

図表 8-2 推定結果 パネルプロビット

| | 2 期前 | | | |
|------------------|----------------------|--------|----------------------|--------|
| | パネルプロビット | | プロビット | |
| | 出産 | 限界効果 | 出産 | 限界効果 |
| 教養娯楽価格 | 3.156*** (1.023) | 0.233 | 3.156*** (1.023) | 0.233 |
| 子ども 1 人×教養娯楽価格 | -0.608*** (0.165) | -0.045 | -0.608*** (0.165) | -0.045 |
| 子ども 2 人×教養娯楽価格 | -1.804*** (0.311) | -0.133 | -1.804*** (0.311) | -0.133 |
| 子ども 3 人以上×教養娯楽価格 | -2.846*** (0.504) | -0.210 | -2.846*** (0.504) | -0.210 |
| 短大・高専ダミー | 0.0833 (0.0552) | 0.006 | 0.0833 (0.0552) | 0.006 |
| 大卒以上ダミー | 0.229*** (0.0805) | 0.020 | 0.229*** (0.0805) | 0.020 |
| 夫の年収 (対数値) | -0.0652 (0.0435) | -0.005 | -0.0652 (0.0435) | -0.005 |
| 妻の年齢 | 0.170 (0.123) | 0.013 | 0.169 (0.123) | 0.013 |
| 妻の年齢の 2 乗項 | -0.434** (0.193) | -0.032 | -0.434** (0.193) | -0.032 |
| 既存児数 | 0.748*** (0.165) | 0.055 | 0.747*** (0.165) | 0.055 |
| 同居・近居ダミー | -0.0373 (0.0524) | -0.003 | -0.0373 (0.0524) | -0.003 |
| 定数項 | -5.263** (2.287) | | -5.263** (2.287) | |
| Prob >chibar2 | 0.493 | | | |
| 対数尤度 | -1511.210 | | -1511.210 | |
| サンプルサイズ | 7453 | | 7453 | |

有意水準：*10% **5% ***1% ()内は標準誤差

**Child Adoption in the United States:
Historical Trends and the Determinants of Adoption Demand and Supply, 1951-2002**

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Abstract

Adoption, as an alternative to child bearing, is a widely accepted means of forming a family in many modern societies. In this paper, we first provide a comprehensive overview of the U.S. adoption market and its historical development. We then document trends in adoptions in the U.S. by adoption type using aggregate-level data from 1951 to 2002 and explore possible reasons for the observed historical patterns. Finally, compiling two micro-level datasets covering the period between 1973 and 2002, we estimate individuals' propensities to adopt and to relinquish a child for adoption, and evaluate alternative hypotheses concerning adoption demand and supply, exploiting both across-time and across-group variations in the data.

* Work in progress: comments are welcome.

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1. Introduction

Adoption, as an alternative to child bearing, is a widely accepted means of forming a family in many western societies. According to the 2000 Census, adopted children comprise roughly 2.5% of all children in the U.S. (U.S. Census Bureau (2000)), while unmet demand for adoption is reported to be far greater (NCFA (2007)). The number of foreign-born children adopted by U.S. citizens, in particular, has more than tripled in the last fifteen years (U.S. Department of Homeland Security (2005)), generating wide press coverage. Although there are no internationally comparable statistics, data indicate that the U.S. likely adopts more children per capita than any other country in the world (Selman (2002)). Who adopts children, and who places children for adoption? How does the market for child adoption function? In spite of rapidly declining demand for biological children in most industrial countries (measured by total fertility rates), what motivates people to adopt children who are not biologically related to them? Is the number of adoptions rising in the U.S.? If so, is the trend driven by economic and demographic factors, or is it more attributable to legal and institutional factors?

Despite its quantitative significance and potentially important welfare implications, unlike sociologists and demographers, economists have paid relatively little attention to child adoption due partly to the scarcity of data (Fisher (2003)).¹ Child adoption, however, is no less an economic issue than is child bearing in the classical Becker (1981) model. The objective of this paper is threefold. First, we provide an overview of the U.S. adoption market, its institutional features, and its historical development over the last 150 years. Second, we document adoption trends in the U.S. by adoption type from 1951 to 2002 using macro (aggregate-level) data compiled from several sources. To explore possible reasons for the observed historical patterns, we divide the adoption market into three submarkets and examine the demand- and supply-side factors in each segment. Third, we investigate the determinants of adoption demand and supply using two micro (individual-level) datasets, the Survey of Income and Program Participation (SIPP), 1984-2001, and the National Survey of Family Growth (NSFG), 1973-2002. By providing a comprehensive overview and new empirical evidence, we hope to advance the understanding of child adoption, an important yet thus far little understood subject in family economics.

¹ Important exceptions are Landes and Posner (1978), Medoff (1993), Gennetian (1999), Hansen and Hansen (2006), and Buckles (2006b).

2. Institutional Background

Child adoption has a number of features distinct from child bearing that require careful investigation. Unlike in the case of child bearing, individuals on the demand side (i.e., adoptive parents) and on the supply side (i.e., relinquishing parents) do not coincide, giving rise to an “adoption market” in which the two sides are matched by intermediaries (i.e., adoption agencies) using primarily non-price mechanisms. As the adoption market deviates greatly from the standard competitive market, institutional factors, such as adoption laws and cultural norms, may play an important role in determining its outcomes. In addition, adoptive parents may incur monetary, time, and psychic costs that are specific to adoption (e.g., legal costs, long waiting time, great uncertainty over the quality of match between a prospective parent and a child, possible stigma associated with adoption), or they may be motivated by factors other than those driving child bearing, such as humanitarian considerations.

Moreover, there are several types of adoption that are *imperfect* substitutes for one another in the adoption market. Adoptions can be categorized as formal versus informal adoptions, related versus unrelated adoptions, domestic versus inter-country adoptions, and foster care adoption. Formal adoption refers to legally approved adoption that entails permanent transfer of parental rights and duties from biological to adoptive parents. In the U.S., state courts decide whether to grant or deny a petition for adoption. Related adoption includes adoptions by relatives as well as stepparents, while unrelated adoption refers to the rest. Unrelated adoption, especially of young infants, is considered to be a close substitute for child bearing, while it is less likely to be the case for related adoption, especially for stepparent adoption. As we show below, related adoption constitutes roughly 40% of all adoptions in the U.S. in recent years.

Furthermore, adoptions can be divided into domestic and inter-country adoptions. For jurisdictional reasons, most domestic adoption (i.e., adoption of U.S. children by U.S. citizens) takes place within state, and inter-state adoption is relatively rare. Inter-*country* adoption refers to adoption of foreign-born children by U.S. citizens. Almost all inter-country adoptions are unrelated adoptions. Finally, within domestic adoption, there is foster care adoption. Over the last two decades, the federal government has placed an increasing emphasis on finding adoptive homes for children in the public foster care system, especially for those children with “special needs.” The definition of special needs children varies from state to state, but it typically refers to children who are above a certain age, members of a sibling group to be adopted together, of minority race, or have physical, mental,

or emotional disabilities. Foster care adoption can be either related or unrelated adoption. Because the characteristics of adoptable children and adoptive parents differ systematically across adoption types, it is important to distinguish these types as much as data permit.

In the U.S., adoptions can be arranged through public child welfare agencies, private agencies, or without involving any agencies (i.e., “independent” adoption). Almost all foster care adoptions are arranged through public agencies. [Need more details.] Data suggest that a majority of independent adoptions are adoptions by stepparents and relatives. [Misleading statement: revise.] By contrast, almost all private agency adoptions and a majority of public agency adoptions are unrelated adoption (Flango and Flango (1995), Table 3). The primary functions of adoption agencies are to evaluate prospective applicants, conduct home studies, arrange suitable placements, and process court applications. A birthmother may relinquish all rights to her child to an agency. All private agencies are licensed and subject to state regulations. Most private agencies are non-profit organizations, but some states permit pro-profit agencies (O’Halloran (2006)). Monetary and time costs of adoption vary substantially by agency and by adoption type. Estimated monetary costs in 2004 range from \$0 to \$2,500 for adoption of foster care children through public agencies, \$5,000 to \$40,000 (with the average \$10,000-\$20,000) for domestic adoption through private agencies, and \$7,000 to \$30,000 for inter-country adoption through private agencies (CWIG (2004)). Expected waiting time for adopting healthy domestic infants through private agencies is between 2 and 4 years, reflecting high excess demand for these children (NCFA (1989)). Expected waiting time for adopting healthy infants from abroad is typically from ten months to two years.² By contrast, the market for foster care adoption is likely characterized by excess supply, as a large number of children in the foster care system are waiting to be adopted each year as we discuss below.

3. History of Child Adoption in the U.S., 1850-2000

To provide the historical background, we briefly describe the evolution of child adoption in the U.S. over the last 150 years.³ The development unfolded roughly in three stages. During the initial stage (circa 1850-1920), starting with the Massachusetts statute in 1851, an increasing number of states enacted adoption laws that established judicial supervision for the adoption of minors and

² Country-specific information on adoption cost and time can be found at the U.S. State Department website: http://travel.state.gov/family/adoption/country/country_369.html.

³ For more details, see Moriguchi (2009).

enabled permanent legal transfer of parental rights from biological to adoptive parents upon court approval.⁴ Despite the efforts by charitable organizations to find adoptive homes for orphaned or abandoned children in large cities, adoptions had remained relatively few in number and informal in nature during the nineteenth century (Sokoloff (1993)). For example, in what is known as the “orphan train movement” in 1854-1904, about 100,000 homeless children in eastern cities were successfully placed on farm communities in the Midwest, but most of them were not formally adopted. The majority of homeless children in cities remained in the care of public or private institutions, where infants faced particularly high mortality rates due to infectious diseases and the lack of wet nurses.

During the next stage (circa 1920-1960), the demand for adoption rose rapidly due partly to the improvements in infant formula, which enabled adoption of new-born babies and infants, and the growing perception that nurture, not nature, was the main determinant of child development. According to Albanesi and Olivetti (2007), the price of infant formula dropped dramatically in the 1930s and 1940s with the introduction of Similac, a leading brand that successfully replicated the nutritional contents of breast milk. By the 1950s, the demand for healthy infants in the U.S. began to exceed the supply (Lovelock (2000), p.912), and adoption agencies matched adoptable children with adoptive parents who shared similar socio-demographic characteristics. Most agencies limited their adoption practice to healthy infants of known background, and children with physical and mental disabilities were considered “unadoptable” well into the 1960s (Hansen (2006a)).

During the third stage (circa 1960-2000), while the supply of adoptable infants within the U.S. declined rapidly, two additional sources of supply became available: foreign-born children and foster care children. First, responding to the large number of WWII orphans abroad, the federal government made the first endorsement of inter-country adoption in 1945 through special legislation, which was followed by similar one-time legislations (Lovelock (2000)). It was not until 1963, however, that Congress passed permanent legislation for inter-country adoption, establishing a special visa category for foreign children adopted by U.S. citizens. Since then, the federal government has gradually liberalized the criteria, increasing the age limit for children to be adoptable and allowing adoption by single parents (Weil (1984)). Second, as the number of children entering the foster care system increased substantially in the 1960s, there were concerns that these children were removed from their homes unnecessarily, and that once they entered the system, insufficient efforts were made to reunify them with their families or to find new adoptive

⁴ By contrast, in England, the first adoption statute was not enacted until 1926.

homes (Murray and Gesiriech (2004)). With the passage of the Adoption Assistance and Child Welfare Act of 1980, the federal government required all states to establish adoption subsidy programs to encourage the placement of foster care children. The act also established an adoption assistance program (“Title IV-E”) that provides states with federal matching funds to assist the adoption of special needs children.

4. Trends in Child Adoption in the U.S., 1944-2001

Our second goal is to survey available aggregate-level data and construct historical trends in U.S. adoption by type. As noted by NAIC (2004) and other adoption specialists, there is no single homogenous data source to estimate the number of children adopted in the U.S. each year. National estimates are made by Zarefsky (1946) and Maza (1984) based on state-level court data by the NCSS for the years 1944, 1951, 1955, 1957-1975. Flango and Flango (1995) combine special studies, court data, and vital records to estimate total adoption for the years 1987-1992. For more recent years, the National Council for Adoption (NCFA) conducted surveys in 1982, 1986, 1992, 1996, and 2002, and provide national estimates. Using similar but slightly different methods, NAIC (2004) also estimates total adoption for 2000 and 2001. Because these studies rely primarily on court records, the data include only formal adoption. The 2000 Census is the first census that asked the number of formally and informally adopted children residing in households, which provides the cumulative stock of adopted children in 2000 as opposed to the annual number of adoptions. No estimates for total adoption are available after 2002. As we discuss below, some micro surveys (e.g., NLSY, PSID, NSFG, and SIPP) do contain questions concerning adoption. Due to the low frequency of adoption, however, it is difficult to construct reliable time trends in adoption from these surveys.

In **Figure 1-a**, we plot total number of adoption in the U.S. from 1944 to 2002 based on the estimates by Maza (1984), Flango and Flango (1995), NAIC (2004), and NCFA (1985, 1989, 1999, 2007). Note that these four separate series are not necessarily comparable due to differences in data and methods. Most important, there is a large discrepancy between the NAIC estimate for 2001 and the NCFA estimate for 2002, making it difficult to establish a recent trend. To resolve this issue, we construct *upper* bound estimates for the NAIC series and *lower* bound estimates for the NCFA series, respectively, using additional data (see “NCFA lower bound” and “NAIC upper bound”

series in **Figure 1-a**).⁵ The two sets of bounds overlap reasonably well, providing some assurance that the true values lie between these bounds. To control for changes in population and fertility over this period, in **Figure 1-b**, we present adoption rates, defined as the number of adoptions per 1,000 live births, from 1944 to 2002. Data limitations notwithstanding, the figure shows that adoption rates in the U.S. increased dramatically from less than 20 per 1,000 births in the early 1950s to over 45 per 1,000 births in 1968-1973. Adoption rates then declined sharply in the 1970s and possibly in the 1980s. As a result, adoption rates in 2002 (32.4 to 37.6 per 1,000 births) are still substantially lower than the historical peak reached in 1971 (47.5 per 1,000 births).

To document the trends in inter-country adoption, **Figure 2-a** presents the number of foreign-born children adopted by U.S. citizens, 1945-2006. U.S. Immigration and Naturalization Service (renamed Department of Homeland Security in 2002) has reported annual data on inter-country adoption since 1962 with the establishment of special visa categories for immigrant-orphans.⁶ Before 1962, there were special one-time legislations in 1945, 1948, 1953, and 1957 that allowed a certain number of immigrant-orphans enter the U.S. and as such, these numbers do not represent annual inflows (Lovelock (2000); Weil (1984)). In **Figure 2-b**, we plot the inter-country adoption rate per 1,000 live births, 1962-2005. The figures show the rise and fall of inter-country adoption in three waves, first in the mid 1970s and second in the mid 1980s, seemingly uncorrelated with the trends in total adoption in **Figure 1-b**. Currently, we are in the midst of the third wave where the number of immigrant-orphans soared from 6,000 (or 1.6 per 1,000 births) in 1992 to over 20,000 (or 5.6 per 1,000 births) in 2004.

In **Figure 3**, we decompose total adoption into related and unrelated adoption from 1951 to 2002 based on Maza (1984) and NCFA (1985, 1989, 1999, 2007). We also plot the estimates for unrelated adoption in 1976-85 by Bachrach et al. (1990) based on National Health Interview

⁵ The difference between the 2001 NAIC estimate and the 2002 NCFA estimate stems largely from the fact that, while the former assume that all inter-country adoptions are included in court data and vital records, the latter assumes that none are included (NCFA (2007), p.79, editor's note). Foreign-born children adopted by U.S. citizens are included in these records only if they are adopted under U.S. state law. Those children who entered the U.S. under an IR4 visa are by federal law required to finalize their adoptions in a U.S. state court. Those who entered under an IR3 visa (whose adoption had been finalized in their birth countries) are not. Even so, government officials recommend IR3 children to be *readopted* in the U.S. to receive additional legal protection. Adoptive parents may incur nontrivial legal costs (\$2,000 or higher) in doing so (CWIG (2004, 2006)). The number of IR3 and IR4 visa entrants are reported in USINS (1982-2002). No data are available as to how many IR3 children are readopted. We obtain lower bounds for the NCFA estimates by subtracting inter-country adoptions from their estimated total. Upper bounds for the NAIC estimates are obtained by adding IR3 adoption to their estimated total.

⁶ The 1962-2005 data do not include 2,911 children from Vietnam who were admitted to the U.S. in 1975 under a special refugee program (Weil (1984), p.289).

Survey (NHIS) data. Because the NHIS series match better with our NCFA lower bound series, we report the NCFA lower bound estimates in the figure. Assuming that all inter-country adoptions are unrelated adoption, we further divide unrelated adoption into domestic and inter-country unrelated adoption. **Table 1** reports the share of related, unrelated, and inter-country adoptions in total adoption for selected years. The percentage of unrelated adoption in total was relatively stable at around 53% in 1955-70, then dropped sharply from 51% in 1970 to 37% in 1975, and resurged recently from 36% in 1982 to 58% in 2002. The percentage of inter-country adoption in total increased steadily from 1.0% in 1965 to 4.4% in 1975, fluctuated between 4% and 9% in 1975-92, and then rose sharply from 5.1% in 1992 to 13.9% in 2002. This increase in inter-country adoption accounts for significant part of the recent surge in unrelated adoption, but not all of it.

How large is stepchildren adoption? Although data are scarce, a large majority of related adoption appears to be stepparent adoption. In 1951, 39% of all adoptions were by stepparents, 12% were by relatives, and 48% were unrelated; and in 1955, 35% of all adoptions were stepparent adoptions, 10% were by relatives, and 55% were unrelated (NCSS (1951, 1955)). In 1992, among 26 reporting states, stepparent adoptions constituted an average of 42% of all adoptions (Flango and Flango (1995)).

To assess the share of foster care adoption in domestic unrelated adoption, in **Figure 4**, we divide domestic unrelated adoption by agency type (Maza (1984); NSFA (1985, 1989, 1999, 2007)). Public agency adoption refers to adoptions arranged by public child welfare agency, while non-public agency adoption includes private agency adoption and independent adoption. We also plot annual estimates for public agency adoption reported by the U.S. Children's Bureau starting in 1990 (VCIS and AFCARS data in USBC (1990-2004)). The figure shows a significant rise in public agency adoption in the 1990s that coincides with the federal initiatives to encourage foster care adoption. In **Table 2**, we report the shares of public agency adoption and inter-country adoption in unrelated adoption for selected years.⁷ In 2002, 44% of unrelated adoption is foster care adoption and 22% are inter-country adoption. Domestic adoption through private agency or individual arrangements accounts for the remaining 34% of unrelated adoption.

Within foster care adoption, limited data suggest that special needs children (i.e., children over a certain age, of a sibling group, of minority race, or with disabilities) comprise a majority in recent years. From 1991-94, the average share of special needs children in public agency adoptions

⁷ No inter-country adoption is arranged through public agency.

ranged from 63% to 82% among the reporting states (USCB (1991-94)). In 2004, 47 states reported that 80 to 100% of public agency adoptions were special needs adoptions (USCB (2004)).

In summary, we find that, in the U.S., (1) the adoption rate in 2002, for both related and unrelated adoption, is still below its historical peak in 1968-73 despite a recent resurgence; (2) the share of unrelated adoption in total adoptions had declined sharply in the 1970s, but has increased over the last decade; and (3) this recent increase in unrelated adoption seems to be driven by the rise in inter-country and foster care adoptions.

5. Understanding Historical Trends in Adoption, 1951-2002

What explains the dramatic increase in the adoption rate for unrelated adoption in the 1960s and its equally dramatic decline in the 1970s? Why is the adoption rate today still substantially below the 1971 level? Why did inter-country adoption become a significant component of total adoptions only in the last decade despite its availability since the early 1960s? Can we attribute the rise in foster care adoption in the 1990s to the change in government policies? To what extent, are inter-country adoption and foster care adoption a substitute for domestic private agency adoption? To better understand the historical trends, we divide the U.S. adoption market into three segments, (1) domestic private agency adoption, (2) inter-country adoption, and (3) foster care adoption, and explore possible demand- and supply-side explanations using historical data.

5.1 Market for Domestic Private Agency Adoption

We first consider the demand-side factors that affect the market for domestic private agency adoption that deals primarily with unrelated adoption of healthy infants. [Revise: also a substantial number of unrelated adoption of infants by public agency and independent arrangements.] A dramatic rise in women's educational attainment and labor force participation since the 1950s has been associated with delayed marriage and childbearing (Goldin and Katz (2002); Caucutt et al. (2002); Olivetti (2006)). **Figure 5** shows that the labor force participation rates for women aged 20-44 had increased sharply from the early 1960s to the late 1980s. **Figure 6** documents a concurrent increase in the age of women at first marriage and at first birth. The dramatic rise in women's educational and occupational attainment implies that interrupting work to bear a child incurs a higher opportunity cost. Indeed, recent studies have found substantial wage premium on delayed childbearing, especially for college educated women and women in highly skilled

professions (Ellwood et al. (2004); Miller (2006); Buckles (2006a)).⁸ Delayed motherhood, however, is in turn associated with higher risk of facing infertility before achieving a desired number of children.⁹ As more women seek both career and family in recent decades (Goldin (2004)), we expect a potentially large increase in the demand for adoptable infants as a substitute for childbearing. In fact, preceding studies have consistently found that women's inability or difficulty in bearing a child is positively related with their likelihood of adoption.¹⁰

At the same time, recent progress in infertility treatment has improved the probability of having biological children for women with fertility problems. Two major advancements are the 1967 FDA approval of fertility drugs, which induce ovulation, and the 1981 introduction of in vitro fertilization (IVF), the most common form of assisted reproductive technology (ART) today.¹¹ As the usage of fertility drugs correlates with the incidents of multiple births, the diffusion of fertility drugs can be inferred, albeit imperfectly, from the changes in multiple birth rates. **Figure 7** plots the ratio of triplet and higher-order multiple births per 100,000 live births in the U.S. from 1971 to 2002. The ratio was nearly constant in the 1970s despite the earlier approval of fertility drugs, and then dramatically increased from the early 1980s to the late 1990s.¹² **Figure 8** presents the number of ART cycles performed and the numbers of resulting live births and deliveries in the U.S. from 1985 to 2003 (note that one delivery may produce multiple births). The figure also plots the success rate, measured by the percentage of ART cycles resulting in live deliveries. The number of ART deliveries has increased dramatically from 3,951 in 1990 to 25,228 in 2000, and the success rate doubled from 13% to 25% during the same period. Improvements in ART led to both the reduction in the monetary cost per delivery and the decline in the risk of multiple births over the last decade

⁸ Miller (2006) finds that an additional year of fertility delay is associated with a 3% increase in hourly wage rates and a 10% increase in lifetime earnings for women.

⁹ For example, the probability of conceiving and delivering a healthy baby for non-contracepting women declines by half from age 25 to age 35 (Van Noord-Zaadstra et al. (1991)).

¹⁰ See Bonham (1977), Bachrach (1983, 1986), Bachrach et al. (1990), Bachrach et al (1991), Chandra et al. (1999), and Hollingsworth (2000). Chandra et al. (1999), however, suggest that this relationship may be weakening over time.

¹¹ ART refers to procedures that involve retrieving eggs from ovaries, combining them with sperms in the laboratory, and transfer them into a woman's uterus or fallopian tube. Artificial insemination, which is not part of ART, has been used to treat infertility since the pre-WWII period with relatively minor technological improvements.

¹² The figure overstates the diffusion of fertility drugs because multiple births increase also with maternal ages and the use of ART (Martin and Park (1999)).

(Toner (2002)). Nevertheless, estimated costs of IVF per delivery in 2006 remain very high, ranging from \$30,000 to \$ 60,000 in 2006.¹³

To what extent, are advanced infertility treatment and adoption substitutes? The ratio of the number of women who delivered their biological children with ART to the number of women who adopted unrelated children domestically has increased from 15% in 1992, 34% in 1996, and to 60% in 2002 (based on the NSFA lower bound estimates for domestic unrelated adoption). In other words, ART likely had a sizable impact on the demand for domestic infants in recent years. To summarize, the continuing trend in delayed childbearing has likely increased the demand for adoptable infants from the 1960s to the 1990s. Starting in the 1980s, however, advancement in ART likely reduced the adoption demand particularly from those individuals with higher income or stronger preference for biological children.

If the adoption market for domestic infants has been characterized by “excess demand” since the 1950s as the historical narrative suggests, then the actual number of unrelated adoption is determined solely by the *supply* of adoptable children. The primary source of the domestic supply of infants has been unmarried (never-married, divorced, or widowed) mothers who relinquish their children for adoption. The number of children born to unmarried women has increased dramatically over the last fifty years (Ventura and Bachrach (2000)), suggesting potentially a large increase in the supply of adoptable infants within the U.S. **Figure 9** presents the number of nonmarital births by race from 1950 to 2000. Nonmarital births to white women in particular increased by a factor of 16 during this period, while that to nonwhite women increased by a factor of 5.5. **Figure 10** shows that the birth rates to unmarried women tripled from 15 per 1,000 unmarried women in 1950 to 45 per 1,000 unmarried women in 1990. The same figure also shows that the percentage of nonmarital births to total births rose steadily from 4% in 1950 to 33% in 1994. **Figure 11** presents birth rate to unmarried women by age groups. For women 15 to 19 years of age, the age group one may consider most likely to relinquish children for adoption, the likelihood of becoming unmarried mothers had increased steadily from 1950 to 1991. From the mid 1970s to the early 1990s, single motherhood has increased in all age groups.

¹³ One cycle of IVF costs \$10,000 to \$15,000 including medications, and, on average, three to four cycles of IVF are required for one live delivery (online information from several infertility clinics). In the U.S., IVF procedures were not covered by insurance except for 6 states as of 1999 (Buckles (2007)).

Clearly, not all unmarried mothers relinquish their children for adoption. To provide a rough proxy for relinquishment rate, **Figure 12** plots the ratio of domestic unrelated adoptions to nonmarital births, 1951-2002. It shows that the ratio was constant at around 25% in the 1950s and 1960s and then fell precipitously in the 1970s to 5%. Using NSFG data, Chandra et al. (1999) report that the percentage of children born to never-married women who were relinquished for adoption declined steadily from 8.7% in the late 1960s to 4.1% in the mid 1970s, 2.0% in the mid 1980s, and 0.9% in the mid 1990s.¹⁴ What determines unmarried mothers' likelihood of relinquishing their children? Nonmarital births can be a result of unintended (i.e., unwanted or mistimed) or intended pregnancies.¹⁵ One would expect much higher relinquishment rates for unwanted births, compared to mistimed or intended births. Therefore, if the diffusion of contraceptive pills among never-married women in the 1970s and the legalization of abortion in 1969-73 disproportionately reduced the number of *unwanted* pregnancies, then one would expect relinquishment rates to fall accordingly.¹⁶ **Figure 13** shows that abortion rate per 1,000 live births increased sharply from 1973 to 1980 and declined steadily in 1980-2000. Brown and Eizenberg (1995) report that 75% of unintended pregnancies to never-married women in 1987 ended in abortion. Using state-level panel data from 1961 to 1975, Bitler and Zaborny (2002) find that, relative to other states, states that repealed abortion restrictions experienced 34% decline in the adoption rates for unrelated white children, concluding that the estimated effect of abortion legalization on adoption rates can account for much of the decline in adoptions during the early 1970s. In other words, the primary cause of the dramatic fall in unrelated adoption in the 1970s was most likely the decline in the domestic *supply* of adoptable infants in the U.S.¹⁷

What explains the continuing decline in relinquishment rates in the 1980s and 1990s? One hypothesis is that relinquishment rates for unwanted births are falling due to declining social stigma attached to single motherhood, improved economic status of women, or the availability of

¹⁴ Due to small sample sizes, these rates are not precisely estimated. White women are much more likely to relinquish than black women (3.2% versus 1.1% in 1982-88), but at the same time, black women are much more likely to give nonmarital births than white women.

¹⁵ For example, Brien (1990) finds that 78% of white single mothers (and 26% of black single mothers) born in 1954 married the biological father of the child within three years of the birth, indicating the prevalence of mistimed, rather than unwanted, births in nonmarital births.

¹⁶ Upon the 1960 FDA approval, oral contraceptives diffused rapidly among married women in the 1960s, but most young unmarried women did not have an access until the early 1970s (Goldin and Katz (2002)). Abortion bans were repealed in seven states in 1969-72 and were stuck down by the 1973 Supreme Court ruling (Bitler and Zaborny (2002)).

¹⁷ By contrast, Medoff (1993), using the 1982 NCFA data, finds no statistically significant effect of the availability of abortion on adoption rates, while Gennetian (1999) finds that restrictive abortion laws reduced (as opposed to increased) relinquishment rates in the 1980s.

government support for single mothers in low income households through the Aid to Families with Dependent Children (AFDC) program.¹⁸ In general, empirical studies have found a negative effect of welfare benefits on marriage and positive effect on fertility for white women, but the magnitude of these effects is heavily disputed (Moffitt (1997)). Using adoption rates as a proxy for relinquishment rates, Medoff (1993) finds a negative effect of AFDC payments on relinquishment rates, while Gennetian (1999) finds no effect. In **Figure 14**, we plot the average monthly AFDC payments per recipient and per family, both expressed in 2002 dollars.¹⁹ The figure shows that, the AFDC payments per family and per recipient peaked in 1969 and 1977, respectively, and have declined in real terms over the last thirty years. Therefore, the changes in the AFDC payments are unlikely to explain the declining trends in relinquishment rates. Another hypothesis is that the share of *intended* births among nonmarital births is rising. The number of adults in nonmarital cohabitation in the U.S. has been increasing steadily since the 1970s (Stevenson and Wolfers (2007)). Unlike in Scandinavian countries, however, the share of nonmarital births to cohabitating couples is relatively small in the U.S., and most out-of-wedlock children live in female-headed single-parent households (Willis (1999)). We thus need further research to understand the recent trends in relinquishment rates.

In summary, the data suggest that the market for domestic private agency adoption has been constrained by the supply of healthy infants available for adoption in the U.S. in the last fifty years. The rise in domestic unrelated adoption in the 1960s may have been driven by the increase in nonmarital births especially to white women in the 1960s. The dramatic decline in adoption rates in the 1970s can be attributed to the fall in relinquishment rates among unmarried women due to the availability of abortion and contraceptive pills both of which reduced the number of unwanted births. The number of domestic private agency adoptions has remained roughly constant in the 1980s and 1990s presumably due to combined effects of rising nonmarital birth rates and falling relinquishment rates.

5.2 Market for Inter-country Adoption

Initially, the demand for inter-country adoption was driven largely by humanitarian motives. After WWII, in addition to a large number of war orphans resulted from the war, U.S. occupational

¹⁸ The AFDC program provided monthly cash assistance to families with needy children who have been deprived of parental support or care due to the absence of their father or mother.

¹⁹ The AFDC program was repealed in 1997 and replaced by the TANF program in 1998.

forces in Asian and European countries produced a significant number of out-of-wedlock mixed-race children in these countries who were placed in orphanages. Increasing public interest in foreign adoptions resulting from these two factors led Congress to pass temporary laws to permit immigration of foreign orphans, such as the 1948 Displaced Persons Act and the 1953 Refugee Act. With the permanent legislation in 1963, prospective adoptive parents who did not meet qualifications (e.g., marital status, age, religious affiliation) for domestic adoption increasingly turned to inter-country adoption. Inter-country adoption also had become increasingly interracial when domestically interracial adoption was not a common practice (Lovelock (2000)). In particular, South Korea became a major source country for foreign adoptions since the Korean War: among some 35,000 immigrant-orphans entering the U.S. in 1963-75, 65% were from South Korea (Weil (1984)).

With increasing acceptance of multiculturalism since the 1970s, inter-country adoption has become closer substitutes for domestic infant adoption over time. **Figure 15** shows that a large majority of inter-country adoption are children aged 0-4 in recent decades, although we have no data on their health or disability status. In particular, the share of infants (age 0 and 1) in total inter-country adoption has increased from 50% in the 1970s to 70% in the 1980s. As in the case of the demand for domestic infants, one may expect the demand for inter-country adoption to increase with delayed childbearing and decrease with the progress in infertility treatment. To see the relationships between inter-country adoption and the use of assisted reproductive technology (ART), in **Figure 16**, we compare the numbers of ART births and deliveries to the number of inter-country adoption in 1985-2003. The number of children born with ART has in fact exceeded the number of children adopted from abroad since 1992. In other words, the recent increase in inter-country adoption is *concurrent* with the even faster increase in ART births. This suggests that either advanced infertility treatment and inter-country adoption are not substitutes, or more plausibly, because the market for inter-country adoption is characterized by excess demand, the reduction in the demand due to ART does not affect the actual number of inter-country adoptions. Moreover, declining search costs through better communication and transportation technology, which likely reduced the monetary and time costs for inter-country adoption, should stimulate the demand for inter-country adoption in recent decades. As we have shown, however, inter-country adoption has grown unevenly over the last forty years. What explains the rise and fall of inter-country adoption documented in **Figure 2**? We now turn to the supply-side of inter-country adoption.

Historically, political and economic crises in sending countries, such as war, famine, and regime changes, appear to have been a major factor in determining the number of children available for (or in need of) foreign adoption. More recently, legal reforms or policy changes in sending countries also became an important factor (Selman (2002)). To examine this hypothesis, **Figure 17** presents the number of inter-country adoption by source country from 1990 to 2006. It shows that a sudden jump in inter-country adoption in 1991 is caused by an inflow of 2,600 children from Romania after the 1989 collapse of the communist regime that exposed the country's overcrowded orphanages. Similarly, the recent surge is almost entirely driven by policy changes in Russia, China, and Guatemala.²⁰ Most notably, the introduction of the one child policy in China in 1979 resulted in a large annual inflow of unwanted healthy infants, predominantly girls, to state orphanages. Since China allowed adoption by foreigners for the first time in 1992, it has become a major source of inter-country adoption for U.S. citizens. Russia, which permitted foreign adoption in 1990, became a major sending country as it experienced prolonged economic crisis after the 1991 dissolution of the Soviet Union. The decline in inter-country adoption in the U.S. in 2004-06 is also triggered by recent policy changes in Russia and China.²¹

To summarize, inter-country adoption in the U.S. has increasingly become a substitute for domestic adoption over the last forty years due likely to (1) growing acceptance of inter-racial adoption and (2) rising supply of healthy infants from source countries such as China. As the demand for inter-country adoption exceeds the supply, the recent changes in inter-country adoption can be accounted almost entirely by the supply-side factors.

5.3 Market for Foster Care Adoption

Finally, we turn to the market for public agency adoption. We first examine the supply-side of foster care adoption. Children are placed in the public foster care system, temporarily or permanently, either by court order for the case of abuse or neglect (involuntary surrender) or when parents are unable to care for their children due to medical, emotional, or financial reasons and voluntarily surrender their parental rights. For this reason, in recent decades, children in foster care come disproportionately from disadvantaged families and may suffer from physical, mental,

²⁰ Surprisingly, South Korea remains to be a major sender today despite the country's high income per capita and fertility rates that are below replacement rates. This is attributed to historical path-dependence (e.g., high quality orphanages, established procedures), persistent social stigma attached to single motherhood, and strong cultural preference for adopting biologically related children (Selman (2002); Lee (2007)).

²¹ "China Tightens Adoption Rules for Foreigners," December 20, 2006, *New York Times*.

learning, or emotional disabilities or are considered to be at risk of developing these conditions. [This might not have been the case in earlier decades. In the 1960s and 1950s, public agency adoption and private agency adoptions seem to have been closer substitutes.]

The number of children in the public foster care system has grown from 193,000 in 1950, 234,000 in 1960, 303,000 in 1980, 406,000 in 1990, and to 552,000 in 2000 (Bar (1992); USCB (1990-2000)). **Table 3** compares the characteristics of children in foster care by their status in 2000, a representative year in 1998-2005. Among the 552,000 children in foster care, 38% were non-Hispanic white and 39% were non-Hispanic black; only 9% were infants aged 0-1; and 4% were placed in pre-adoptive homes, 25% in related foster homes (i.e., foster parents are relatives of the child), and 47% in unrelated foster homes. Not all foster care children are available for adoption. Among the 272,000 children who exited foster care in 2000, 57% were reunified with their birth parents, 17% were adopted, 10% lived with their relatives, and 7% were emancipated.

Foster care children are classified as “waiting to be adopted” (a proxy for the supply of adoptable foster care children) if parental rights of their birth parents are permanently terminated. In 2000, the number of such children was 131,000 with a mean age of 8.1. As **Table 3** shows, the waiting children were more likely to be non-Hispanic black, aged 2 to 12, and more likely to be placed in pre-adoptive or foster homes, compared to the entire foster care population. Although data are not available, a large majority of the waiting children are “special needs” children defined by states, i.e., children above a certain age, of ethnic or racial minority, of members of a sibling group, or with disabilities.

Who adopt children from the foster care system? **Table 3** shows that, among the 51,000 children adopted in 2000, 21% were adopted by relatives who were not foster parents prior to adoption, 18% by unrelated individuals who were not foster parents prior to adoption, and 61% by former foster parents. Assuming that 75% of foster parents are non-relatives (as in the case for children waiting to be adopted), 64% of foster care adoption was *unrelated* adoption. The adopted children are less likely to be non-Hispanic black and between age 2 and 8 compared to the waiting children. Importantly, 93% of the children shared the same race with at least one of their adoptive parents, suggesting that inter-racial adoption is still relatively rare in foster care adoption (USCB (2006)). Although the percentage of the adopted children to the waiting children has increased from 30% in 1998 to 46% in 2002, the supply of adoptable foster care children is still far greater than the demand.

Adoptive parents for special needs children are often described as having “a big heart and limited resources” (Bower and Law (2002), p.8), referring both to their humanitarian motives and financial constraints they face. As such, one may expect adoption subsidies to affect the demand for foster care adoption. Upon the passage of the 1980 Adoption Assistance and Child Welfare Act, the federal and state governments jointly established an adoption assistance program that would provide monthly subsidy to adoptive parents of special needs children until the child reaches age 18.²² The act not only removed the disincentives for states to provide adoption assistance for children in foster homes who receive federal aid for foster care maintenance payments, but also destigmatized adoption assistance by basing the eligibility for subsidy mainly on the child’s characteristics as opposed to family income (Hansen (2006b)). **Figure 18** presents the average monthly number of the recipients of adoption assistant payments from 1981 to 2002, as well as the average monthly federal expenditure on the program. In 1990, the federal government monthly paid \$200 per family to match state grants, supporting total 44,000 adoptive families; the equivalent figures rose to \$300 and 286,000 families by 2002. States determine the amount of adoption assistant payments on case-by-case basis taking into account the needs of the child and the adoptive parents. **Table 4** presents the number of public agency adoption, the percentage of adoption eligible for adoption assistance payments, and the average monthly payments received by eligible families, from 1996 to 2002. In 2000, 75% of foster care adoptions were eligible for the payments, receiving on average \$460 of monthly subsidy. Does the adoption subsidy increase the number of foster care adoption? Using state-level data in 1996-97, Hansen and Hansen (2006) find positive correlations between adoption subsidies and the demand for public agency adoption, while Dalberth et al. (2005) find no correlations in the 2001 data.²³

To what extent, is foster care adoption a substitute for infant adoptions domestically and internationally? Given the systematic difference in the characteristics of adoptable children in foster care and at domestic private agency, despite much lower monetary costs for foster care adoption, one may expect a low degree of substitutability between the two.²⁴ Depending on source

²² The 1997 Adoption and Safe Families Act further established an adoption incentive program where federal government provides states with incentive payments of \$4,000 (or \$6,000 for special needs) for each child adopted over the baseline number (NCFA (2007)).

²³ Buckles (2006b) questions the validity of these OLS estimates, pointing out that adoption subsidies are endogenous to the characteristics of adopted children, adoptive parents, and social workers.

²⁴ Prospective adoptive parents’ preferences may be flexible, however. According to the 1995 NSFG survey, among the women who seek to adopt, even though only 25% (or 5.5%) would prefer to adopt a child with mild (or severe) disabilities, 83% (or 33%) were willing to accept a child with mild (or severe) disabilities.

countries, inter-country adoption may be a closer substitute. Although empirical studies are scarce, using state-level data, Hansen and Hansen (2006) find that foster care adoption is strongly and negatively correlated with inter-country adoption, but only weakly and negatively correlated with private agency adoption.

6. Empirical Analysis of Adoption Demand and Supply using Micro Data

The final objective of this paper is to analyze the demand for, and supply of, adoptable children in the U.S. using micro (individual-level) data. Preceding studies on adoption demand using micro data are relatively scarce and primarily in the field of sociology and demography. Most studies (e.g., Bonham (1977); Bachrach (1983, 1986); Poston and Cullen (1986, 1989); Bachrach et al. (1990); Bachrach et al. (1991); Chandra et al. (1999); Hollingsworth (2000)) use single-year cross-sectional data from the NSFG or the NHIS and compare the characteristics of adoptive and non-adoptive women (or adoption seeking and non-adoption seeking women). The common findings are that adoptive (or adoption seeking) women are on average more likely to be white, married, older, religious, fecundity impaired, better educated, and have higher income. Most of these results are descriptive, however, and only a handful of studies employ multivariate regression analysis (e.g., Poston and Cullen (1986, 1989); Bachrach et al. (1991); Hollingsworth (2000)). The empirical literature on adoption supply using micro data is even scarcer.²⁵ Two studies, Bachrach (1986) and Chandra et al. (1999), use single-year cross-sectional data from the NSFG. Their analyses are purely descriptive due to small sample sizes that preclude the use of multivariate analysis.

In other words, the previous studies have mostly used descriptive statistics instead of multivariate analysis, have focused on a single cross-section without exploiting across-time variation in the data, have examined unrelated adoption without distinguishing adoption types (i.e., domestic, inter-country, and foster care adoption), and have not explicitly formulated or tested hypotheses concerning the determinants of adoption demand and supply. To overcome these limitations, in this paper, we use more rigorous econometric analysis and two complementary micro datasets, the National Survey of Family Growth (NSFG) and the Survey of Income and Program Participation

Similarly, while 58% of women expressed a preference for adopting an infant less than 2 years of age, 28% did the same for a child aged 2-5, and only 6.8% did the same for a child aged 6-12, 86% said they would accept a child aged 2-5 and 56% said they would accept a child aged 6-12 (Chandra et al. (1999)).

²⁵ As discussed in the previous section, several economists have used aggregate state-level data to study adoption supply (i.e., Bitler and Zavodny (2002); Medoff (1993); Genettian (1999)).

(SIPP), to estimate individuals' propensity to adopt a child and to relinquish a child for adoption.

6.1. Data and Empirical Methods

The National Survey of Family Growth (NSFG), conducted by the National Center for Health Statistics, consists of six cycles of repeated cross-sectional data in 1973, 1976, 1982, 1988, 1995 and 2002. Through personal interviews, the data were collected from a nationally representative sample of women of childbearing age (15 to 44 years old).²⁶ As we elaborate below, the sampling universe has expanded slightly over time, including 7,600 to 11,000 women in each cycle.

The primary strength of the NSFG is the availability of detailed information on marital and fertility history and reproductive and sexual health of women (e.g., pregnancy, miscarriage, abortion, contraceptive use, fecundity status, infertility treatment), in addition to basic socio-demographic characteristics. In particular, in all cycles, women are asked if they have ever adopted a child. In the last two cycles, women are also asked if they consider adopting a child, and if so, if they have taken any steps toward adopting a child, which enable us to study not only *fulfilled* demand but also *potential* demand for adoption. To the extent that fulfilled demand is constrained by the supply of adoptable children, the analysis of potential demand should provide better identification. Furthermore, in the last three cycles, we can distinguish different types of adoption, i.e., unrelated adoption, related adoption, stepchildren adoption, and foster care adoption.²⁷ Last but not least, starting in the second cycle, women are also asked if they have ever relinquished a child for adoption. To our knowledge, the NSFG is the only micro data source based on a national survey that provides information on child relinquishment.

The Survey of Income and Program Participation (SIPP), conducted by the U.S. Census Bureau, consists of 13 waves of panel data from 1984 to 2004, with a national sample of 12,000 to 44,000 households in each wave.²⁸ The SIPP provides rich information on individual household members, including spouses, partners, and cohabitating children. In addition to demographic characteristics, it also provides detailed information on individuals' labor market status (e.g. hours worked, wages, work history, occupation), sources of income and assets, and their participation in various welfare programs. Using the household relationship topical module, which elicits relationships between all

²⁶ To protect privacy, part of the interview was conducted through audio-assisted self interview.

²⁷ We cannot identify inter-country adoption in NSFG data.

²⁸ The duration of each panel is short (one to four years).