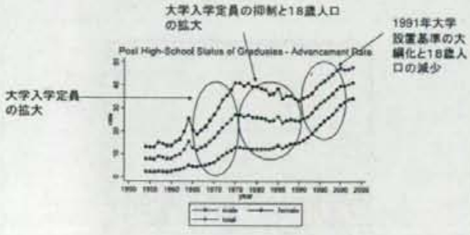
4年制大学進学率の時系列



供給シフトを制御した上での需要シフトの識別

- 生産関数 $Q_t = [(\theta_{ct}L_{ct})^{\eta} + (\theta_{ht}L_{ht})^{\eta}]^{1/\eta}$

  $\sigma_e = 1/(1-\eta)$
- 合成労働投入 $L_{ct} = [\sum_j (\alpha_j L_{cjt}^{\rho})]^{1/\rho}, L_{ht} = [\sum_j (\alpha_j L_{hjt}^{\rho})]^{1/\rho}$

  $\sigma_a = 1/(1-\rho)$
- 企業の利潤最大化条件

$$\frac{w_{cjt}}{w_{hjt}} = \left(\frac{L_{ct}}{L_{ht}}\right)^{\eta-1}\left(\frac{\theta_{ct}}{\theta_{ht}}\right)^{\eta}\left(\frac{L_{cjt}}{L_{hjt}} / \frac{L_{ct}}{L_{ht}}\right)^{\rho-1}\frac{\alpha_j}{\beta_j}$$

推定式

$$\ln\left(\frac{w_{cjt}}{w_{hjt}}\right) = \left(1-\frac{1}{\sigma_e}\right)\ln\left(\frac{\theta_{ct}}{\theta_{ht}}\right) + \ln\left(\frac{\alpha_j}{\beta_j}\right) - \frac{1}{\sigma_e}\ln\left(\frac{L_{ct}}{L_{ht}}\right) - \frac{1}{\sigma_a}\left(\ln\frac{L_{cjt}}{L_{hjt}} - \ln\frac{L_{ct}}{L_{ht}}\right)$$

W: 時間当たり賃金率, L: 人×時間労働投入量

技能偏向的技術進歩 $\left(1-\frac{1}{\sigma_e}\right)\ln\left(\frac{\theta_{ct}}{\theta_{ht}}\right) = \gamma \times trend$

LctとLhtは未知のパラメータ値に依存しているため、上記の式は直接推定できない。まず最初に年齢間の代替の弾力性を推定し、その後、上記の式を推定する多段階推定が必要となる。

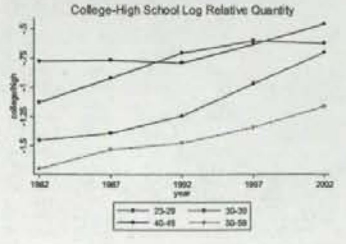
労働供給の内生性

$$\left(\frac{L_{ct}}{L_{ht}}\right) = \left(\frac{\bar{h}_{ct}}{\bar{h}_{ht}}\right) \times \left(\frac{P_{ct}}{P_{ht}}\right) \times \left(\frac{N_{ct}}{N_{ht}}\right)$$

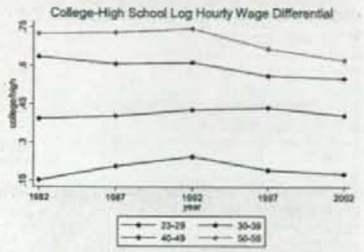
労働時間と就業率は賃金の関数となっている。

学歴別人口比率(Nc/Nh)を操作変数とした推定を行う。

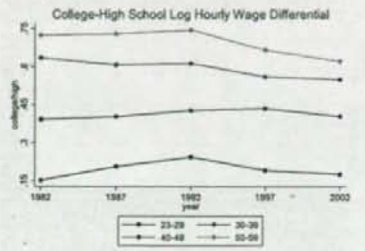
人数×時間の大卒・高卒相対労働投入量



大卒・高卒相対賃金率



大卒・高卒相対人口



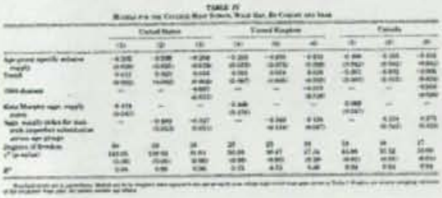
第一段階目推定結果

	(1)	(2)	(3)	(4)
年齢グループ数	4	4	8	8
推定手法	OLS	IV	OLS	IV
大卒・高卒数量比率	-0.11	-0.13	-0.10	-0.11
(年齢・年ごと)	(0.06)	(0.06)	(0.05)	(0.05)
年次ダミー	含む	含む	含む	含む
年齢階層ダミー	含む	含む	含む	含む
定数項	含む	含む	含む	含む
年齢階の代替の弾力性	9.06	7.99	10.10	8.92
サンプルサイズ	20	20	40	40
R2	0.99	0.99	0.99	0.99

第二段階目推定結果

	(1)	(2)	(3)	(4)
年齢グループ数	4	4	8	8
推定手法	OLS	IV	OLS	IV
大卒・高卒数量比率（年次ごと）	-0.778	-0.646	-0.755	-0.642
	(0.306)	(0.558)	(0.248)	(0.440)
トレンド	0.024	0.022	0.023	0.021
	(0.008)	(0.015)	(0.007)	(0.012)
学歴間の代替の弾力性	1.30	1.55	1.32	1.56
サンプルサイズ	20	20	40	40
R2	0.67	0.73	0.52	0.59

アメリカ・イギリス・カナダとの比較



Card and Lemieux (2001)

技能偏向的な技術進歩は重要か？

高卒・大卒間の残差賃金格差の拡大を説明する仮説

- 大学教育の質が上がった
  人的資本の価格ではなく大学教育で付与される人的資本量が変化した。
- 国際貿易の進展
  技能集約財の相対価格上昇→ストルパー＝サムエルソン定理により技能の相対要素価格上昇。(佐々木・桜(2004))
- 海外直接投資の進展
  企業の垂直的な多国籍化。生産現場は発展途上国にシフト。(Head and Ries (2001))
- 技能偏向的技術進歩
  ICTに代表される職場の情報化は技能労働者の生産性を相対的にあげるような技術進歩であった。(Sakurai (2001))

技能偏向的な技術進歩仮説の直接的検証

- 技能偏向的な技術進歩の度合いは産業によって異なる。
- 労働者の産業間移動が自由におこるならば、技能への収益率は産業間で同一。
- 技能偏向的な技術進歩が起こった産業で高技能労働者の相対投入量が増加する。
- Berman, Bound and Griliches (1994), Autor, Katz and Krueger (1998), Sakurai (2001)が行った研究手法

産業ごと高技能労働者比率の変化

- 被説明変数：
  大卒労働者への賃金総支払／高卒労働者への賃金総支払
  大卒労働者総労働時間／高卒労働者総労働時間
  大卒労働者数／高卒労働者数
- 説明変数：
  1982年から2002年にかけての労働時間1時間当たりIT資本投資額の平均値 （JIPデータベース）
  2002年の職場でのパソコン利用率（JGSS）
- 回帰式

$$\Delta_{2002-1982} L_C / L_H = \beta_0 + \beta_1 \Delta_{2002-1982} IT + \beta_2 (L_C / L_H)_{1982} + u$$

産業別回帰分析結果
IT投資を用いた分析

4大卒／高卒比率の変化	(1) 賃金総支払	(2) 労働時間	(3) 雇用量	(4) 賃金総支払	(5) 労働時間	(6) 雇用量
労働時間あたり平均IT投資率	0.138	0.229	0.061	0.258	0.389	0.127
	(0.117)	(0.172)	(0.058)	(0.125)	(0.184)	(0.061)
1982年の4大卒／高卒 比率				−0.178	−0.168	−0.189
				(0.084)	(0.062)	(0.081)
定数項	1.278	1.602	0.605	1.126	1.548	0.486
	(0.308)	(0.451)	(0.152)	(0.301)	(0.453)	(0.151)
観測値	36	36	36	36	36	36
R2	0.05	0.05	0.04	0.16	0.16	0.17

産業別回帰分析結果
パソコン利用率を用いた分析

4大卒／高卒比率の変化	(1) 賃金総支払	(2) 労働時間	(3) 雇用量	(4) 賃金総支払	(5) 労働時間	(6) 雇用量
労働時間あたり平均IT投資率	0.184	−0.903	−0.078	2.256	2.867	1.038
	(0.434)	(0.935)	(0.317)	(1.066)	(1.780)	(0.594)
1982年の4大卒／高卒 比率				−0.294	−0.258	−0.287
				(0.123)	(0.138)	(0.134)
定数項	0.844	1.357	0.472	−0.674	−0.816	−0.279
	(0.295)	(0.439)	(0.142)	(0.765)	(1.247)	(0.417)
観測値	17	17	17	17	17	17
R2	0.01	0.00	0.00	0.25	0.19	0.25

結論

- 日本の賃金分布は 1982年から 2002年にかけて安定していた。
- 供給面で4年制大学卒業者が増加した。
- 需要面で4年制大学卒業者に対しての相対需要が強まった。
- 供給面・需要面の変化が打ち消しあって、時間当たり賃金率は安定的に推移した。
- 4年制大学卒業者に対して相対需要の強まりはITCの浸透によって説明できる。

労働市場研究委員会2008年4月25日

生活保護基準の再検討

OECD相対的貧困基準と生活保護基準の重なり

山田篤裕　四方理人　駒村康平　田中聡一郎

目的

- OECD相対的貧困基準と生活保護基準
  - 高い日本のOECD基準による相対的貧困率
    - 政策的に重要視されていない
  - 政策的な貧困基準：生活保護基準
- OECD相対的貧困基準と生活保護基準の重なり
  - 容易なOECD相対的貧困基準による貧困世帯率の計算
    - 等価可処分所得＝世帯所得÷√世帯人員
    - 中位等価可処分所得の50%
  - 複雑な生活保護基準による貧困率（要保護世帯率）の計算
    - 居宅第1類＋第2類＋勤労控除＋各種扶助＋各種加算×資力調査
- OECD相対的貧困基準と生活保護基準のズレ
  - 等価尺度の再検討
  - 生活保護基準の再検討
    - 最低賃金、社会保障給付、児童手当の再検討
- 資力調査の再検討

結論（暫定的）

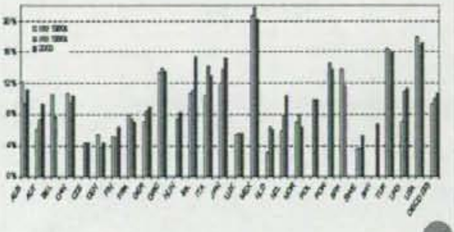
- OECD相対的貧困基準と生活保護基準の重なり
  - 平均で8割の重なり（1級地1基準）
  - 世帯主年齢階級別、世帯員数別、世帯類型別で同じ増減
  - OECDの相対的貧困率で代用可能
- OECD相対的貧困基準と生活保護基準のズレ
  - 高齢世帯主世帯、単身世帯、夫婦と子ども世帯および三世代同居世帯で大きい乖離
  - 特別なニードを考慮するための等価尺度の再考の必要性
- 資力調査の再検討
  - 若年世帯主世帯、多人数世帯、二世代ひとり親同居世帯、夫婦と子ども世帯で資産考慮による増減幅は小さい
  - 車保有は有力な資力の把握方法

構成

- OECDの相対的貧困基準による国際比較(1/5)
  - 日本は相対的貧困率が高い
- 使用データ（全国消費実態調査）の特徴(2/5)
  - 低所得層の把握が手薄い
- OECD相対的貧困基準と生活保護基準の重なり(3/5)
  - 8割の重なり
- 等価尺度の検討(4/5)
  - OECD基準は少人数世帯の規模の経済を過大評価
- 資産の考慮による要保護率の変動(5/5)
  - 一様の変動でない

OECDの相対的貧困基準による
国際比較 (1/5)

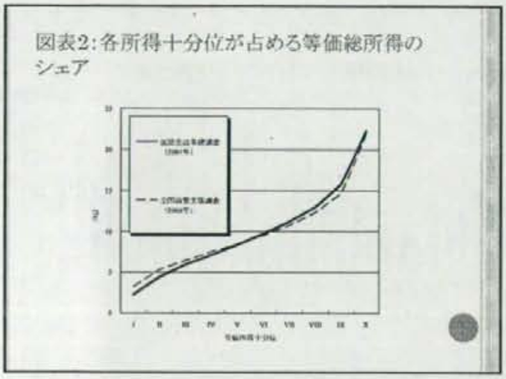
図表1:OECD相対的貧困率の国際比較

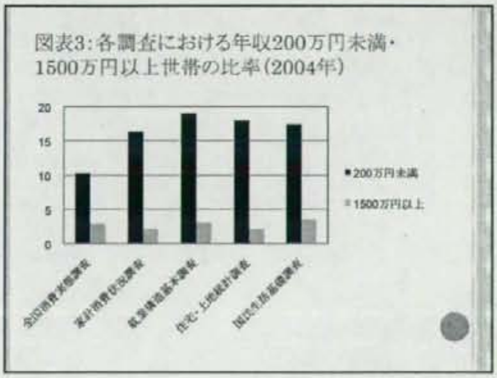


全国消費実態調査の特徴 (2/5)

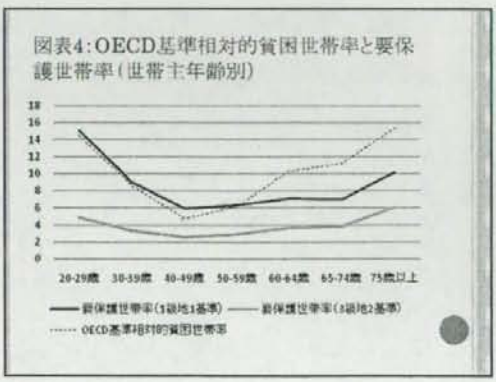
全国消費実態調査における相対的貧困線と
低所得層

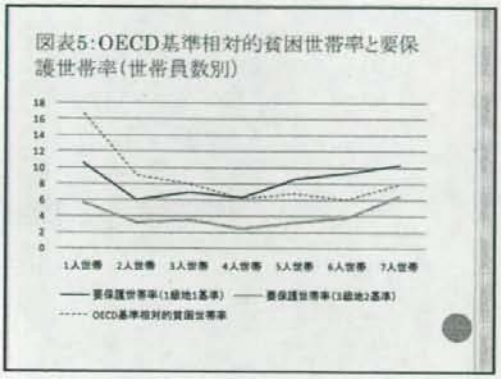
- 国生(2001年)中位等価可処分所得50%
  - =年138万円:相対的貧困率15%
- 全消(2004年)中位等価可処分所得50%
  - =年146万円:相対的貧困率 9%
- 全消(2004年)中位等価可処分所得60%
  - =年175万円:相対的貧困率15%


図表2:各所得十分位が占める等価総所得の
シェア

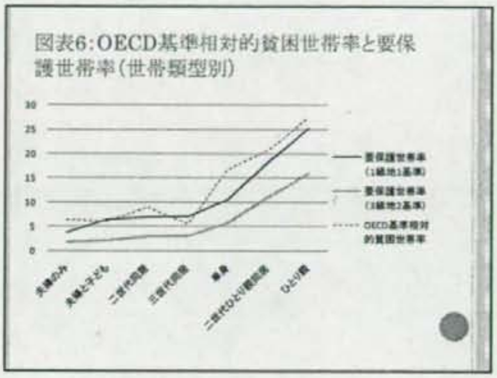

図表3:各調査における年収200万円未満・
1500万円以上世帯の比率(2004年)
20
15
10
5
0
全国消費実態調査
家計消費状況調査
就業構造基本調査
住宅・土地統計調査
国民生活基礎調査
200万円未満
1500万円以上


OECD相対的貧困基準と生活保護
基準の重なり (3/5)

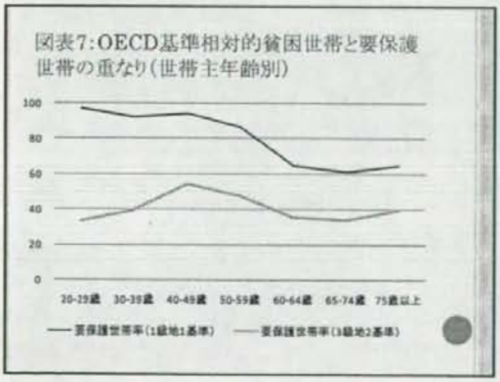

図表4:OECD基準相対的貧困世帯率と要保
護世帯率(世帯主年齢別)
18
16
14
12
10
8
6
4
2
0
20-29歳 30-39歳 40-49歳 50-59歳 60-64歳 65-74歳 75歳以上
要保護世帯率(1級地1基準)
要保護世帯率(3級地2基準)
OECD基準相対的貧困世帯率



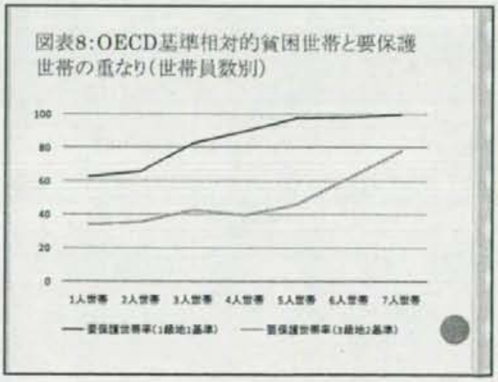
図表5：OECD基準相対的貧困世帯率と要保護世帯率（世帯員数別）



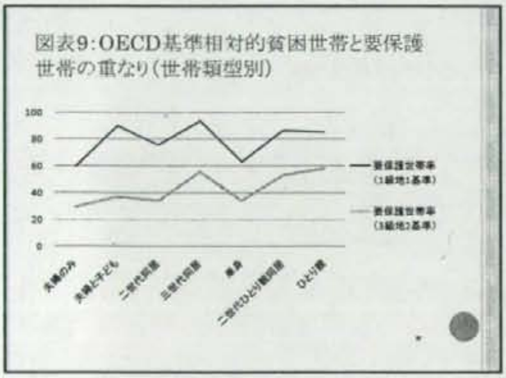
図表6：OECD基準相対的貧困世帯率と要保護世帯率（世帯類型別）



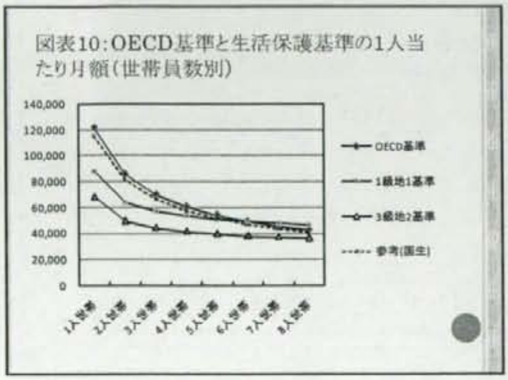
図表7：OECD基準相対的貧困世帯と要保護世帯の重なり（世帯主年齢別）



図表8：OECD基準相対的貧困世帯と要保護世帯の重なり（世帯員数別）

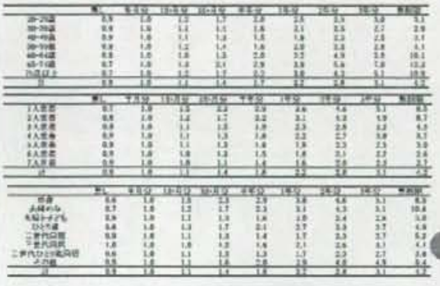

図表9:OECD基準相対的貧困世帯と要保護世帯の重なり(世帯類型別)
100
80
60
40
20
0
夫婦のみ
夫婦と子ども
二世代同居
三世代同居
単身
二世代ひとり親同居
ひとり親
要保護世帯率(1級地1基準)
要保護世帯率(3級地2基準)


等価尺度の検討 (4/5)
OECD

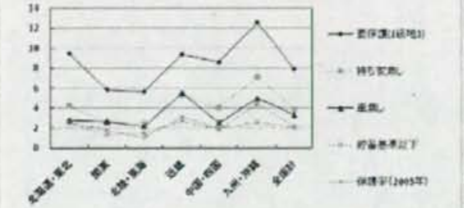

図表10:OECD基準と生活保護基準の1人当たり月額(世帯員数別)
140,000
120,000
100,000
80,000
60,000
40,000
20,000
0
1人世帯
2人世帯
3人世帯
4人世帯
5人世帯
6人世帯
7人世帯
8人世帯
OECD基準
1級地1基準
3級地2基準
参考(国生)

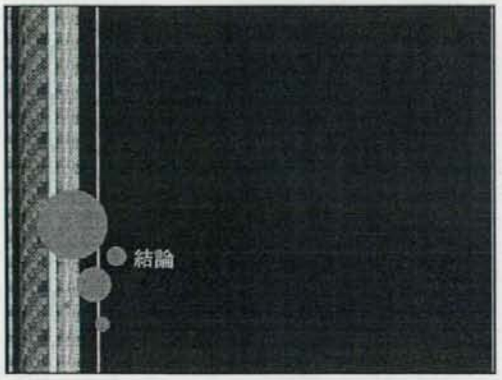

資産の考慮による要保護率の変動 (5/5)

図表11－13:純資産額の考慮による要保護世帯率の変動(1級地1)



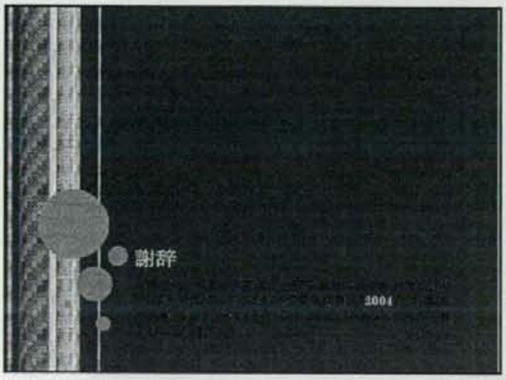
(補足) 地域ブロック別保護率と資産





結論(暫定的)

- OECD相対的貧困基準と生活保護基準の重なり
  - 平均で8割の重なり(1級地1基準)
  - 世帯主年齢階級別、世帯員数別、世帯類型別で同じ増減
  - OECDの相対的貧困率で代用可能
- OECD相対的貧困基準と生活保護基準のズレ
  - 高齢世帯主世帯、単身世帯、夫婦と子ども世帯および三世代同居世帯で大きい乖離
  - 特別なニードを考慮するための等価尺度の再考の必要性
- 資力調査の再検討
  - 若年世帯主世帯、多人数世帯、二世代ひとり親同居世帯、夫婦と子ども世帯で資産考慮による増減幅は小さい
  - 車保有は有力な資力の把握方法


謝辞
2004

Gender-specific labor market conditions and family formation

Ayako Kondo*

Columbia University

ak2258@columbia.edu

May 18, 2008

Abstract

This paper investigates the effects of gender-specific unemployment rates on family formation among American women. Using the Susevey of Income and Program Participation combined with state-level male and female unemployment rates, I find: (1) young women are more likely to marry when labor market conditions for women are bad relative to those of men; (2) this increase in marriage incidence is a timing effect among women who would eventually marry without such labor market shocks so that the effects fade away as these women age; (3) gender-specific unemployment rates at marriage are not systematically correlated with the probability of divorce or ever having a child, although shift in marriage timing leads to a parallel shift in motherhood timing.

Preliminary - any suggestions would be appreciated.

Updated versions will be available at http://www.columbia.edu/~ak2258/.

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1 Introduction

Better labor market opportunities for women raise the opportunity cost of a marriage and better labor market opportunities for men increase the gain from a marriage. Existing studies have confirmed that gender-specific labor market conditions affect the incidence of marriage for young American women (Schultz, 1994; Blau, Kahn and Waldfogel, 2000). Hence, gender specific labor market shocks that a woman experienced in youth could dramatically change her life through whether, when and with whom to marry. To understand the long-term consequences on the affected woman's life, however, there remains much to learn about mechanisms underlying this observed correlation between gender specific labor market conditions and the marriage incidence.

In particular, a higher incidence of marriage does not necessarily mean more women experience marriage. Shocks to gender specific labor market conditions can raise the marriage incidence by making those who would eventually marry without such shocks marry earlier. If a woman wants to marry by a certain age for some other reasons such as the physical limit of fertility, she will become less and less concerned about the temporary rise in gains from marriage due to labor market fluctuations as she ages. Therefore, this woman eventually marries regardless of male and female labor market conditions, and gender-specific labor market fluctuations affect only the timing of marriage. This is a completely different story from inducing marriages for some women who would not marry otherwise. Also, if women compromise on the matching quality to exploit the temporary gain from relatively better labor market conditions for men, it leads to an increase in poorly matched, short-lived marriages, which would have quite different implications than more stable marriages.

To investigate the effects of gender specific labor market conditions on the family formation of American women, I link the female unemployment rate and the male-female gap in the unemployment rates in each state and year with retrospective information on individual women's marriage histories from the Survey of Income and Program Participation (SIPP) 1990-2004 Panels. Using these data, I confirm that young women are more likely to marry when the female unemployment rate is high and the male unemployment rate is relatively low. I also find, however, that the effects for women older than 24 are opposite in sign to those for younger women. Also, the initial increase in the marriage rate for young women due to relatively worse female labor market conditions fades away as these women age.

These findings suggest that increases in the incidence of marriage due to gender-specific labor market shocks are primarily due to acceleration in the timing of marriage among people who would eventually marry without such shocks. Furthermore, gender-specific unemployment rates at the time of marriage are not systematically correlated with the probability of divorce later in life or age and educational background of the spouse. Although the shift in the timing of marriage causes a parallel shift in the timing of motherhood, there is no long-term effect on the likelihood of having a child, either.

This paper is different from existing studies on the effect of labor market opportunities for men and women on the marriage rate in several ways: first and foremost, I investigate not only the contemporaneous effect of gender-specific labor market conditions on the probability of marriage but also the long-term outcomes of marriages induced by temporary labor market fluctuations. Second, I focus on temporary shocks to each gender's labor market conditions by using annual data with controls for nation-wide year effects and time-invariant state fixed effects. Existing studies typically use the decennial Census and inevitably mix up temporary fluctuations with more persistent gender gaps in employment opportunities, which could have quite different effects through the permanent income.

The rest of the paper is organized as follows. Section 2 provides a conceptual framework thorough which to interpret the empirical results. Section 3 describes data, and Section 4 reports the results. The final section gives concluding remarks.

2 Conceptual Framework

[APOLOGY: THIS SECTION IS INCOMPLETE.]

Empirical studies have found that better labor market opportunities for women decrease the incidence of marriage for young women (Preston and Richards, 1975; White, 1981; Schultz, 1994; Blau et al., 2000) and that better labor market opportunities for men increase it (Schultz, 1994; Wood, 1995; Blau et al., 2000).[1] Their typical interpretation is that better labor market opportunities for women raise the opportunity cost of a marriage and better labor market opportunities for men increase the gain from a marriage. This kind of argument assumes that married women spend more time on the household work than single women in return to receiving a part of their spouse's earnings. Becker (1973) presents a formal model in which the potential

[1] Related studies by Loughran (2002) and Gould and Paserman (2003) find that the expansion of male wage inequality in the local labor market also decreases the marriage rate by raising age at first marriage for female.

gains from division of labor between spouses serves as an important incentive for marriage, provided that men have comparative advantage in market work.

To understand what these changes in the aggregate marriage rate mean for each woman, consider a very simplistic model which treats a marriage as if it were a kind of job. The "wage" of this "job" is the husband's earnings. In each period, a single woman receives a marriage proposal from a man, whose inherent productivity θ_i is randomly drawn from an exogenously given distribution. If she accepts his marriage proposal in period t, she receives $w^h(\theta_i, u_t^h)$, which is increasing in the husband's inherent productivity θ_i and decreasing in the male unemployment rate, u_t^h. Her outside option is to stay in labor force and receive her market wage, $w^w(u_t^w)$, which is decreasing in the female unemployment rate u_t^w. For now, assume that all women are homogenous and indifferent about spouse's characteristics other than earnings, and omit any other reason to marry such as the desire to have a child. Then, if divorce is free, this woman marries if and only if $w^h(\theta_i, u_t^h) > w^w(u_t^w)$. [I hope to construct a more formal search model which incorporates divorce costs, but for now, let's proceed without it.]

Since $\partial w^h / \partial u_t^h < 0$, the reservation level of θ_i also decreases in u_t^h. Hence, better labor market conditions for men increase the incidence of marriage; however, it increases the likelihood of divorce in future because women accept less productive men. Likewise, worse labor market conditions for women lower the reservation θ_i, increase both marriage incidence and future divorce.

Clearly, this is far from the reality. First, there are many other reasons to marry. Some of such reasons are binding more for older women. For example, if the woman wants to have a child, the physical limit of fertility matters. A social norm that women should marry by a certain age could also pressure women who have not married yet, as they approach to the threshold age. Whatever the reason is, as the limit approaches, women get less conscious about temporary fluctuations in labor market conditions. Further, the matching function may be proportional to men/women ratio, i.e. it is difficult for a woman to marry when more of other women want to marry. Therefore, it could be the case that, while younger women marry more when the female unemployment rate is high and the male unemployment rate is low, older women marry less because they are less likely to be able to match with a man.

Second, women do care about spouses' characteristics other than earning capacity, and men's willingness to marry is not exogenously given, either. If women compromise on the spouse's characteristics to increase the probability of getting married, it still leads to more future divorces. However, the decision could be more like whether to marry given a boyfriend rather than searching over the random pool of men. In economic parlance, the preference for the spouse is lexicographic and pecuniary compensation cannot substitute certain characteristics, namely, love. Then, an increase in marriage incidence does not necessarily lead to an increase in divorce.

3 Data

To examine the effects of gender specific labor market conditions on American women's family formation, I combine individual women's marriage histories with male and female unemployment rates of each state and year. The main source of individual women's marriage histories is retrospective information from the Survey of Income and Program Participation (SIPP) 1990-2004 Panels. Male and female unemployment rates are calculated from the monthly Current Population Surveys for 1978-2003.

The SIPP is a series of short panel surveys conducted by the Census Bureau, with sample size ranging from approximately 14,000 to 36,700 interviewed households. From 1984 to 1993, new panel of households taken from the representative US population was introduced each year, and each panel was followed for 32-40 months (e.g. households in the 1990 Panel were interviewed from 1990 to 1992). Then, the 1996 redesign replaced the overlapping panels by a single, larger panel and started to oversample households living in high poverty areas. Thus, 1996, 2001 and 2004 Panels do not overlap each other. I pool the seven panels from 1990 to 2004 and use the appropriate sample weights to address the different sample design between pre- and post- 1996 panels.

Although each SIPP core panel covers at most four years, supplemental topical modules provide rich retrospective information. Marriage History and Migration History Topical Modules attached to the Wave 2 allows me to construct "panel data" of marital status and state of residence going back to the 1970s. Since the survey does not actually trace people every year, it is free from sample attrition due to divorces. This is a big advantage of the SIPP over actual panel data such as the Panel Study of Income Dynamics, and the large sample size is another advantage. However, the available retrospective information is limited: employment status and income are available only for the period covered by the core panel, no information on the ex-spouse for a divorced person is available, and the state of residence in a given year cannot be determined if the respondent has moved across states twice or more since that year.[2] To make up for the lack of retrospective information on employment and income, I use the core contents of the seven different Panels as repeated cross section data.

I focus on first marriages of non-Hispanic white women in the contiguous United States to avoid the issue of selectivity into second marriages and the complication arising from the different social norm about marriage across ethnic groups. Also, I restrict my sample to women born in 1956-1980 and dropped who had married by 1978, because the state-level unemployment rate is available only since 1978. Lastly, I omit marriages by women younger than 16 or older than 35; those who had married by 16 are dropped from the sample, and those who had not married until 35 are treated as "never married."

Table 1 presents the summary statistics. First, the upper panel a. shows unweighted summary statistics of the base sample of women born in 1956-1980. Column A is the sample used to estimate the effects of gender specific unemployment rates in the state of actual residence on the marriage formation. Column B is the sample used for regressions on unemployment rates in the state of birth at age 18-20; since the state of birth is available for all women born in the United States, column B includes some women not included in column A. The lower panels b. – d. correspond to the subsample used for the analysis of divorce and fertility, spouses characteristics, and income and employment, respectively. Figure 1 shows the transition of marital status of women in the base sample. More than 80% of the women marry at some point between age 17 and 35, and about a half have married by 23. Although the conditional probability of getting married peaks in the late twenties, the distribution of the age at marriage shows the most women marry around age 20.

The individual-level data from the SIPP are merged with the female unemployment rate and the male-female gap in the unemployment rates calculated from the monthly basic Current Population Surveys. The universe is non-Hispanic white civilian labor force of age 15-40, and the rates are calculated for each gender and state.[3] I take the annual average to reduce sampling errors. Table 2 reports the summary statistics. Since identification is based on variations net of state- and year- fixed effects, I also report the residuals as well as the raw rates. About half

[2] The appendix provides more detail on this issue.

[3] Maine and Vermont, and North Dakota, South Dakota and Wyoming, are grouped together, because the original variable for the state of current residence in the SIPP is defined in such a way. Alaska, Washington DC and Hawaii are dropped.

of the variation in the female unemployment rate remains after controlling for state- and year-fixed effects and the male-female gap in the unemployment rates. Variation in the male-female gap is also substantial. Figure 2 plots the female unemployment rate and the male-female gap for the United States and five randomly picked states.

4 Empirical Results

4.1 Effects of the gender specific unemployment rates on marriage formation

To estimate the contemporaneous effects of gender-specific unemployment rates on the incidence of marriage, I use the following Cox's proportional Hazard model:

$$M_{its} = \lambda(age_{it}) \exp(\alpha_{age} u_{ts}^{w} + \beta_{age}(u_{ts}^{h} - u_{ts}^{w}) + \eta_s + \xi_t + \varepsilon_{its}) \tag{1}$$

Where the $M_{its}$is the probability of getting married during the calendar year t conditional on having never married until year $t-1$ for a woman i living in state s, age_{it} is woman i's age in year t, $u_{ts}^{w}$and $u_{ts}^{h}$are the female and male unemployment rates in year t in state s. I include the male- female gap rather than the male unemployment rate as it is, so that it does not pick up the effect of the change in overall unemployment rate. η_s is a state fixed effects, ξ_t is a calendar year fixed effects, and ε_{its} is the remaining error. The baseline hazard λ is a non-parametric function of age, since Figure 1.2 shows marriage hazard depends on age non-monotonically. To address the autocorrelation of state-specific random shocks, standard errors are estimated with clustering by states.

Table 3 reports the estimated α and β in equation (1) interacted with dummies for four age categories.[4] The first column presents the coefficients estimated with the entire sample. A high female unemployment rate and a relatively lower male unemployment rate both significantly increase the incidence of marriage for women younger than 20. Interestingly, a high female unemployment rate significantly *decreases* the incidence of marriage for women who are 24 or older.[5] Moreover, the effect of the female unemployment rate on the marriage hazard is

[4]The dummy variables themselves are not included because they are completely determined by the baseline hazard, which is a non-parametric function of single year age.

[5]The results for older woman may look inconsistent with Blau *et al.* (2000)'s findings that better labor market for men and worse labor market for women increase marriage incidence for 25-34 years old women. One possible reason is that their results for older woman pick up the effects of labor market conditions which they experienced when they were young. For example, the proportion of currently married women in women who were 25-34 years old in 1980 Census could reflect any shocks that affected 20-year-old women in the early 1970s. As shown in

monotonically decreasing in age: Figure 3 plots the coefficient of the female unemployment rate and the male-female gap interacted with dummies for single year age. The timing when the effect of the female unemployment rate turns negative coincides with the timing when the effect of the gender gap becomes zero.

If equation (1) is estimated without allowing α and β to vary with age of the woman, the overall effect of the female unemployment rate on the marriage hazard is positive, and the effect of the male-female gap is negative. This is consistent with existing studies such as Blau et al (2000). Also, it implies that the increase in the number of young women getting married exceeds the decrease in the number older women getting married. Therefore, the negative effect of the female unemployment rate on the marriage hazard for older women may be due to crowding out by the younger women.

Since more educated women tend to marry later, one might suspect that the differences in the estimated effect of gender-specific unemployment rates might be picking up the differential effects across educational categories. Thus, the second to the fourth columns of Table 3 show α and β estimated separately for three education categories; the pattern across age is fairly robust within each educational categories. Furthermore, the timing when the signs of the coefficients flip is later for more educated women.

The last two columns of Table 3 shows the effect estimated separately for those who have moved from the state of birth and those who have not. This exercise was motivated by a speculation that older women are more likely to have left the community where they were grown up and thus have difficulty in finding a mate when other women want to marry. This speculation seems to be wrong, although the effect of the female unemployment rate is closer to zero for the stayers.

These findings are consistent with the hypothesis of acceleration of marriage among those who would eventually marry without the changes in labor market conditions. If the increased marriage rate for younger women is really due to the acceleration of marriages of women who would marry anyway, the effects of gender specific unemployment rate in youth on the ratio of married women at the cohort level should fade away as they age.

To confirm this, I split birth cohorts 1960-1970 from 2001 and 2004 panels [6] into two groups,

Table 4, the cumulative marriage rate of cohorts who experienced relatively worse labor marked conditions for women in their early twenties remain higher until the late twenties.

[6] I restrict my sample so that I can follow the same people from 18 to 30 years old.

one of which consists of cohorts (defined by state and year of birth) that experienced the female unemployment rate higher than the median when they were 18-20 years old, calculate the fraction of women who have married by each for each group, and take the difference between the two groups. I repeat the same process for groups split by the male-female gap in the unemployment rate at age 18-20. Figure 4 plots these differences over age. Women in cohorts that experienced a higher female unemployment rate and a lower male-female gap are more likely to have married by early twenties, but the difference fade away by the thirties.

More formally, I estimate the following linear probability model using birth cohorts 1960-1970 from 2001 and 2004 panels, separately for different ages:

$$\Pr(married) = \alpha\bar{u}^{w}_{\tau s} + \beta(\bar{u}^{h}_{\tau s} - \bar{u}^{w}_{\tau s}) + \eta_s + \xi_\tau + \varepsilon_{i\tau s} \tag{2}$$

where $\bar{u}^{w}_{\tau s}$and $\bar{u}^{h}_{\tau s}$are the average female and male unemployment rates in years when the woman was 18-20 or 19-21 years old in the state of birth, $\eta_s$is a state-of-birth fixed effect, $\xi_\tau$is a year-of-birth fixed effects, and $\varepsilon_{i\tau s}$is the remaining error. Table 4 confirms the same pattern shown in Figure 4: a high female unemployment rate and a low male unemployment rate increases the marriage rate for young women, but these effects fade away by their early thirties.

To put it another way and check robustness to sample selection, Table 5 presents the Cox proportional hazard model replacing the previous year's unemployment rates in equation (1) with the average unemployment rates in years when the woman was 18-20 years old or 19-21 years old. Since non-negligible number of women lack the state of actual residence at such young age, the first two columns assign the unemployment rates based on the state of birth, and control for a year-of-birth fixed effects and state-of-birth fixed effects in stead of calendar year and state of current residence in equation (1). The last column assigns the unemployment rates based on the state of actual residence at age 19, dropping those whose state of residence at age 19 is not identified. All specifications yield similar estimates and imply that the decline in marrage incidence for young women who experienced a relatively low female unemployment rate is basically a delay in the timing.

Next question is whether the increased marriages for young women are associated with lower match quality. If these women lower the reservation quality of spouses to exploit the temporary rise in gains from marriage, it will lead to more divorces in future. To assess this hypothesis, I