement: "My [husband's/wife's/significant other's] career will *not* suffer if we move to the places that are best for my career."

Table 4.13 presents results from regressions of the subjective probability of living apart on these measures of partner migration ties. Column 1 indicates that, as expected, higher levels of educational attainment are associated with greater likelihoods of living apart. Economists whose partner had or was pursuing a master's degree believed they were 9 percentage points more likely to live apart than those whose partner had no more than a college degree. Economists whose partner had or was pursuing a PhD believed they were 16 percentage points more likely to live

apart. School enrollment was also associated with living apart. Economists whose partner expected to be in school in the year after the job market believed they were 9 percentage points more likely to live apart than economists whose partner did not expect to be in school.

Turning to labor-force attachment, the results in Column 2 suggest that the impact of expected work hours on the likelihood of living apart is modest. The estimated coefficients on the percent chance of working at least 20 and at least 40 hours per week are small and are not statistically different from zero. The estimated coefficient on the percent chance of working at least 60 hours per week is also small, but is statistically significant. In particular, the estimate indicates that an increase of 10 percentage points in the percent chance that the partner will work long hours over most of the next ten years is associated with an increase of 3 percentage points in the percent chance that the couple will live apart in the year after the job market.

The quality of the partner's job prospects in the location of the economist's job has a substantively and statistically significant association with the percent chance that the couple lives apart. The results in Column 3 suggest that, compared with economists whose partner had good job prospects in the location of their job, economists whose partner had fair prospects believed they were 11 percentage points more likely to live apart, and economists whose partner had poor prospects believed they were 33 percentage points more likely to live apart. The results in Column 4 are consistent with the results in Column 3. Economists who agreed that the career attainment of their partner would *not* be harmed by following them to their individually preferred location believed they were 18 percentage points less likely to live apart than economists who thought that the career attainment of their partner would be harmed.

On the whole, the estimates from Columns 1 through 4 are robust to the inclusion of additional variables in the regression model. Column 5 presents estimates from a regression model that includes all of the measures of partner migration ties. While

some estimates that were statistically significant in the partial models lose significance in the full model, the signs and magnitudes of most estimates change only modestly. Interestingly, the association between educational attainment and living apart is not statistically significant in the model that includes direct measures of migration ties. This result suggests that, while education is a reasonable proxy for migration ties in studies that lack direct measures, it is not itself responsible for the decision to live apart.

### **Role of relationship-related utility**

Turning to the impact of relationship characteristics on living arrangements, the extended model predicts that economists are more likely to live apart when their value of living together is lower. A reasonable hypothesis is that couples have a stronger preference for living together when they are more committed to each other and more satisfied with their relationship. On the other hand, qualitative studies of long-distance relationships have found that couples who live apart are not motivated to do so by problems in their relationship, and do not expect to break up ([Gerstel and Gross, 1982](#)).

The Job Seekers data contain two measures of relationship satisfaction and commitment. First, we ask respondents to classify their relationship as “married,” “marriage-like,” “committed,” or “dating.” Second, we ask them to rate their satisfaction with the relationship in the months leading up to the job market. In addition, the surveys contain six items designed to assess the relationship-related costs of living apart. Specifically, we ask respondents how upset they would be if they were living apart from their partner in the year after the job market, and we ask them to rate their agreement with the following statements: (1) “It would be possible for me to have a fulfilling relationship while living apart from my [husband/wife/significant other],” (2) “I would never consider living apart from my [husband/wife/significant other],”

(3) “I would be willing to make a large career sacrifice so that I could live with my [husband/wife/significant other],” (4) “I would consider jobs that require me to live apart from my [husband/wife/significant other] for up to one year,” and (5) “I would consider jobs that require me to live apart from my [husband/wife/significant other] for up to five years.”

Table 4.14 presents results from regressions of the subjective probability of living apart on relationship commitment, relationship satisfaction, and other relationship-related cost measures. Column 1 indicates that lower levels of relationship commitment are associated with greater likelihoods of living apart. Compared with economists who were married, those in marriage-like and committed relationships believed they were between 11 and 33 percentage points more likely to live apart. Column 2 suggests that relationship satisfaction plays a moderately important role in decisions about living arrangements. Economists who were extremely satisfied with their relationship in the months leading up to the job market believed they were 15 percentage points less likely to live apart than economists who were less satisfied.

Column 3 presents estimates from a regression model that includes dummy variables indicating that the respondent would be very upset or extremely upset to be living apart in the year after the job market, along with dummy variables indicating that the respondent agreed with the statements enumerated above. Surprisingly, just two estimates in Column 3 are statistically significant. Economists who would be extremely upset to be living apart believed they were 19 percentage points less likely to live apart than economists who would be less upset. Those who agreed that they would consider jobs that required them to live apart from their partner for up to five years believed they were 19 percentage points more likely to live apart than those who disagreed that they would consider such jobs.

Column 4 presents estimates from a model that includes all of the relationship-related cost measures. The estimates in this column are comparable to estimates in

the preceding columns. Economists who are less committed to their relationships are more likely to live apart than those who are more committed, and economists who report a strong preference for living together are less likely to live apart than those who report a weaker preference for living together. Taken together, these results contrast with, but do not contradict, the findings of the qualitative studies. Previous studies of long-distance relationships have identified participants using non-random sampling methods. Consequently, they have not estimated predictors of living apart for the population – or a known sub-population – of dual-career couples. To the extent that the snowball sampling methods employed by these studies identified the most successful and enduring long-distance relationships, they may have overrepresented couples who were committed and happy in their relationships.

### **Role of child-related utility**

Couples are likely to place a higher value on living together when they have children. Qualitative studies of long-distance marriages have found that couples with young children find living apart more stressful than couples without children. In addition, couples who anticipate having children report that they will not continue living apart when they become parents ([Gerstel and Gross, 1982](#)). These findings are understandable for two reasons. First, to the extent that parents enjoy spending time with their children, men and women whose children live with their partner during a long-distance marriage lose an important source of utility. Second, to the extent that the demands of parenting conflict with the demands of work, those whose children live with them may harm their careers as much by parenting alone as they would by moving with their partner to their jointly preferred location.

The Job Seekers data includes measures of current parental status and expectations of future fertility. We identify respondents who already had children by the time of the job-market year, and we ask all respondents what they think is the per-

cent chance that they will have a child in the next year and the next five years. In addition to these measures, the surveys contain several items designed to assess the child-related costs of living apart. Specifically, we ask respondents to rate their agreement with the following statements: (1) "I would consider having a child while living apart from my [husband/wife/significant other]," (2) "Living apart from my [husband/wife/significant other] over the next year would prevent us from having as large a family as we would like," (3) "Living apart from my [husband/wife/significant other] over the next five years would prevent us from having as large a family as we would like," (4) "My children would live with me if my [husband/wife/significant other] and I were living apart," and (5) "I could have a very good relationship with my children even if they were not living with me."

Table 4.15 presents results from regressions of the subjective probability of living apart on parental status, fertility expectations, and other child-related costs of living apart. Column 1 shows that, as expected, parenthood is associated with a lower likelihood of living apart. Parents believed they were 15 percentage points less likely to live apart than non-parents.

Column 2 shows that the expectation of having children is also associated with a lower likelihood of living apart. An inspection of the distributions of subjective probabilities of having children indicated that they were tri-modal, with responses clustering near 0, 0.5, and 1. To assess the role of fertility expectations on decisions about living arrangements, we regressed the expected probability of living apart on dummy variables corresponding to subjective probabilities of less than 0.25, probabilities between 0.25 and 0.75, and probabilities greater than 0.75. Estimates from this regression model are small in magnitude and, with one exception, are not statistically different from zero. The exception is a strong expectation of having children within five years. Economists who thought that they would probably have a child in the next five years believed they were 10 percentage points less likely to live apart than

economists who were less sure that they would have children.

Results from Column 3 suggest that, consistent with the findings of qualitative studies of long-distance marriages, some couples will not consider living apart while growing their families. Economists who disagreed that they would consider having a child while living apart from their partner believed they were 18 percentage points less likely to live apart than economists who viewed long-distance relationships and parenting as compatible. With one exception, the estimated coefficients for the remaining child-related cost measures are of the expected signs. None, however, are statistically different from zero. Notably, while we find suggestive evidence that respondents who would bear the burden of daily caretaking for their children are less likely to live apart, and that respondents who could maintain good relationships with their children are more likely to live apart, these results are not statistically significant.

Column 4 presents estimates from a regression model that includes all of the child-related cost measures. The estimates in this column are comparable to the estimates in Columns 1 through 3. Like the qualitative studies of long-distance relationships, we find consistent evidence that children increase the cost of living apart and deter couples from adopting the arrangement.

## 4.5 Conclusions

Findings from the Job Seekers project are partially consistent with the Mincer model. Some of the new economists we surveyed rejected desirable career outcomes in order to live with their partner. Surprisingly, however, given that many economists are members of highly educated dual-career couples – precisely the sort of couples most vulnerable to severe migration ties – the career sacrifices they anticipated were not large. Just 14 percent of Job Seekers respondents rejected their individually preferred job for the benefit of their relationship. Among respondents who rejected

their individually preferred job, the differences between that job and the job they accepted were moderate.

We argue that the gap between the substantial career sacrifices we expected based on the Mincer model and the relatively minor career sacrifices we observe is explained, in part, by the availability of an option Mincer never considered: living apart. Studies using non-probability samples have found that living apart allows some couples with severe migration ties to avoid both career sacrifices and relationship dissolution. Our study corroborates that finding using representative data from a known sub-population of dual-career couples. Sixteen percent of the new economists we surveyed expected to be living apart from their partner in the year after they entered the job market, and economists whose careers stood to gain most from living apart were the most likely to adopt the arrangement.

Previous research on the migration decisions of dual-career couples has assessed the impact of migration ties on their employment status and earnings. Our results suggest that this focus is too narrow. Of the eight specific career outcomes we considered as likely components of new economists' assessments of their overall career prospects, expected lifetime income was one of just two outcomes that did *not* significantly influence the living arrangements of new economists. Instead, the economists we surveyed were motivated to live apart when they believed that the arrangement would improve their research productivity and facilitate their future career mobility. To the extent that these findings are representative of dual-career couples more generally, studies that focus exclusively on earnings and employment status neglect important costs that migration ties impose on highly educated workers.

Finally, results from the Job Seekers project suggest that living apart is a more viable option for some couples than others. While severe migration ties can induce even happy couples to live apart, relationship commitment and satisfaction are deterrents to long-distance relationships. Children and the expectation of having children are

also deterrents. In light of these findings, we posit that the impact of migration ties on the professional outcomes of dual-career couples is conditioned by their personal circumstances. Couples who are deeply engaged in family life find it more difficult than other couples to protect their careers when their locational preferences diverge.

## 4.6 Tables

Table 4.1: Relationship status

	All respondents	Men	Women
In relationship	73%	76%	67%
Relationship status			
Married	48%	51%	40%
Marriage-like	8%	8%	10%
Committed	12%	12%	12%
Dating	5%	5%	5%
Not in relationship	27%	24%	33%
Observations	1,503	707	503

*Notes:* Table includes respondents from the 2007-08, 2008-09 and 2009-10 job-market cohorts who gave relationship information in the post-market survey. “In relationship” and “Not in relationship” indicate whether the respondent was partnered in November of the job-market year. Relationship status is the most committed status the respondent ever reported with respect to that relationship.

Table 4.2: Partner educational attainment

	All respondents	Men	Women
Bachelor’s degree or less	24%	27%	18%
Master’s or professional degree	36%	41%	25%
PhD	40%	32%	57%
Observations	1,057	730	327

*Notes:* Table includes data from 2007-08, 2008-09 and 2009-10 cohort respondents who were in a relationship in November of the job-market year and responded to questions about the educational attainment of their partner. Educational attainment is the highest degree the partner had earned or was pursuing during the job-market year.

Table 4.3: Respondents choosing individually preferred job outcomes

Chose individually preferred job outcome?	Percent
Yes	86.4%
No	13.6%
Observations	631

*Notes:* The individually preferred job outcome is the outcome the respondent would have preferred in the absence of constraints imposed by the partner's preferences or career. It may refer to a particular job offer or to a preference to reject all job offers. Sample includes respondents from 2007-10 who were in relationships at least from November until March of the job-market year (2007-09 cohorts), or through the post-market survey (2009-10 cohort).

Table 4.4: Career outcome ratings of individually preferred (IP) and jointly preferred (JP) jobs

Chance respondent will ... Constraint group	Mean <sup>b</sup>		Obs
	IP	JP	
Earn tenure at a research university			
Not constrained		3.76	143
Constrained, accepted IP job	4.43	3.57	7
Constrained, rejected IP job	4.10	3.90	21
Earn tenure at a four-year college			
Not constrained		3.14	139
Constrained, accepted IP job	3.29	3.14	7
Constrained, rejected IP job	3.35	3.15	20
Publish regularly in top journals			
Not constrained		3.76	144
Constrained, accepted IP job	4.14	3.14	7
Constrained, rejected IP job	4.10	3.95	21
Have opportunities to move to more prestigious jobs			
Not constrained		4.04	143
Constrained, accepted IP job	4.20	3.20	5
Constrained, rejected IP job	4.38	4.29	21
Have opportunities to move to different kinds of jobs			
Not constrained		4.26	143
Constrained, accepted IP job	4.57	3.71	7
Constrained, rejected IP job	4.24	4.52	21
Have higher-than-average lifetime income for field			
Not constrained		3.93	144
Constrained, accepted IP job	3.71	3.57	7
Constrained, rejected IP job	4.19	4.00	21
Have everyday work that is satisfying			
Not constrained		4.95	144
Constrained, accepted IP job	4.83	3.83	6
Constrained, rejected IP job	5.00	4.67	21

Chance respondent will ... Constraint group	Mean <sup>b</sup>		Obs
	IP	JP	
Have plenty of time for life outside of work			
Not constrained		4.48	143
Constrained, accepted IP job	3.71	3.57	7
Constrained, rejected IP job	4.43	4.52	21
Rating of overall career prospects at IP job, relative to JP job <sup>a</sup>			
Not constrained		–	–
Constrained, accepted IP job		2.00	10
Constrained, rejected IP job		2.39	28

*Notes:* Respondents rated the likelihood of each outcome for both the individually preferred and jointly preferred jobs on a six-point scale, where 1 is “extremely unlikely,” 2 is “very unlikely,” 3 is “somewhat unlikely,” 4 is “somewhat likely,” 5 is “very likely,” and 6 is “extremely likely.” Observations are from coupled respondents from the 2009-10 cohort only, since these questions were not asked before 2009-10. “Not constrained” indicates that respondent’s individually preferred choice coincided with couple’s jointly preferred choice. For those who were constrained, “accepted individually preferred job” indicates that the respondent accepted the individually preferred job and “rejected individually preferred job” indicates that the respondent accepted the jointly preferred job.

<sup>a</sup> Respondents rated the overall quality of the individually preferred job relative to the jointly preferred job on a five-point scale, where 1 is “much better,” 2 is “somewhat better,” 3 is “about the same,” 4 is “somewhat worse,” and 5 is “much worse.” Mean ratings below 3 indicate that, on average, respondents felt that the individually preferred job was more likely to yield better long-term career prospects than the jointly preferred job.

<sup>b</sup> The ratings we summarize in this table are ordinal data. We present means rather than ordinal measures of central tendency, such as medians or modes, because the ratings for most outcomes cluster at the high end of the scale, and the ordinal measures obscure important variation within that range.

Table 4.5: Career costs experienced by respondents rejecting individually preferred job offer

Chance respondent will...	Number of respondents rating ...		Sign test ( <i>p</i> )
	IP > AJ	IP < AJ	
Earn tenure at a research university	6	3	0.254
Earn tenure at a four-year college	5	5	0.623
Publish regularly in top journals	5	2	0.226
Have opportunities to move to more prestigious jobs	6	2	0.145
Have opportunities to move to different kinds of jobs	3	4	0.773
Have higher-than-average lifetime income for field	6	4	0.377
Have everyday work that is satisfying	8	3	0.113
Have plenty of time for life outside of work	5	5	0.623
Observations: 21			
Overall career prospects <sup>a</sup>	14	2	0.002
Observations: 28			

*Notes:* Observations represent partnered respondents from the 2009-10 job-market cohort who rejected the individually preferred job (IP) and accepted an alternative job (AJ). The middle two columns in the table present the frequencies of ratings indicating that the individually preferred job is more likely than the accepted job to yield a particular outcome (IP > AJ) or that the individually preferred job is less likely to yield the outcome (IP < AJ). The excluded category is IP = AJ. The sign test column presents one-sided p-values based on the probability of observing the given frequencies of positive signs on the differences between ratings of the individually preferred job and the accepted job from a binomial distribution with mean 0.5. For the eight specific outcomes, respondents rated the likelihood of realizing the outcome on a six-point scale, where 1 is “extremely unlikely,” and 6 is “extremely likely.”

<sup>a</sup> Respondents rated their overall career prospects with the individually preferred job relative to their prospects with the accepted job on a five-point scale, where 1 is "much better," 2 is "somewhat better," 3 is "about the same," 4 is "somewhat worse," and 5 is "much worse." Ratings below 3 indicate that the individually preferred job is better than the accepted job, while ratings above 3 that the accepted job is better than the individually preferred job.

Table 4.6: Career costs avoided by respondents accepting individually preferred job over jointly preferred job

Chance respondent will...	Number of respondents rating ...		Sign test ( $p$ )
	IP > JP	IP < JP	
Earn tenure at a research university	5	0	0.031
Earn tenure at a four-year college	3	2	0.500
Publish regularly in top journals	5	0	0.031
Have opportunities to move to more prestigious jobs	4	0	0.063
Have opportunities to move to different kinds of jobs	5	0	0.031
Have higher-than-average lifetime income for field	2	1	0.500
Have everyday work that is satisfying	4	0	0.063
Have plenty of time for life outside of work	1	2	0.875
Observations: 7			
Overall career prospects <sup>a</sup>	8	0	0.004
Observations: 10			

*Notes:* Observations represent partnered respondents from the 2009-10 job-market cohort who faced a choice between an individually preferred job (IP) and a jointly preferred alternative (JP), and who chose to accept the individually preferred job. The middle two columns in the table present the frequencies of ratings indicating that the individually preferred job is more likely than the jointly preferred job to yield a particular outcome (IP > JP) or that the individually preferred job is less likely to yield the outcome (IP < JP). The excluded category is IP = JP. The sign test column presents one-sided p-values based on the probability of observing the above frequencies of positive signs on the differences between ratings of the individually preferred job and the jointly preferred job from a binomial distribution with mean 0.5. For the eight specific outcomes, respondents rated the likelihood of realizing the outcome on a six-point response scale, where 1 is “extremely unlikely,” and 6 is “extremely likely.”

<sup>a</sup> Respondents rated their overall career prospects with the individually preferred job relative to their prospects with the jointly preferred job on a five-point scale, where 1 is “much better,” 2 is “somewhat better,” 3 is “about the same,” 4 is “somewhat worse,” and 5 is “much worse.” Ratings below 3 indicate that the individually preferred job is better than the jointly preferred job, while ratings above 3 that the jointly preferred job is better than the individually preferred job.

Table 4.7: Impact of migration ties on job choice set by stage of job search

	Stage of job search							
	Applications		Interviews		Fly-outs		Job offers	
By stage	Obs	Statistic	Obs	Statistic	Obs	Statistic	Obs	Statistic
Median size of choice set <sup>a</sup>	620 <sup>c</sup>	100	766	17	761	6	751	3
Percent reporting changed choice set due to migration ties <sup>b</sup>	710	44%	740	12%	707	14%	628	14%
Median change in size of choice set due to migration ties, conditional on having changed choice set <sup>d</sup>	103	-5	33	2	35	-1		
Cumulative to this stage								
Percent reporting changed choice set due to migration ties <sup>e</sup>	544	43%	544	46%	544	49%	544	54%
Percent reporting some or all employers knew about partner			747	72%	604	84%		

*Notes:* Statistics are computed for respondents who were in a relationship from November through March of the job market year. Sample includes observations from all cohorts for which data are available (see footnotes for more detail). Questions about applications were asked in the pre-market survey for the 2007-08 cohort and in both the post-market and pre-market surveys for later cohorts. Questions about interviews, fly-outs and job offers were only asked in the post-market surveys, so fewer observations are available compared to the applications stage.

<sup>a</sup> At the application stage, *choice set* refers to the number of applications respondents submitted. At the interview and fly-out stages, *choice set* refers to the number of invitations extended by prospective employers for interviews and fly-outs. At the job-offer stage, *choice set* refers to the sum of job offers extended by prospective employers and job offers not officially extended but that respondents are sure would have been extended if they had not indicated to the employers that they would not accept.

<sup>b</sup> At the application stage, *changed choice set* indicates that the respondent applied to a different set of jobs (not necessarily fewer) because of migration ties. At the interview and fly-out stages, *changed choice set* indicates that the respondent accepted a different set of interviews or fly-outs (again, not necessarily fewer). At the job-offer stage, *changed choice set* indicates that respondents rejected their individually preferred job.

<sup>c</sup> In 2007-08, total number of applications is missing for job candidates who did not complete the post-market survey.

<sup>d</sup> Due to changes in the surveys over time, this information is available at the application stage only for the 2008-09 job-market cohort, and at the interview and fly-out stages only for the 2007-08 job-market cohort.

<sup>e</sup> Sample is restricted to the subset of respondents who provided information about choices at every stage. Requires that respondents had non-zero applications, interviews, fly-outs and offers, and provided answers to questions about outcomes and migration ties at each stage.

Table 4.8: Probit regressions: Impact of migration ties and gender on job-market choices

Dependent variable:	(1)	(2)	(3)
	Altered job choice	Altered earlier choice	Altered any choice
Female	0.041 (0.030)	0.095** (0.048)	0.057 (0.049)
Relationship status			
Married	–	–	–
Marriage-like	–0.035 (0.040)	–0.084 (0.067)	–0.062 (0.068)
Committed	–0.074** (0.033)	–0.094 (0.064)	–0.109* (0.064)
Dating	0.006 (0.072)	–0.346*** (0.085)	–0.254** (0.102)
Partner education			
Bachelor’s degree or less	–	–	–
Master’s or professional degree	0.072** (0.033)	0.017 (0.056)	0.042 (0.056)
PhD	0.059* (0.032)	0.069 (0.056)	0.074 (0.057)
Observations	613	537	537

*Notes:* Standard errors in parentheses, \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ . Regression samples include observations from partnered respondents from all cohorts. Column 1 requires at least one job offer, while Columns 2 and 3 also require that respondents provided information about the impact of migration ties at application, interview and fly-out stages. Dependent variables are dummy variables for rejecting the individually preferred job (Column 1), for altering the application, interview, or fly-outs set in response to migration ties (Column 2), or for doing either of these (Column 3). Partner education is highest degree completed or in progress.

Table 4.9: Relationship outcomes in March after the job-market year

Likely relationship outcome	Percent
Live together	77.8%
Live apart	16.1%
Break up	6.2%
Observations	454

*Notes:* Expected relationship outcomes are the expected outcomes in March of the year after the job-market year, asked at the time of the post-market survey. *Live together* refers to sharing a primary residence or living close enough that the partners can see each other on weeknights; *live apart* refers to not living close enough that the partners can see each other on weeknights. Outcomes are coded as the most likely outcome based on respondents' subjective probabilities of each outcome; respondents were also coded as *break up* if their relationship had already ended by the time of the post-market survey. Sample includes respondents from 2008-10 who were in relationships from November until March of the job-market year.

Table 4.10: Career and relationship trade-offs

	<u>Expected relationship outcome</u>			<u>Expected relationship outcome</u>		
	Yes			No		
Sample includes past break-ups:	2008-09			2008-10		
Cohorts:	2008-09			2008-10		
Chose individually preferred outcome?	Live together	Live apart	Break up	Live together	Live apart	Break up
Yes	138 68.7%	32 15.9%	13 6.5%	261 72.5%	54 15.0%	0 0%
No	15 7.5%	1 0.5%	2 1.0%	41 11.4%	4 1.1%	0 0%
Observations	201			360		

*Notes:* Expected relationship outcomes are the expected outcomes in March of the year after the job-market year, asked at the time of the post-market survey. The individually preferred job outcome is the outcome the respondent would have preferred in the absence of constraints imposed by their partner's preferences or career. It may refer to a particular job offer or to a preference to reject all job offers. The sample is restricted to respondents who received at least one job offer and were in a relationship from November until March of the job-market year. In the first panel, respondents whose relationships had ended between March of the job-market year and the time of the post-market survey are included under the *break up* category. In the second panel, respondents whose relationships had ended by the time of the post-market survey are excluded because job preference data for these respondents is missing in 2009-10.

Table 4.11: Linear regressions: Impact of job trade-offs on subjective probability of living apart

Regressors:	(1)			(2)
	Single regressor			All regressors
	Coef	Obs	Adj $R^2$	Coef
IP > JP with respect to chance respondent will...				
Have better job prospects overall	0.246*** (0.060)	176	0.089	– –
Earn tenure at a research university	0.228*** (0.073)	171	0.049	–0.135 (0.124)
Earn tenure at a four-year college	0.163* (0.084)	166	0.016	0.087 (0.130)
Publish regularly in top journals	0.326*** (0.080)	172	0.083	0.423*** (0.157)
Have opportunities to move to more prestigious jobs	0.261*** (0.078)	169	0.057	–0.177 (0.148)
Have opportunities to move to different kinds of jobs	0.446*** (0.092)	171	0.117	0.346** (0.141)
Have higher than average income for field	0.139 (0.097)	172	0.006	0.068 (0.167)
Have satisfying everyday work	0.169** (0.072)	171	0.025	–0.124 (0.136)
Have plenty of time for life outside of work	0.041 (0.112)	171	–0.005	–0.128 (0.129)
Observations	–	–	–	160
Adjusted $R^2$	–	–	–	0.085

*Notes:* Standard errors in parentheses, \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ . Dependent variable is the subjective probability of living apart in the year after the job market. For overall career prospects, counts are based on a direct counterfactual question with a 1 to 5 response scale, where 1 indicates that "IP is much better than AJ" and 5 indicates that "IP is much worse than AJ." For each of the eight specific career outcomes, respondents rated the likelihood of each outcome on a six-point scale where 1 was "extremely unlikely," 2 was "very unlikely," 3 was "somewhat unlikely," 4 was "somewhat likely," 5 was "very likely," and 6 was "extremely likely." Regressors for all regressions are dummy variables indicating that respondent thought the individually preferred job was better than the jointly preferred job. Column 1 reports estimates from regressions in which the dummy variable for each outcome enters as the sole regressor. Column 2 reports estimates from a regression in which all of the dummy variables enter together.

Table 4.12: Association between relative likelihoods of achieving long-term career outcomes at individually and jointly preferred job

% IP > JP	“You will publish regularly in top journals.”			“You will have opportunities to move to different kinds of jobs.”		
	IP > JP	IP <= JP	Chi-sq	IP > JP	IP <= JP	Chi-sq
“You will earn tenure at a research university.”	82%	29%	7.337	63%	45%	0.700
“You will earn tenure at a four-year college.”	45%	38%	0.171	38%	42%	0.050
“You will have opportunities to move to more prestigious jobs.”	70%	25%	5.106	86%	26%	7.394
“Your lifetime income will be higher than average for your field.”	36%	24%	0.539	50%	20%	2.520
“Your everyday work will be satisfying to you.”	73%	38%	3.240	86%	40%	4.340
“You will have plenty of time for your life outside of work.”	18%	24%	0.113	25%	20%	0.085
						0.771

Notes: Number of observations ranges from 26 to 28. IP is individually preferred job. JP is jointly preferred job.

Table 4.13: Linear regressions: Partner's career-related predictors of living apart

	(1)	(2)	(3)	(4)	(5)
Cohorts:	2008-10	2009-10	2008-10	2009-10	2009-10
Regressors:	Education	LF at- tachment	Job prospects	Mobility	All
Highest degree completed or in progress					
Bachelor's degree or less	-				-
Master's or professional degree	0.087** (0.042)				0.034 (0.081)
PhD	0.155*** (0.043)				0.096 (0.076)
Expects to be in school next year	0.092** (0.041)				0.245*** (0.085)
“What do you think is the percent chance that your husband/wife/significant other will work at least 20/40/60 hours per week over most of the next ten years?”					
At least 20 hours per week		0.003 (0.002)			0.002 (0.003)
At least 40 hours per week		-0.001 (0.002)			0.001 (0.002)

Regressors:	Education	LF attachment	Job prospects	Mobility	All
At least 60 hours per week		0.003*** (0.001)			0.001 (0.001)
“At the time you accepted your job, how would you have rated your husband’s/wife’s/significant other’s job prospects in this location?”					
Good			–		–
Fair			–		–
Poor			0.113*** (0.040)		0.171*** (0.060)
			0.327*** (0.061)		0.276*** (0.103)
Agrees with: “My husband’s/wife’s/significant other’s career will <i>not</i> suffer if we move to the places that are best for my career.”				–0.178*** (0.052)	–0.138*** (0.059)
Observations	428	205	344	162	130
R-squared	0.047	0.068	0.086	0.068	0.251

*Note:* Standard errors in parentheses, \*\*\* p<0.01, \*\* p<0.05, \* p<0.1. Dependent variable is the subjective probability of living apart in the year after the job market. Wording of labor-force attachment questions changed slightly over time. Question text for all years is available in the appendix.

Table 4.14: Linear regressions: Relationship-related predictors of living apart

	(1)	(2)	(3)	(4)
Cohorts:	2008-10	2008-09	2009-10	2009-10
Regressors:	Commitment	Satisfaction	Cost of distance	All
<hr/>				
Relationship status				
Married	–			–
Marriage-like	0.107** (0.047)			0.230*** (0.072)
Committed or dating	0.330*** (0.044)			0.188*** (0.070)
“In the past few months, how satisfied have you been with your romantic relationship?”				
Somewhat satisfied or dissatisfied		–		
Very satisfied		–0.042 (0.087)		
Extremely satisfied		–0.152* (0.083)		
Agrees with: “It would be possible for me to have a fulfilling relationship while living apart from my husband/wife/significant other.”			–0.082 (0.052)	–0.051 (0.051)

Regressors:	Commit- ment	Satis- faction	Cost of distance	All
Agrees with: "I would never consider living apart from my husband/wife/significant other."			-0.008 (0.055)	-0.001 (0.053)
Agrees with: "I would be willing to make a large career sacrifice so that I could live with my husband/wife/significant other."			-0.071 (0.058)	-0.015 (0.058)
Agrees with: "I would consider jobs that require me to live apart from my husband/wife/significant other for up to one year."			0.059 (0.058)	0.027 (0.057)
Agrees with: "I would consider jobs that require me to live apart from my husband/wife/significant other for up to five years."			0.194*** (0.071)	0.178** (0.069)
"How upset would you be if you were in your current relationship, but living in a different area from your husband/wife/significant other one year from now?"				
Somewhat upset or not upset			-	-
Very upset			-0.075 (0.065)	-0.081 (0.062)
Extremely upset			-0.190*** (0.066)	-0.163** (0.064)

Regressors:	Commitment	Satisfaction	Cost of distance	All
Observations	430	144	178	178
R-squared	0.120	0.037	0.186	0.250

*Note:* Standard errors in parentheses, \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ . Dependent variable is the subjective probability of living apart in the year after the job market.

Table 4.15: Linear regressions: Child-related predictors of living apart

	(1)	(2)	(3)	(4)
Cohorts:	2008-10	2008-10	2009-10	2009-10
Regressors:	Parental status	Expected fertility	Cost of distance	All
Has at least one child	-0.149*** (0.036)			-0.136*** (0.053)
“What do you think is the percent chance that you will have or adopt a/another child in the next year?”				
Low ( $0 \leq p < .25$ )		-		-
Medium ( $.25 \leq p < .75$ )		-		-
High ( $.75 \leq p \leq 1$ )		-0.020 (0.052)		0.015 (0.067)
“What do you think is the percent chance that you will have or adopt a/another child in the five years?”				
Low ( $0 \leq p < .25$ )		-0.058 (0.058)		-0.016 (0.079)
Medium ( $.25 \leq p < .75$ )				
High ( $.75 \leq p \leq 1$ )				
Low ( $0 \leq p < .25$ )		-		-
Medium ( $.25 \leq p < .75$ )		-		-
High ( $.75 \leq p \leq 1$ )		0.025 (0.053)		-0.123 (0.087)
		-0.102***		-0.213***

Regressors:	Parental status	Expected fertility	Cost of distance	All
Agrees with: "I would consider having a child while living apart from my [husband/wife/significant other]."		(0.051)	0.183** (0.081)	0.192** (0.081)
Agrees with: "Living apart from my [husband/wife/significant other] over the next year would prevent us from having as large a family as we would like."			-0.072 (0.056)	-0.034 (0.057)
Agrees with: "Living apart from my [husband/wife/significant other] over the next five years would prevent us from having as large a family as we would like."			0.015 (0.067)	0.076 (0.077)
Agrees with: "My children would live with me if my [husband/wife/significant other] and I were living apart."			-0.036 (0.051)	-0.046 (0.050)
Agrees with: "I could have a very good relationship with my children even if they were not living with me."			0.043 (0.053)	0.018 (0.053)
Observations	428	397	197	197
R-squared	0.038	0.040	0.040	0.106

*Note:* Standard errors in parentheses, \*\*\* p<0.01, \*\* p<0.05, \* p<0.1. Dependent variable is the subjective probability of living apart in the year after the job market.

## 4.7 References

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## CHAPTER V

### Conclusion

The new millenium is an exciting time for family economists. Widespread changes in the structure and behavior of families offer unprecedented opportunities to study novel arrangements. This dissertation moves beyond studies of heterosexual married couples to explore the implications of work-family trade-offs for two groups of non-traditional families. My results suggest that families are innovative in the face of changing constraints. They also suggest that a break with traditional norms in one area may prompts similar breaks in other areas.

In the first essay, I show that men and women who seek same-sex rather than different-sex partners also invest in less the human capital members of their sex have traditionally obtained and spend less time in the activities members of their sex have traditionally performed. The theoretical analysis in this essay indicates that a non-traditional choice with respect to household formation – formation of a same-sex household – may prompt a non-traditional choice with respect to household roles. In the third essay, I show that professional men and women who choose professional partners may live apart to avoid career sacrifices associated with family migration. The empirical results in this essay suggest that a non-traditional choice with respect to household specialization – a relative lack of specialization – may prompt a non-traditional choice with respect to living arrangements.

This dissertation underscores the close connection between outcomes in the home and outcomes in the labor market. The choices people make about their family lives have implications for the choices they make about their work lives, and vice versa. The essays I have presented show that new models and data can illuminate the structure and behavior of modern families. Family economists stand to learn much if they are as flexible in their research approaches as families in their private and public arrangements.

## APPENDIX

## Text of key survey questions

### Job preferences: Ranking of job types

Cohort	Survey	Question	Responses	Universe
2007-08	Pre-market	Please rank the following types of job in order of your preference, with "1" being your most preferred and "5" being your least preferred. Research university	Whole number between 1 and 5	All respondents
2007-08	Pre-market	Please rank the following types of job in order of your preference, with "1" being your most preferred and "5" being your least preferred. Four-year college	Whole number between 1 and 5	All respondents

**Job preferences: Ranking of job types** (*continued*)

Cohort	Survey	Question	Responses	Universe
2007-08	Pre-market	Please rank the following types of job in order of your preference, with "1" being your most preferred and "5" being your least preferred. Postdoctoral fellowship	Whole number between 1 and 5	All respondents
2007-08	Pre-market	Please rank the following types of job in order of your preference, with "1" being your most preferred and "5" being your least preferred. Non-academic, research	Whole number between 1 and 5	All respondents

**Job preferences: Ranking of job types** (*continued*)

Cohort	Survey	Question	Responses	Universe
2007-08	Pre-market	Please rank the following types of job in order of your preference, with "1" being your most preferred and "5" being your least preferred. Non-academic, non-research	Whole number between 1 and 5	All respondents
2008-09	Pre-market	Please rank the following types of job in order of your preference, with "1" being your most preferred and "5" being your least preferred. Assistant professor at university	Whole number between 1 and 5	All respondents

**Job preferences: Ranking of job types** (*continued*)

Cohort	Survey	Question	Responses	Universe
2008-09	Pre-market	Please rank the following types of job in order of your preference, with "1" being your most preferred and "5" being your least preferred. Assistant professor at four-year college	Whole number between 1 and 5	All respondents
2008-09	Pre-market	Please rank the following types of job in order of your preference, with "1" being your most preferred and "5" being your least preferred. Postdoctoral fellow	Whole number between 1 and 5	All respondents

**Job preferences: Ranking of job types** (*continued*)

Cohort	Survey	Question	Responses	Universe
2008-09	Pre-market	Please rank the following types of job in order of your preference, with "1" being your most preferred and "5" being your least preferred. Non-academic researcher (e.g., researcher at a think tank, government research unit, central bank, or international financial organization)	Whole number between 1 and 5	All respondents

**Job preferences: Ranking of job types** (*continued*)

Cohort	Survey	Question	Responses	Universe
2008-09	Pre-market	Please rank the following types of job in order of your preference, with "1" being your most preferred and "5" being your least preferred. Private sector researcher	Whole number between 1 and 5	All respondents
2009-10	Pre-market	Please rank the following jobs in order of your preference, with "1" being your most preferred and "5" being your least preferred. Assistant professor at a university	Whole number between 1 and 5	All respondents

**Job preferences: Ranking of job types** (*continued*)

Cohort	Survey	Question	Responses	Universe
2009-10	Pre-market	Please rank the following jobs in order of your preference, with "1" being your most preferred and "5" being your least preferred. Assistant professor at a four-year college	Whole number between 1 and 5	All respondents
2009-10	Pre-market	Please rank the following jobs in order of your preference, with "1" being your most preferred and "5" being your least preferred. Postdoctoral fellow	Whole number between 1 and 5	All respondents

**Job preferences: Ranking of job types** (*continued*)

Cohort	Survey	Question	Responses	Universe
2009-10	Pre-market	Please rank the following jobs in order of your preference, with "1" being your most preferred and "5" being your least preferred. Researcher at a non-profit, governmental, or quasi-governmental organization	Whole number between 1 and 5	All respondents
2009-10	Pre-market	Please rank the following jobs in order of your preference, with "1" being your most preferred and "5" being your least preferred. Researcher at a business or industry establishment	Whole number between 1 and 5	All respondents

**Expected career outcomes**

Cohort	Survey	Question	Responses	Universe
2009-10	Pre-market	Imagine that, next year, the faculty in your department compile a list of the job placements of their graduates over the last five years. They put the placements they consider to be most impressive at the top of the list. Thinking about the kind of job you expect to obtain, where do you think you would fall in this list?	Select one: (1) 1st decile (most impressive), (2) 2nd decile, (3) 3rd decile, ..., (9) 9th decile, (10) 10th decile	All respondents

**Expected career outcomes** (*continued*)

Cohort	Survey	Question	Responses	Universe
2009-10	Post-market	How likely do you think it is	Select one: (1)	Respondents who
		that, over the course of your	Extremely unlikely, (2)	accepted a job
		life, you will earn tenure at a	Very unlikely, (3)	
		research university?	Somewhat unlikely, (4)	
			Somewhat likely, (5)	
			Very likely, (6)	
			Extremely likely	
2009-10	Post-market	How likely do you think it is	Select one: (1)	Respondents who
		that, over the course of your	Extremely unlikely, (2)	accepted a job
		life, you will earn tenure at a	Very unlikely, (3)	
		four-year college?	Somewhat unlikely, (4)	
			Somewhat likely, (5)	
			Very likely, (6)	
			Extremely likely	

**Expected career outcomes** (*continued*)

Cohort	Survey	Question	Responses	Universe
2009-10	Post-market	How likely do you think it is	Select one: (1)	Respondents who accepted a job
		that, over the course of your	Extremely unlikely, (2)	
		life, you will publish regularly in	Very unlikely, (3)	
		top journals?	Somewhat unlikely, (4)	
2009-10	Post-market	How likely do you think it is that, over the course of your life, you will have opportunities to move to more prestigious jobs?	Somewhat likely, (5)	Respondents who accepted a job
			Very likely, (6)	
			Extremely likely	
			Select one: (1)	
2009-10	Post-market	How likely do you think it is that, over the course of your life, you will have opportunities to move to more prestigious jobs?	Extremely unlikely, (2)	Respondents who accepted a job
			Very unlikely, (3)	
			Somewhat unlikely, (4)	
			Somewhat likely, (5)	
2009-10	Post-market	How likely do you think it is that, over the course of your life, you will have opportunities to move to more prestigious jobs?	Very likely, (6)	Respondents who accepted a job
			Extremely likely	
			Select one: (1)	
			Extremely unlikely, (2)	
2009-10	Post-market	How likely do you think it is that, over the course of your life, you will have opportunities to move to more prestigious jobs?	Very unlikely, (3)	Respondents who accepted a job
			Somewhat unlikely, (4)	
			Somewhat likely, (5)	
			Very likely, (6)	
2009-10	Post-market	How likely do you think it is that, over the course of your life, you will have opportunities to move to more prestigious jobs?	Extremely likely	Respondents who accepted a job
			Select one: (1)	
			Extremely unlikely, (2)	
			Very unlikely, (3)	

**Expected career outcomes** (*continued*)

Cohort	Survey	Question	Responses	Universe
2009-10	Post-market	How likely do you think it is that, over the course of your life, you will have opportunities to move to different kinds of jobs?	Select one: (1) Extremely unlikely, (2) Very unlikely, (3) Somewhat unlikely, (4) Somewhat likely, (5) Very likely, (6) Extremely likely	Respondents who accepted a job
2009-10	Post-market	How likely do you think it is that, over the course of your life, your lifetime income will be higher than average for your field?	Select one: (1) Extremely unlikely, (2) Very unlikely, (3) Somewhat unlikely, (4) Somewhat likely, (5) Very likely, (6) Extremely likely	Respondents who accepted a job

**Expected career outcomes** (*continued*)

Cohort	Survey	Question	Responses	Universe
2009-10	Post-market	How likely do you think it is	Select one: (1)	Respondents who
		that, over the course of your	Extremely unlikely, (2)	accepted a job
		life, your everyday work will be	Very unlikely, (3)	
		satisfying to you?	Somewhat unlikely, (4)	
			Somewhat likely, (5)	
			Very likely, (6)	
			Extremely likely	
2009-10	Post-market	How likely do you think it is	Select one: (1)	Respondents who
		that, over the course of your	Extremely unlikely, (2)	accepted a job
		life, you will have plenty of time	Very unlikely, (3)	
		for your life outside of work?	Somewhat unlikely, (4)	
			Somewhat likely, (5)	
			Very likely, (6)	
			Extremely likely	

### Individual counterfactual: Applications

Cohort	Survey	Question	Responses	Universe
2007-08	Pre-market	Would the set of all jobs for which you applied have been different in any way if you were not in a relationship?	Select one: (1) Yes, (2) No	Respondents who were in a relationship
2008-09	Pre-market	Are there jobs for which you applied, but for which you would not have applied if you were not in a relationship?	Select one: (1) Yes, (2) No	Respondents who (1) were in a relationship and (2) applied for at least one job
2008-09	Pre-market	Are there jobs for which you did not apply, but for which you would have applied if you were not in a relationship?	Select one: (1) Yes, (2) No	Respondents who were in a relationship

**Individual counterfactual: Applications** (*continued*)

Cohort	Survey	Question	Responses	Universe
2008-09	Post-market	Imagine that your [husband/wife/significant other] would have been be equally happy with any outcome of your job search — no matter what location or job you eventually chose. In that situation, would you have applied to a different set of jobs?	Select one: (1) Yes, (2) No	Respondents who (1) were in a relationship and (2) applied for at least one job

**Individual counterfactual: Applications** (*continued*)

Cohort	Survey	Question	Responses	Universe
2009-10	Pre-market	Imagine that your [husband/wife/significant other] would be equally happy with any outcome of your job search — no matter what location or job you eventually chose. In that situation, would you have applied for a different set of jobs?	Select one: (1) Yes, (2) No	Respondents who were in a relationship

**Individual counterfactual: Applications** (*continued*)

Cohort	Survey	Question	Responses	Universe
2009-10	Post-market	Suppose your [husband/wife/significant other] could have an equally satisfying professional and personal life in any location — that is, suppose it would not be a sacrifice for [him/her] to move with you anywhere. In that situation, would you have applied to a different set of jobs?	Select one: (1) Yes, (2) No	Respondents who (1) were in a relationship and (2) applied for at least one job

### Individual counterfactual: Interviews

Cohort	Survey	Question	Responses	Universe
2007-08	Post-market	Did you refuse any interviews you would have accepted if you were not in a relationship?	Select one: (1) Yes, (2) No	Respondents who (1) were in a relationship and (2) refused at least one interview invitation
2007-08	Post-market	Did you accept any interviews you would have refused if you were not in a relationship?	Select one: (1) Yes, (2) No	Respondents who (1) were in a relationship and (2) accepted at least one interview invitation

**Individual counterfactual: Interviews** (*continued*)

Cohort	Survey	Question	Responses	Universe
2008-09	Post-market	Imagine that your [husband/wife/significant other] would have been be equally happy with any outcome of your job search – no matter what location or job you eventually chose. In that situation, would you have accepted a different set of interviews?	Select one: (1) Yes, (2) No	Respondents who (1) were in a relationship and (2) received at least one interview invitation

**Individual counterfactual: Interviews** (*continued*)

Cohort	Survey	Question	Responses	Universe
2009-10	Post-market	Suppose your [husband/wife/significant other] could have an equally satisfying professional and personal life in any location — that is, suppose it would not be a sacrifice for [him/her] to move with you anywhere. In that situation, would you have accepted a different set of interviews?	Select one: (1) Yes, (2) No	Respondents who (1) were in a relationship and (2) received at least one interview invitation

### Individual counterfactual: Fly-outs

Cohort	Survey	Question	Responses	Universe
2007-08	Post-market	Did you refuse any fly-outs you	Select one: (1) Yes, (2)	Respondents who (1)
		would have accepted if you were	No	were in a relationship
		not in a relationship?		and (2) refused at least one fly-out invitation
2007-08	Post-market	Did you accept any fly-outs you	Select one: (1) Yes, (2)	Respondents who (1)
		would have refused if you were	No	were in a relationship
		not in a relationship?		and (2) accepted at least one fly-out invitation

**Individual counterfactual: Fly-outs** (*continued*)

Cohort	Survey	Question	Responses	Universe
2008-09	Post-market	Imagine that your [husband/wife/significant other] would have been be equally happy with any outcome of your job search – no matter what location or job you eventually chose. In that situation, would you have accepted a different set of fly-outs?	Select one: (1) Yes, (2) No	Respondents who (1) were in a relationship and (2) received at least one fly-out invitation

**Individual counterfactual: Fly-outs** (*continued*)

Cohort	Survey	Question	Responses	Universe
2009-10	Post-market	Suppose your [husband/wife/significant other] could have an equally satisfying professional and personal life in any location — that is, suppose it would not be a sacrifice for [him/her] to move with you anywhere. In that situation, would you have accepted a different set of fly-outs?	Select one: (1) Yes, (2) No	Respondents who (1) were in a relationship and (2) received at least one fly-out invitation

### Individual counterfactual: Job choice

Cohort	Survey	Question	Responses	Universe
2007-08	Post-market	If you had considered only your own preferences and had ignored the preferences of your [husband/wife/significant other], would you have accepted the same job or would you have accepted a different job?	Select one: (1) I would have accepted the same job, (2) I would have accepted a different job	Respondents who (1) were in a relationship and (2) accepted a job
2008-09	Post-market	If your [husband/wife/significant other] would have been equally happy with any outcome of your job search, would you have accepted the same job, or would you have accepted a different job?	Select one: (1) Same job, (2) Different job	Respondents who (1) were in a relationship and (2) accepted a job

**Individual counterfactual: Job choice** (*continued*)

Cohort	Survey	Question	Responses	Universe
2009-10	Post-market	Suppose your [husband/wife/significant other] could have an equally satisfying professional and personal life in any location — that is, suppose it would not be a sacrifice for [him/her] to move with you anywhere. In that situation, what do you think the outcome of your job search would have been?	Select one: (1) I would have accepted the same job, (2) I would have accepted a different job, (3) I would not have accepted a job	Respondents who (1) were in a relationship and (2) accepted a job

**Individual counterfactual: Job choice** (*continued*)

Cohort	Survey	Question	Responses	Universe
2009-10	Post-market	Suppose your [husband/wife/significant other] could have an equally satisfying professional and personal life in any location — that is, suppose it would not be a sacrifice for [him/her] to move with you anywhere. In that situation, would you have accepted a job?	Select one: (1) Yes, (2) No	Respondents who (1) were in a relationship, (2) received at least one job offer, and (3) did not accept a job

### Individual counterfactual: Expected career outcomes

Cohort	Survey	Question	Responses	Universe
2009-10	Post-market	If you had accepted your	Select one: (1)	Respondents who
		individually preferred job, how	Extremely unlikely, (2)	rejected their
		likely do you think it is that,	Very unlikely, (3)	individually preferred
		over the course of your life, you	Somewhat unlikely, (4)	job
		would have earned tenure at a	Somewhat likely, (5)	
		research university?	Very likely, (6)	
			Extremely likely	
2009-10	Post-market	If you had accepted your	Select one: (1)	Respondents who
		individually preferred job, how	Extremely unlikely, (2)	rejected their
		likely do you think it is that,	Very unlikely, (3)	individually preferred
		over the course of your life, you	Somewhat unlikely, (4)	job
		would have earned tenure at a	Somewhat likely, (5)	
		four-year college?	Very likely, (6)	
			Extremely likely	

**Individual counterfactual: Expected career outcomes** (*continued*)

Cohort	Survey	Question	Responses	Universe
2009-10	Post-market	If you had accepted your	Select one: (1)	Respondents who
		individually preferred job, how	Extremely unlikely, (2)	rejected their
		likely do you think it is that,	Very unlikely, (3)	individually preferred
		over the course of your life, you	Somewhat unlikely, (4)	job
		would have published regularly	Somewhat likely, (5)	
		in top journals?	Very likely, (6)	
			Extremely likely	
2009-10	Post-market	If you had accepted your	Select one: (1)	Respondents who
		individually preferred job, how	Extremely unlikely, (2)	rejected their
		likely do you think it is that,	Very unlikely, (3)	individually preferred
		over the course of your life, you	Somewhat unlikely, (4)	job
		would have had opportunities to	Somewhat likely, (5)	
		move to more prestigious jobs?	Very likely, (6)	
			Extremely likely	

**Individual counterfactual: Expected career outcomes** (*continued*)

Cohort	Survey	Question	Responses	Universe
2009-10	Post-market	If you had accepted your	Select one: (1)	Respondents who
		individually preferred job, how	Extremely unlikely, (2)	rejected their
		likely do you think it is that,	Very unlikely, (3)	individually preferred
		over the course of your life, you	Somewhat unlikely, (4)	job
		would have had opportunities to	Somewhat likely, (5)	
		move to different kinds of jobs?	Very likely, (6)	
			Extremely likely	
2009-10	Post-market	If you had accepted your	Select one: (1)	Respondents who
		individually preferred job, how	Extremely unlikely, (2)	rejected their
		likely do you think it is that,	Very unlikely, (3)	individually preferred
		over the course of your life, your	Somewhat unlikely, (4)	job
		lifetime income would have been	Somewhat likely, (5)	
		higher than average for your	Very likely, (6)	
			Extremely likely	

**Individual counterfactual: Expected career outcomes** (*continued*)

Cohort	Survey	Question	Responses	Universe
2009-10	Post-market	If you had accepted your	Select one: (1)	Respondents who
		individually preferred job, how	Extremely unlikely, (2)	rejected their
		likely do you think it is that,	Very unlikely, (3)	individually preferred
		over the course of your life, your	Somewhat unlikely, (4)	job
		everyday work would have been	Somewhat likely, (5)	
		be satisfying to you?	Very likely, (6)	
			Extremely likely	
2009-10	Post-market	If you had accepted your	Select one: (1)	Respondents who
		individually preferred job, how	Extremely unlikely, (2)	rejected their
		likely do you think it is that,	Very unlikely, (3)	individually preferred
		over the course of your life, you	Somewhat unlikely, (4)	job
		would have had plenty of time	Somewhat likely, (5)	
		for your life outside of work?	Very likely, (6)	
			Extremely likely	

**Joint counterfactual: Job choice**

Cohort	Survey	Question	Responses	Universe
2009-10	Post-market	Where do you think you would have been living next March if you and your were constrained to live together?	Select one: (1) The area where you actually expect to be living next March, (2) The area where your [husband/wife/significant other] actually expects to be living next March, (3) Some other area	Respondents who (1) were in a relationship and (2) did not expect to be living with their partner the following March

**Joint counterfactual: Job choice** (*continued*)

Cohort	Survey	Question	Responses	Universe
2009-10	Post-market	What do you think you would have been doing as your primary activity next March if you and your [husband/wife/significant other] were constrained to live together?	Select all that apply: (1) Working for pay, (2) Looking for a paid job, (3) Going to school, (4) Stay-at-home parenting or other unpaid work, (5) Other	Respondents who, if constrained to live with their partner the following March, would not have lived in the area where they actually expected to be living

**Joint counterfactual: Job choice** (*continued*)

Cohort	Survey	Question	Responses	Universe
2009-10	Post-market	Would you have been working at a job from your job-market choice set?	Select one: (1) Yes, (2) No	Respondents who, if constrained to live with their partner the following March, (1) would not have lived in the area where they actually expected to be living and (2) would be working for pay

**Joint counterfactual: Expected career outcomes**

Cohort	Survey	Question	Responses	Universe
2009-10	Post-market	If you and your [husband/wife/significant other] were constrained to live together next March, how likely do you think it is that, over the course of your life, you would have earned tenure at a research university?	Select one: (1) Extremely unlikely, (2) Very unlikely, (3) Somewhat unlikely, (4) Somewhat likely, (5) Very likely, (6) Extremely likely	Respondents who, if constrained to live with their partner the following March, would not have lived in the area where they actually expected to be living

**Joint counterfactual: Expected career outcomes** (*continued*)

Cohort	Survey	Question	Responses	Universe
2009-10	Post-market	If you and your [husband/wife/significant other] were constrained to live together next March, how likely do you think it is that, over the course of your life, you would have earned tenure at a four-year college?	Select one: (1) Extremely unlikely, (2) Very unlikely, (3) Somewhat unlikely, (4) Somewhat likely, (5) Very likely, (6) Extremely likely	Respondents who, if constrained to live with their partner the following March, would not have lived in the area where they actually expected to be living

**Joint counterfactual: Expected career outcomes** (*continued*)

Cohort	Survey	Question	Responses	Universe
2009-10	Post-market	If you and your [husband/wife/significant other] were constrained to live together next March, how likely do you think it is that, over the course of your life, you would have published regularly in top journals?	Select one: (1) Extremely unlikely, (2) Very unlikely, (3) Somewhat unlikely, (4) Somewhat likely, (5) Very likely, (6) Extremely likely	Respondents who, if constrained to live with their partner the following March, would not have lived in the area where they actually expected to be living

**Joint counterfactual: Expected career outcomes** (*continued*)

Cohort	Survey	Question	Responses	Universe
2009-10	Post-market	If you and your [husband/wife/significant other] were constrained to live together next March, how likely do you think it is that, over the course of your life, you would have had opportunities to move to more prestigious jobs?	Select one: (1) Extremely unlikely, (2) Very unlikely, (3) Somewhat unlikely, (4) Somewhat likely, (5) Very likely, (6) Extremely likely	Respondents who, if constrained to live with their partner the following March, would not have lived in the area where they actually expected to be living

**Joint counterfactual: Expected career outcomes** (*continued*)

Cohort	Survey	Question	Responses	Universe
2009-10	Post-market	If you and your [husband/wife/significant other] were constrained to live together next March, how likely do you think it is that, over the course of your life, you would have had opportunities to move to different kinds of jobs?	Select one: (1) Extremely unlikely, (2) Very unlikely, (3) Somewhat unlikely, (4) Somewhat likely, (5) Very likely, (6) Extremely likely	Respondents who, if constrained to live with their partner the following March, would not have lived in the area where they actually expected to be living

**Joint counterfactual: Expected career outcomes** (*continued*)

Cohort	Survey	Question	Responses	Universe
2009-10	Post-market	If you and your [husband/wife/significant other] were constrained to live together next March, how likely do you think it is that, over the course of your life, your lifetime income would have been higher than average for your field?	Select one: (1) Extremely unlikely, (2) Very unlikely, (3) Somewhat unlikely, (4) Somewhat likely, (5) Very likely, (6) Extremely likely	Respondents who, if constrained to live with their partner the following March, would not have lived in the area where they actually expected to be living

**Joint counterfactual: Expected career outcomes** (*continued*)

Cohort	Survey	Question	Responses	Universe
2009-10	Post-market	If you and your [husband/wife/significant other] were constrained to live together next March, how likely do you think it is that, over the course of your life, your everyday work would have been be satisfying to you?	Select one: (1) Extremely unlikely, (2) Very unlikely, (3) Somewhat unlikely, (4) Somewhat likely, (5) Very likely, (6) Extremely likely	Respondents who, if constrained to live with their partner the following March, would not have lived in the area where they actually expected to be living

**Joint counterfactual: Expected career outcomes** (*continued*)

Cohort	Survey	Question	Responses	Universe
2009-10	Post-market	If you and your [husband/wife/significant other] were constrained to live together next March, how likely do you think it is that, over the course of your life, you would have had plenty of time for your life outside of work?	Select one: (1) Extremely unlikely, (2) Very unlikely, (3) Somewhat unlikely, (4) Somewhat likely, (5) Very likely, (6) Extremely likely	Respondents who, if constrained to live with their partner the following March, would not have lived in the area where they actually expected to be living

### Expected partner work hours

Cohort	Survey	Question	Responses	Universe
2008-09	Post-market	What do you think is the percent chance that your [husband/wife/significant other] will work the following schedules most weeks for most of the next ten years? At least [20/40/60] hours per week.	Whole number between 1 and 100	All respondents
2009-10	Post-market	What do you think is the percent chance that your [husband/wife/significant other] will work at least [20/40/60] hours per week over most of the next ten years?	Whole number between 1 and 100	All respondents

### Partner job prospects

Cohort	Survey	Question	Responses	Universe
2007-08	Post-	At the time you accepted your	Select one: (1) Good,	Respondents who (1)
	market	job, how would you have rated	(2) Fair, (3) Poor, (4)	were in a relationship
		your	Not applicable	and (2) accepted a job
		[husband's/wife's/significant		
		other's] job prospects in this		
		location?		
2008-09	Post-	At the time you accepted your	Select one: (1) Good,	Respondents who (1)
	market	job, how would you have rated	(2) Fair, (3) Poor, (4)	were in a relationship
		your	Not applicable	and (2) accepted a job
		[husband's/wife's/significant		
		other's] job prospects in this		
		location?		

**Partner job prospects** (*continued*)

Cohort	Survey	Question	Responses	Universe
2009-10	Post-market	At the time you accepted your job, how would you have rated your [husband's/wife's/significant other's] job prospects in this location?	Select one: (1) Good, (2) Fair, (3) Poor, (4) Does not plan to work	Respondents who (1) were in a relationship and (2) accepted a job

### Relationship satisfaction

Cohort	Survey	Question	Responses	Universe
2007-08	Pre-market	In the past few months, how satisfied have you been with your romantic relationship?	Select one: (1) Extremely dissatisfied, (2) Very dissatisfied, (3) Somewhat dissatisfied, (4) Somewhat satisfied, (5) Very satisfied, (6) Extremely satisfied	Respondents who were in a relationship

**Relationship satisfaction** (*continued*)

Cohort	Survey	Question	Responses	Universe
2008-09	Pre-market	In the past few months, how satisfied have you been with your romantic relationship?	Select one: (1) Extremely dissatisfied, (2) Very dissatisfied, (3) Somewhat dissatisfied, (4) Somewhat satisfied, (5) Very satisfied, (6) Extremely satisfied	Respondents who were in a relationship

### Attitudes toward living apart: Relationship

Cohort	Survey	Question	Responses	Universe
2009-10	Pre-market	How much do you agree or disagree with the following statements? It would be possible for me to have a fulfilling relationship while living apart from my [husband/wife/significant other].	Select one: (1) Strongly disagree, (2) Disagree, (3) Somewhat disagree, (4) Somewhat agree, (5) Agree, (6) Strongly agree	Respondents who were in a relationship
2009-10	Pre-market	How much do you agree or disagree with the following statements? I would never consider living apart from my [husband/wife/significant other].	Select one: (1) Strongly disagree, (2) Disagree, (3) Somewhat disagree, (4) Somewhat agree, (5) Agree, (6) Strongly agree	Respondents who were in a relationship

**Attitudes toward living apart: Relationship** *(continued)*

Cohort	Survey	Question	Responses	Universe
2009-10	Pre-market	How much do you agree or disagree with the following statements? I would be willing to make a large career sacrifice so that I could live with my [husband/wife/significant other].	Select one: (1) Strongly disagree, (2) Disagree, (3) Somewhat disagree, (4) Somewhat agree, (5) Agree, (6) Strongly agree	Respondents who were in a relationship
2009-10	Pre-market	How much do you agree or disagree with the following statements? I would consider jobs that require me to live apart from my [husband/wife/significant other] for up to one year.	Select one: (1) Strongly disagree, (2) Disagree, (3) Somewhat disagree, (4) Somewhat agree, (5) Agree, (6) Strongly agree	Respondents who were in a relationship

**Attitudes toward living apart: Relationship** *(continued)*

Cohort	Survey	Question	Responses	Universe
2009-10	Pre-market	How much do you agree or disagree with the following statements? I would consider jobs that require me to live apart from my [husband/wife/significant other] for up to five years.	Select one: (1) Strongly disagree, (2) Disagree, (3) Somewhat disagree, (4) Somewhat agree, (5) Agree, (6) Strongly agree	Respondents who were in a relationship
2009-10	Pre-market	How upset would you be in you were in your current relationship, but living in a different area from your [husband/wife/significant other] one year from now?	Select one: (1) Not upset, (2) Somewhat upset, (3) Very upset, (4) Extremely upset	Respondents who were in a relationship

### Expected fertility

Cohort	Survey	Question	Responses	Universe
2008-09	Post-market	What do you think is the	Whole number between	All respondents
		percent chance that you will or	1 and 100	
		adopt [a/another] child in the		
2009-10	Pre-market	next [year/five years/ten years]?	Whole number between	All respondents
		What do you think is the	1 and 100	
		percent chance that you will or		
2009-10	Post-market	adopt [a/another] child in the	Whole number between	All respondents
		next [year/five years/ten years]?	1 and 100	
		What do you think is the		
2009-10	Post-market	percent chance that you will or	Whole number between	All respondents
		adopt [a/another] child in the	1 and 100	
		next [year/five years/ten years]?		

### Attitudes toward living apart: Children

Cohort	Survey	Question	Responses	Universe
2009-10	Post-market	How much do you agree or disagree with the following statements? I would consider having a child while living apart from my [husband/wife/significant other].	Select one: (1) Strongly disagree, (2) Disagree, (3) Somewhat disagree, (4) Somewhat agree, (5) Agree, (6) Strongly agree	Respondents who were in a relationship
2009-10	Post-market	How much do you agree or disagree with the following statements? Living apart from my [husband/wife/significant other] over the next year would prevent us from having as large a family as we would like.	Select one: (1) Strongly disagree, (2) Disagree, (3) Somewhat disagree, (4) Somewhat agree, (5) Agree, (6) Strongly agree	Respondents who were in a relationship

**Attitudes toward living apart: Children** (*continued*)

Cohort	Survey	Question	Responses	Universe
2009-10	Post-market	How much do you agree or disagree with the following statements? Living apart from my [husband/wife/significant other] over the next five years would prevent us from having as large a family as we would like.	Select one: (1) Strongly disagree, (2) Disagree, (3) Somewhat disagree, (4) Somewhat agree, (5) Agree, (6) Strongly agree	Respondents who were in a relationship
2009-10	Post-market	How much do you agree or disagree with the following statements? My children would live with me if my [husband/wife/significant other] and I were living apart.	Select one: (1) Strongly disagree, (2) Disagree, (3) Somewhat disagree, (4) Somewhat agree, (5) Agree, (6) Strongly agree	Respondents who were in a relationship

**Attitudes toward living apart: Children** (*continued*)

Cohort	Survey	Question	Responses	Universe
2009-10	Post-market	How much do you agree or disagree with the following statements? I could have a very good relationship with my children even if they were not living with me.	Select one: (1) Strongly disagree, (2) Disagree, (3) Somewhat disagree, (4) Somewhat agree, (5) Agree, (6) Strongly agree	Respondents who were in a relationship

### Composition of application set

Cohort	Survey	Question	Responses	Universe
2007-08	Pre-market	Of the jobs for which you have applied in the United States and Canada, how many fall into the following categories? Research university	Whole number	Respondents who applied to at least one job in the United States or Canada
2007-08	Pre-market	Of the jobs for which you have applied in the United States and Canada, how many fall into the following categories? Four-year college	Whole number	Respondents who applied to at least one job in the United States or Canada

**Composition of application set** (*continued*)

Cohort	Survey	Question	Responses	Universe
2007-08	Pre-market	Of the jobs for which you have applied in the United States and Canada, how many fall into the following categories?	Whole number	Respondents who applied to at least one job in the United States or Canada
		Postdoctoral fellowship		
2007-08	Pre-market	Of the jobs for which you have applied in the United States and Canada, how many fall into the following categories?	Whole number	Respondents who applied to at least one job in the United States or Canada
		Non-academic research (for example, the Federal Reserve Board, think tanks, policy research organizations)		

**Composition of application set** (*continued*)

Cohort	Survey	Question	Responses	Universe
2007-08	Pre-market	You indicated that you have applied to jobs in non-academic settings like the Federal Reserve Board, think tanks, and policy research organizations. Have you applied for any non-academic jobs in other settings (for example, consulting, banking, management)?	Whole number	Respondents who applied to at least one job in the United States or Canada

**Composition of application set** (*continued*)

Cohort	Survey	Question	Responses	Universe
2007-08	Pre-market	For how many such jobs have you applied?	Whole number	Respondents who applied to non-academic jobs in non-academic settings like consulting, banking, or management
2008-09	Pre-market	Of the jobs for which you have applied, how many are of the following types? Assistant professor at university	Whole number	Respondents who applied to at least one job

**Composition of application set** (*continued*)

Cohort	Survey	Question	Responses	Universe
2008-09	Pre-market	Of the jobs for which you have applied, how many are of the following types? Assistant professor at four-year college	Whole number	Respondents who applied to at least one job
	Pre-market	Of the jobs for which you have applied, how many are of the following types? Postdoctoral fellow	Whole number	Respondents who applied to at least one job 2008-09
	Pre-market	Of the jobs for which you have applied, how many are of the following types? Private sector researcher	Whole number	Respondents who applied to at least one job

**Composition of application set** (*continued*)

Cohort	Survey	Question	Responses	Universe
2008-09	Pre-market	Of the jobs for which you have applied, how many are of the following types? Other	Whole number	Respondents who applied to at least one job
		Of the applications you have submitted, how many (or about how many) are for jobs of the following types? Assistant professor at a university	Whole number	Respondents who applied to at least one job
2009-10	Pre-market	Of the applications you have submitted, how many (or about how many) are for jobs of the following types? Assistant professor at a four-year college	Whole number	Respondents who applied to at least one job

**Composition of application set** (*continued*)

Cohort	Survey	Question	Responses	Universe
2009-10	Pre-market	Of the applications you have submitted, how many (or about how many) are for jobs of the following types? Post-doctoral fellow	Whole number	Respondents who applied to at least one job
2009-10	Pre-market	Of the applications you have submitted, how many (or about how many) are for jobs of the following types? Researcher at a non-profit, governmental, or quasi-governmental organization	Whole number	Respondents who applied to at least one job

**Composition of application set** (*continued*)

Cohort	Survey	Question	Responses	Universe
2009-10	Pre-market	Of the applications you have submitted, how many (or about how many) are for jobs of the following types? Researcher at a business or industry establishment	Whole number	Respondents who applied to at least one job
2009-10	Pre-market	Of the applications you have submitted, how many (or about how many) are for jobs of the following types? Other	Whole number	Respondents who applied to at least one job

### Composition of interview and fly-out sets

Cohort	Survey	Question	Responses	Universe
2007-08	Post-market	Of the interviews/fly-outs you were offered, how many were for the following types of jobs? Assistant professor at university	Whole number	Respondents who received at least one interview/fly-out offer
		Of the interviews/fly-outs you were offered, how many were for the following types of jobs? Assistant professor at four-year college	Whole number	Respondents who received at least one interview/fly-out offer
2007-08	Post-market	Of the interviews/fly-outs you were offered, how many were for the following types of jobs? Postdoctoral fellow	Whole number	Respondents who received at least one interview/fly-out offer

Composition of interview and fly-out sets (continued)

Cohort	Survey	Question	Responses	Universe
2007-08	Post-market	Of the interviews/fly-outs you were offered, how many were for the following types of jobs? Non-academic researcher (e.g., researcher at a think tank, government research unit, central bank, or international financial organization)	Whole number	Respondents who received at least one interview/fly-out offer
2007-08	Post-market	Of the interviews/fly-outs you were offered, how many were for the following types of jobs? Private sector researcher	Whole number	Respondents who received at least one interview/fly-out offer

Composition of interview and fly-out sets (*continued*)

Cohort	Survey	Question	Responses	Universe
2007-08	Post-market	Of the interviews/fly-outs you were offered, how many were for the following types of jobs?	Whole number	Respondents who received at least one interview/fly-out offer
		Other		
		Of the interviews/fly-outs you were offered, how many (or about how many) were for the following types of job?		
2008-09	Post-market	Assistant professor at a university	Whole number	Respondents who received at least one interview/fly-out offer

Composition of interview and fly-out sets (*continued*)

Cohort	Survey	Question	Responses	Universe
2008-09	Post-market	Of the interviews/fly-outs you were offered, how many (or about how many) were for the following types of job?	Whole number	Respondents who received at least one interview/fly-out offer
		Assistant professor at a four-year college		
2008-09	Post-market	Of the interviews/fly-outs you were offered, how many (or about how many) were for the following types of job?	Whole number	Respondents who received at least one interview/fly-out offer
		Postdoctoral fellow		

Composition of interview and fly-out sets (*continued*)

Cohort	Survey	Question	Responses	Universe
2008-09	Post-market	Of the interviews/fly-outs you were offered, how many (or about how many) were for the following types of job?	Whole number	Respondents who received at least one interview/fly-out offer
		Researcher at a non-profit, governmental, or quasi-governmental organization		
		Of the interviews/fly-outs you were offered, how many (or about how many) were for the following types of job?	Whole number	Respondents who received at least one interview/fly-out offer
2008-09	Post-market	Researcher at a business or industry establishment		

**Composition of interview and fly-out sets (continued)**

Cohort	Survey	Question	Responses	Universe
2009-10	Post-market	Of the interviews/fly-outs you were offered, about how many were for the following types of jobs? Assistant professor at a university	Whole number	Respondents who received at least one interview/fly-out offer
	Post-market	Of the interviews/fly-outs you were offered, about how many were for the following types of jobs? Assistant professor at a four-year college	Whole number	Respondents who received at least one interview/fly-out offer
	Post-market	Of the interviews/fly-outs you were offered, about how many were for the following types of jobs? Postdoctoral fellow	Whole number	Respondents who received at least one interview/fly-out offer

Composition of interview and fly-out sets (*continued*)

Cohort	Survey	Question	Responses	Universe
2009-10	Post-market	Of the interviews/fly-outs you were offered, about how many were for the following types of jobs? Researcher at a non-profit, governmental, or quasi-governmental organization	Whole number	Respondents who received at least one interview/fly-out offer
		Of the interviews/fly-outs you were offered, about how many were for the following types of jobs? Researcher at a business or industry establishment	Whole number	Respondents who received at least one interview/fly-out offer

**Composition of interview and fly-out sets (continued)**

Cohort	Survey	Question	Responses	Universe
2009-10	Post-market	Of the interviews/fly-outs you were offered, about how many were for the following types of jobs? Other	Whole number	Respondents who received at least one interview/fly-out offer

### Composition of job-offer set

Cohort	Survey	Question	Responses	Universe
2007-08	Post-market	How many offers did you receive for the following types of job? Assistant professor at university	Whole number	Respondents who received at least one job offer
	Post-market	How many offers did you receive for the following types of job? Assistant professor at four-year college	Whole number	Respondents who received at least one job offer
2007-08	Post-market	How many offers did you receive for the following types of job? Postdoctoral fellow	Whole number	Respondents who received at least one job offer

**Composition of job-offer set** (*continued*)

Cohort	Survey	Question	Responses	Universe
2007-08	Post-market	How many offers did you receive	Whole number	Respondents who
		for the following types of job?		received at least one
		Non-academic researcher (e.g.,		job offer
		researcher at a think tank, government research unit, central bank, or international financial organization)		
2007-08	Post-market	How many offers did you receive	Whole number	Respondents who
		for the following types of job?		received at least one
		Private sector researcher		job offer
2007-08	Post-market	How many offers did you receive	Whole number	Respondents who
		for the following types of job?		received at least one
		Other		job offer

**Composition of job-offer set** (*continued*)

Cohort	Survey	Question	Responses	Universe
2008-09	Post-	How many offers did you receive	Whole number	Respondents who
	market	for the following types of job?		received at least one
		Assistant professor at a university		job offer
2008-09	Post-	How many offers did you receive	Whole number	Respondents who
	market	for the following types of job?		received at least one
		Assistant professor at a four-year college		job offer
2008-09	Post-	How many offers did you receive	Whole number	Respondents who
	market	for the following types of job?		received at least one
		Postdoctoral fellow		job offer

**Composition of job-offer set** (*continued*)

Cohort	Survey	Question	Responses	Universe
2008-09	Post-market	How many offers did you receive for the following types of job?	Whole number	Respondents who received at least one
		Researcher at a non-profit, governmental, or quasi-governmental organization		job offer
2008-09	Post-market	How many offers did you receive for the following types of job?	Whole number	Respondents who received at least one
		Researcher at a business or industry establishment		job offer
2009-10	Post-market	How many offers did you receive for the following types of jobs?	Whole number	Respondents who received at least one
		Assistant professor at a university		job offer

**Composition of job-offer set** (*continued*)

Cohort	Survey	Question	Responses	Universe
2009-10	Post-market	How many offers did you receive	Whole number	Respondents who
		for the following types of jobs?		received at least one
		Assistant professor at a four-year college		job offer
2009-10	Post-market	How many offers did you receive	Whole number	Respondents who
		for the following types of jobs?		received at least one
		Postdoctoral fellow		job offer
2009-10	Post-market	How many offers did you receive	Whole number	Respondents who
		for the following types of jobs?		received at least one
		Researcher at a non-profit, governmental, or quasi-governmental organization		job offer

**Composition of job-offer set** (*continued*)

Cohort	Survey	Question	Responses	Universe
2009-10	Post-market	How many offers did you receive	Whole number	Respondents who
		for the following types of jobs?		received at least one
		Researcher at a business or industry establishment		job offer
2009-10	Post-market	How many offers did you receive	Whole number	Respondents who
		for the following types of jobs?		received at least one
		Other		job offer