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## Child-Adoption Matching: Preferences for Gender and Race<sup>†</sup>

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LEONARDO FELLI, AND LEEAT YARIV\*

*This paper uses a new dataset on child-adoption matching to estimate the preferences of potential adoptive parents over US-born and unborn children relinquished for adoption. We identify significant preferences favoring girls and against African American children put up for adoption. These attitudes vary in magnitudes across different adoptive parents—heterosexual, same-sex couples, and single women. We consider the effects of excluding single women and same-sex couples from the process, and find that this would substantially reduce the overall number of adopted children. (JEL C78, J13, J15, J16)*

Adoption is an important phenomenon in the United States. According to the Census 2000, about 1.6 million or 2.5 percent of all children were adopted. Of these, 87 percent were US-born and adopted through the domestic-adoption channel. In terms of revenues, the adoption industry is a substantial one, generating approximately \$2–3 billion annually (see Riben 2007).

In most cases, a successful domestic adoption is the result of a match between a *birth mother* (BMO hereafter) who seeks to relinquish her child, and *prospective adoptive parents* (PAPs hereafter). The underlying matching process is fairly decentralized and involves a bilateral search characterized by several layers of mediation. Typically, adoption agencies represent BMOs, while PAPs work vis-à-vis adoption agencies, lawyers, or facilitators.

According to the census, 54 percent of US-born adopted children under the age of 10 are female, and 18 percent are African American. In contrast, girls and

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African Americans represent 48 percent and 15 percent of all children, respectively.<sup>1</sup> These differences can be explained by either the preferences of PAPs (the demand side), or the characteristics of children relinquished for adoption by BMOs (the supply side). In this paper, we exploit the unique nature of a new dataset documenting the operations of an adoption facilitator in order to disentangle demand and supply effects on outcomes. We identify the preferences of PAPs over the attributes of children relinquished for adoption, the BMOs' choices, and the factors that determine ultimate outcomes (i.e., a successful adoption, a decision to parent by the BMO, or a child's placement in foster care).

Our dataset was constructed by following the matching process of an online adoption facilitator between 2004 and 2009. The dataset is comprised of approximately 840 cases of either born or unborn children that the facilitator collected from multiple agencies and posted on a website designed for client PAPs. On the website, each child is identified by a code, by an array of attributes, by the adoption finalization costs, and by a set of restrictions imposed by the BMO specifying which categories of PAPs she considers acceptable (such as straight couples, same-sex couples, etc).

Each PAP pays a fixed fee to the facilitator to enter this matching process. PAPs who participate in the matching process observe the children available for adoption sequentially and can express interest in any child by submitting an application to the BMO (as long as they meet the BMO's requirements). Our data records all the PAPs that apply for each child, as well as some BMOs' final choice, be it selecting an applicant PAP, matching through channels other than the facilitator, or deciding to parent the child.

As motivation for our analysis, consider Table 1, documenting attributes of children in our data for whom we know the ultimate adoption outcomes (whether they were matched through the facilitator or otherwise). Focusing on gender, 25.9 percent of the children are girls, while 34.4 percent are boys (the rest being of unknown gender). The matching outcomes seem to reflect a similar pattern—be it on the website, or overall—more boys are ultimately matched than girls (in fact, the wedge is greatest for the facilitator's matches). However, when looking at the volume of applications children receive, this pattern is reversed. The percentage of boys receiving no applications is substantially higher than that corresponding to girls, and large volumes of applications (five or more) are much more likely to occur for girls than for boys (35.7 percent relative to 25.9 percent). A similar effect emerges with respect to race. For example, Caucasian children constitute 35.8 percent of the sample, while African American children constitute 40.9 percent. The differences in matching outcomes are also rather small, both overall and through the facilitator (though slightly more Caucasian children are matched on the facilitator's website). However, a different image emerges from the applications profile. Of the children receiving no applications, 26.6 percent are Caucasian, while 51.2 percent are African American. Of the children receiving five or more applications, 50.4 percent are Caucasian, while only 22.9 percent are African American. This suggests that the matching

<sup>1</sup> These figures are derived from the authors' own tabulation using the 5 percent PUMS.

TABLE 1—AGGREGATE STATISTICS ON APPLICATIONS FOR MATCHED CHILDREN

Variable	All (%)	No applications (%)	Five or more applications (%)	Matched (%)	Matched on website (%)
Already born	9.4	24.2	5.6	8.3	5.4
Girl	25.9	21.7	35.7	26.7	29.2
Boy	34.4	33.7	25.9	35.7	44.6
Caucasian	35.8	26.6	50.4	36.8	38.5
African American	40.9	51.2	22.9	38.6	35.9
Hispanic	14.5	13.8	18.4	15.5	16.0
BMOs	662	91	143	409	65

Note: All values expressed in percent except BMOs.

outcomes in and of themselves provide a partial picture of the attributes parents are looking for, while their application choices entail much more information.

In order to elicit parents' preferences directly from their behavior in the application process, we need to account for the supply of children of different attributes. A revealed preference assumption is at the root of our estimation: *whenever PAPs apply for a subset of the children available, the PAPs prefer the children they apply for over those they do not*. This approach enables us to estimate the preferences on each side of the matching process separately. Its main advantage is that it is not sensitive to either demand or supply shifts. We estimate PAPs' marginal rates of substitution over children's attributes (gender, race, and time to birth) and adoption finalization costs.

We show that PAPs exhibit a preference in favor of girls and against African American children. Specifically, if we consider a non-African American child, the probability that a given PAP expresses interest in such a child is 11.6 percent if the child is a girl and 8.2 percent if the child is a boy. The effect of the estimated adoption cost on child desirability is significant and negative. That is, *ceteris paribus*, an increase in expected adoption costs lowers the desirability of a child. This allows us to convert the gender preference into dollars: the increase in desirability of a non-African American girl with respect to a non-African American boy is equivalent to about an \$18,300 decrease in adoption finalization costs.

With regard to race, most children in our data are characterized by the composition of varying percentages of three ethnicities: Caucasian, African American, and Hispanic. For an unborn child of unknown gender, the probability that a given PAP expresses interest in the child is about 13.1 percent if the child is non-African American and 1.8 percent if the child is African American. Again, converting the racial preference into dollars, we find that the increase in desirability of a non-African American child with respect to an African American child (both of unknown gender) is equivalent to about a \$37,600 decrease in adoption finalization costs. However, we do not observe any significant bias against Hispanic children, who represent a substantial fraction of the children in our dataset. This is important when contemplating what underlies the observed gender preferences. Indeed, the PAPs in our sample are predominantly Caucasian and so one might conjecture that a desire for children that resemble PAPs in looks, who can potentially pass as their biological children, is at the root of some of the racial preferences we identify. However, to the extent that

Hispanic children are more likely to appear different from Caucasian PAPs relative to Caucasian children, such a force would suggest a (possibly weaker) bias against Hispanic children as well, which is not confirmed by the data.

A natural concern pertains to the selection of participants on both sides into the matching process. In particular, observed characteristics of children (such as gender and race) may signal important health and behavioral attributes. Consequently, estimated PAPs' preferences may simply reflect their concerns regarding health and behavior. To address this, we look at the correlation between gender and race of the children in our data and an array of health and behavioral measures of the BMOs. We find no significant difference in any of these measures across gender and race. If anything, we find that African American BMOs are associated with slightly more desirable health and behavioral markers. On the other side of the process, the preferences of the PAPs that select into the facilitator's operations may not be representative of the entire population of adoptive parents. However, using the Census 2000 data, we find that the cases available through the facilitator end up with adoptions of substantially more boys and African American children relative to the average adopting household in the United States. This suggests that PAPs selecting into the facilitator's client pool are potentially more open to adopting boys and African American children.

We also estimate the extent to which PAPs' preferences depend on their own characteristics. The preferences mentioned above hold true for all categories of PAPs (heterosexual and same-sex couples, as well as single applicants), and the racial preference is stronger for same-sex couples. However, same-sex couples submit applications at nearly three times the rate of straight ones.

On the normative side, the question of which parents are legitimate prospective adoptive parents (specifically, for the case of same-sex or single PAPs) is a topic of ongoing debate in the United States and abroad. Banning a certain category of PAPs from the adoption process has two effects. First, it affects the volume of PAPs involved in the process, and therefore the number of expected matches. Second, given the differential preferences across PAPs' categories, it changes the distribution of preferences among active PAPs and consequently impacts the type of children that are adopted. Focusing on the effects of participation of same-sex couples, we shut down the possibility for same-sex PAPs to submit applications to BMOs, and we find that this results in a 9 percent decrease in the probability of being matched (while only 20 percent of matched children allow for same-sex applications). Furthermore, there are significantly more boys and African American children within the lost matches. Similarly, when we shut down the possibility of single PAPs to submit applications, we find a reduction of 9 percent in overall matches as well (out of 57 percent of matched children that allowed for single PAP applications).

### *A. Literature Review*

Despite the scope of the adoption industry in terms of volume of children and annual revenues, as well as the unique matching mechanisms it employs, adoption has, thus far, received little attention in the economics literature. There are, however, a few important exceptions.

The paper that is closest to ours in terms of questions addressed is Bernal et al. (2009). That paper presents a historical analysis of domestic adoption, uncovering the trends in different types of adoption. At the individual level, the paper estimates the propensities of PAPs to adopt and of BMOs to relinquish their children across time. These findings provide an important springboard for our analysis, which takes PAPs' and BMOs' decisions to participate in the adoption process as given and focuses on their behavior *within* that process.

Landes and Posner (1978) suggest the opening of a market for children that would allow for equilibrating monetary transfers between PAPs and BMOs. Our analysis is useful in assessing this proposal, in that it identifies parents' preferences that would feed into estimating efficiency and the likelihood of entry to foster care in a fully decentralized mechanism as such. Sacerdote (2002, 2007, 2011) makes use of adoption data to study questions regarding the impacts of nature as opposed to nurture.<sup>2</sup> The adoption industry has received attention in other disciplines, ranging from legal studies to sociology, psychology, and history. For detailed accounts of child adoption in the United States, we refer the interested reader to Melosh (2002), Pertman (2000), and references therein.

From a methodological point of view, our revealed preference assumption is in line with a two-sided matching with search model (e.g., Adachi 2003; Burdett and Coles 1997; Eeckhout 1999; and Smith 2006). We know of very few other empirical estimations of two-sided matching with frictions (see Abramitzky, Delavande, and Vasconcelos 2011; Botticini and Siow 2010; Del Boca and Flinn 2011; as well as some of the work on online dating discussed below). The existing work focuses mainly on the marriage-market context. We note that the commitment entailed in the successful conclusion of an adoption makes this process a particularly good fit for this class of models.

Gender and racial preferences are both common and well documented (for overviews see Loury 2002 and Nelson 2009). Related to this paper, several recent papers have used matching environments of other types, particularly the online dating market, to estimate racial preferences (e.g., Fisman et al. 2006, 2008; Lee 2009; and Hitch, Hortaçsu, and Ariely 2010). This work identifies a preference for same-race partners, much in the spirit of the racial preferences we observe.<sup>3</sup> Technically, adoption through facilitators and online dating are similar in that both involve a two-sided search. However, unlike most online dating markets, in which an outcome is an agreement for a rather preliminary contact, outcomes in the adoption environment are effectively binary and irreversible. A match means a likely successful adoption. In terms of gender preferences, there is some work suggesting preferences for biological sons in the United States (see Dahl and Moretti 2008; and Almond and Edlund 2008) and abroad (for instance, the case of the missing women in Asia, as noted by Sen 1990). Most of this work uses indirect indicators (e.g., separation

<sup>2</sup>Björklund, Lindahl, and Plug (2006) also focus on the long-term effects on both education and income of Swedish adoptees. Chen et al. (2010) show that in domestic Chinese adoption a propensity to adopt girls is compatible with postnatal discrimination against them.

<sup>3</sup>See also Banerjee et al. (2010) for an empirical analysis of the arranged marriage market in India. They document strong preferences for within-caste marriages, similar to the preferences for same-race partners unearthed by the online dating literature.

rates of couples as a function of their children's gender) to assess these preferences. In this paper, we use the detailed matching data to estimate parents' preferences over children's attributes directly, and we identify a substantial preference for girls in the adoption context.

## I. Institutional Setting and Data

### A. *The Adoption Process in the United States*

In this section, we summarize the main elements of the adoption process in the United States (see Jasper 2008 or Mabry and Kelly 2006 for a full state-by-state survey of adoption jurisdiction).

The supply side of domestic adoption is represented by a population of BMOs who intend to relinquish their children for adoption. The children can be either born or unborn. When not searching for adoptive parents on her own, the BMO can use adoption agencies to be matched with PAPs.

The demand side of domestic adoption consists of PAPs. These PAPs can be either (straight or same-sex) couples or singles. After undergoing a certification based on a home study, PAPs who decide to search for a child domestically can use adoption agencies, pursue a private adoption with the aid of specialized attorneys, or advertise in local magazines and newsletters.

Each of these channels can be problematic from the PAPs' point of view. Since adoption agencies often operate in geographical areas where they can easily locate BMOs, or where they are subject to less regulation, it can be difficult for PAPs (who usually reside in cities and high-income areas) to locate, screen, and interact with many agencies at the same time. Moreover, in many states, adoption attorneys are not allowed to act as intermediaries in adoptions. Independent search through advertising is time-consuming and may entail significant cost uncertainty. These considerations created a role for intermediaries, usually referred to as "adoption facilitators." Much like adoption agencies, the role of facilitators is regulated by state laws, and in some states their activity is restricted.<sup>4</sup> Often operating online, adoption facilitators connect with BMOs from multiple agencies and coordinate the matching process with PAPs.

Once a PAP is matched with a child, the ensuing process depends on whether the child is born or not. If the BMO of an already born child has not yet relinquished her parental rights to an agency, then she can relinquish them as soon as the match occurs. The child is then put in the custody of the PAP. If, instead, the child is unborn, the parties wait until birth, with no commitment to complete the adoption on either side. During this time, the PAP normally pays the living and the medical expenses of the BMO. At birth, with a lag determined by state law, the BMO can, if she still desires, relinquish her parental rights. In this case, the child is placed in the custody of the PAP.

<sup>4</sup>In fact, only in very few states, such as California and Pennsylvania, can adoption facilitators be legally paid (see, e.g., California Family Code Sections 8623-8638, Chapter 1.5).

This initiates the post-placement process. The adoption is finalized when a court transfers the parental rights to the PAP. The finalization is conditional on a series of legal requirements determined by the state. The court bases its decision on a report completed by a social worker on the basis of some visits to the adopting family. The court also screens the nature of the financial transfers that have taken place between the PAP and the BMO, as well as the transfers that the PAP has made to the adoption agency. In particular, the court checks that transfers to the BMO constitute allowed reimbursements of either living or medical expenses.<sup>5</sup>

*Gay, Lesbian, and Single Adoption.*—Adoption by gay and lesbian couples or individuals is permitted in only a few countries around the world. In the United States, many states have enacted or attempted to enact legislation on gay and lesbian adoption since the early 2000s. However, state laws are still largely silent on the issue. While some states restrict adoption by sexual orientation or marital status, legislation with respect to this issue is still in flux, and gay and lesbian adoption is the subject of a very active and heated policy debate.<sup>6</sup> The Census 2000 indicated that 4 percent of all adopted children in the United States live in a gay or lesbian household. Even though in 2000 the adoption rate of same-sex households was reported as 1.6 percent, this rate has the potential to increase dramatically if the current restrictions are lifted.<sup>7</sup>

Since the early 1990s, there has been an increase in the number of adoptions by single individuals, the vast majority of whom are women. By 2000, singles accounted for at least 15 percent of all adoptive parents in the United States (see the Census 2000). While allowed in the United States, adoption by local or foreign single individuals is prohibited in the majority of countries all over the world.

## B. *The Data*

*The Facilitator's Operations.*—We constructed our dataset monitoring an online adoption facilitator who mediates between agencies dealing with BMOs and PAPs, over the period from June 2004 to December 2009.<sup>8</sup> Over a five-year period, we collected data on the applications of 729 PAPs to 839 BMOs. The facilitator placed 65 children, while 409 were placed through other channels.

<sup>5</sup> Any transfer from the PAP to the BMO that is aimed to obtain consensus of the adoption is illegal. State laws specify the precise categories of BMO expenses (such as medical, legal, and living costs) that can be covered by PAPs, which are classified as charity. If the BMO changes her mind regarding the adoption before finalization, all transfers are generally nonreimbursable.

<sup>6</sup> At the time of writing of this paper, only Michigan, Mississippi, North Carolina, Ohio, Utah, and Wisconsin imposed restrictions on gay and lesbian adoption. Nonetheless, in many states in which statutes do not prohibit adoption by gay men and lesbians, individual judges or courts have ruled against the practice. In fact, in 40 states, Statute or Appellate Court rulings have banned joint adoption by same-sex couples. For details regarding states' jurisdiction on gay and lesbian adoption, see National Conference of State Legislatures (2013).

<sup>7</sup> See Gates et al. (2007).

<sup>8</sup> See the Data Appendix, available at [http://www.hss.caltech.edu/~lyariv/Papers/Adoption\\_Data\\_Appendix.pdf](http://www.hss.caltech.edu/~lyariv/Papers/Adoption_Data_Appendix.pdf) for detailed information on the construction of the dataset.



New cases of unborn children or already born children available for adoption are posted on the facilitator's publicly accessible website regularly. Activity on the website follows this basic timing:

1. *An unborn child, or already born child, is posted as a new case on the facilitator's website.* The child is identified by the BMO's code name. For every case, the facilitator publishes the following information: (a) the child's characteristics: date on which the case is presented, race composition, gender (when available), due date for unborn children, and age for already born children;<sup>9</sup> (b) the costs of adopting the child. These include a fixed facilitator fee, adoption agency fees, BMO's expenses (that may include living and medical costs), and legal fees; and (c) the constraints that the BMO or the adoption agency impose on PAPs. Specifically, the BMO can restrict the availability of her child from same-sex PAPs, single PAPs, etc.<sup>10</sup>

2. *After paying the fixed fee to the facilitator, a PAP can submit one or more applications to adopt any of the available children at no additional cost.*<sup>11</sup> As PAPs submit an application to a BMO, their first names (or initials) are posted on that child's case. The PAPs' application consists of a letter to the BMO sent through the facilitator and the agency. In this letter, the PAPs describe themselves, their lifestyle, and how they plan to raise the child. This letter is prepared by the PAPs at the beginning of the matching process and left with the facilitator. In other words, the only decision a PAP has to make when a child becomes available for adoption is whether or not to apply for that child. No other contact between BMO and PAPs is permitted prior to a match.

3. *The posted cases can be resolved in several ways:* (a) the BMO chooses the desired PAP among the applicants. As soon as a PAP is accepted by a BMO, *any active application of that PAP for other children is immediately dropped.*<sup>12</sup> The match is observable on the website, and both the BMO and the PAP leave the process; (b) the BMO is matched through a different channel, and the child is reported as "matched" on the website; (c) the BMO decides to parent, and the decision is reported on the website; (d) the facilitator reports a lost contact with the BMO; or (e) there are no applications for the case (after a wait of about one month, the facilitator reports the case as "closed"). The latter outcome sometimes leads the BMO to parent, but in most cases the child remains unmatched. Unmatched children enter

<sup>9</sup>The website also reports fetus anomalies detected by an ultrasound or other documented health problems. However, these medical issues occur for only 0.2 percent of the children in our dataset.

<sup>10</sup>There are some additional restrictions on the PAPs' characteristics dictated by state laws or special adoption regulations. For example, the Indian Child Welfare Act of 1978 gives Native American Indian Nations and Tribes the right to control adoptions that involve their tribal members's children. In addition, the BMO can also express her preference toward an open adoption. In our sample, in only 4 percent of cases did the BMO specify a preference regarding a closed as opposed to an open adoption.

<sup>11</sup>In some cases, before applying, the PAPs receive additional information regarding the BMO and the child based on an interview the agency conducts with the BMO. This interview comprises questions regarding the BMO's health and lifestyle, her family, and the birth father's characteristics.

<sup>12</sup>In fact, the facilitator's policy specifies that if the selected PAPs reject a match, they will not be allowed any further applications through the facilitator. Thus, *applications are binding from the PAPs' point of view.* The BMO stops receiving applications from other PAPs upon a match. However, she can still decide to parent until she relinquishes parental rights.

TABLE 2—SUMMARY STATISTICS FOR BMOs

Variable	Mean	Standard deviation	Minimum	Maximum	Observations
Girl	0.249	0.433	0	1	839
Boy	0.343	0.475	0	1	839
Caucasian	0.369	0.392	0	1	839
African American	0.383	0.418	0	1	839
Hispanic	0.133	0.271	0	1	839
Asian	0.022	0.111	0	1	839
Non-African American boy	0.203	0.372	0	1	839
Non-African American girl	0.137	0.321	0	1	839
African American girl	0.112	0.291	0	1	839
African American boy	0.14	0.312	0	1	839
Finalization cost	26,745	8,661	3,500	52,300	737
Already born	0.196	0.397	0	1	839
Months to birth for unborn	2.691	1.889	0.033	8.6	650
Months to birth for born	1.574	6.241	0.033	69.733	370
Days from presentation to last day on website	54.848	45.481	1	530	829
Days from first application to last application	20.465	32.647	0	217	837
Days on website if always born	42.883	37.917	1	184	163
Days on website if always unborn	46.14	35.055	1	217	407
Days on website if switch from unborn to born	78.221	56.201	5	530	244
Number of interested PAPs	2.316	2.295	0	16	839
Applications per day	0.094	0.245	0	4	829
Bad health words	0.002	0.049	0	1	839
Single PAP allowed	0.616	0.486	0	1	839
Same-sex PAP allowed	0.247	0.431	0	1	839

the foster-care system, where they remain adoptable until the age of 18. Foster care is notoriously detrimental to children's short- and long-term welfare.<sup>13</sup>

The entire process, from posting of a BMO on the website to finding a match with a PAP, is very quick. Most PAP applications are submitted within the first ten days from when a child's information is first posted, and the average time a BMO spends in this process is less than two months.

### C. Summary Statistics

*Birth Mothers' Statistics.*—Table 2 reports the summary statistics pertaining to children's attributes in our data, while the summary statistics conditional on a match and the time trends of some of the children's attributes appear in Tables A1 and A2, respectively, in the online Appendix (the number of observations for each attribute corresponds to data points for which that attribute was specified).

In terms of gender, not conditioning on the achievement of a match, 24.9 percent of the children in our sample are girls, 34.3 percent are boys, and the rest are of unknown gender. A child of unknown gender is either a child at an earlier stage of gestation or an unborn child who is less likely to have received medical attention than a child whose gender is known.

<sup>13</sup> Barth (1990) reports that 35 percent of youth at least 1 year old and less than 10 years out of foster care in the San Francisco area were homeless, and 35 percent had spent time in jail. See also Doyle (2008).

TABLE 3—SUMMARY STATISTICS FOR PAPs

Variable	Mean	Standard deviation	Minimum	Maximum	Observations
Gay PAP	0.041	0.199	0	1	729
Lesbian PAP	0.043	0.202	0	1	729
Single PAP	0.067	0.251	0	1	729
Straight couple	0.573	0.495	0	1	729
PAP with ambiguous name	0.276	0.447	0	1	729
Applies for a baby (on a specific day)	0.053	0.057	0	1	729
Applies for a baby (allowed choices only)	0.065	0.093	0	1	729
Applies for a baby (at some point in time)	0.060	0.067	0	1	729
Days between first and last application	109	200	1	1,797	729
Days since last application for a PAP	2.431	6.669	0	85.698	722
Applications per day on website	0.098	0.209	0	2	729

*Notes:* PAP with ambiguous name refers to a PAP name such as Robin&Kim, which cannot be classified in a PAP category. Applies for a baby (allowed choices only) restricts the choices of a PAP, those BMOs for which they are allowed to apply. Applies for a baby (at some point in time) looks at the application decision for a PAP on the last day that a BMO is on the website.

We treat race as a continuous variable to account for children of mixed descent (e.g, a child with a Caucasian father and an African American mother is classified as 0.5 Caucasian and 0.5 African American). Averaging across percentages of each ethnicity, the unconditional breakdown in our dataset is 36.9 percent Caucasian, 38.3 percent African American, and 13.3 percent Hispanic. The non-African American category refers to children who are 0 percent African American.

Already born children constitute 19.6 percent of our dataset, while, conditional on being unborn, the average time to birth at which the cases are presented to the facilitator is just below three months. The average age of already born children is about two months. In terms of PAPs who are acceptable to BMOs, same-sex PAPs are allowed in 24.7 percent of the cases, and single women in 61.6 percent of the cases.<sup>14</sup> Finally, the costs to finalize an adoption range from \$3,500 to \$52,300, in addition to the \$4,800 fixed fee for working with the facilitator.

In terms of the outcomes of the matching process, the average number of PAPs who apply for a given child is 2.3, varying from 0 to 16. BMOs decide to parent their child in 5 percent of the cases, are reported as a lost contact in 5 percent of the cases, and as a closed case in 29 percent of cases. The average number of days a case remains on the facilitator's website is 55 days, ranging from 1 to 530 days.

*Prospective Adoptive Parents' Statistics.*—We now turn to the demand side, represented by the PAPs. The summary statistics on the PAPs' attributes are in Table 3, while the time trends of some of the PAPs' attributes are in Table A2 in the online Appendix.

Recall that when a PAP applies for a specific child, *only the PAP's first name(s)* appear on the website next to the child requested. We therefore infer PAPs' characteristics based on their names. When the PAP consists of one person, we identify

<sup>14</sup>There are very few cases in which lesbian PAPs are allowed to apply and gay men are not, or vice-versa. The variable "Same-Sex Allowed" identifies a baby for which at least one of these PAP categories is considered acceptable. In addition, according to an interview with the facilitator, there are no single men among the PAPs.

that PAP as a single woman. When the PAPs' names unequivocally indicate that the PAP is a straight couple, or a same-sex couple, we assign the relevant attribute to the PAP. Of these PAPs, 79.1 percent are straight couples, 5.7 percent are gay men, 5.9 percent are lesbians, and 9.3 percent are single women. We exclude from the estimates regarding different PAPs' categories all PAPs that have names with ambiguous gender classification.

With respect to PAPs' race, interviews with the facilitator confirmed that virtually all of the PAPs in our dataset are Caucasian. We consider a PAP *active* from the time at which the PAP submits the first application until the PAP is reported as "matched" or, if it is never reported as such, until ten days after the last application is submitted. Given these assumptions, active PAPs apply for a child for which they are acceptable with a 6.5 percent probability. The average time elapsed between the PAPs' first and last application is 109 days. The (average) application probability of a PAP for an available child on each day is 5.3 percent, while the probability of applying for that child at some point is 6 percent.<sup>15</sup>

## II. Strategy for Estimating Adoptive Parents' Preferences

This section presents the strategy behind our estimations regarding PAPs' preferences. We are interested in studying PAPs' preferences over gender, race, and finalization costs. Since many adoption-policy debates revolve around the participation of special categories of PAPs (such as same-sex couples and singles), we analyze how the preferences with respect to children's attributes vary across these categories. An observation in our sample corresponds to a triplet  $(t, b, p)$ , where  $t$  identifies a date,  $b$  a child who is unmatched on the website at date  $t$ , and  $p$  a PAP that is active on the website at time  $t$  and for whom  $b$  is an available choice—that is,  $b$ 's BMO did not exclude the type of PAP  $p$  upon entering the matching process.<sup>16</sup>

### A. Underlying Assumptions

There are two assumptions at the root of our estimations:

**Revealed Preference for PAPs.** If two children,  $c_1$  and  $c_2$ , are available on the website on the same day, and PAP  $i$  (who qualifies for both) applies for  $c_1$  and not  $c_2$ , then PAP  $i$  must prefer  $c_1$  to  $c_2$ ; and

**Revealed Preference for BMOs.** If two PAPs,  $\theta_1$  and  $\theta_2$ , apply for the same child and the corresponding BMO  $j$  selects  $\theta_1$  and not  $\theta_2$ , then BMO  $j$  must prefer  $\theta_1$  to  $\theta_2$ .

<sup>15</sup>Consider a PAP who is active for 20 days and a BMO who is available over that entire period. Suppose the PAP applies for the baby on day 11 (so that the PAP has an open application to the BMO from day 11 to day 20). Then, the (average) application probability on each day is 50 percent, while the probability of applying at some point in time is 100 percent.

<sup>16</sup>In the online Appendix, we discuss the robustness of our results to a PAPs' activity window of 90 days (see Table A3). Also, Table A4 illustrates results obtained looking at the decision of a PAP to apply to a BMO without including the time variation  $t$ . These alternative definitions of PAP activity do not have a noticeable impact on our results.

These assumptions have two important implications for our estimation strategy. First, they allow us to assess preferences for each side of the matching process separately. Second, they enable us to evaluate marginal rates of substitution over attributes of parents and children when only a slice of the market is being observed. The latter point is particularly important in view of the fact that some PAPs may be utilizing multiple adoption channels and, likewise, some BMOs may pursue several paths when considering relinquishing their child.

In our environment, PAPs search for a BMO to be matched with, while BMOs search for a PAP to relinquish their child to. Therefore, one way to think of our underlying assumptions is through a sequential two-sided matching model. In the online Appendix, we present the basic structure of such a model (which is closely related to Burdett and Coles 1997 and Eeckhout 1999) and characterize its equilibrium.

### B. Discussion of the Estimation Strategy

There are several features of the matching process that make the assumptions above plausible. Since most of our analysis focuses on PAPs' preferences, PAPs in our data always have incentives to apply for children that are desirable to them according to the revealed preference assumption above. In what follows, we discuss this assumption and other important features of our matching process.

*No-Cost Applications.*—Once PAPs pay the fixed cost to the facilitator, any application is done at no cost to the PAPs. Therefore, there is no monetary reason to forgo an application.<sup>17</sup>

*Equal Opportunity Applications.*—When considering BMOs' selection of PAPs among those who apply, we cannot reject BMOs' selecting one of the applications at random. Indeed, a model in which the chosen PAP depends on all observable characteristics (namely, the volume of applicants and the categories to which they belong, in addition to the relevant child's attributes) generates no significant proxies of choice (see Table A5 in the online Appendix). In that respect, PAPs of different types do not exhibit different incentives to apply for particular children.

*No Supply Shock Effects in Applications.*—One may be concerned that despite the lack of application costs, parents respond to competition by applying less frequently to children who are likely to receive more applications. The restrictions BMOs impose over the admissible PAPs offer a natural variation in potential application volume corresponding to children who are otherwise similar. In particular, suppose we search for pairs of children with similar attributes, but with different restrictions of admissible PAPs imposed by the BMOs. For straight couple PAPs, the presence of restrictions against either same-sex couples or single PAPs does not impact the PAPs' preferences over these children, but does shift the extent of competition they face to obtain them.

<sup>17</sup> Furthermore, on any given day, there are, on average, 23 BMOs on the website, all listed sequentially on the same page. This makes it straightforward for PAPs to browse the entire list of available BMOs.

Given the large number of children in our dataset, it is possible to select several variables (gender, race, and whether the child is born or not) for which the matching is exact, and others, such as presentation dates and adoption finalization costs, for which we use a nearest-neighbor propensity score to match pairs of children (see Abadie et al. 2004). We can then compare two children that the same straight couple PAP can apply for, with different restrictions on admissible PAPs.

First, fewer restrictions do increase the amount of competition among PAPs for a child. If a BMO allows same-sex PAPs (or single PAPs) to apply, we estimate that conditional on the matched traits discussed above, there will be 50 percent more applications for this child with a standard error of 9 percent.

Second, allowing for same-sex couple applications, raises the probability of an application from straight couple PAPs by 0.87 percent, with a standard error of 0.37 percent. Similarly, allowing single PAPs to apply raises the probability of an application from a straight couple PAP by 0.25 percent, with a standard error of 0.34 percent, and therefore not significant with 5 percent confidence. In both cases, increased competition is not associated with fewer applications on the part of straight couple PAPs.

In addition, we replicated our estimates checking whether the number of pre-existing applications for a child affects the probability of that child receiving an application from a PAP. We found no significant impact of the number of previous applications on the probability of a child getting an additional one (see Table A6 in the online Appendix).

*Limited Scope of Learning.*—Participants (both PAPs and BMOs) spend a fairly short time interacting in the process we document. The mean number of days a PAP spends in the process is 109, while the mean number of days a BMO spends in the process is 54. Furthermore, PAPs make and BMOs receive only a handful of applications while they are active. We also note that the facilitator's website is on public domain so that interested PAPs are likely to inspect the website (and learn about its workings) prior to becoming active participants.

To test the scope of learning in our matching process, we examined whether PAPs had different application behavior in the first 30 days that they were present on the website, when there could be potential for learning, versus the period after their first 30 days on the website. We found no statistically significant differences in their application decisions (see Table A7 in the online Appendix).

*Dynamic Effects in Application Behavior.*—Overall, our analysis suggests that PAPs do not go out of order in their application behavior (applying earlier to some children who are lower in their preference ranking). Indeed, when we perform our analysis ignoring the time at which applications are submitted, considering the overall pool of children a PAP applied for, we generate virtually identical preference estimations (see Table A4 in the online Appendix).

*PAPs' Selection.*—One may also be concerned about the ecological validity and interpretation of our exercise. Namely, there might be selection effects that make the participating population of PAPs not representative of the entire population of adoptive parents.

Using the Census 2000, we can compare aggregate characteristics of adopted children in the United States and of matched children in our dataset. Specifically, the census identifies 54 percent of adopted children as girls. In our dataset, 25 percent of posted cases correspond to girls and 34 percent to boys. Out of matched cases in which the children's gender is known, 43 percent correspond to girls, while 57 percent correspond to boys. The comparison with the census figures suggests that PAPS who select into our dataset are, if anything, more likely to adopt a boy relative to the average adopting household in the United States.

With respect to race, the census reports 18 percent of adopted children as African American, while only 6.4 percent of adopted children are reported as African American when the head of the household is classified as Caucasian (the census' data is based on a coarse classification of race). In our data, of all cases of matched children (through the facilitator or through other channels), 54 percent correspond to children who are at least partially African American and 24 percent correspond to children who are 100 percent African American. Recall that PAPS in our dataset are virtually all Caucasian. This suggests that PAPS who select into our dataset are, if anything, more open to adopting an African American child than the average adopting household in the United States.

*BMOs' Selection.*—In order to address the concern of adverse selection of BMOs, we obtained auxiliary data from the facilitator containing more detailed information about 196 BMOs corresponding to recently posted cases. These data document BMOs' age, medical history, education, criminal record, as well as drug and alcohol abuse. If the observed child characteristics (namely, gender and race) are proxies for any of these, we should observe a nontrivial correlation between observed characteristics and indicators of health and behavioral issues. Table 4 reports means of the BMOs' health, demographic, and behavioral markers conditional on the children's gender and race.

Regarding gender, the cases corresponding to boys and girls do not appear significantly different from one another (with 10 percent confidence) in any of the dimensions we consider. Regarding race, we have split the data according to whether the race composition of the child is above or below 50 percent African American.<sup>18</sup>

Overall, we find that BMOs of African American children, who are less desirable according to our preference analysis in Section IIIC below, consistently exhibit slightly superior values in each of the markers. The level of prenatal care, age, and education achievement are all very similar across the two groups of BMOs. However, criminal records, serious health problems, serious drug abuse, and obesity are more frequent (albeit not in a statistically significant way, even with 10 percent confidence) among the less African American cases.

<sup>18</sup>Of the 196 cases in our additional data, 62 involve children whose race composition is at least partly African American. Of these, six children are 25 percent African American, 29 are 50 percent African American, and 24 are fully African American. The division of the data utilized to create the table therefore corresponds to a median split over these cases.

TABLE 4—BMO'S SELECTION

	African American					
	< 50 percent			≥ 50 percent		
	Mean	Observations		Mean	Observations	
<i>Panel A. Race</i>						
Prenatal care <sup>a</sup>	0.91 (0.03)	74		0.89 (0.05)	39	
Criminal record <sup>b</sup>	0.56 (0.08)	43		0.56 (0.10)	25	
Serious health problems <sup>c</sup>	0.59 (0.06)	63		0.43 (0.08)	35	
Drug or alcohol use <sup>d</sup>	0.68 (0.06)	69		0.53 (0.08)	40	
Obesity (BMI above 30)	0.28 (0.04)	101		0.3 (0.06)	56	
Age	28.2 (0.6)	94		28.5 (0.8)	50	
Education <sup>e</sup>	1.95 (0.09)	75		2.18 (0.14)	42	
	Boy		Girl		Gender unknown	
	Mean	Observations	Mean	Observations	Mean	Observations
<i>Panel B. Gender</i>						
Prenatal care <sup>a</sup>	0.86 (0.06)	35	0.88 (0.05)	43	0.95 (0.04)	38
Criminal record <sup>b</sup>	0.57 (0.11)	23	0.48 (0.11)	23	0.6 (0.11)	20
Serious health problems <sup>c</sup>	0.53 (0.09)	34	0.58 (0.09)	33	0.47 (0.09)	34
Drug or alcohol use <sup>d</sup>	0.66 (0.07)	44	0.67 (0.08)	33	0.43 (0.10)	28
Obesity (BMI above 30)	0.25 (0.06)	56	0.29 (0.07)	49	0.26 (0.06)	47
Age	29 (0.8)	50	28.5 (0.9)	45	28 (1.1)	44
Education <sup>e</sup>	2.09 (0.13)	44	1.88 (0.14)	39	2.19 (0.13)	27

Notes: Standard errors in parentheses.

<sup>a</sup>Prenatal care refers to a binary variable that records whether the BMO received medical attention during the pregnancy.

<sup>b</sup>Criminal record refers to felony convictions or jail time.

<sup>c</sup>Serious health problems include cancer, diabetes, heart condition, coma, epilepsy, severe depression, and chlamydia during pregnancy.

<sup>d</sup>Drug use includes meth, crack, heroin, cocaine, amphetamines. Alcohol use refers to heavy alcohol consumption during pregnancy.

<sup>e</sup>Education refers to the last grade completed as follows: 1 for some high school, 2 for completed HS/GED, 3 for some college, and 4 for a college degree.

### C. Estimation

The assumptions above are tantamount to PAPs and BMOs operating using a (possibly time-dependent) reservation utility. In particular, a child receives an application from a PAP if and only if the PAP's utility from being matched with that child exceeds the PAP's reservation utility. For the sake of estimation, we consider a



stochastic specification and assume that each PAP of type  $\theta$  assesses the utility from a child of characteristics  $\mathbf{c}$  as

$$(1) \quad u_{PAP}(\theta; \mathbf{c}) = \beta_{\theta} \cdot \mathbf{c} + \beta_{\theta,0} + \varepsilon_{ibp} \geq \bar{u}_{PAP}(\theta),$$

where  $\beta_{\theta,0}$  is a constant term that varies with PAPs' type and year,  $\varepsilon_{ibp}$  is an idiosyncratic unobservable distributed according to the standard normal distribution (corresponding to each triplet  $(t, b, p)$ ), and  $\bar{u}_{PAP}(\theta)$  is the reservation utility of PAPs of type  $\theta$ .

This specification allows us to estimate discrete choice models in which the probability of applying for a match with a specific child depends on the child's observable attributes. Note that this method enables us to evaluate the weights that different types of PAPs put on different attributes. However, it does not allow us to identify the absolute level of the reservation utility, as it is confounded with the constant term in the utility specification.

In principle, individual PAPs may be using different reservation utilities (due to, say, access to different adoption channels). PAPs could also use a strategy that allows for reservation utilities that vary with the time the PAPs spend on the website. When we estimate the parameters of equation (1) controlling for the PAPs' time on the website, we obtain coefficients  $\beta_{\theta}$  that are essentially identical to those presented below, as presented in Column III of Table A8 in the online Appendix.

Furthermore, note that any change in the supply of available children, in terms of either volume or distribution of types, will only change the constant term in our estimation. Therefore, PAP-day fixed effects absorb whatever changes in reservation values occur due to supply-side shifts. We estimated the parameters of equation (1) using a conditional logit with PAP-day fixed effects, and find coefficients  $\beta_{\theta}$  that are virtually identical to those we present below (see Table A9 in the online Appendix). Thus, our identification is a consequence of the variation in choice sets PAPs face on any given day, rather than an artifact of differences between PAPs or changes over time. We present our results in terms of probit coefficients since they allow us to compute marginal effects of different child attributes on application rates, as well as identify differences in base-application rates of different classes of PAPs.

### III. Adoptive Parents' Preferences

Table 5 presents the results of probit estimations targeted at assessing PAPs' preferences over different attributes and their dependence on PAPs' categories. We cluster standard errors by PAP-BMO pairs to account for serial correlation, since a PAP's application is kept on the website until the child is matched. Here and throughout the rest of the regression tables, unless otherwise indicated, the  $t$ -statistics appear in parentheses.

The first column of Table 5 refers to the behavior of the entire PAP population. It corresponds to a model in which the different categories of PAPs in our sample—straight couples, gay men, single women, and lesbian couples—are characterized by the same utility function—namely, the coefficients  $\beta_{\theta}$  in (1) are restricted to be

TABLE 5—DETERMINANTS OF PAPs' APPLICATIONS: MARGINAL EFFECTS FOR PROBIT

Dependent variable					
PAP applies for BMO					
Activity window: 10 days	All	Straight PAP	Gay PAP	Lesbian PAP	Single PAP
Already born <sup>d</sup>	-0.014*	-0.015	-0.020	-0.060	0.031
	(-2.01)	(-1.91)	(-0.20)	(-0.61)	(0.96)
Months to birth	-0.001***	-0.001**	-0.001	-0.001	-0.001
	(-3.46)	(-2.59)	(-0.24)	(-0.36)	(-1.07)
Finalization cost in \$10,000	-0.019***	-0.018***	-0.023	-0.109*	-0.019
	(-6.00)	(-4.96)	(-0.65)	(-2.45)	(-1.92)
African American girl	-0.052***	-0.051***	-0.213*	-0.232**	-0.055*
	(-6.18)	(-5.11)	(-2.38)	(-2.71)	(-2.31)
African American boy	-0.065***	-0.068***	-0.050	-0.094	-0.077**
	(-7.46)	(-6.39)	(-0.65)	(-0.97)	(-2.77)
African American unknown gender	-0.070***	-0.075***	-0.131	-0.114	-0.082***
	(-8.17)	(-7.22)	(-1.28)	(-1.40)	(-3.83)
Non-African American girl	0.028***	0.028***	0.120	0.273*	0.032
	(4.23)	(3.73)	(1.16)	(2.53)	(1.37)
Non-African American boy	-0.006	-0.010	-0.020	0.128	-0.000
	(-0.99)	(-1.39)	(-0.26)	(1.76)	(-0.00)
Hispanic	0.004	-0.001	0.141	-0.043	-0.028
	(0.53)	(-0.09)	(1.35)	(-0.31)	(-1.09)
Single PAP <sup>d</sup>	0.013				
	(1.72)				
Gay couple PAP <sup>d</sup>	0.088***				
	(3.79)				
Lesbian couple PAP <sup>d</sup>	0.155***				
	(5.89)				
Year FE	X	X	X	X	X
Probability for mean attributes	0.088	0.073	0.190	0.221	0.077
Probability for base case <sup>‡</sup>	0.109	0.114	0.177	0.272	0.089
$\chi^2$	341.08	181.87	29.58	44.48	43.48
log-likelihood	-219,850.8	-143,090.0	-5,573.2	-8,604.6	-20,407.6
Observations	871,215	592,416	12,982	16,727	79,652
PAP-BMO	30,688	21,386	428	544	2,493

Notes: Standard errors clustered by PAP-BMO pair.

<sup>d</sup>For discrete change of dummy variable from 0 to 1.

<sup>‡</sup>The omitted category is a gender unknown, non-African American, unborn child, less than one month to birth, with finalization cost of \$26,000 in 2009.

\*\*\*Significant at the 0.1 percent level.

\*\*Significant at the 1 percent level.

\*Significant at the 5 percent level.

identical across PAPs—but may have different thresholds (captured by the dummy variables corresponding to PAPs' categories) due to the different streams of children for whom they can be considered. The PAPs-category dummy variables in the first column are significantly different from one another. The remaining columns of Table 5 correspond to estimated models in which different categories of PAPs are allowed to have different preferences. In what follows, we first discuss the aggregate preferences over children's attributes and then compare estimated preferences across different categories of PAPs.

The omitted category corresponding to all estimations reported in Table 5 is a 2009 child, a month before birth, whose gender is still unknown, whose race composition is 0 percent African American, and whose adoption finalization costs are \$26,000. This omitted category of children has an 10.9 percent probability of receiving an application, while a child whose attributes correspond to the population means (as reported in Table 2) receives an application with a probability of 8.8 percent.

According to the third and fourth columns of Table 5, gay and lesbian couples have a significantly higher probability of submitting an application than straight couples. Indeed, the probability of submitting an application for the child whose attributes correspond to the population mean is 7.3 percent for straight couples, 19 percent for gay PAPs, 22.1 percent for lesbian PAPs, and 7.7 percent for single women. These can be partly explained by the constraints that gay and lesbian couples face when adopting a child. Since many of the children on this website are not available to them, gay and lesbian couples conceivably compensate by applying more frequently when they can.

#### *A. Adoption Finalization Costs*

Our analysis reveals that PAPs' application behavior is significantly affected by the cost of finalizing the adoption. However, the effects we find are not very large in aggregate terms. Indeed, Table 5 shows that an increase in adoption finalization costs of \$10,000 decreases the probability of receiving an application from 8.8 percent to 6.9 percent.

We find that alternative PAP categories respond quite differently to changes in adoption finalization costs. Indeed, lesbian couples seem to respond to changes in adoption finalization costs more than straight and gay couples and single women. Thus, a \$10,000 increase in adoption finalization costs reduces the desirability of a child by 1.8 percent for straight couples, 2.3 percent for gay men, 10.9 percent for lesbian couples, and 1.9 percent for single women. The sensitivity of these categories is consistent with the Census 2000, which reports that adoptive straight couples and gay men are, on average, wealthier than lesbian couples.

The fact that the probability of receiving an application is significantly influenced by the finalization costs allows us to estimate an analogous model in which coefficients associated with different attributes are expressed in dollar terms. These estimates are reported in Table 6.

In Table A10 in the online Appendix we show that, in fact, there is a strong dependence of adoption finalization costs on children's attributes. We find that African American children of unknown gender are associated with costs that are \$7,480 lower relative to non-African American children of unknown gender. In addition, non-African American boys are associated with costs that are \$2,270 lower than non-African American girls. While these differences are significant, notice that they are far smaller than the differences in willingness to pay for children of different attributes that we discuss below. Thus, while differences in costs mitigate the differences in desirability for race and gender, they provide only partial compensation.

TABLE 6—DETERMINANTS OF PAPs' APPLICATIONS: COEFFICIENTS EXPRESSED IN DOLLARS

Dependent variable: PAP applies for BMO Activity window: 10 Days					
	All	Straight PAP	Gay PAP	Lesbian PAP	Single PAP
Already born	-8,194 (-1.86)	-9,517 (-1.74)	-9,063 (-0.20)	-5,978 (-0.56)	14,178 (1.08)
Months to birth	-556 (-3.45)	-552 (-2.58)	-313 (-0.24)	-110 (-0.36)	-479 (-1.06)
Finalization cost in 10,000's of \$	-10,000 (-5.92)	-10,000 (-4.88)	-10,000 (-0.66)	-10,000 (-2.50)	-10,000 (-1.91)
African American girl	-27,708 (-6.22)	-28,828 (-5.11)	-92,396 (-2.42)	-21,350 (-2.74)	-28,493 (-2.34)
African American boy	-35,139 (-7.42)	-38,069 (-6.31)	-21,563 (-0.65)	-8,678 (-0.96)	-40,479 (-2.76)
African American unknown gender	-37,639 (-8.03)	-42,276 (-6.99)	-56,875 (-1.22)	-10,441 (-1.39)	-42,945 (-3.80)
Non-African American girl	15,069 (4.20)	15,655 (3.72)	52,188 (1.19)	25,152 (2.58)	16,712 (1.37)
Non-African American boy	-3,264 (-0.99)	-5,655 (-1.39)	-8,646 (-0.26)	11,763 (1.76)	0 (-0.00)
Hispanic	2,153 (0.53)	-414 (-0.09)	61,146 (1.36)	-3,939 (-0.31)	-14,863 (-1.09)
Gay couple PAP	34,028 (4.94)				
Single PAP	6,806 (1.82)				
Lesbian couple PAP	51,528 (8.24)				
Year FE	X	X	X	X	X
$\chi^2$	341.08	181.87	29.58	44.48	43.48
log-likelihood	-219,850.8	-143,090.0	-5,573.2	-8,604.6	-20,407.6
Observations	871,215	592,416	12,982	16,727	79,652
PAP-BMO	30,688	21,386	428	544	2,493

Notes: Probit on application decision. Coefficients converted into dollar equivalents, i.e., the ratio of the coefficient to the coefficient on finalization cost. *T*-statistic presented in parentheses, clustered by PAP-BMO pair. The omitted category is a gender unknown, non-African American, unborn child, less than one month to birth, with finalization cost of \$26,000 in 2009.

### B. Preferences over Gender

In our data, the gender of each child is “boy,” “girl,” or “unknown.” Since “gender unknown” may be a consequence of limited medical attention, we measure the PAPs’ gender preference by comparing the probabilities of receiving an application by girls and boys.

Non-African American girls have a probability of receiving an application that is 3.4 percent higher than non-African American boys, a large effect given that the child with mean attributes has a probability of 8.8 percent of receiving an application. In other words, PAPs have a positive and sizable preference in favor of (non-African American) girls. According to Table 6, the increase in desirability of a non-African American girl with respect to a non-African American boy is equivalent to a decrease of \$18,333 in finalization costs. This higher desirability of

girls is consistent with anecdotal evidence reported by adoption agencies and the popular press covering the adoption process.<sup>19</sup> If we consider adoption *outcomes* in the United States, the Census 2000 reported that 46 percent of adopted children were male as compared with 51 percent of biological children (see Kreider 2003). Our result suggests that these outcomes are explained, at least partially, by a significant demand effect. A preference for girls has also been documented for biological mothers by Gallup polls, though, interestingly, biological fathers tend to report a preference for boys.

In our data, the preference for girls is apparent, though somewhat different, across all categories of PAPs. Lesbian couples exhibit, by far, the most intense preference for non-African American girls. Indeed, for non-African American children, the estimated difference in application probabilities between girls and boys is 3.8 percent for straight couples, 14 percent for gay couples, 14.5 percent for lesbian couples, and 3.2 percent for single women (a chi-squared test indicates these differences are significant at any reasonable confidence level). The strong gender preferences pertaining to gay and straight couples suggest that women's preference for girls is not the sole driving force behind this preference. We note that there is a strand of literature based on hypothetical surveys of different classes of PAPs regarding preferences over children's gender (see Goldberg 2009, and references therein). Our results are the first to report a stronger preference over children's gender for same-sex than for straight PAPs.

Table 5 also highlights a positive and sizable (although not statistically significant) preference for African American girls with respect to African American boys. In particular, the difference between the application probabilities for an African American boy and an African American girl is 1.3 percent.

The gender bias we observe is compatible with the idea that girls are viewed as "safer" in terms of dysfunctional behavior and are, therefore, more appealing candidates for adoption. However, we suspect this does not fully explain the gender preferences we observe since this conjecture would suggest that the gender gap should be stronger for African American children, for whom the gap in terms of negative outcomes is greater between the genders.<sup>20</sup>

We note that the substantial preference for girls that we document constitutes a reversal, in the adoption environment, of the preference for sons identified by the literature studying the preferences over gender of biological children by looking at indirect indicators such as divorce, likelihood of the mother's remarriage, etc. For instance, Dahl and Moretti (2008) find that first-born daughters are associated with a

<sup>19</sup> See, for instance, Gravois (2004).

<sup>20</sup> There are some data backing the perception that girls are "safer" behaviorally. For instance, the US Department of Justice reports that lifetime chances of a person going to prison are significantly higher for men (11.3 percent) than for women (1.8 percent). Also, girls are less likely to develop behavioral problems, such as autism spectrum disorders (four times more prevalent in boys than in girls, according to the Autism Society of America), or ADHD (diagnosed two to four times as frequently in boys as in girls, see Dulcan 1997). This conjecture has been mentioned repeatedly in the popular press, see, e.g., Gravois (2004) and Landsburg (2003). When considering differences between races through incarceration, the US Department of Justice reports that the imprisonment rates in 2001 were: 16.6 percent for African American males, 7.7 percent for Hispanic males, 2.6 percent for Caucasian males, 1.7 percent for African American females, 0.7 percent for Hispanic females, and 0.3 percent for Caucasian females.

range of negative predicaments for the survival of couples.<sup>21</sup> Since the Census 2000 suggests that approximately 50 percent of households containing adopted children do not include any biological child, it is difficult to explain this inconsistency by the mere ordering of children in the family (which would require parents to have dramatically different gender preferences for first and later children).

### C. Preferences over Race

To our knowledge, racial preferences over offspring have not yet been documented. Anecdotal evidence from adoption agencies and facilitators suggest that there are greater difficulties in matching African American children with respect to other ethnicities. However, to this date, the only evidence to support this claim has been the gap between the proportion of African American children awaiting adoption in the US foster-care system (32 percent in 2006, according to the US Department of Health and Human Services Report). On the other hand, according to the census, 18 percent of adopted children are African American, while African Americans represent only 15 percent of all children. The limitation of these statistics is that they cannot be directly related to PAPs' preferences. In that respect, our dataset provides a direct channel to estimate parents' racial preferences in the adoption environment.<sup>22</sup>

Our results show that children's probability of receiving an application is considerably affected by their race. In particular, this probability dramatically decreases if the child is, at least partially, African American.

Projecting the marginal effect linearly, the probability that a 100 percent African American child (of unknown gender) receives an application is 1.8 percent in contrast to a probability of 13.1 percent for a 0 percent African American child (a chi-squared test indicates these differences are significant at any reasonable confidence level).<sup>23</sup> Similarly, application probabilities decrease dramatically for both African American girls and boys. In other words, PAPs in our sample exhibit a large and negative preference against African American children. This suggests that the overrepresentation of African Americans in the population of adopted children is due to a *sizable supply effect*.

From Table 6, the decrease in desirability of an African American child of unknown gender with respect to a non-African American child is equivalent to a \$37,639 increase in adoption finalization costs.

Physical similarity may be underlying these preferences. In fact, preference for similarity, or *homophily*, is a well-known and documented phenomenon in the sociology

<sup>21</sup> Specifically, Dahl and Moretti (2008) report that (i) women are less likely to remarry if they have a first-born daughter than if they have a first-born son; (ii) couples tend to divorce less often if they have first-born sons rather than first-born daughters; and (iii) the number of children is significantly higher in families with first-born girls.

<sup>22</sup> Estimating preferences over physical characteristics of biological children is inherently difficult due to the limited choice parents have over offsprings' appearance. Furthermore, according to the Census 2000, only 4 percent of marriages in the United States are interracial, so variation in the race of biological children may be challenging to assess.

<sup>23</sup> The 13.1 percent probability is derived through a linear interpolation of the 1.8 percent probability of application for a 100 percent African American child (of unknown gender) and the 8.8 percent probability of application for the child with mean attributes (according to Table 2, 38.3 percent of children are African American).

literature (see McPherson, Smith-Lovin, and Cook 2001 and references therein).<sup>24</sup> In the context of adoption, homophily may manifest itself in the desire of PAPs to adopt children who are similar to them and could, therefore, appear as their biological offspring. Since virtually all of the PAPs in our dataset are Caucasian, homophily would be consistent with a negative attitude toward African American children.

Hispanic children account for 13.3 percent of children on the website. However, we do not find a racial preference for or against Hispanics. The estimated desirability of Caucasian and Hispanic children is roughly identical, with a nonsignificant increase of the application probability of 0.4 percent if the child is Hispanic. To the extent that Hispanic children may look different than Caucasian children, this suggests that a preference for physical similarity alone cannot account for the racial preferences we observe. Statistically, the 95 percent confidence interval for the Hispanic coefficient is given by (−1 percent, 1.9 percent), so we cannot reject the hypothesis that PAPs have the same preferences for Caucasian and Hispanic children.

In terms of different PAP categories, our estimates suggest that the racial preference against African American children is somewhat stronger (although in some cases not significantly so) for gay men, lesbian couples, and single women than for straight couples.

#### IV. Adoption by Same-Sex Couples and Single Women

Reducing the number of adopted children comes at significant costs. For example, Barth et al. (2006), as well as Hansen and Hansen (2006), show that state and federal governments save between \$65,422 and \$126,825 on the average child who enters foster care at age three if he or she is adopted rather than remains there throughout childhood. Furthermore, Hansen (2006) calculated that the human service costs of adoption are about one-half the costs of long-term foster care.<sup>25</sup> Moreover, reducing the volume of PAPs in the matching process may affect the distribution of attributes (gender, race, etc.) of adopted children, as well as adopting PAPs. In this section, we quantify the effect of bans on certain categories of PAPs (same-sex couples and single women) from our matching process. In particular, we estimate the impact of the participation of same-sex couples in the adoption process under consideration by assessing the number of matches that would be lost should gay and lesbian PAPs be restricted from participating. In our data, same-sex couples are chosen by the BMOs in 17 percent of all cases of matched children for whom we know the identity of the chosen PAP. This serves as an upper bound on the percentage of matches that would have been lost had same-sex couples been prohibited from participating in the adoption process. In order to generate a more conservative estimate, we count all the matched children that received only applications from unambiguously same-sex PAPs. In that case, banning same-sex applicants would reduce the number of applications received by these BMOs to zero, effectively making a match

<sup>24</sup>This desire for similarity would be in line with racial preferences over romantic partners documented by Fisman et al. (2006, 2008).

<sup>25</sup>She also found that when examining other social costs, such as reduced incarceration or increased education attainment, each dollar spent on the adoption of children from foster care results in \$2.45 to \$3.26 in tangible benefits to society.

impossible.<sup>26</sup> This amounts to 9 percent of matched cases in our data. This is clearly a large effect given that, according to Table A1 in the online Appendix, only 19.6 percent of matched cases allow gay and lesbian PAPs to apply.<sup>27</sup> It is important to note that this method ignores two important elements of our environment. First, it ignores the fact that certain heterosexual parents may not appear acceptable to some birth mothers. Second, it ignores the endogenous effects on PAPs' application behavior. Indeed, reducing the pool of potential parents would reduce the competition on the PAPs' side and could lead to less applications being submitted.

In terms of the attributes associated with children whose match would have been lost under our exercise, we find that 80 percent of severed matches correspond to boys (to be contrasted with boys representing 36 percent of the overall observed matches). In terms of race, 48 percent of lost matches correspond to African American children (as compared with 39 percent of matched children being African American). This suggests that, while same-sex couples have strong preferences against boys and African American children, they still play an important role in their placement due to their higher application rates, as we discussed in Section IV.

As for single PAPs, an analogous exercise generates similar results. In our data, 14 percent of matched children are ultimately matched with a single PAP. Nine percent of matched children received applications only from single PAPs, which serves as an estimate of the percentage of matches that would be lost had single PAPs been banned from the process. This is a substantial effect given that only 57 percent of matched cases allow single PAPs to apply.

Of the matches that would have been lost, 68 percent are African American children, significantly higher than the percentage of African Americans in the entire population of matched children. Finally, 36 percent of the severed matches due to the exclusion of single PAPs correspond to boys, which is similar to the fraction of matched boys in the sample.

## V. Conclusion

We collected a novel dataset to track the matching of potential adoptive parents to birth mothers looking to relinquish their child for adoption. The detailed data on over 800 children allow us to estimate parents' preferences over child attributes, most notably over gender, race, and adoption finalization costs.

We find clear patterns in parents' preferences. First, adoption finalization costs impact demand significantly. An increase in adoption finalization costs of \$10,000 decreases the aggregate probability of receiving an application from 8.8 percent to 6.9 percent. Second, girls are consistently preferred to boys, and Caucasians and Hispanics are consistently preferred to African Americans. In monetary terms, the

<sup>26</sup>The significant variance observed in the number of applications BMOs receive by the time of a match suggests that they are not determining their stay on the website based on the number of applications received. However, our counterfactual estimates do not take into account that, had certain PAP categories been excluded, BMOs could stay on the website longer, possibly receiving additional applications that we do not observe.

<sup>27</sup>Among the set of matched BMOs for whom the adopting PAP can be unambiguously classified, 26 percent allowed for same-sex adoption. Thirty percent (of those 26 percent of matched BMOs) ultimately matched with same-sex PAPs.



increase in desirability of a girl relative to a boy can be compensated by a decrease of approximately \$18,300 in adoption finalization costs. Similarly, the increase in desirability of a non-African American child with respect to an African American child (both of unknown gender) is equivalent to a decrease of at least \$37,600 in adoption finalization cost.

Different categories of adoptive parents—straight, gay, lesbian, or single—have different behaviors in the matching process. We find that gay men and lesbian couples submit applications to 19 percent and 22 percent of children, respectively, while straight couples submit applications to only 7.3 percent of children. However, we do not find evidence that same-sex couples or single women's preferences are less sensitive to children's attributes than straight couples'. If anything, they seem to have stronger preferences in favor of girls and against African American children. Finally, our data suggest that banning same-sex parents from our sample lowers the number of adopted children by about 9 percent. A similar exercise entailing the exclusion of single women from our sample also lowers the number of adopted children by approximately 9 percent.

While adoption is far-reaching in the United States (2.5 percent of all children are adopted in an industry that generates \$2–3 billion annually), it is still an unexplored territory for economists. In our context, the domestic adoption process is unique in that it allows us to answer fundamental questions regarding preferences over race and gender.

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