

**Divorce and Hispanic Labor Force Participation: A Comparison to All Females**

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**October 2008**

**Presented at Session Z13-1, the “Social Norms Session”  
at the 66<sup>th</sup> International Atlantic Economic Conference  
Hilton Montreal Bonaventure, Montreal, Quebec, Canada  
Friday, October 10, 2008, 9:00 a.m. – 11:00 a.m.**

## **Divorce and Hispanic Labor Force Participation: A Comparison to All Females**

### **I. Introduction**

The decision to divorce involves a consideration of a complex series of variables. The dissolution of family financial assets and liabilities has to be considered as does the difficult decision of who gets the custody of any children. The complex calculus of comparing marital income and the income after divorce also enters the decision process. In addition, ethnic backgrounds also affect the probability of divorce. These cultural and family traditions may affect the psychic cost associated with divorce. This paper investigates divorce among Hispanic women and analyzes the relationship between the percent of Hispanic women divorced and the labor force participation rate of Hispanic women. A previous study of aggregate data showed the causality runs both ways: increases in the divorce rate lead to more women in the labor force and increased participation in the labor force resulted in a higher divorce rate. This paper will also compare the response of Hispanic women to the response of all women in the aggregate sample and to the response of black women.

The paper focuses on four annual data series between 1971 and 2007: the percentage of Hispanic women that are divorced, the average number of children living with Hispanic women, the average real wage income of Hispanic women and the average number of hours that Hispanic women worked the previous week. Finding these four data series are stationary, a vector autoregressive (VAR) model is estimated and impulse response functions were generated. The impulse response functions show that the percentage of Hispanic women that are divorced is much less response to increases real wage income than the percentage of black women that are divorced or the percentage of all women that are divorced, most of which who are predominately white. While increased in the percentage of women divorced lead to more women, in general,

and more black women, in particular, in the labor market, the percentage of divorced Hispanic women was less sensitive to increases in real wage. Unlike the aggregate sample of women and the narrower sample of only black women, impulse response functions show that the hours that Hispanic women work was also relatively invariant to increases in the real wage. Finally, impulse functions indicate that increases in real wages led to a modest decline in the average number of children living in the households of Hispanic women.

Following this introduction, the second section offers a brief literature of the empirical and theoretical literature about the divorce decision. The third section describes the data, reports whether the data is stationary and discusses preliminary Granger causality results. The VAR model and the analysis of its associated impulse response functions are in the fourth section of the paper. A summary of the results and some concluding thoughts are in the fifth and final section of the paper.

## **II. Literature Review**

### **Theoretical models**

The decision to divorce has been modeled with theoretical models and empirical models using either micro-level data or aggregate macro data. Becker *et al.* (1977) argued that when a person decides to dissolve a marriage, he or she is comparing the value of being single to the joint value of being married. Following the work of Weiss (1996), assume a wife's present value of being married equals  $W_M(X_W, X_H, K, \theta)$  where  $W_M$  denotes the wife's utility function of being married and its arguments include  $X_W$ , characteristics of the wife,  $X_H$ , characteristics of the husband,  $K$ , marriage-specific capital such as children and  $\theta$ , an unobserved measurement of the quality of the marriage. Likewise, the husband's present value of being married equals  $H_M(X_W, X_H, K, \theta)$ . The wife will seek a divorce in today's no-fault divorce legal environment if

$$W_S(X_W, \alpha K) + Y_H - C > W_M(X_W, X_H, K, \theta)$$

where  $W_S$  is the wife's present value of being single,  $Y_H$  is the present value of the alimony and child-support received from the ex-husband,  $\alpha$  is the percentage of marriage capital that the wife receives after the divorce and  $C$  is the present value of the cost of a divorce.  $C$  not only includes the legal costs of a divorce but it also includes the opportunity costs of the time involved in negotiations during the divorce proceedings and the psychic costs involved in the process.

Simply put, a wife seeks a divorce if the present value of the net benefits of being single exceeds the present value of the net benefits of remaining married. Likewise, males will seek a divorce if

$$H_S[X_W, (1-\alpha)K] + Y_W - C > H_M(X_W, X_H, K, \theta).$$

Factors that affect this decision include the wife's income relative to the husband's, the wife's relative ease of joining the labor market, and the cost of getting a divorce. Over time, the cost of a divorce has fallen due to the lower cost associated with the no-fault divorce laws and the increased ability to remarry.

### **Time-series models using macro data**

In studying the growth of divorce rates in Great Britain, Smith (1997) found that the higher divorce rates could not be attributed to the introduction of no-fault divorce laws. While these procedural and legal changes may have had a temporary affect, Smith concluded that the rising divorce rate was caused by the increasing female labor force participation and rising levels of female income which reduced women's economic dependence on joint marital income. The advent of the birth control pill and technological change also contributed to rising divorce rates. Improved fertility control resulted in fewer children which significantly reduced the transactions costs of a divorce.

South (1985) investigated the effect that business cycle had on divorce rates. He found a small, direct relationship between unemployment rates and divorce rates. However, Smith concluded that changes in demographic factors such as the age structure of women and increases in the female labor force participation rate had significantly stronger impacts on the divorce decision than changes in real GDP or the unemployment rate.

Using a vector autoregressive model and Granger-causality tests, Bremmer and Kesselring (1999) found that divorce rates did Granger cause female labor force participation rates. However, the causality flows were unidirectional as they also found that female labor force participation rates did not Granger cause divorce rates.

Bremmer and Kesselring [2004] used U.S. macro time-series data and cointegration techniques to investigate the relationship between divorce, female labor force participation, and median female income. Using standard, time-series techniques found in the analysis of macroeconomic time series, they found these variables had unit roots; but, their first differences were stationary, and these variables were cointegrated. Impulse functions revealed an increase in divorce rate led to a rise in female labor force participation and positive innovations to female labor force participation led to an increase in the divorce rate. Other impulse functions showed that increases in female income caused both higher divorce rates and rising labor force participation rates on the part of females.

In a study using time-series data from the March Supplement of the Current Population Survey, Kesselring and Bremmer (2008) analyzed the relationship between labor force participation and the divorce rate for two samples. One of the data sets included all women in the sample while the other data set consisted of only black women. Once again statistical tests indicated that the data series in both samples exhibit unit roots; but, cointegration tests indicated

that the data series in both samples had a long-run relationship that was captured by a single cointegrating equation. In each sample, the single cointegrating equation was used to estimate a vector error correction model.

Their findings indicate the relationship between divorce rates and women in the labor force may differ across races. Impulse response functions indicate the average number of hours worked by black women was much less sensitive to an increase in the percentage of black female divorcees than the sample that included all women, most of which were predominately white. Whether the sample included all women or just black women, impulse functions showed that higher wages resulted in both larger percentages of divorced females and increases in hours worked. In both of these cases, the impulse functions for black women showed a larger response.

### **Micro empirical studies**

Several papers have made a clear causality argument by showing that an increase in the likelihood of divorce increases a female's willingness to enter the labor force. Lombardo [1999], and Greene and Quester [1982] argue wives facing a higher risk of divorce hedge against that risk with higher levels of labor force participation, and that they respond by working longer hours. Investment in nonmarket activities, such as child rearing, becomes relatively less attractive (it yields a lower expected return), and investment in human capital becomes relatively more attractive (it yields a higher expected return) as the probability of divorce increases. Studies by Johnson and Skinner [1986], and Shapiro and Shaw [1983] provide additional evidence that women increase their labor force participation prior to dissolution of a marriage.

In two separate studies, Spitze and South [1985, 1986] argue a different line of causality exists. Their conclusion is that an increase in female labor force participation results in more

familial conflict and, consequently, an increase in divorce. Confirming this result, Mincer [1985] surveyed twelve industrialized nations and found that rising divorce rates lag rising female labor force participation rates.

Previous studies of the impact of income on divorce have provided mixed results. Becker, Landes, and Michael [1977] find that a rise in expected female earnings increases the probability of divorce, while a rise in expected male earnings reduces the probability of divorce. D'amico [1983] recognizes two distinctly different possible effects of income on divorce. One hypothesis is that as the female's wage relative to the male's rises, conflict based on competition for status within the marriage will occur and will increase the likelihood of divorce. The second, opposing hypothesis is the notion that the pursuit of higher socioeconomic status is a familial one and that a wife earning a relatively higher wage than that of the husband may contribute to the overall status goal and solidify the marriage. D'amico's results tend to confirm the latter hypothesis. Finally, Hoffman and Duncan [1995] find no support for the hypothesis that higher real female wages lead to increased divorce rates and a study by Sayer and Bianchi [2000] tends to confirm this finding.

However, Spitze and South cast doubt on the sole importance of income in the divorce decision. In their 1985 study, they produced evidence that the number of hours a wife works had a greater impact on the probability of divorce than various measures of the wife's income.

Using a sample of over 100,000 individuals, Kesselring and Bremmer [2006] found that as females experience greater levels of success in the labor market, they also tend to experience higher levels of divorce. A key result was that as the female's earnings became a larger portion of the family income, the likelihood of divorce increased even while controlling for general successes in the labor market. This study used probit analysis to control for a limited dependent

variable that was either 1 or 0 (either married or divorced) and sample selection techniques were used to analyze the divorce decision.

### **III. Data Sources, Unit Root Tests and Granger Causality Tests**

Analyzing whether there are racial differences in the divorce decision is a problematic empirical issue. The divorce rate reported by the Center for Disease Control (CDC) is not disaggregated in terms of race; rather, they publish an aggregate divorce rate including all races. After 1980, birth rates published by the CDC were disaggregated in terms of the mother's race; however, prior to 1980 the figures were based on the child's race. The Bureau of Labor Statistics (BLS) doesn't report labor force participation rates of the different races before 1972. Finding census income data for women disaggregated by race is also problematic. As was done Kesselring and Bremmer (2008), these variables or an equivalent proxy were extracted from the March Supplement of the Current Population Survey, which is published by the BLS. While data on annual data on black women can be found beginning in 1964, data for Hispanic women begins in 1971.

#### **Data**

Between 1971 and 2007, four annual time series were extracted from the BLS database: (i) the percentage of Hispanic women that were divorced, (ii) the average number of hours work performed by Hispanic women in the previous week, (iii) the average value of the annual wage income for Hispanic women (converted to real terms using the CPI), and (iv) the average number of children in each Hispanic household that were less than eighteen years old. Plots of the data are provided in Figures 1 – 3.<sup>1</sup>

The plot of the percentage of Hispanic women that were divorced in each year is in Figure 1. Note that this percentage has increased over time. However, compared to the sample

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<sup>1</sup> The time series are available upon request.

that includes all women, the percentage of Hispanic women that are divorced is smaller. The percentage of Hispanic women that are divorced is less than the percentage of all women who are divorced which is again less than the percentage of black women that are divorced.

According to Figure 2, Hispanic women have the larger average number of children at home than the sample containing all women. Hispanics' average number of children is greater than the average number of children of black women, which in turn is greater than the average number of children for all women.

Figure 3 plots the average hours worked during the previous week for Hispanic, black and all women. Again the results are in line with the stylized facts regarding labor force participation rates across the races. The average hours worked by all women, most of which are white, tends to be the greatest. Black women tend to work relatively fewer hours compared to their white counterparts, but the gap has narrowed or even disappeared in recent years. Hispanic women tend to work the fewest hours as their plot lies below the plot for black women and the gap between those two has stayed relatively constant.

### **Unit root tests**

Table 1 indicates the four data series dealing with Hispanic women are stationary. The augmented Dickey-Fuller tests reject the null hypothesis of unit roots, indicating the regressions can be estimated with level data with little fear of obtaining spurious results.

According to Table 1, the null hypotheses of unit roots is rejected at the ten percent level for percent of Hispanic women divorced, the average number of children in their households, and the average real wage income for Hispanic women. In the case of the average number of hours that Hispanic women worked in the previous week, the null hypothesis of a unit root is rejected at the 5 percent level. Given the four data series do not exhibit unit roots, a cointegration test is

not needed to find a long run relationship between the variables. Instead of using the vector error correction model that embodies any cointegrating equations, a standard VAR model can be estimated with level data.

### **Granger causality tests**

Table 2 reports the results of three Granger causality tests that were estimated with level data. The first test reported detects no relationship exists between the percentage of Hispanic women divorced and the average number of hours that Hispanic women worked. The current value of the percent divorced was not a function of lagged values of hours worked, nor was the current average hours of work a function of past divorce rates.

The second test reported is a curious result. This statistic test indicates while current values of real wage income is a function of the past values of the percent of women divorced, the current values of the percent divorced are not a function of the lagged values of real wage income. The interpretation here is that past increases in real wage income does increase the percentage of Hispanic women who are divorced.

The last result reported also has an unexpected result. This pair wise Granger causality test indicates that the current value of the average number of children is not related to the past percentages of Hispanic women divorced. On the other hand, there is evidence that the current percentage of Hispanic women divorced is a function of the number of children in the past. Here the F-statistic of 7.517 implies the null hypothesis that all the slope coefficients associated with previous number of children are simultaneously equal to zero is rejected at the one percent level.

### **IV. The VAR model and the impulse response functions**

Rather than estimate a structural model describing the behavior of these four variables, a VAR model is estimated. The increasing prevalence of VAR's in time series estimations derives

from the problems usually confronted by economists wishing to avoid specification errors common to most time-series methods. For most econometric models, the choice of specification can be a very thorny issue. The typical specification search is strictly one of trial and error. Frequently, different functional forms and combinations of possible explanatory variables are selected and tested. The reason for this is that economic theory may not conclusively indicate the impact of a given variable, nor may it conclusively indicate which variables should be included in--or, for that matter, excluded from--the model's specification. Furthermore, theory may do little to reveal the true functional form of the model.

### **The VAR model**

Therefore, to minimize the possibility of specification errors, to exploit the simultaneity of the variables chosen for the model, and to circumvent the possibility of making incorrect distinctions between exogenous and endogenous variables, a VAR model was chosen to explain the relationship between the percentage of Hispanic women divorced, the average hours they worked in the previous week, the average number of children in the household and average real wage income of Hispanic women. In a VAR framework, each endogenous variable is a function of past values of all endogenous variables. In addition, successive lagged endogenous variables are added to the specification until the error term is no longer autocorrelated.

The results of the VAR model are reported in Table 3. Successive likelihood ratio tests indicate that proper lag length is one or that each of the four regression models include as explanatory variables all the variables from the previous observation. The  $R^2$ s of these four regressions range from 0.88 to 0.98.

### **Impulse response functions**

Statistical inference in the vector error correction model is complicated and the current practice of analyzing how the endogenous variables respond to exogenous shocks in the other

variables is to construct impulse response functions. In the impulse response functions that follow, there was an exogenous, one standard deviation shock or innovation to one of the endogenous variables. These innovations are orthogonalized using the inverse of the Cholesky factor of the residual covariance matrix and adjusted for the degrees of freedom.

Figure 4 shows the key result: the percentage of Hispanic women that are divorced appears not to be affected by an increase in real wage income in the long run. Notice that an increase in real wage income causes the divorce percent to increase for both the sample that includes all women and the sample that includes only black women. But the effect of higher real wages on the percentage of Hispanic women that are divorced is almost negligible.<sup>2</sup> Likewise, Figure 5 shows that increases in the percentage of divorced women lead to more women, in general, and more black women, in particular, working more hours per week. But once again, if more Hispanic women become divorced, the long-run number of hours worked is basically unaffected.

Two of the three plots in Figure 6 agree with economic intuition. Regarding the sample of all women and the sample of black women, an increase in real wage income leads to more hours worked. However, the response of the predominately white sample is greater than the response of black women. However, this model predicts that the average number of hours worked by Hispanic women is relatively unresponsive to an increase in the real wage income that they earn.

The response of the average number of children to an increase in divorce rates is shown in Figure 7. For the larger sample of all women and for the narrower sample of just black women, higher divorced rates lead to fewer children. However, like the previous impulse response functions, the response of Hispanic women is relatively small. At first the number of

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<sup>2</sup> The results for the sample of all women and black women come from Kesselring and Bremmer (2008).

children falls, but the average number of children eventually approaches its initial long-run value.

Finally, in regards to the average number of children, the impulse response functions plotted in Figure 8 show that the sample of all women and the sample of only Hispanic women have a similar response to changes in real income. In both samples, an increase in real wages leads to a modest decline in the average number of children. Black women show a larger response to changes in wages as higher wages leads to a much larger decline in the average number of children.

## **VI. Summary and Conclusion**

The decision whether to get a divorce involves the analysis of several variables. The utility of remaining married and the perceived utility of being single once again have to be compared. Economic variables such as the division of assets and the income after divorce are considered. Cultural values and ethnic backgrounds also enter the decision process. This paper considered the relationship between the percentage of Hispanic women that are divorced and the labor force participation rate of Hispanic women. Four annual data series between 1971 and 2007 were extracted from the Current Population survey: (i) the percentage of Hispanic women divorced, (ii) the average number of hours that Hispanic women worked in the previous week, (iii) the average annual wage income for Hispanic women and (iv) the average number of dependents in the households of Hispanic women. The data series were found to be stationary and a VAR model was estimated.

Impulse response functions indicate that increases in wage income do not affect the percentage of Hispanic women that are divorced. Hispanic women labor supply was relatively unresponsive to changes in wage income. The average number of children living the households

of Hispanic women was relatively unresponsive to changes in their wage income or the percentage of them that were divorced. These results are different than those samples consisting of only black women or the aggregate sample consisting of all women, most of which were predominantly Caucasian. This first pass of analyzing this data shows significant differences in the divorce decision across wages and further analysis is justified.

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**Table 1**  
**Augmented Dickey-Fuller Tests: Level Data for Hispanic Women**

Variable	Test Statistic	Lags	Variable	Test Statistic	Lags
Percent Divorced <sup>†</sup>	-2.836 <sup>***</sup>	0	Hours Worked <sup>‡</sup>	-4.135 <sup>**</sup>	1
Number of Children <sup>‡</sup>	-3.286 <sup>***</sup>	9	Wage Income <sup>†</sup>	-2.818 <sup>***</sup>	4

\* \*\* (\*\*\*) indicates the null hypothesis that the time series has a unit root is rejected at the 5% (10%) level. <sup>†</sup> indicates that the regression model included an intercept, while <sup>‡</sup> indicates the regression included both an intercept and a time trend. Annual data: 1971 - 2007.

**Table 2**  
**Granger Causality Tests: Hispanic Women, 1971 – 2007**

	F-Statistic	Lags
Percent Divorce Does Not Granger Cause Average Hours Worked	2.254	2
Averaged Hours Worked Does Not Granger Cause Percent Divorced	1.577	2
Percent Divorced Does Not Granger Cause Real Wage Income	4.129 <sup>***</sup>	1
Real Wage Income Does Not Granger Cause Percent Divorced	1.332	1
Percent Divorced Does Not Granger Cause Number of Children	0.123	1
Number of Children Does Not Granger Cause Percent Divorced	7.517 <sup>*</sup>	1

<sup>\*</sup> and <sup>\*\*\*</sup> indicate the null hypothesis can be rejected at the 1% level or 10 % level, respectively.

**Table 3**  
**Vector Autoregression Estimates: Hispanic Women, 1971 – 2007**

<i>Independent Variables</i>	<i>Dependent Variables</i>			
	Percent Divorced	Average Hours Worked	Average Number Of Children	Real Wage Income
Percent Divorced	0.436 (2.763)	50.326 (2.861)	-0.761 (-0.316)	16259.610 (2.639)
Average Hours Worked	-0.001 (-0.819)	0.645 (3.650)	-0.053 (-2.193)	82.877 (1.338)
Average Number Of Children	-0.019 (-2.552)	1.618 (1.957)	0.801 (7.077)	621.299 (2.145)
Real Wage Income	0.000002 (0.618)	0.0006 (1.915)	0.00009 (1.94)	0.837 (7.360)
Constant	0.089 (2.942)	-3.290 (-0.974)	0.806 (0.462)	-2746.441 (-2.322)
R <sup>2</sup>	0.884	0.966	0.965	0.982
F-Statistic	59.095	217.538	215.854	429.067

Figure 1

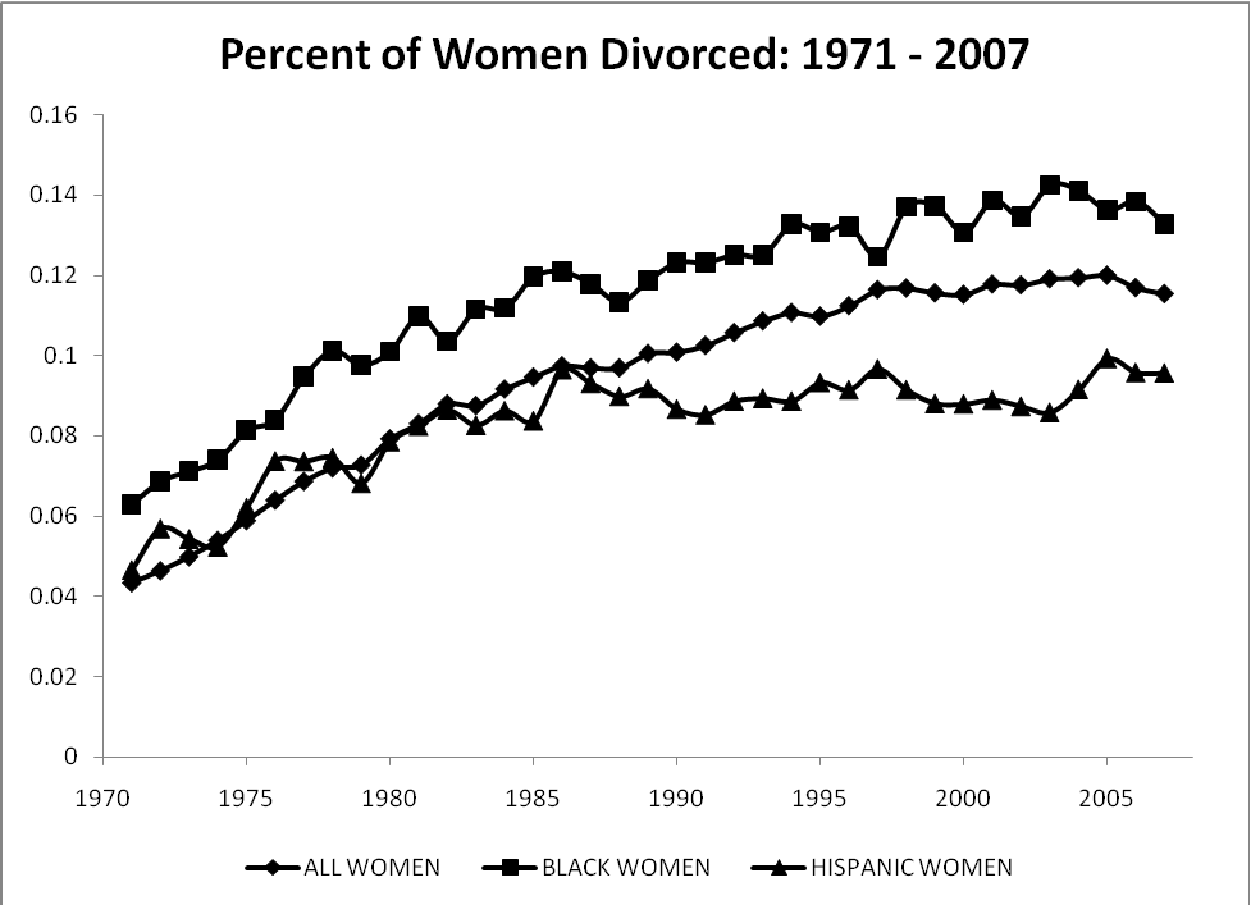


Figure 2

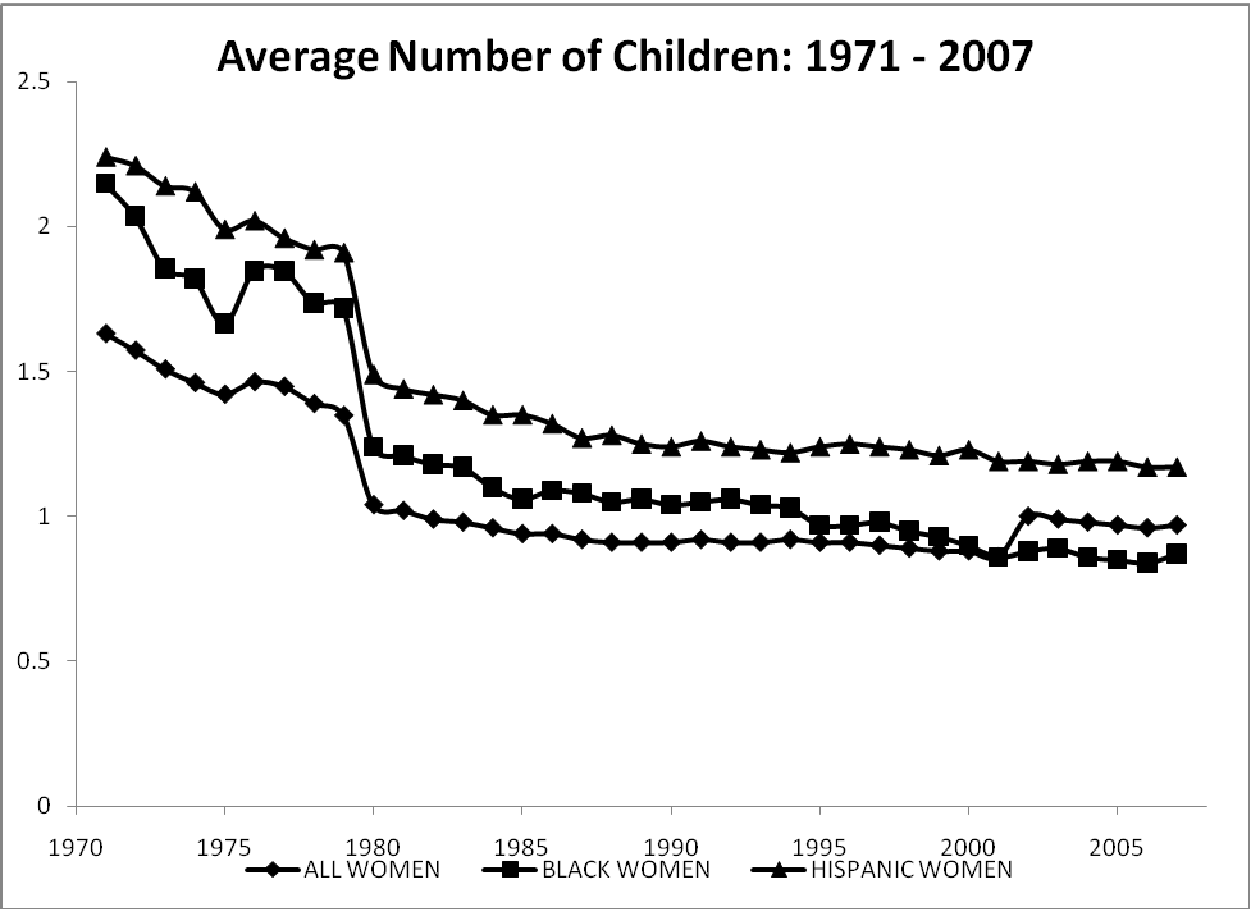


Figure 3

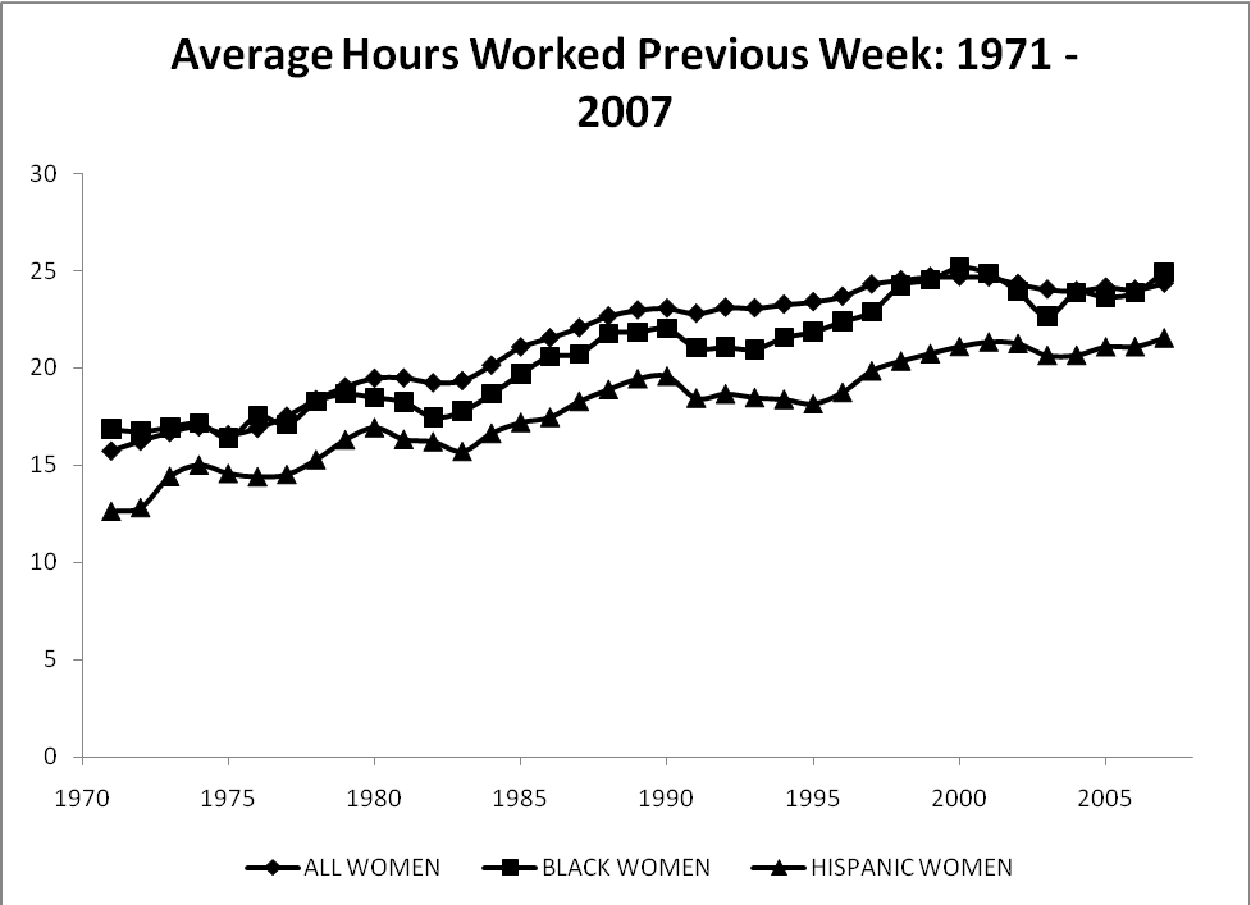


Figure 4

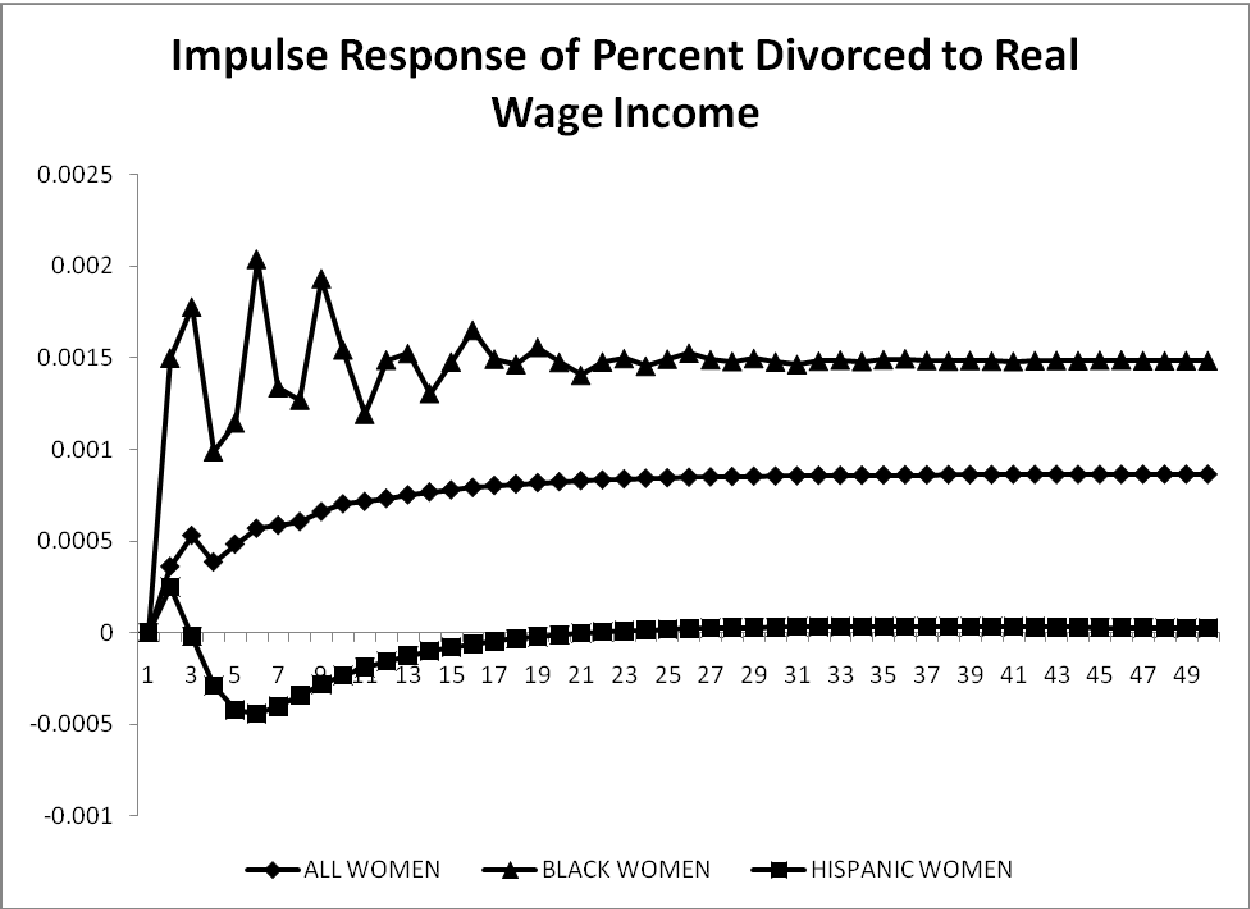


Figure 5

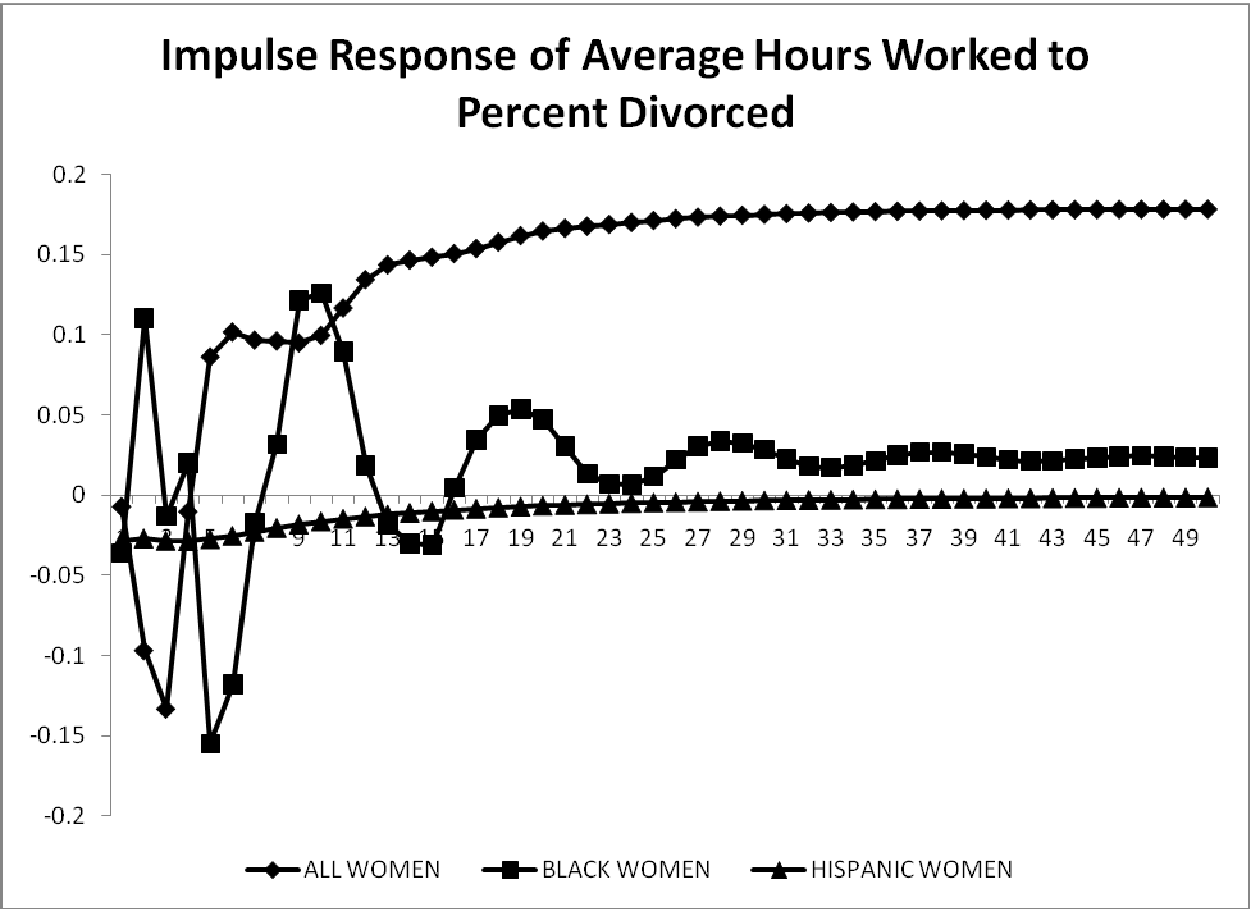


Figure 6

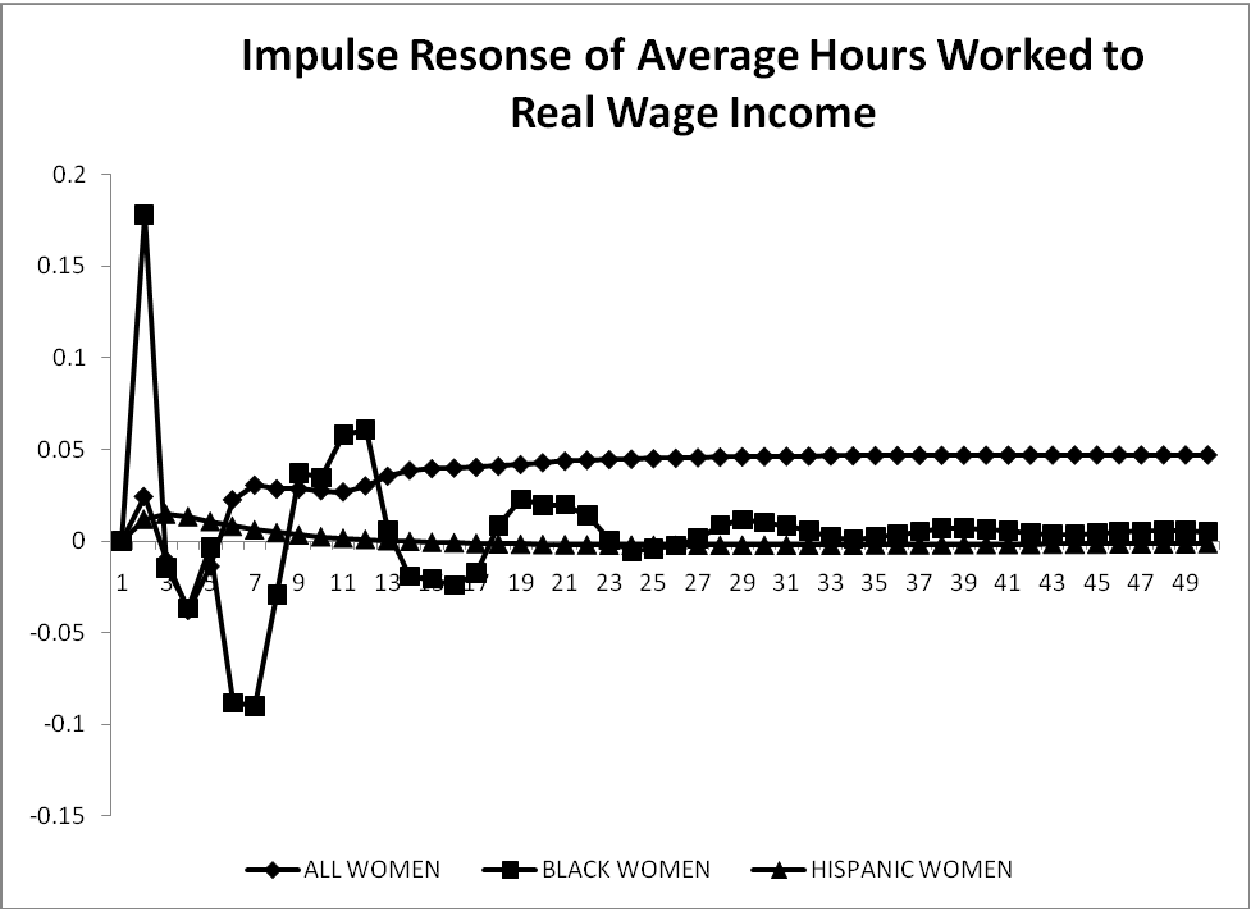


Figure 7

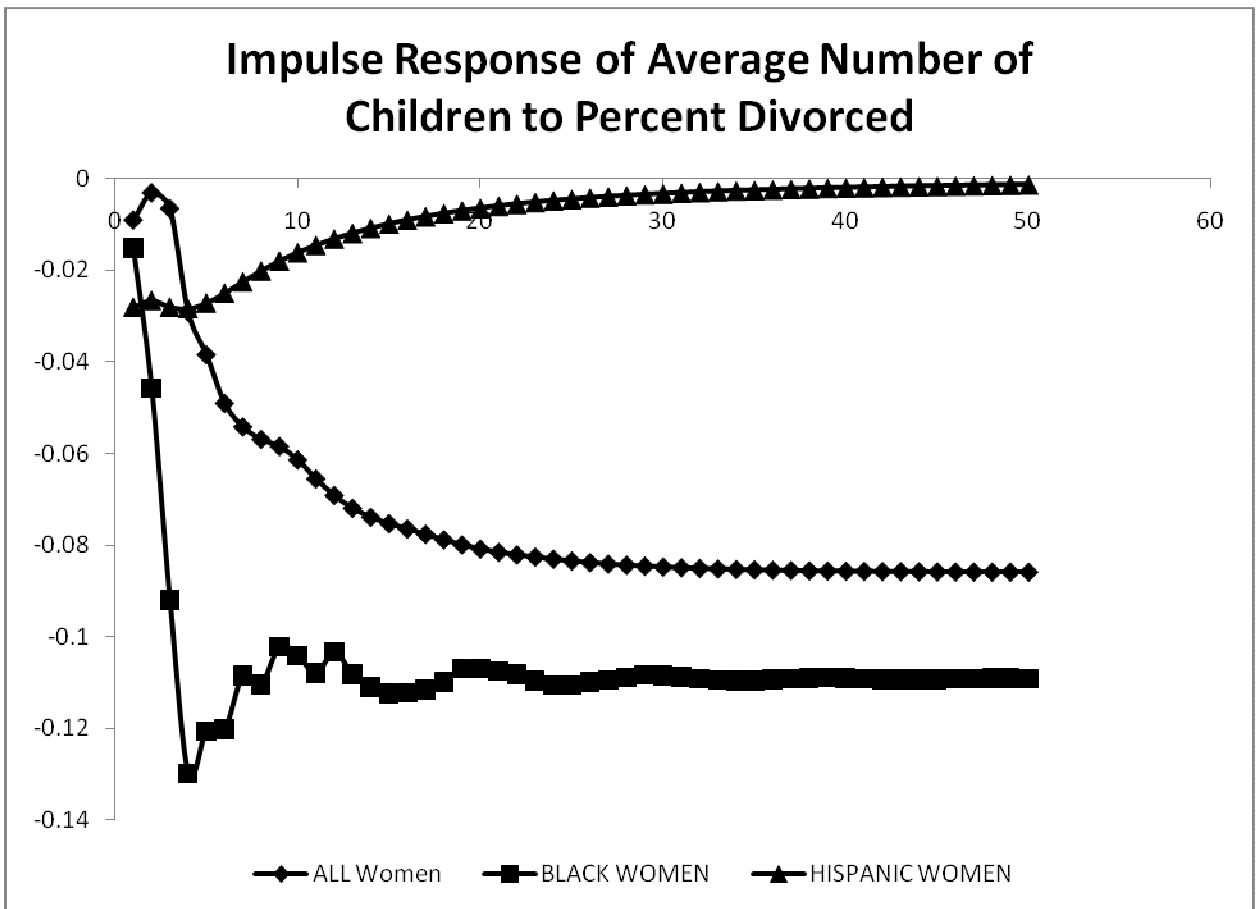


Figure 8

