

# UC Santa Barbara

## UC Santa Barbara Previously Published Works

**Title**

Canadian contributions to family economics

**Permalink**

<https://escholarship.org/uc/item/1sd3r6xh>

**Journal**

Canadian Journal of Economics/Revue canadienne d'économique, 50(5)

**ISSN**

0008-4085

**Authors**

Lundberg, Shelly

Siow, Aloysius

**Publication Date**

2017-12-01

**DOI**

10.1111/caje.12299

Peer reviewed

## Canadian Contributions to Family Economics

Shelly Lundberg and Aloysius Siow<sup>1</sup>

April 9, 2017

The study of the family as a branch of mainstream economics began with a series of papers in the 1970s by Gary Becker and his collaborators.<sup>2</sup> Particularly important was a set of papers published as a *Journal of Political Economy* supplement on *New Economic Approaches to Fertility* in 1973. In “A Theory of Marriage: Part I” (1973), Becker first outlined his theory of the marriage market, in which men and women assess the gains to marrying a partner with particular attributes relative to the value of remaining single. In “Part II” (1974), he extended this model to consider the effect of “love” on marriage market equilibrium, polygamy as a possible market outcome, the implications of marital sorting for economic inequality, and the role of dating in a market with imperfect information. In the same *JPE* supplement, Robert Willis presented a comprehensive model of fertility demand, investments in children, and household time allocation. Also in 1973, Becker and H. Gregg Lewis published “On the Interaction between the Quantity and Quality of Children,” formalizing a suggestion advanced in Becker (1960) that “an increase in income should increase both the quantity and quality of children, but the quantity elasticity should be small compared to the quality elasticity.” The economic study of divorce began in 1977, when Becker, Elisabeth Landes, and Robert Michael constructed a model of marital dissolution as an outcome of uncertainty in a utility-maximizing marriage market.

By the time the first edition of Becker’s book *A Treatise on the Family* was published in 1981, research on the family as an economic construct and a context for economic choices was well-established. The chapters in this book lay out the key themes of early family economics: specialization

---

<sup>1</sup> We thank a referee for useful references.

<sup>2</sup> Earlier work includes Richard Easterlin’s studies of historical changes in birth rates (1968) and T. Paul Schultz on family planning (1969), but the theoretical structures provided by Becker and others in the early 1970s proved to be very influential.

and exchange in households and the gender division of labor, altruism in the family and family utility functions, assortative mating in marriage markets, fertility and investments in children. In the decades to follow, Canadian economists and scholars in Canadian universities made substantial contributions to the literature in this new field.

#### **A. Explaining marital matching and its changes**

Since the seventies, marriage rates have fallen in both Canada and the U.S. This decline was accompanied by an increase in cohabitation and non-marital childbearing and divorce rates that, in the case of the U.S., surged after the passage of unilateral divorce laws and then stabilized. Overall, the prevalence of families with a married or cohabiting couple in both countries has declined. These dramatic changes in marital behavior have prompted a flood of studies by economists, both theoretical and empirical.

One strand of this literature builds on Becker to construct empirically tractable and behavioral models of marriage matching. To a marriage market participant, different types of individuals of the opposite gender are spousal substitutes. A behavioral model must allow for substitution effects but the more substitution effects there are, the more challenging it is to estimate such models. As a practical matter, demographers have primarily estimated marriage matching models which do not admit substitution effects (eg. Robert Schoen (1981)). More recently, economists have found a class of marriage matching functions which admits substitution effects for every type of marriage market participant and is also empirically tractable. John Dagsvik (2000), Eugene Choo and Aloysius Siow (2006; hereafter CS) provided a non-transferable utility and transferable utility marriage matching functions, respectively. Ismael Mourifié and Siow (2017) integrated both models to provide a large class of marriage matching functions which allows for peer and scale effects in marriage matching as well as

cohabitation. CS showed that the legalization of abortion in the US lowered the gains to marriage and thus reduced the US marriage rate. This result is consistent with the provocative analysis of George Akerlof, Janet Yellen, and Michael Katz (1996), who argued that increased control over births led to an increase in single parenthood because it reduced the need for men to agree to marriage and children in order to obtain premarital sex. Loren Brandt, Siow and Carl Vogel (2016) used the CS model to show that individuals who were born during the 1960 famine in China had poor health as adults and were discriminated against in the marriage market. Instead of men marrying women on average 2.5 years younger, members of the famine-born cohort, who were scarce, disproportionately married each other. While there has been a general increase in individuals with the same education marrying each other, Ismael Mourifié and Siow (2017) showed that there is no significant increase in general positive assortative matching in marriage by education in the US in recent decades, a result well known to sociologists (Christine Schwartz, 2013). They also provided evidence of scale and peer effects within a marriage market.

Raquel Fernandez, Nezih Guner, and John Knowles (2005) presented the first equilibrium model of positive assortative matching by spousal education and earnings inequality. They show that the correlation in spousal education and earnings inequality are positively related across countries. Elizabeth Caucutt, Guner, and Knowles (2002) argue that high ability women, due to their higher wage rate, will have fewer children and spend less time with them compared with low ability women. Because they expect to have fewer children, they are more selective about the men that they are willing to marry, leading to positive assortative matching in spousal abilities and a delay in the age of marriage relative to lower ability women. Gillian Hamilton and Siow (2007) estimated an equilibrium model of differential fecundity, age of marriage and positive assortative matching by social status for 18<sup>th</sup> century Quebecers.

Some observers argue that the recent increase in earnings inequality in the US has led to the decline in marriage (e.g. June Carbone and Naomi Cahn (2014)). Using the CS model, Kristen Cornelson and Siow (2016) showed that this effect is quantitatively unimportant in explaining the decline in marriage. There was a negative relationship between male earnings inequality and marriage rates across states in 1970. But this negative relationship explained at most 5% of the 38% drop in the national marriage rate.

Starting with Elizabeth Peters (1986), economists have studied the effects of changes in divorce laws on divorce.<sup>3</sup> “Fault” or mutual consent divorce regimes imply that both spouses must consent to the divorce unless one party can show “fault” on the part of the spouse. “No fault” or unilateral regimes means that a divorce may be granted if one spouse wants to end the marriage without having to demonstrate fault on the other spouse, reducing the cost of divorce. Stephane Méchoulan (2006) finds that the change from fault to no-fault divorce increased the odds of divorcing for couple who married before this change, but that couples who marry after this shift marry later and more selectively. Increased selectivity reduces divorce, and offsets the direct effect of the divorce regime change.

In recent surveys, Betsey Stevenson and Justin Wolfers (2007) and Shelly Lundberg and Robert Pollak (2007) attribute declining rates of marriage to economic forces that have decreased the surplus value of marriage relative to remaining single. Reliable birth control has reduced the cost of delaying marriage and, by encouraging women to remain in school longer and invest in professional careers. This has contributed to the decrease in the gender wage gap which, along with improvements in household technology and an expanding market for goods and services that substitute for home production, have reduced the traditional gains from specialization and exchange within marriage.

---

<sup>3</sup> The empirical research on changes in divorce laws cited here use U.S. data because Canadian law on divorce operates primarily at the federal level.

Lundberg, Pollak, and Jenna Stearns (2016), addressing the growing socioeconomic divide in marital behavior, note that, though declining gender specialization has reduced incentives to commit to a long-term marital relationship, the persistence of marriage among college-educated couples may be attributed to their continued intense investments in children.

## **B. Household Decision-making and Spousal Bargaining**

One of the fundamental questions facing family economics is how to reconcile the standard economic model of a utility-maximizing individual with observable decisions, such as consumer expenditure and labor supply, that emerge from multi-person households. For many years, that gap was bridged by the unitary model of the household. This model postulates a family that acts as though it is a single agent with a utility function that depends on the goods and leisure consumed by each family member. First discussed by Samuelson (1956) as a “consensus” model of the family, the unitary model has a number of shortcomings. It cannot be used to analyze the formation or dissolution of marriages, nor the distribution of resources within the family. In addition, the model has some very strong implications, such as symmetry of cross-price effects and income pooling, which do not hold up well under empirical testing.

The dominance of the unitary model as a theoretical framework for family studies began to fade with the introduction of game-theoretic models in which two individual agents (spouses) bargain over marital outcomes. In Manser and Brown (1980) and McElroy and Horney (1981), marriage is treated as a cooperative game: husbands and wives have independent preferences and their (possibly) conflicting interests are resolved according to a Nash or some other explicit bargaining solution. The solutions of these cooperative games depend upon the consequences of a failure to reach agreement—the threat point—and early spousal bargaining models specify the end of the marriage as that fall-back. “Divorce-

threat” models of marriage provide a route for individual resources to affect the wellbeing of men and women within marriage, since they are likely to affect maximal utility levels outside the marriage.

Cooperative bargaining models, as well as the collective model of the household developed by Pierre-André Chiappori (1988, 1992), assume that the outcome of household decision-making will be efficient. In contrast, Frances Woolley (1988) presented a novel model in which spouses, though interdependent through caring preferences and household public goods, are unable to bargain cooperatively, and a non-cooperative equilibrium such as Cournot-Nash is the outcome. Following a suggestion in Woolley, Lundberg and Pollak (1993) develop a “separate spheres” model in which a non-cooperative equilibrium with gender-specialized provision of public goods is the threat point in a cooperative bargaining framework. They argue that a non-cooperative, inefficient equilibrium provides a more realistic default for marital bargaining than does the costly alternative of divorce. In the separate spheres model, a redistribution of control over income between spouses, even if it has no implications for individual wellbeing outside the marriage, can affect intra-household distribution. Zhiqi Chen and Woolley (2001) develop this type of non-cooperative threat model further in a generalized Nash framework that includes bargaining over transfers within the household.

Static bargaining models such as these imply that individual control over economic resources can affect the distribution of wellbeing within a household. Dynamic bargaining models allow for multi-stage games in which decisions made in one period affect future bargaining. Lundberg and Pollak (2003) show that if a two-earner couple makes a joint location decision that affects future income and bargaining power, inefficient outcomes can result unless the couple is able to make binding commitments to refrain from exploiting future bargaining advantages. Using a dynamic model in which first-period labor supply increases second-period wages, Elisabeth Gugl (2009) examines the effects of alternative tax systems (individual taxation vs. income splitting). She finds that income-splitting, as

expected, tends to increase the level of household specialization but that the impacts on individual wellbeing can vary.

Alternative models of household decision-making have distinct implications for observed household behavior, and Canadian economists have contributed to rigorous empirical testing of these restrictions. A great deal of attention has centered on the “income pooling” property implied by unitary models, in which the effect of income flows on expenditure patterns should be independent of the income source or direct recipient. Shelley Phipps and Peter Burton (1998) show that female and male incomes have different marginal effects on the expenditures of Canadian households. They find, for example, that spending on restaurant meals is more elastic with respect to women’s earnings than to men’s earnings and that child care expenses are increasing only in women’s earnings. Lundberg, Pollak, and T. J. Wales (1997) re-examine the pooling hypothesis in the context of an exogenous change in income control within households—a change in U.K. child benefit payments from a tax allowance applied to the primary earner’s paycheck to a direct payment to mothers. They find evidence that a shift towards greater spending on women’s clothing and children’s clothing relative to men’s clothing coincided with this intra-household income redistribution from men to women. Bernard Fortin and Guy Lacroix (1997) also reject income pooling in a structural setting.

Chiappori’s collective model of the household, in which the household is assumed to maximize a weighted sum of individual utilities, imposes additional restrictions on observed expenditures and Martin Browning, with several collaborators, has tested these restrictions on cross-sectional consumption data from several countries. Francois Bourguignon, Browning, Chiappori and Valerie Lechène (1993) reject the income pooling hypothesis using French consumption data and also fail to reject an additional restriction of the collective model, that the ratio of the marginal propensities to consume with respect to the incomes of two household members must be constant across goods. In



Browning et al. (1994), the same authors hypothesize that the bargaining weights of individual household members are functions of characteristics such as relative ages and incomes, and show that this is supported in Canadian consumption data. Browning and Chiappori (1998) show that the collective model also implies that demands satisfy a generalization of Slutsky symmetry, and fail to reject this restriction with data on two-person household consumption from Canada. A full characterization of testable restrictions of the collective model and conditions for identification of the intrahousehold sharing rule is provided in Bourguignon, Browning, and Chiappori (2009).

Many tests of alternative models of household decision-making focus on identifying “assignable” goods that are consumed by one household member and can be treated as private goods. Acquiring a more complete picture of how household resources are distributed is challenging because the consumption of many goods is measured only at the household, not individual, level and others are shared public goods. Woolley and Judith Marshall (1994) compare alternative measures of the extent of inequality within households, including inequality in money incomes and inequality in control over household finances and decision-making, finding that these estimates do not imply a single indicator of intra-household allocation. Phipps and Burton (1995) find that alternative assumptions about the degree of resource sharing within families yield very different measures of individual poverty. Following an approach very different from these bounding exercises, Geoffrey Dunbar and Krishna Pendakur, with Arthur Lewbel, (2013) identify the share of household resources received by children by placing semiparametric restrictions on individual preferences and observing how expenditures on private goods vary with income and family size. Applying this technique to households in Malawi, they find that standard poverty indices understate the prevalence of child poverty.

The sharing of resources across generations is also economically significant, particularly in developing countries. Joseph Altonji, Fumio Hayashi and Lawrence Kotlikoff (1992, 1997) showed that

American parents transfer about 13 cents to their child when their child loses a dollar worth of earnings. This is far less than what is implied by the unitary model of the family. In developing countries, although still lower than what the unitary model would predict, the redistributive transfers are larger. Loren Brandt, Siow and Hui Wang (2015) showed that rural Chinese parents transfer 0.47 yuan to a son as a marital gift if another son has 1 yuan more of schooling investment.

### **C. Economic behavior in a family context**

#### 1. Labor supply

Women's labor force participation, which had been rising since 1950 in both the U.S. and Canada, began to accelerate in the 1970s. Employment among women aged 25-34, including mothers with young children, grew particularly rapidly in this decade, marking a notable departure from the rigid gender roles inherent in the Becker household model. Interest in analyzing both the changes and the variability in women's labor supply rose sharply among economists, and neoclassical models of individual labor supply seemed inadequate as a foundation for such analysis. The labor supply decisions of married women were clearly interdependent with those of their husbands, and the time allocation problem involved not just a tradeoff between income and leisure, but also a balancing of domestic responsibilities, including housework and child care.

The empirical literature on married women's labor supply in the early 1980s featured substantial contributions from Canadian scholars. Early empirical challenges included simultaneous estimation of labor supply and fertility behavior and incorporating the dramatic heterogeneity in the labor force attachment of individual women. In 1980, "Female Labor Supply and Fertility in Canada" by Geoffrey Carliner, Christopher Robinson, and Nigel Tomes was published in the *Canadian Journal of Economics*. Using the 1971 Canadian Census, they estimate a model of labor supply and completed

fertility as functions of own wages, husband's wages, religion, language, and province of residence. With the same data, Robinson and Tomes (1982) estimated a similar model that allowed for two groups of families, distinguished by whether the wife ever worked in the labor market. They find that the results from this two-regime model differ substantially from those generated by a conventional model.

In 1986, the first *Handbook of Labor Economics* included a chapter on women's labor supply by Mark Killingsworth and James Heckman. The foundation for this chapter was a set of unitary "family" labor supply models with multiple family members and household production that contrasted with the individual labor supply model used in the chapter on men's labor supply. Killingsworth and Heckman's discussion of female labor supply elasticities is based primarily on recent Canadian studies whose findings deviated from earlier studies that had found large positive female labor supply elasticities, both in absolute terms and relative to male wage elasticities. Masao Nakamura, Alice Nakamura and Dallas Cullen (1979), Nakamura and Nakamura (1981), Martin Dooley (1982), and Robinson and Tomes (1985) all found uncompensated elasticities (conditional on participation) of -0.30 or less, implying a backward-bending supply curve for women similar to that of men.<sup>4</sup> These results indicated that the contrasting trends in the labor supply of men and women result from a more elastic wage response of female participation, relative to male participation, rather than more elastic hours responses among workers.

Nakamura and Nakamura extended their analysis in a book, *The Second Paycheck: A Socioeconomic Analysis of Earnings* (1985), that presents dynamic labor supply models for men and women based on U.S. longitudinal data. These dynamic models demonstrate the importance of heterogeneity in labor force attachment and selection bias in estimates of female labor supply parameters and show that only recent labor market history is important for predicting current labor

---

<sup>4</sup> Dooley (1982) also reports large positive elasticities for some age/race groups.

supply. In later work, Nakamura and Nakamura (1992, 1994) focused on the estimation of the effects of children on female labor supply, showing that the results are sensitive to modelling choices.

In both unitary and collective family models, the labor supplies of husbands and wives are jointly determined. Though most studies of joint labor supplies employ a standard labor-leisure tradeoff, T. J. Wales and A. D. Woodland (1977) formulate a novel model of household time allocation in which husbands and wives divide their time between market work, housework, and leisure. They find that estimates of labor supply elasticities differ substantially from more traditional models in which leisure is measured as time not working. Lundberg (1988) estimates labor supply functions for husbands and wives as a dynamic simultaneous equations system with covariance restrictions, and finds no evidence that spousal labor supplies are jointly determined except for couples with young children. Other studies have focused on the labor supply responses of wives to changes in husbands' wages and employment status. Rene Morissette and Feng Hou (2008) use both micro data and grouped data to estimate the cross-wage elasticities of married women's labor supply in Canada during the 1980s and 1990s, and Lundberg (1985) finds evidence of an added-worker response to husband's unemployment in the labor market transitions of married women. Tammy Schirle (2015) finds that the Canadian universal child care benefit has significant negative effects on the labor supply of married men and women, with particularly large effects on the participation and work hours of less-educated mothers.

Unbiased estimates of labor supply parameters are important for predicting the impact of policies at both the federal and provincial levels. Many Canadian studies of female labor supply estimate the effects of child care costs, and child care policies, on the participation and work hours decisions of mothers. Gordon Cleveland, Morley Gunderson, and Douglas Hyatt (1996) examine the effects of child care costs and wages on the joint decision of women with preschool children to engage in market work and purchase market childcare. Lisa Powell (1997, 2002) also estimates the effect of

childcare prices on married mothers' labor supply and then extends this analysis to jointly estimate employment and childcare mode choices. In the latter model, simulations are used to estimate the impacts of wage subsidies, targeted childcare subsidies, and unconditional childcare subsidies on labor supply decisions and child care mode. Baker and Milligan (2010) find that expansions in Canadian maternity leave entitlements have large impacts on maternal time at home in a child's first year of life.

Pierre Lefebvre and Philip Merrigan (2008) take advantage of a dramatic universal-access childcare policy introduced in Quebec in 2000, which reduced the price of care for children aged 4 to \$5.00 per day. They document both substantial short-term increases in mothers' labor supply and, in Lefebvre, Merrigan, and Matthieu Verstraete (2009), longer-term effects, relative to other provinces, as new facilities were created and the child age of eligibility was reduced. Michael Baker, Jonathan Gruber, and Kevin Milligan (2008), studying the same Quebec childcare policy, confirm the increase in maternal labor supply, but also find negative impacts on child and parent health and behavior. A reassessment of the policy by Lefebvre, Merrigan, and Francis Roy-Desrosiers (2011) concludes that the structure of the program provided parents with strong incentives to use long hours of childcare for very young children, and recommend changes in the childcare policy.

Not surprisingly, most of the studies of labor supply decisions in a family context have focused on the employment and work hours of married women. Economic analysis of family influences on the labor supply of men has concentrated on the positive association between marriage and men's employment, hours, and wages. A few studies, however, have used panel data to document the impact of children on the work hours of fathers (Lundberg and Elaina Rose, 2000) and, in particular, the differential effects of sons and daughters on men's labor supply behavior. Lundberg and Rose (2002) find that the work hours and wages of American fathers rise substantially more in response to the birth

of a son than to the birth of a daughter, and Hyung-jai Choi, Jutta Joesch, and Lundberg (2008) find similar results for German fathers.

## 2. Human Capital

In 1970, more men graduated from college than women in every country. Since then, the educational attainment of women has increased relative to men such that today, there are more female college graduates than male college graduates in the United States, Canada, Argentina, Israel and many other countries (E.g. Fortin, Oreopoulos and Phipps 2015). We expect the decreasing gender wage premium to shrink the gender education gap, but this overtaking is harder to explain. Married women still work less than their husbands. Siow (1998) pointed out that due to differential male and female fecundity, mothers prefer to invest more in current children than their fathers which means that married men work more than their wives. Consistent with the higher remarriage rate of divorced men relative to their ex-wives, divorced men have higher earnings relative to their ex-spouses to attract another spouse/child. Zhang (2016) argues that because women work less when they have children, high income women are relatively scarce in the marriage market. If there are gains to positive assortative matching in the marriage market by income as say conjectured by Lundberg and Pollak (2007), the relative scarcity of high earnings women will create a relatively higher return to women for obtaining a university degree. This hypothesis deserves empirical investigation because it provides a mechanism about why women may acquire more schooling than men even though women are likely to work less in the labor market.

Claudia Goldin and Lawrence Katz (2002), and Bailey (2006) have argued that access to birth control technologies increased the relative demand for human capital accumulation by girls relative to boys in the U.S. Murat Iyigun and Jeanne Lafortune (2016) have a more nuanced view. Given the

widespread over taking of female college graduation rates to male college graduation rates across many countries, such country-specific events cannot be the full explanation. Kirsten Cornelson (2016) provides some evidence that there may be cultural effects on schooling attainment. Using across city and time data, she showed that the popular television show, “The Cosby Show”, which focused on a successful black doctor and his family, significantly increased the educational attainment rates of black males during its initial run on television.

### 3. Location Decisions and Intergenerational Transfers

In 2000, Dora Costa and Matthew Kahn documented a substantial increase since 1940 in the proportion of college educated couples residing in large U.S. metropolitan areas. They argue that the source of this trend is not simply a result of the increasing urbanization of the college educated, but also due to the growth of dual career couples. The joint co-location problem faced by these “power couples” is solved most easily in the dense labor markets of big cities. Janice Compton and Pollak (2007) revisit this question and find that, although the Costa and Kahn hypothesis predicts that power couples should be more likely to migrate to large cities than power singles, this does not appear to be true. Instead, migration decisions depend only on the education of the husband, and the observed trends in college-educated couple location result from high rates of power couple formation in large cities. Katrine Løken, Kjell Erik Lommerud and Lundberg (2013) use administrative data to examine intergenerational location patterns in Norway. Although resource flows across generations, including childcare and eldercare, are particularly important between women and their mothers, they find that young couples tend to live closer to the husband’s parents than to the wife’s. This surprising result seems to be due to the very low mobility of young men without a college degree, particularly in rural areas.

Compton has also examined the impact of intergenerational family proximity and the patterns of caregiving it implies, on the labor supply of women in Canada and the U.S. Compton and Pollak (2014) find that the employment rates of American married women with young children are substantially higher if they live close to their mothers or their mothers-in-law, who may provide either regular childcare or insurance against the disruption of a childcare arrangement. In Compton (2015), she finds similar effects of proximity to mothers on the labor supply of married women with young children, and also impacts on single mothers. Single women without young children who co-reside with their mothers, and who are therefore more likely to be responsible for the care of an elderly parent, have lower rates of labor market attachment than those who do not. Care of the elderly is also examined by Løken, Lundberg, and Julie Riise (2017), who find that an expansion of formal eldercare in Norway reduces the use of insured sick leave by adult daughters, suggesting that this program is used to increase the flexibility of women's employment.

#### 4. Fertility and Child Wellbeing

An economic model of the demand for children predicts that fertility will increase when the price of raising children falls. There is little consistent evidence, however, that policies such as child benefits and tax allowances, intended to encourage larger families, have successfully done so. Studies of the effectiveness of pronatalist policies have found it difficult to distinguish between quantum effects on completed family size and tempo effects that alter the timing of fertility but leave the total number of children unchanged. A couple of Canadian studies have used generous pronatalist efforts in Quebec to re-examine this question. Daniel Parent and Ling Wang (2007) use a reform of the Family Allowance Program in the mid-1970s and Census data that allows cohorts of women to be tracked through the end of their childbearing years to separate these effects. Quebec modified the program to give stronger financial incentives to families who already had children, and women in that province increased their



fertility in the short-run, but reduced fertility later in life so that the Family Allowance reform had no net impact on fertility. Milligan (2005) also finds a substantial positive, though short-term, fertility effect of a subsequent child allowance program in Quebec between 1988 and 1997.

In an innovative study, Jeremy Greenwood, Ananth Seshadri, and Mehmet Yorukoglu (2005) proposed that the electrification of the household led to enormous increases in time productivity in the household and contributed to the baby boom in the US. Using across county and time data, Martha Bailey and William Collins (2011) showed that counties which were more exposed to electric appliances reduced their fertility rates. Joshua Lewis (2014a, 2014b) provided a partial reconciliation of Greenwood et al. and Bailey and Collins by showing that states that received electrification earlier reduced both infant mortality and fertility earlier, a pattern consistent with models of the demographic transition in which a reduction in fertility follows a decline in childhood mortality.

The wellbeing of children, and their future economic success, will depend upon a matrix of parental, environmental, and policy influences that affect the development of their health and human capital. The work of James Heckman and his collaborators on the impact of early childhood education around the turn of the century has stimulated an entirely new field within family economics, and our understanding of child “production functions” in general and the impacts of parental and educational resources in particular has increased rapidly.

In a series of papers using the National Longitudinal Survey of Children and Youth, Martin Dooley and Jennifer Stewart examine the relationship between household income and various child outcomes. In Dooley and Stewart (2004) they document the usual positive association between family income and child test scores, and implement a series of empirical approaches, including fixed effects and using exogenous changes in welfare income, designed to test whether this relationship is causal or

the result of unobserved heterogeneity. The results are consistent with a true effect of income that is positive, but smaller than conventional estimates. Following a similar strategy, they find little evidence of an impact of income on child behavioral emotional scores in Dooley and Stewart (2007), but that measures of parenting style are strongly related to these outcomes. Dooley, Ellen Lipman and Stewart (2005), examining what they call the “good mother hypothesis”, find no consistent evidence of a positive relationship between a mother’s share of household income and her child’s activities or outcomes.

There is a long-standing controversy in the social sciences over the effects of mother’s employment and the use of paid childcare on child wellbeing, with early studies unable to establish causal influences. Baker, Gruber and Milligan (2008) take advantage of a policy change—the Quebec childcare subsidy—and their findings of substantial negative impacts of early childcare on children are unusual in this literature. In later work (2015), these authors find that negative behavioral effects persist into school years, and that affected cohorts have worse health and higher crime rates later in life. On the other hand, in a series of papers on maternity leave expansions, Baker and Milligan (2008, 2010, 2015) do not find significant impacts of additional maternal time at home in a child’s first year on developmental and behavioral outcomes. Yee Fei Chia (2008) finds that an increase in mother’s work intensity following a child’s birth is associated with an increase in the probability of childhood overweight or obesity, and Phipps, Lethbridge, and Burton (2006) also document a link between maternal work hours and child obesity.

Peter Kennedy and Linda Welling (1997) bring an unusual theoretical approach to the allocation of parental time to childcare and the efficiency of the market work-childcare equilibrium. They identify two externalities in the decisions of parents driven by both consumption and investment motives—an intergenerational externality of their childcare time on the productivity of the next generation and an

intragenerational externality on the productivity of their coworkers. Gugl and Welling (2012) introduce a gender dimension to parental investments in child quality in the form of an assumption that parental time with same-sex children is more productive. With a gender wage gap, this implies that it is cheaper for the household to produce female child quality than male child quality and explains many of the empirical regularities reviewed in Lundberg (2005).

In “Viewpoint: Child Research Comes of Age” (CJE, 2004), Janet Currie discussed the increasing range of research on children, research opportunities using existing Canadian data, and the additional high-quality research on families and children that could be done with increased researcher access to data. Currie’s own research up to that point, and in the subsequent decade, adds up to a substantial body of work on the forces influencing child development, including the effects of early education policies and in-utero influences on child and later health. A few examples: In part of a series of papers on Head Start, an early intervention program for poor preschoolers, Currie and Duncan Thomas (1995) find evidence of short-term test score gains but also of rapid erosion of these gains for African-American children. Eliana Garces, Currie and Thomas (2002) find, in a sample of siblings, long-term gains to Head Start in some early-adult outcomes.

Other studies by Currie focus on the effects of policies that improve the health and nutrition of pregnant women on birth outcomes and the health of their children. Currie and Jonathan Gruber (1996) find that expansions of Medicaid eligibility reduce infant mortality and the incidence of low birth weight. Marianne Bitler and Currie (2005) find that, even after controlling for the positive selection of pregnant women into the program, the supplemental nutrition program WIC has substantial positive effects on birth outcomes. Anna Aizer, Shari Eli, Joseph Ferrie, and Adriana Lleras-Muney (2016) showed that the first welfare program in the US, a mothers’ pension program implemented in 1911, improved the long run outcomes for children of families who received a pension compared to those who did not.

In her Ely Lecture on “Inequality at Birth: Some Causes and Consequences” (2011), Currie emphasizes that her work, and that of other researchers including Mark Stabile, shows that economic inequality begins early in life, even before birth, and that differences in early health have important consequences for future wellbeing (E.g. Currie and Stabile (2006), Oreopoulos, Stabile, Walld and Roos (2008)). One important aspect of this is that unequal exposure to adverse environmental conditions can have long-term consequences. Currie and Matthew Neidell (2005) document the impact of in-utero exposure to pollution on infant mortality, and show that reductions in carbon monoxide of the 1990s saved 1000 infant lives in California. Contaminated drinking water is linked to large effects on birth weight and gestation in Currie, Joshua Graff Zivin, Katherine Meckel, Neidell and Wolfram Schlenker (2013).

Most of the economics literature on child development does not treat the child as an active agent, but rather as an investment good valued by parents and the passive recipient of their investments. A small literature, however, examine parenting strategies in the presence of children with preferences and agency. Burton, Phipps, and Lori Curtis (2002) set up a principal-agent model in which the child chooses a level of costly “good behavior” and the parent on a level of praise or censure that is a function of the child’s behavior. In an empirical analysis, they find evidence of simultaneity in these parent-child interactions. Lundberg, Jennifer Romich and Kwok Ping Tsang (2009) model parental decisions about the level of costly control to exert over the behavior of children who can engage in costly resistance, and estimate the determinants of child reports of shared and sole decision-making in several domains. They find that the determinants of sole decision-making by the child and shared decision-making are distinct, and that sharing decisions seems to be a form of parental investment in child development. Indicators of child capabilities and preferences affect decision-making authority in ways that suggest child demand for autonomy as well as parental discretion drives the transfer of

authority. Anyck Dauphin, Abdel-Rahmen El Lahga, Fortin, and Lacroix (2011) employ the parametric restrictions of the collective model and expenditure data from the U.K. to assess the number of decision-makers in households, and find that children appear to be independent agents in family decisions.

Moving from the welfare of young children to adult children, early empirical studies of the intergenerational correlation of annual incomes between fathers and son found relatively low correlations because annual incomes have large transitory components and measurement errors. Building on the seminal work of Gary Solon (1992) which correlated intergenerational permanent incomes, Miles Corak's 2013 survey showed that the intergenerational elasticities of sons' earnings with respect to fathers' earnings ranged from 0.2 (Scandinavian countries), to 0.3 (Canada) and 0.5 (US). He also showed that, across countries, the intergenerational elasticity of a country is positively correlated with earnings inequality in that country. The majority of papers on intergenerational transmission of earnings study transmissions across two generations. Claudia Olivetti, M. Daniele Paserman and Laura Salisbury (2016) have a remarkable paper which studies intergeneration transmission of incomes across three generations in the U.S., separating the contributions of paternal versus maternal grandparents. They show that grandparents are important for the welfare of their grandchildren over and above their impact on their parents' incomes. Maternal grandfathers are more important for the incomes of granddaughters and paternal grandfathers are more important for the incomes of grandsons.

Recently, economists have started to investigate behavioral genetics, both using genetic markers as controls and instruments, and also to study the effect of genetic markers on behavioral outcomes (eg. Weili, Ding, Steven F. Lehrer, J. Niels Rosenquist, and Janet Audrain-McGovern, 2009; Jason Fletcher and Steven Lehrer 2011; Aysu Okbay, Jonathan P. Beauchamp, Mark Alan Fontana, James J. Lee, Tune H. Pers, Cornelius A. Rietveld, Patrick Turley et al., 2016). This literature is in its infancy but

there are many potential innovative applications. DNA information is now available in existing U. S. longitudinal data sets such as the Health and Retirement Study and the National Longitudinal Study of Adolescent to Adult Health. If researchers are successful in isolating the effects of particular genetic markers on behavioral traits such as risk tolerance, time preference, etc., we can study how behavioral traits, via their genetic markers, affected the earlier behavior of these individuals. That is, genetic markers may reduce the degree of unobserved heterogeneity across individuals which researchers find in their current empirical studies.

## Conclusion

Since Becker's contributions, many of the advances in the economics of the family have been empirical, allowing governments and NGOs to use these studies to inform public policies on family issues. Today, government agencies use estimates of human capital returns to build schools, use behavioral estimates to justify subsidy programs to increase fertility and married women's labor force participation rate, and use incentive arguments to design cash transfers to poor rural families. Policy makers may be less interested in the root causes of a behavior than in predictions regarding the impacts of policies.

Our understanding of mechanisms which affect family behavior, such as distinguishing between unitary and non-unitary models of the family and measuring the impacts of early conditions on child capabilities, have grown. These advances have relied significantly on randomized control experiments and quasi-natural experiments. Though these techniques are well-suited for studying particular mechanisms, they are less effective for learning about long-term trends in family behavior. We currently know little about what mechanisms are salient for explaining large aggregate changes in family behavior such as the baby boom, the decline in marriage in North America, the rise of single female parenthood in the U.S. when birth control is easily available, the overtaking of educational attainment of women relative to men and the decline in fertility in many countries. So there is much work to be done.

## References

- Aizer, Anna, Shari Eli, Joseph Ferrie, and Adriana Lleras-Muney. "The long-run impact of cash transfers to poor families." *The American Economic Review* 106, no. 4 (2016): 935-971.
- Akerlof, George A., Janet L. Yellen, and Michael L. Katz. "An analysis of out-of-wedlock childbearing in the United States." *The Quarterly Journal of Economics* 111.2 (1996): 277-317.
- Altonji, Joseph G., Fumio Hayashi, and Laurence J. Kotlikoff. "Parental altruism and inter vivos transfers: Theory and evidence." *Journal of Political Economy* 105.6 (1997): 1121-1166.
- Altonji, Joseph G., Fumio Hayashi, and Laurence J. Kotlikoff. "Is the extended family altruistically linked? Direct tests using micro data." *The American Economic Review* (1992): 1177-1198.
- Bailey, Martha J. "More power to the pill: the impact of contraceptive freedom on women's life cycle labor supply." *The Quarterly Journal of Economics* 121.1 (2006): 289-320.
- Bailey, Martha J., and William J. Collins. "Did improvements in household technology cause the baby boom? Evidence from electrification, appliance diffusion, and the Amish." *American Economic Journal: Macroeconomics* 3.2 (2011): 189-217.
- Baker, Michael, Jonathan Gruber, and Kevin Milligan. "Universal child care, maternal labor supply, and family well-being." *Journal of political Economy* 116, no. 4 (2008): 709-745.
- Baker, Michael, Jonathan Gruber, and Kevin Milligan. *Non-cognitive deficits and young adult outcomes: The long-run impacts of a universal child care program*. No. w21571. National Bureau of Economic Research, 2015.
- Baker, Michael, and Kevin Milligan. "Maternal employment, breastfeeding, and health: Evidence from maternity leave mandates." *Journal of health economics* 27, no. 4 (2008): 871-887.
- Baker, Michael, and Kevin Milligan. "Evidence from maternity leave expansions of the impact of maternal care on early child development." *Journal of human Resources* 45, no. 1 (2010): 1-32.
- Baker, Michael, and Kevin Milligan. "Maternity leave and children's cognitive and behavioral development." *Journal of Population Economics* 28, no. 2 (2015): 373-391.
- Becker, Gary S. "An economic analysis of fertility." In *Demographic and economic change in developed countries*, pp. 209-240. Columbia University Press, 1960.
- Becker, Gary S. "A theory of marriage: Part I." *Journal of Political economy* 81, no. 4 (1973): 813-846.
- Becker, Gary S. "A theory of marriage: Part II." *Journal of political Economy* 82, no. 2, Part 2 (1974): S11-S26.
- Becker, Gary. *A treatise on the family*. Harvard University Press: Cambridge, MA 30 (1981).



- Becker, Gary S., Elisabeth M. Landes, and Robert T. Michael. "An economic analysis of marital instability." *Journal of Political Economy* 85, no. 6 (1977): 1141-1187.
- Becker, Gary S., and H. Gregg Lewis. "On the Interaction between the Quantity and Quality of Children." *Journal of Political Economy* 81, no. 2, Part 2 (1973): S279-S288.
- Bitler, Marianne P., and Janet Currie. "Does WIC work? The effects of WIC on pregnancy and birth outcomes." *Journal of Policy Analysis and Management* 24, no. 1 (2005): 73-91.
- Bourguignon, Francois, Martin Browning, Pierre-André Chiappori, and Valérie Lechene. "Intra household allocation of consumption: A model and some evidence from French data." *Annales d'Economie et de Statistique* (1993): 137-156.
- Bourguignon, François, Martin Browning, and Pierre-André Chiappori. "Efficient intra-household allocations and distribution factors: Implications and identification." *The Review of Economic Studies* 76, no. 2 (2009): 503-528.
- Brandt, Loren, Siow, Aloysius. and Vogel, Carl. Large Demographic shocks and small changes in the marriage market. *Journal of the European Economic Association*, 14 (2016),: 1437–1468
- Brandt, Loren, Aloysius Siow, and Hui Wang. "Compensating for unequal parental investments in schooling." *Journal of Population Economics* 28.2 (2015): 423-462.
- Browning, Martin, Francois Bourguignon, Pierre-Andre Chiappori, and Valerie Lechene. "Income and outcomes: A structural model of intrahousehold allocation." *Journal of political Economy* 102, no. 6 (1994): 1067-1096.
- Browning, Martin, and Pierre-Andre Chiappori. "Efficient intra-household allocations: A general characterization and empirical tests." *Econometrica* (1998): 1241-1278.
- Burton, Peter, Shelley Phipps, and Lori Curtis. "All in the family: A simultaneous model of parenting style and child conduct." *The American Economic Review* 92, no. 2 (2002): 368-372.
- Caucutt, Elizabeth M., Nezih Guner, and John Knowles. "Why do women wait? Matching, wage inequality, and the incentives for fertility delay." *Review of Economic Dynamics* 5.4 (2002): 815-855.
- Carbone, June, and Naomi Cahn. *Marriage markets: How inequality is remaking the American family*. Oxford University Press, 2014.
- Carliner, Geoffrey, Christopher Robinson, and Nigel Tomes. "Female labour supply and fertility in Canada." *Canadian Journal of Economics* (1980): 46-64.
- Chia, Yee Fei. "Maternal labour supply and childhood obesity in Canada: evidence from the NLSCY." *Canadian Journal of Economics/Revue canadienne d'économique* 41, no. 1 (2008): 217-242.

Chiappori, Pierre-André. "Rational household labor supply." *Econometrica: Journal of the Econometric Society* (1988): 63-90.

Chiappori, Pierre-Andre. "Collective labor supply and welfare." *Journal of political Economy* 100, no. 3 (1992): 437-467.

Chen, Zhiqi and Frances Woolley. "A Cournot–Nash model of family decision making." *The Economic Journal* 111, no. 474 (2001): 722-748.

Choi, Hyung-Jai, Jutta M. Joesch, and Shelly Lundberg. "Sons, daughters, wives, and the labour market outcomes of West German men." *Labour Economics* 15, no. 5 (2008): 795-811.

Choo, Eugene, and Aloysius Siow. "Who marries whom and why." *Journal of political Economy* 114.1 (2006): 175-201.

Cleveland, Gordon, Morley Gunderson, and Douglas Hyatt. "Child care costs and the employment decision of women: Canadian evidence." *Canadian Journal of Economics* (1996): 132-151.

Compton, Janice. "Family proximity and the labor force status of women in Canada." *Review of Economics of the Household* 13, no. 2 (2015): 323-358.

Compton, Janice, and Robert A. Pollak. "Why are power couples increasingly concentrated in large metropolitan areas?" *Journal of Labor Economics* 25, no. 3 (2007): 475-512.

Compton, Janice, and Robert A. Pollak. "Family proximity, childcare, and women's labor force attachment." *Journal of Urban Economics* 79 (2014): 72-90.

Cornelson, Kirsten. "Media Role Models and Educational Attainment: Evidence from The Cosby Show." University of Toronto manuscript, (2016).

Cornelson, Kirsten, and Aloysius Siow. "A quantitative review of marriage markets: How inequality is remaking the American family by Carbone and Cahn." *Journal of Economic Literature* 54.1 (2016): 193-207.

Corak, Miles. "Income inequality, equality of opportunity, and intergenerational mobility." *The Journal of Economic Perspectives* 27.3 (2013): 79-102.

Costa, Dora L., and Matthew E. Kahn. "Power couples: changes in the locational choice of the college educated, 1940–1990." *The Quarterly Journal of Economics* 115, no. 4 (2000): 1287-1315.

Currie, Janet. "Viewpoint: Child research comes of age." *Canadian Journal of Economics/Revue canadienne d'économique* 37, no. 3 (2004): 509-527.

Currie, Janet. "Inequality at Birth: Some Causes and Consequences." *American Economic Review* 101, no. 3 (2011): 1-22.

- Currie, Janet, Joshua Graff Zivin, Katherine Meckel, Matthew Neidell, and Wolfram Schlenker. "Something in the water: Contaminated drinking water and infant health." *Canadian Journal of Economics/Revue canadienne d'économique* 46, no. 3 (2013): 791-810.
- Currie, Janet, and Jonathan Gruber. "Saving babies: the efficacy and cost of recent changes in the Medicaid eligibility of pregnant women." *Journal of political Economy* 104, no. 6 (1996): 1263-1296.
- Currie, Janet, and Matthew Neidell. "Air pollution and infant health: what can we learn from California's recent experience?" *The Quarterly Journal of Economics* 120, no. 3 (2005): 1003-1030.
- Currie, Janet and Mark Stabile. "Child Mental Health and Human Capital Accumulation: The Case of ADHD," *Journal of Health Economics*, 25 #6, Nov. 2006, 1094-1118,
- Currie, Janet, and Duncan Thomas. "Does Head Start Make a Difference?." *The American Economic Review* (1995).
- Dagsvik, John K. "Aggregation in matching markets." *International Economic Review* 41.1 (2000): 27-58.
- Dauphin, Anyck, El Lahga, Bernard Fortin, and Guy Lacroix. "Are Children Decision-Makers within the Household?." *The Economic Journal* 121, no. 553 (2011): 871-903.
- Ding, Weili, Steven F. Lehrer, J. Niels Rosenquist, and Janet Audrain-McGovern. "The impact of poor health on academic performance: New evidence using genetic markers." *Journal of health economics* 28, no. 3 (2009): 578-597.
- Dooley, Martin D. "Labor Supply and Fertility of married women: an analysis with grouped and individual data from the 1970 US census." *Journal of Human Resources* (1982): 499-532.
- Dooley, Martin, Ellen Lipman, and Jennifer Stewart. "Exploring the good mother hypothesis: Do child outcomes vary with the mother's share of income?." *Canadian Public Policy/Analyse de politiques* (2005): 123-143.
- Dooley, Martin, and Jennifer Stewart. "Family income and child outcomes in Canada." *Canadian Journal of Economics/Revue canadienne d'économique* 37, no. 4 (2004): 898-917.
- Dooley, Martin, and Jennifer Stewart. "Family income, parenting styles and child behavioural–emotional outcomes." *Health economics* 16, no. 2 (2007): 145-162.
- Dunbar, Geoffrey R., Arthur Lewbel, and Krishna Pendakur. "Children's resources in collective households: identification, estimation, and an application to child poverty in Malawi." *The American Economic Review* 103, no. 1 (2013): 438-471.
- Easterlin, Richard A. "The American baby boom in historical perspective." In *Population, Labor Force, and Long Swings in Economic Growth: The American Experience*, pp. 77-110. NBER, 1968.

- Fletcher, Jason M., and Steven F. Lehrer. "Genetic lotteries within families." *Journal of health economics* 30.4 (2011): 647-659.
- Fortin, Bernard, and Guy Lacroix. "A test of the unitary and collective models of household labour supply." *The economic journal* 107, no. 443 (1997): 933-955.
- Fortin, Nicole, Philip Oreopoulos and Shelley Phipps. 2015. "Leaving Boys Behind: Gender Disparities in High Academic Achievement," *Journal of Human Resources*, 50 (Summer), 549-583.
- Garces, Eliana, Duncan Thomas, and Janet Currie. "Longer-term effects of Head Start." *The American Economic Review* 92, no. 4 (2002): 999-1012.
- Goldin, Claudia, and Lawrence F. Katz. "The power of the pill: Oral contraceptives and women's career and marriage decisions." *Journal of political Economy* 110.4 (2002): 730-770.
- Greenwood, Jeremy, Ananth Seshadri, and Mehmet Yorukoglu. "Engines of liberation." *The Review of Economic Studies* 72.1 (2005): 109-133.
- Gugl, Elisabeth. "Income splitting, specialization, and intra-family distribution." *Canadian Journal of Economics/Revue canadienne d'économique* 42, no. 3 (2009): 1050-1071.
- Gugl, Elisabeth, and Linda Welling. "Time with sons and daughters." *Review of Economics of the Household* 10, no. 2 (2012): 277-298.
- Hamilton, Gillian, and Aloysius Siow. "Class, gender and marriage." *Review of Economic Dynamics* 10.4 (2007): 549-575.
- Iyigun, Murat, and Jeanne Lafortune. "Why Wait? A Century of Education, Marriage Timing and Gender Roles." (2016).
- Kennedy, Peter W., and Linda Welling. "Production externalities and the efficiency of parental childcare choices." *Canadian Journal of Economics* (1997): 822-834.
- Killingsworth, Mark R., and James J. Heckman. "Female labor supply: A survey." *Handbook of labor economics* 1 (1986): 103-204.
- Lefebvre, Pierre, and Philip Merrigan. "Child-care policy and the labor supply of mothers with young children: A natural experiment from Canada." *Journal of Labor Economics* 26, no. 3 (2008): 519-548.
- Lefebvre, Pierre, Philip Merrigan, and Francis Roy-Desrosiers. "Québec's Childcare Universal Low Fees Policy 10 Years After: Effects, Costs and Benefits." *Cahier de recherche/Working Paper* 11 (2011): 01.
- Lefebvre, Pierre, Philip Merrigan, and Matthieu Verstraete. "Dynamic labour supply effects of childcare subsidies: Evidence from a Canadian natural experiment on low-fee universal child care." *Labour Economics* 16, no. 5 (2009): 490-502.

Lewis, Joshua. "Fertility, child health, and the diffusion of electricity into the home." University of Montreal working paper, 2014a.

Lewis, Joshua. "Short-run and long-run effects of household electrification." University of Montreal working paper, 2014a.

Løken, Katrine V., Kjell Erik Lommerud, and Shelly Lundberg. "Your place or mine? On the residence choice of young couples in Norway." *Demography* 50, no. 1 (2013): 285-310.

Løken, Katrine V., Shelly J. Lundberg, and Julie Riise. "Lifting the burden: State care of the elderly and labor supply of adult children." forthcoming in *Journal of Human Resources*, (2017).

Lundberg, Shelly. "The added worker effect." *Journal of Labor Economics* 3, no. 1, Part 1 (1985): 11-37.

Lundberg, Shelly. "Labor Supply of Husbands and Wives: A Simultaneous Equations Approach." *The Review of Economics and Statistics* 70, no. 2 (1988): 224-35.

Lundberg, Shelly. "Sons, daughters, and parental behaviour." *Oxford Review of Economic Policy* 21, no. 3 (2005): 340-356.

Lundberg, Shelly, and Robert A. Pollak. "Separate spheres bargaining and the marriage market." *Journal of political Economy* 101, no. 6 (1993): 988-1010.

Lundberg, Shelly, and Robert A. Pollak. "Efficiency in marriage." *Review of Economics of the Household* 1, no. 3 (2003): 153-167.

Lundberg, Shelly, and Robert A. Pollak. "The American family and family economics." *The Journal of Economic Perspectives* 21.2 (2007): 3-26.

Lundberg, Shelly, Robert A. Pollak, and Jenna Stearns. "Family inequality: Diverging patterns in marriage, cohabitation, and childbearing." *The Journal of Economic Perspectives* 30, no. 2 (2016): 79-101.

Lundberg, Shelly J., Robert A. Pollak, and Terence J. Wales. "Do husbands and wives pool their resources? Evidence from the United Kingdom child benefit." *Journal of Human resources* (1997): 463-480.

Lundberg, Shelly, Jennifer L. Romich, and Kwok Ping Tsang. "Decision-making by children." *Review of Economics of the Household* 7, no. 1 (2009): 1-30.

Lundberg, Shelly, and Elaina Rose. "Parenthood and the earnings of married men and women." *Labour Economics* 7, no. 6 (2000): 689-710.

Lundberg, Shelly, and Elaina Rose. "The effects of sons and daughters on men's labor supply and wages." *Review of Economics and Statistics* 84, no. 2 (2002): 251-268.

- Manser, Marilyn, and Murray Brown. "Marriage and household decision-making: A bargaining analysis." *International economic review* (1980): 31-44.
- McElroy, Marjorie B., and Mary Jean Horney. "Nash-bargained household decisions: Toward a generalization of the theory of demand." *International economic review* (1981): 333-349.
- Mechoulan, Stéphane. "Divorce laws and the structure of the American family." *The Journal of Legal Studies* 35.1 (2006): 143-174.
- Milligan, Kevin. "Subsidizing the stork: New evidence on tax incentives and fertility." *Review of Economics and statistics* 87, no. 3 (2005): 539-555.
- Morissette, René, and Feng Hou. "Does the labour supply of wives respond to husbands' wages? Canadian evidence from micro data and grouped data." *Canadian Journal of Economics/Revue canadienne d'économique* 41, no. 4 (2008): 1185-1210
- Mourifié, Ismael, and Aloysius Siow. *The Cobb Douglas marriage matching function: Marriage matching with peer and scale effects*. No. 2017-007. Human Capital and Economic Opportunity Working Group, 2017.
- Nakamura, Alice, and Masao Nakamura. "A comparison of the labor force behavior of married women in the United States and Canada, with special attention to the impact of income taxes." *Econometrica: journal of the Econometric Society* (1981): 451-489.
- Nakamura, Alice, and Masao Nakamura. *The second paycheck: A socioeconomic analysis of earnings*. Academic Press, 1985.
- Nakamura, Alice, and Masao Nakamura. "The econometrics of female labor supply and children." *Econometric Reviews* 11, no. 1 (1992): 1-71.
- Nakamura, Alice, and Masao Nakamura. "Predicting female labor supply: Effects of children and recent work experience." *Journal of Human Resources* (1994): 304-327.
- Nakamura, Masao, Alice Nakamura, and Dallas Cullen. "Job opportunities, the offered wage, and the labor supply of married women." *The American Economic Review* 69, no. 5 (1979): 787-805.
- Okbay, Aysu, Jonathan P. Beauchamp, Mark Alan Fontana, James J. Lee, Tune H. Pers, Cornelius A. Rietveld, Patrick Turley et al. "Genome-wide association study identifies 74 loci associated with educational attainment." *Nature* 533, no. 7604 (2016): 539-542.
- Olivetti, Claudia, M. Daniele Paserman, and Laura Salisbury. *Three-generation Mobility in the United States, 1850-1940: The Role of Maternal and Paternal Grandparents*. No. w22094. National Bureau of Economic Research, 2016.

Oreopoulos, Philip, Mark Stabile, Randy Walld, and Leslie Roos. "Short, Medium, and Long Term Consequences of Poor Infant Health: An Analysis using Siblings and Twins," *Journal of Human Resources*, Vol. 43, No. 1, Winter 2008, pp. 88-138.

Parent, Daniel, and Ling Wang. "Tax Incentives and Fertility in Canada: quantum vs tempo effects." *Canadian Journal of Economics/Revue canadienne d'économique* 40, no. 2 (2007): 371-400.

Peters, H. Elizabeth. "Marriage and divorce: Informational constraints and private contracting." *The American Economic Review* 76.3 (1986): 437-454.

Phipps, Shelley A., and Peter S. Burton. "Sharing within families: implications for the measurement of poverty among individuals in Canada." *Canadian Journal of Economics* (1995): 177-204.

Phipps, Shelley A., and Peter S. Burton. "What's mine is yours? The influence of male and female incomes on patterns of household expenditure." *Economica* 65, no. 260 (1998): 599-613.

Phipps, Shelley A., Lynn Lethbridge, and Peter Burton. "Long-run consequences of parental paid work hours for child overweight status in Canada." *Social science & medicine* 62, no. 4 (2006): 977-986.

Powell, Lisa M. "The impact of child care costs on the labour supply of married mothers: Evidence from Canada." *Canadian Journal of Economics* (1997): 577-594.

Powell, Lisa M. "Joint labor supply and childcare choice decisions of married mothers." *Journal of Human Resources* (2002): 106-128.

Robinson, Chris, and Nigel Tomes. "Family labour supply and fertility: A two-regime model." *Canadian Journal of Economics* (1982): 706-734.

Robinson, Chris, and Nigel Tomes. "More on the labour supply of Canadian women." *Canadian Journal of Economics* (1985): 156-163.

Samuelson, Paul A. "Social indifference curves." *The Quarterly Journal of Economics* 70, no. 1 (1956): 1-22.

Schirle, Tammy. "The effect of universal child benefits on labour supply." *Canadian Journal of Economics/Revue canadienne d'économique* 48, no. 2 (2015): 437-463.

Schoen, Robert. "The Harmonic Mean as the Basis of a Realistic Two-Sex Marriage Model." *Demography*, 18, May (1981): 201-216.

Schultz, T. Paul. "An economic model of family planning and fertility." *Journal of Political Economy* 77, no. 2 (1969): 153-180.

Siow, Aloysius. "Differential fecundity, markets, and gender roles." *Journal of Political Economy* 106.2 (1998): 334-354.

- Solon, Gary. "Intergenerational income mobility in the United States." *The American Economic Review* (1992): 393-408.
- Stevenson, Betsey, and Justin Wolfers. "Marriage and divorce: Changes and their driving forces." *The Journal of Economic Perspectives* 21.2 (2007): 27-52.
- Schwartz, Christine R. "Trends and variation in assortative mating: Causes and consequences." *Annual Review of Sociology* 39 (2013): 451-470.
- Wales, Terence J., and Alan D. Woodland. "Estimation of the allocation of time for work, leisure, and housework." *Econometrica: Journal of the Econometric Society* (1977): 115-132.
- Willis, Robert J. "A new approach to the economic theory of fertility behavior." *Journal of political Economy* 81, no. 2, Part 2 (1973): S14-S64.
- Woolley, Frances. *A non-cooperative model of family decision making*. Taxation, Incentives and the Distribution of Income Programme, 1988.
- Woolley, Frances R., and Judith Marshall. "Measuring inequality within the household." *Review of Income and Wealth* 40, no. 4 (1994): 415-431.
- Zhang, Hanzhe. "A Marriage-Market Perspective of the College Gender Gap." Michigan State working paper. (2016).