THE MARRIAGE TAX AND THE RATE AND TIMING OF MARRIAGE

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Abstract *- The effect of the differential tax treatment of married and unmarried couples, the so-called marriage tax, on the rate and timing of marriages is analyzed. Using time-series data, we study the effect of the marriage tax on the fraction of unmarried women over the age of 15 years who marry in each year. We find no effect. We also investigate whether couples shift the timing of their marriage from the end of one year to the beginning of the next year in response to an increase in the marriage tax. We find empirical support for this behavior.*

INTRODUCTION

Much has been made over time of the existence of a marriage tax and subsidy. This literature has focused on the issue of the equity of a marriage tax and the proper tax treatment of a married couple relative to unmarried individuals. With the exception of Alm and Whittington (1992, 1995), there appears to be no research that investigates the effect of the marriage tax and subsidy on marriage behavior. In this paper, we address this issue, focusing on the effect over time of the marriage tax on both the rate at which females marry and the timing of marriages.

Alm and Whittington conducted a time-series analysis, 1947–87, relating the percentage of females, 15 to 44 years of age, who are married to a measure of the marriage tax, and several control variables. They find a negative and statistically significant relationship between the two variables. Our analysis differs from theirs in two important respects. First, we specify a similar model but use the fraction of nonmarried females who marry within a year as the dependent variable. We also measure the marriage tax in several different ways, including the measure that Alm and Whittington use. Contrary to Alm and Whittington, we find no support for the hypothesis that the marriage tax negatively affects the rate at which females marry. Second, we consider the possibility that the marriage tax has only a transitory effect on the rate at which females marry. In particular, we investigate whether the marriage tax simply affects the timing of the marriage, causing a couple to wait until the next tax year. We find weak support for the hypothesis that increases in the marriage tax cause couples to postpone marriage.

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A substantial literature addresses both the positive and normative aspects of the tax treatment of single individuals and married couples. Bittker (1975) is the standard reference on the appropriate tax treatment. Brazer (1980), Munnell (1980), and Brozovsky and Cataldo (1994) contain extensive discussions of the history of the tax treatment of the family in the United States, while Pechman and Engelhardt (1990) provide an international perspective. Feenberg (1983), Rosen (1987), and Feenberg and Rosen (1994) provide calculations of the marriage tax and subsidy, and show how the tax/subsidy varies with the level and distribution of income between the two partners.

The tax treatment of married couples has varied considerably over the past 47 years as Congress has revised the tax code. This variation offers an excellent opportunity to explore the effect of the marriage tax on the decision to marry and the timing of marriage.

The rest of the paper is organized as follows. The next section contains the presentation of the theoretical framework used in the analysis. That is followed by sections that present the data and analysis of the rate of marriage and the timing of marriage, respectively. A summary and conclusion section completes the paper.

FRAMEWORK

The basic approach to the economic analysis of marriage is due to Becker (1974, 1981), and has been adopted in several studies seeking to explain marriage patterns, *e.g.,* Espenshade (1985), Keeley (1979), Michael and Tuma (1985), and Preston and Richards (1975). Freiden (1974) presents an empirical implementation of Becker's work, and we adopt his framework. Within this framework, people agree to marry when each partner's real, or full, income is higher when married than not married. Following Freiden, let Z represent full income, m and f represent males and females, and mf represent a married couple, and assume that Z^{mf} is given. Consider the number of males who will agree to marry. First, order the males according to their income if single, Z_m. The supply of males in the marriage market is given by the number of males whose income while single is less than their full income in marriage, Z_m^{mf}. Given the ordering of males by their income if single, the supply curve of males is an upward-sloping curve, *i.e.,* the greater is Z_m^{mf}, the greater the number of males who are willing to marry.

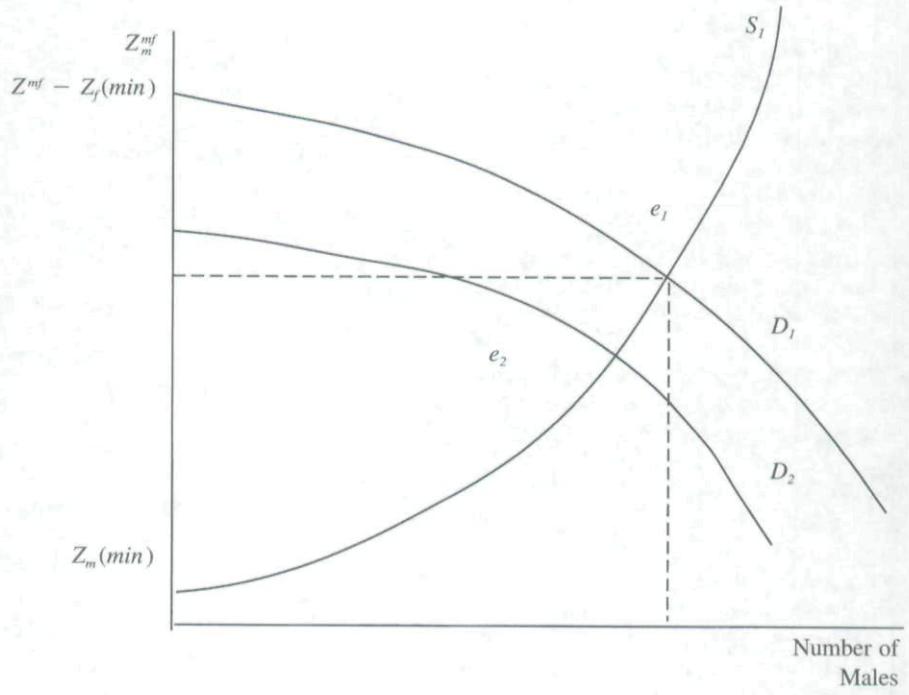
The supply of females is the derived demand for husbands by females. This function is an inverse function of Z_m^{mf}.

Figure 1 captures the marriage market and is based on Figure 1 from Freiden. The y-axis in Figure 1 measures Z_m^{mf} and the x-axis measures the number of males willing to marry. For the moment ignore D_2. Equilibrium in the marriage market is given by the point e_1, *i.e.,* where the supply of males, S_1, equals the derived demand for males, D_1.

D_1's intersection with the y-axis is determined by the value of Z_m^{mf} that would cause the first male to enter the marriage market. This value of Z_m^{mf} equals the lowest full income of a male when single, i.e., $Z_m(min)$. The difference between Z^{mf} and Z_m^{mf} is the income that would be available to the female in the marriage. Thus, females enter the marriage market when $Z_m^{mf} \leq Z^{mf} - Z_f(min)$. Higher values of Z_m^{mf} result in more males willing to enter marriage but fewer females because Z_f^{mf} falls when Z_m^{mf} increases.

Now suppose that a tax is imposed on married couples, the effect is to reduce Z^{mf}. When Z^{mf} falls as a result of the marriage tax, the level of full income available to the female falls at each value of Z_m^{mf}. This reduces the derived demand for husbands and thus shifts D_1 to D_2. The sup-

FIGURE 1. Supply and Demand in the Marriage Market



ply curve of males does not shift because it reflects the number of males who enter the marriage market at each value of Z_m^{mf}. The new equilibrium is given by e_2, where the number of marriages is less than at e_1.

To the extent that the size of the marriage tax depends upon the distribution of earnings between the couple, the couple's behavior in the married state may adjust to offset the marriage tax. For example, suppose the marriage tax is calculated by determining the change in total income tax that two individuals would pay if they got married *and* each continued to earn the same income. Freiden's model suggests that there is no benefit to marriage if each person in the marriage has the same marginal productivity in the labor force. Thus, each member would specialize, with one doing at-home work and the other away-from-home work. If this is how married couples behave, then the marriage tax, as defined, could have no effect on the decision to get married.

As noted above, we analyze this issue in two ways: (1) by studying the effect of the marriage tax on the flow of marriages; and (2) by considering the effect on the timing of marriages. We consider the analysis of the flow of marriages in the next section and the timing of marriage following that.

ANALYSIS OF THE RATE OF MARRIAGE

To analyze the effect of the marriage tax on the rate of marriage, we estimate a

time-series regression of the propensity to marry against the marriage tax and a set of control variables. The dependent variable is the fraction of unmarried females over 15 years of age who marry each year. Other studies of marriage, including Alm and Whittington and Freiden, have used the fraction of the female population that is married. The fraction of women married is a stock variable, while the rate of marriages reflects the flow. The model presented in the previous section can be considered either as a model of the stock of marriages, *i.e.,* the number of females who are married, or as a flow of marriages, *i.e.,* the number of females who marry in each period. There is nothing inherently preferable about modeling the marriage market as a stock or flow; *e.g.,* one can study the effect of taxes on the size of the capital stock or on investment. However, using changes in the stock of marriages over time means that there are two separate decisions being combined, whether to get married and whether to get divorced. A change in the marriage tax could affect those decisions differently, even though the model does not consider that possibility. Considering just the flow of marriages is perhaps a cleaner test of the hypothesis. Thus, we believe that it is more appropriate to use the rate at which females marry than a measure of the number of married females. This approach is consistent with studies of the effect of taxes on capital or savings, which normally focus on investment or the savings rate as the dependent variable, not the size of the capital stock or the volume of savings.

The dependent variable we use, denoted *MRATE,* is the annual number of marriages per 1,000 unmarried (including previously married) women 15 years of age and over for the years 1948–87. (*MRATE* is shown in Figure 2.) We experimented with alternative measures of the marriage rate, including annual number of marriages per 1,000 women (regardless of marital status and age); the basic results reported below were not altered.

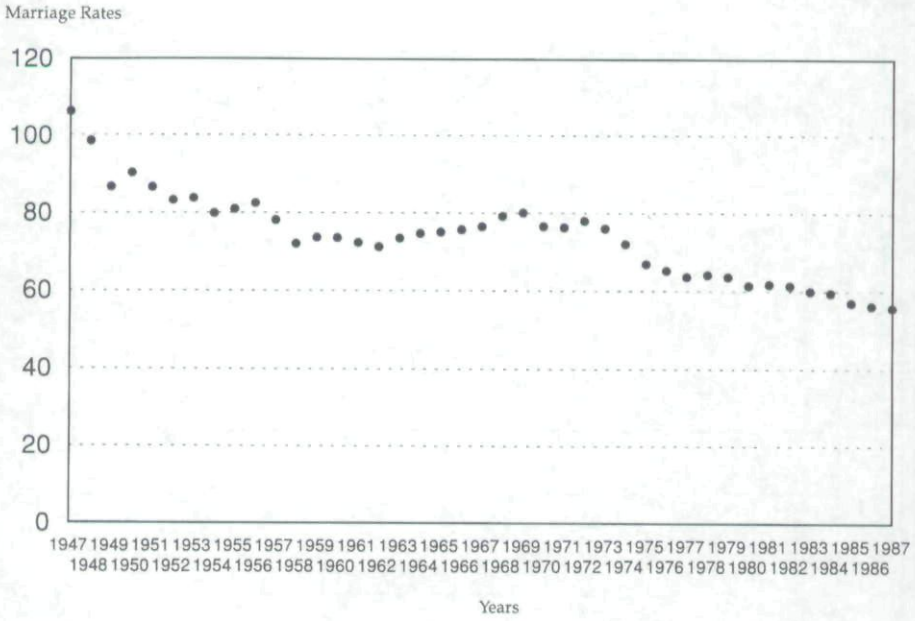
The principal independent variable is the value of the marriage tax, denoted *MTAX.* We calculated the marriage tax in several different ways. From *Current Population Reports,* we obtained annual median earnings of single males and females, and married males and females. We first calculated the federal tax for the four values of median earnings for each year, assuming the use of the standard deduction, a single personal deduction, and the tax schedule for a single person. We then calculated the federal tax for the combined median earnings of single males and single females, and the combined median earnings of married males and females, assuming a joint return, the use of the standard deduction, and two personal deductions.[1] In each year we applied the relevant tax code provisions to calculate the tax liability. These tax liabilities were then put in real terms to adjust for changes in prices.

The marriage tax is defined as the difference between the income tax paid if a couple is married and the sum of the taxes paid if they are single. Let T_{SM}, T_{SF}, T_{MM}, T_{MF}, T_S, and T_M represent the tax liability on single males, single females, married males, married females, the two singles treated as a married couple, and the married couple, respectively. The marriage tax, *MTAX,* can thus be measured in three alternative ways, namely:

$$MTAX1 = T_S - T_{SM} - T_{SF}$$
$$MTAX2 = T_M - T_{MM} - T_{MF}$$
$$MTAX3 = T_M - T_{SM} - T_{SF}$$

For *MTAX1* the earnings of single males and single females are used. For *MTAX2* the earnings of married males and married females are used.[2] The value of these two measures differ because the median earnings of single and married individuals

FIGURE 2. Annual Marriage Rates, 1947–87



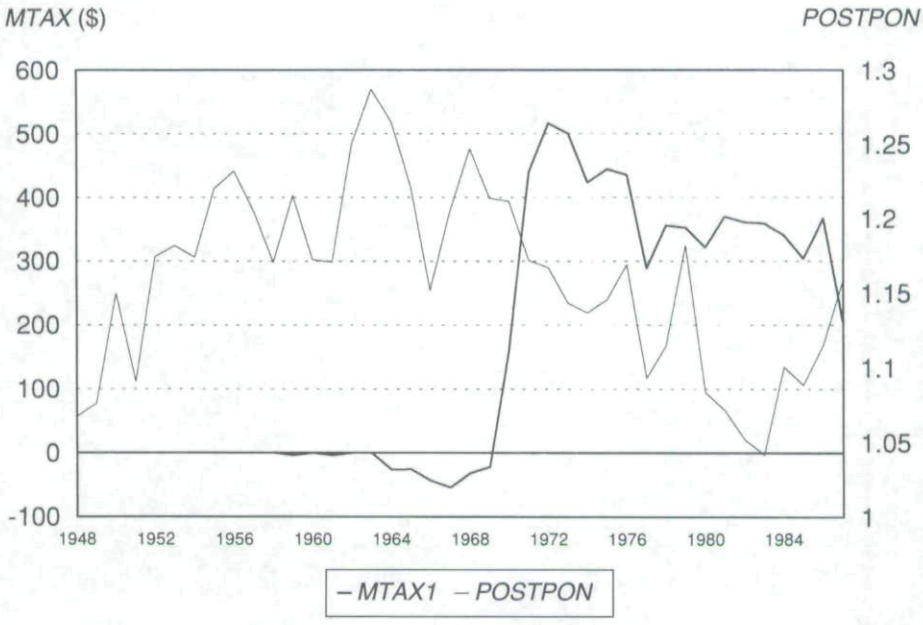
differ. The appropriate choice between these two measures depends upon whether those considering marriage use their current earnings, *i.e.*, their earnings as single individuals or their earnings after being married to calculate the effect of marriage on their taxes. The decision to marry may be more influenced by *MTAX1*, while the decision to divorce may be more influenced by *MTAX2*.

MTAX1 and *MTAX2* follow the traditional ways of measuring the marriage tax, *i.e.*, by calculating the difference in tax liability if the two individuals were treated as single and if they were treated as married. These calculations, however, assume that the earnings of the individuals remain the same whether married or single. The theory of marriage, however, assumes that labor market behavior will change upon marriage. *MTAX3* takes this change into account by using earnings of married males and females to calculate the income tax for a married couple, and the earnings of single males and females to calculate the income tax if single.

In the results reported below we use *MTAX1*. (The values of *MTAX1* are shown in Figure 3). However, when we used the other two measures of the marriage tax in an empirical analysis, the results obtained were similar to those we report.[3]

There are obvious limitations with this measure of the marriage tax. First, it measures the tax in annual terms. The decision to marry is a long-term decision and the couple must anticipate the marriage tax over the life of the marriage. We could, at least for the earlier years, calculate a present value of the marriage tax over some period of time, but that as-

FIGURE 3. Marriage Tax and *POSTPON*, 1948–87



sumes that the couple can correctly forecast the marriage tax (and the duration of the marriage). It seems as reasonable to assume that the couple believes the current marriage tax will remain the same over time as to assume any other forecast. The second limitation is that it measures the tax only for median earnings, and assumes that the female with median earnings is married to the male with median earnings. As was discussed above, in the post-1969 period the marriage tax and subsidy vary with the level of income and its distribution between the couple. Some couples pay a marriage tax, which varies widely in magnitude between couples, while other couples receive a subsidy. However, we have not found an alternative way of measuring the marriage tax that accounts for the distribution of penalties and benefits across couples. Third, it ignores state income taxes. Because we have only national data on annual earnings, we are unable to adjust for state income taxes.

The other variables in the regression act as control variables and are those that have been used in other empirical research of the marriage market. Table 1 provides summary statistics for each of these variables and their sources.

- *Ratio of females to males, FMRATIO.* Freiden shows that the equilibrium in the marriage market depends upon the ratio of females to males. A greater number of males relative to females increases the supply of males. This increases the full income of females in marriage and hence increases the number of females who marry. This can be seen in Figure 1. An increase in the number of males is assumed to rotate the supply of males outward. This lowers the equilibrium of Z_m^{mf} and increases the number of

TABLE 1
SUMMARY STATISTICS FOR DATA

Variable	Mean	Standard Deviation	Source
MRATE	73.840	11.120	*Monthly Vital Statistics Report*
MTAX1	154.590	196.720	Author's calculations
REARN	0.298	0.026	*Current Population Reports, P-60,* various years.
PCCATH	21.482	2.0177	*Yearbook of American and Canadian Churches, 1989*
SFEARN	3,606.0	3,090.0	*Current Population Reports, P-60,* various years
UNEMP	5.276	1.794	*Economic Report of the President,* various years
FMRATIO	0.835	0.021	*Statistical Abstract of the U.S.,* various years

marriages. We measure *FMRATIO* as the ratio of the number of females to the number of males over the age of 15 for each year.

- *Percent Catholic, PCCATH.* Freiden argues that the decision to marry is made under uncertainty, *i.e.,* there is some probability that the marriage may not work out. Thus, the cost of exiting the marriage should affect the marriage rate. If the cost of making a mistake is high, individuals will want to be more certain about their prospective partners. Thus, the decision to marry will be delayed the greater the cost of making a mistake. The percent of the population that is Catholic is used to proxy the cost of making a mistake because divorce is not recognized by the Catholic Church and annulments are difficult to obtain.
- *Single Female Earnings, SFEARN.* The likelihood of a female marrying should depend negatively on her earnings potential as a single female. The earnings of single females steadily increased over the period and thus *SFEARN* is highly correlated with a time trend variable. Therefore, *SFEARN* also reflects the general downward trend in the marriage rate.
- *Relative earnings, REARN.* The income of females relative to males reflect the relative opportunities for females outside of marriage. The higher the relative income of females, the more attractive is participation in the labor market (or in income redistribution programs), and thus the less likely they are to marry. In terms of Figure 1, higher income for females relative to males mean that $Z_f(min)$ is greater and thus that the derived demand for males shifts downward. This results in a lower equilibrium value of the number of marriages.
- *Unemployment, UNEMP.* Previous studies, e.g., Silver (1965), have suggested that the marriage rate varies with the business cycle. To reflect this cycle we use the unemployment rate for males. Higher unemployment rates reduce the earnings of single males, thus shifting S_1 in Figure 1 downward. However, higher unemployment also reduces the earnings of married males, thus reducing Z^{mf}. This shifts D_1 downward. The net effect of higher male unemployment is thus indeterminate.

The decisions of a female to marry and to participate in the labor force (and hence her earnings after marriage) are endogenous; there is a substantial literature addressing this simultaneity. However, data limitations prevent us from modeling this simultaneity. In addition, since 1969 the marriage tax is a function of both the level of income as well as the distribution of earnings between partners, meaning that the marriage tax depends on a woman's choice of partner. Thus, a female can influence the value of the marriage tax by her choice of partner and her labor force

decision. Again, lack of data prevents any empirical consideration of this issue. However, to the extent that our measure of the marriage tax captures the mean of the distribution of likely marriage taxes that result from the sorting, this is not a serious problem.

Table 2 contains the results of the analysis. The model was estimated by ordinary least squares (OLS) using a Cochran-Orcutt correction for first order autocorrelation; the Durbin's *h*-statistic indicates no evidence of further serial correlation.

Note that the estimated coefficient on the marriage tax variable, *MTAX1*, is extremely small in magnitude and is not significantly different from zero. These results contrast with those of Alm and Whittington, who found a significant negative relationship between the marriage tax and their measure of the marriage ratio. To explore the differences in these two sets of results, we replaced the marriage rate with the marriage ratio, *i.e.*, the stock variable that Alm and Whittington used. The coefficient on the marriage tax variable was again insignificant. However, when we did not correct for autocorrelation, the coefficient on the marriage tax was negative and significant in both equations.[4] However, because Alm and Whittington did correct for autocorrelation, this cannot explain the difference in results. We also reestimated our model using Alm and Whittington's calculated marriage tax, but still found an insignificant coefficient on the marriage tax. It thus appears that the difference between the two results is due to differences in the control variables used or in how the marriage stock is measured (Alm and Whittington use the percent of females aged 15 to 44, while our measure is for all females over 15 years).

TABLE 2
REGRESSION USING FLOW OF MARRIAGES

Variable	Estimated Coefficient	Absolute Value *T*-ratio
REARN	83.438	2.669
SFEARN	−0.0023	5.801
PCCATH	−1.938	−3.253
UNEMP	−1.688	3.880
FMRATIO	−48.842	1.520
MTAX1	0.0056	0.960
Constant	148.090	5.644

$R^2 = 0.941$
Durbin's *h*-statistic = 0.714

Our dependent variable measures the gross flow into marriage, *i.e.*, it ignores divorces. Using the net flow, *i.e.*, weddings less divorces, does not alter our results, *i.e.*, the marriage tax is still insignificant.[5]

With regards to the other explanatory variables, the coefficients on the other variables are generally of the expected sign and are statistically significant at standard levels with the exception of *FMRATIO*. The measure of relative income (female's income relative to male's income), however, has a positive and significant effect on the marriage rate; we expected that women would find marriage less desirable as their own incomes rise relative to men's.

We also estimated the above model using the other two measures of the marriage tax as well as the ratio of married taxes to the sum of single taxes as our measure of the marriage tax, but the empirical results were virtually unchanged. We also tried a specification in which the coefficient on the marriage tax was allowed to differ pre-1969 and post-1969; this was to allow for a different response to the changing tax structure. Once the model was corrected for autocorrelation, however, a likelihood ratio test could not reject the null hypothesis that the slope was the same (and essentially zero).

TIMING OF MARRIAGE

It has been suggested that the effect of tax changes on behavior is largely transitory (Slemrod, 1995). For example, the long-term saving or investment rate may

not be affected by tax considerations, but the timing of saving and investment may be influenced by adjustments in the tax structure. Thus, we distinguish between the rate at which people get married and the timing of marriages. The notion here is that a couple may, as a result of the marriage tax, delay getting married for a short period of time.

The marriage market model assumes that the stock of individuals in the market, or the flow of individuals into the market, is independent of the stock or flow in every other period. However, suppose that the marginal value of the intangible benefits to a specific individual from marrying increases over time, at least over some period of time. Thus, individuals must decide when to get married and do so when the cost of waiting one more year exceeds the benefits from getting married this year. If the marriage tax increases, then the cost of waiting goes down and the individual will postpone marriage. However, if the benefits of marrying increase over time, then eventually the benefits of marrying offset the lower cost of waiting due to the higher marriage tax. For example, suppose that n females enter the marriage market each year and all marry at the end of the third year. In year t, the marriage tax is increased and suppose as a result, all females wait an additional year to marry. In year t we would observe no marriages, while in year $t + 1$, and each subsequent year, n females would again marry. Thus, we should observe only a temporary change in the rate, not a permanent one.

If this is how the participants in the marriage market behave, then we expect that we would not find that the level of the marriage tax would affect the rate of marriage. Instead, changes in the rate of marriage should depend on changes in the marriage tax. However, there is no way to know how long the delay might be.

To investigate the possibility of a delay effect, we repeated the analysis reported above, but instead of using *MTAX1* and the rate of marriage, we used the year-to-year change in the marriage tax, and in the marriage rate. The coefficient on the change in the marriage tax was highly insignificant. We tried alternative specifications but all yielded the same result. (The results of this analysis are not reported here but are available from the authors.)

A second way that a couple may delay marriage is simply to wait until the next tax year, where the propensity to wait depends upon the magnitude of the marriage tax. Consider a couple who were planning to marry at the end of a tax year, but as a result of the marriage tax, decide to postpone the marriage until the next tax year. Thus, the higher the marriage tax, the smaller the fraction of marriages that would occur at the end of the year and the more that would occur at the beginning of the year. While one might expect that December marriages would be postponed to January, preferences regarding the time of year to marry do differ across the year. Thus, the couple must balance the loss in benefits from waiting with the gain from marrying in a more desirable month. January and February are not very popular times of the year to get married, only about 12.2 percent of marriages occur during these months. Thus, delaying marriage may mean that marriages are delayed from the end of the year to early spring.

This suggests that we regress the ratio of the number of end-of-year, November and December, marriages to the number of marriages in March and April in the following year, denoted as *POSTPON,* against the marriage tax in effect in the earlier year. (*POSTPON* is presented in Figure 3.) Alternatively, we used the fraction of marriages in year t that occurred in

November and December divided by the fraction of marriages in year $t + 1$ that occurred in March and April. We experimented with alternative definitions of the end of the year and the first of the year, and the results are sensitive to the choice of months used in forming the ratio, *POSTPON*. Large standard errors result from the use of different months. If 3 months are included for both end-of-year and first-of-year marriages, the variability in the ratio declines too much to allow for meaningful estimation. Because we are not investigating the rate of marriage, the control variables used above are not appropriate. The results of this analysis are reported in Table 3, where the standard errors were calculated using an autocorrelation-heteroskedastic consistent covariance matrix estimator.

The results for this model are straightforward. The marriage tax has a significant negative effect on the timing of marriages; as the marriage tax increases, fewer couples marry in the months of November and December relative to the number of marriages during the first two months of spring in the new year. The coefficient appears small in magnitude, but the dependent variable, $(\text{late marriages})_t/(\text{early marriages})_{t+1}$, is also small, with a mean of 1.2, and a range of 1.0 to 1.3.[6]

The empirical finding that females appear to postpone marriage for short periods as a result of the marriage tax is consistent with research on the effect of other taxes on behavior, namely that taxes have large timing effects but small permanent effects on behavior patterns. While the marriage tax can be very large for some couples, our *a priori* expectations were that changes of a few hundred dollars in the value of the marriage tax would not have an effect on the decision to marry; for many couples, simply inviting a few less guests to the wedding reception would offset the cost of a higher marriage tax. However, the decisions regarding when to marry should be more sensitive to variations in the marriage tax. Even for the timing of marriage, however, we would not expect a large effect. In fact, the implied point elasticity from Table 3 evaluated at the means is -0.022, which is small. Thus, even for the behavior pattern that appears to be influenced by the marriage tax, the effect is not of much consequence.

TABLE 3
REGRESSION USING POSTPON

Variable	Estimated Coefficient	Absolute Value *T*-ratio
MTAX1	−0.0017	3.406
Constant	1.186	88.6

Summary and Conclusions

In this paper, we explored the possible effect of the marriage tax on the rate of marriage and the timing of marriage. Using a theoretical framework based on Freiden (1974), we tested whether the marriage tax has any influence on the rate at which females marry. Our regression results find no statistically significant effect. We do, however, find some evidence that the marriage tax causes individuals to postpone marriage for short periods of time.

ENDNOTES

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1 Incomes do differ among the individuals and couples, and thus the likelihood of itemizing differs. However, income levels are low and thus the likelihood of itemizing is very low. Therefore, the use of the standard deduction should not be a serious problem.

2 *MTAX2* is equivalent to how Rosen and others calculate the marriage tax, *i.e.*, by using the earnings of married couples.

[3] In addition to calculating the marriage tax as the difference between the tax when married and the sum of the taxes when filing separately, we also used the ratio of the two. We obtain similar results.

[4] It is well documented that using OLS estimators in the presence of uncorrected autocorrelation yields consistent but inefficient parameter estimates and biased standard error estimates. Autocorrelation means that the error terms are not independent, so that the usual OLS variance/covariance matrix, which assumes independence, is incorrect. This results in estimated standard errors that are biased, so that specification test statistics based on these standard errors cannot be expected to follow their supposed null distributions. It is also generally the case that in models where the autocorrelation coefficient is positive, the OLS standard errors are biased downwards, making tests of significance reject the null too often. That appears to be the case in this model, the estimated autocorrelation parameter is 0.96. When this model is reestimated with an AR(1) correction, the estimated standard errors change substantially. See Davidson and MacKinnon (1993), chapter 10.

[5] We might assume that the flow and stock of marriages can be modeled as a stock adjustment process, where the flow of marriages is some percentage of the difference between the desired marriage stock and the actual marriage stock. We estimated such a model but the coefficient on the marriage tax was again highly insignificant.

[6] It is clear from Figure 3 that *POSTPON* is affected by variables besides the marriage tax. We estimated the model for the restricted period 1968–88. The R^2 increased and the standard error on the marriage tax coefficient fell slightly.

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