Strategic Behavior in Marriage: A Non-Cooperative Model of Resource Allocation

Cumbie, MacDonald, and Britt (2013) published a recent finding as it relates to spousal money arguments that was not fully explored—as partner incomes increased, marital conflict surrounding money also increased. The impact of income on marital harmony is not clear, and, in fact, the empirical research presents a mixed picture. Some researchers have found a negative relationship between income and frequency of money arguments (Britt, Huston, & Durband, 2010; Dew & Yorguson, 2010). In these studies the researchers used different data sets and techniques finding higher income is, in fact, associated with lower levels of money arguments. Older research has found income to have no association with the frequency of money arguments (Goodman, 1986).

Among psychologists, therapists, and researchers, a debate exists as to whether game theory is relevant in explaining the marital relationship. For example, White (2011) categorically rejected the notion that non-cooperative game theory provided any genuine insight into the marital relationship. Speaking for many, White argued that in applying non-cooperative game theory to the study of marriage one is basically assuming the parties to a marriage are self-centered, which does not provide a romantic nor a means to a successful marriage. At this juncture it is tempting to point out that not all marriages are successful. Approximately 50% of marriages fail, and thus the fact a strategy does not work well in marriage does not mean that it will not be used. However, White argued that non-cooperative game theory is not applicable to people who care about each other.

To the economist schooled in the neoclassical tradition, viewing any interaction as a competitive interaction between self-regarding actors comes quite naturally. Therefore, the application of game theory, and more specifically strategic interaction in which each individual adopts the strategy that will most likely further their interests even if their improvement comes at the expense of the other party, is really quite natural. Thus, the work of Becker (1991) in applying economic models of behavior of the family was seen as natural and discussions of the "marriage market" and marriage as a form of strategic interaction were hardly seen as controversial.

While the authors will readily concede the fact that economic theory does view marriage as a strategic interaction, this does not provide evidence that marriage is a strategic interaction. The fact that the romantic ideal of marriage is offended by applying non-cooperative game theory to marriage does not provide any evidence that marriage is not a strategic interaction, and thus an empirical examination is warranted.

To that end, we first develop a model of marriage as a non-cooperative game. Using evidence from experimental economics (Ashraf, 2009), we demonstrate that as the amount of disposable resources in a marriage increases, a rational maximizing actor would find that their utility maximization would be increased by engaging in more conflicts over money. We then propose a regression model using data from the NLSY. The empirical analysis demonstrates that there is some support for the proposition that, contained within the marital relationship, there may be room for non-cooperative self-regarding action.

Generally, when modeling family behavior, an efficient allocation of resources is reached by treating the married couple as a single agent in a model derived from the

firm's production function in which the couple combines resources to produce a jointly agreed upon good and an efficient allocation of effort is reached. Marriage is also modeled through the use of cooperative game theory, which assumes that the players can make costless, binding, and enforceable agreements (Lundberg & Pollack, 1996). In the absence of these rigorous conditions being met, allocations within marriage are likely to be inefficient, and a cooperative outcome is not assured. Let us assume that in a marriage, costless, binding, and enforceable agreements are not possible or not assured and develop a model of marital bargaining beginning from that point. Let us also assume a dual income couple, who are both willing to entertain the concept of divorce, and that consumption preferences are not fully interdependent. Once divorce is entertained as a possibility, each spouse has a threat point that can lead to a strategic advantage. Furthermore, if all consumption expenditures do not bring equal utility to both parties to the marriage, then utility functions are not fully independent. Finally, it is admitted that once divorce is contemplated as a threat point then utility must be assessed across risky alternatives. Through the use of von Neuman-Morgenstern utilities, this problem can be solved. Thus the husband's utility function could be specified as follows:

$$U_h = \vartheta\alpha_i U_{MH}^h + \vartheta\beta_i U_{DH}^w + \vartheta\gamma_i U_{MW}^h + \vartheta\delta_i U_{DW}^w$$

In this equation, $\vartheta = 1$ is for the applicable marital state and 0 if not. Thus, if husband remains married, his utility function would be specified as follows:

$$U_{hm} = \vartheta\alpha_i U_{MH}^h + \vartheta\gamma_i U_{MW}^w$$

As the other terms would drop out and if married, his utility would be specified as follows:

$$U_{hd} = \vartheta\beta_i U_{DH}^h + \vartheta\delta_i U_{DW}^w$$

The other terms would drop out due to being multiplied by zero. The fact that the utility functions vary depending on whether the husband is married or single is demanded by the fact that in this model the utility preferences are not fully interdependent. The subscript *m* represents married, *d* represents divorced, *h* represents husband, and *w* represents wife. In the divorced state, the resources that each party must devote to their preferred bundle of consumption, relative to their former spouses bundle of consumption, is because some post- divorce asset transfers may be judicially mandated. For the husband if $U_{hd} > U_{hm}$ then divorce will be chosen, otherwise marriage is the preferable state. The same state would hold for the wife. In a situation where individuals command relatively greater resources it is then possible that divorce becomes less costly, assuming that extremely large judicially mandated wealth transfers are not the norm. It is also self-evident from this specification of the utility function, that transferring a relatively greater percentage of resources to one's preferred bundle of spending from their spouse's, one's overall utility will increase.

In a marriage where one party controlled all of the income or there was relatively little income to be distributed between preferred bundles of expenditures, one would expect to see little disagreement about money expenditures. However, as income increases, and especially as both parties' incomes increase, one would expect to see

increased amounts of monetary disagreement as each party attempts to assert leverage over the other.

Respondent data was retrieved from the National Longitudinal Survey of Child/Young Adult (1983-2008). Using this data the following regressions were estimated:

$\beta_{\sum finbeh}$ = Sum of financial behaviors,
β_{IQ} = I.Q.,
β_{ed} = Education,
β_{inc} = Income,
β_{age} = Age, and
β_{bthord} = Birth order.

Thus,

$$\textit{The Frequency of Money Arguments} = \beta + \beta_{\sum finbeh} + \beta_{IQ} + \beta_{ed} + \beta_{inc} + \beta_{age} + \beta_{bthord} + \varepsilon_i$$

This regression produced the following preliminary results.

Table 1
Summary of Logistic Regression Analysis Predicting High Frequency of Money Arguments (n = 851)

Predictor	B	*Standardized B*	e^B
Intercept	-2.57**		
Sum of negative financial behaviors	0.24***	0.34	1.28
Log I.Q.	-0.21	-0.07	0.81
Education	-0.01	-0.01	1.00
Income by 1,000	0.01**	0.14	1.01
Age	0.06	0.10	1.06
Male	-0.07	-0.02	0.94
Firstborn	-0.63***	-0.17	0.54

*p <.05, **p < .01, ***p < .001

The implications of this research are significant to both the theoretician and the practitioner. From the practitioner's point of view, it is highly likely that they will encounter couples who have frequent arguments about financial resources; therefore, we believe this work sheds light on the causes of those arguments. Once one understands the root causes of these arguments, one can be more successful in assisting clients in finding more positive ways to accomplish sharing their preferences concerning the disposition of marital resources. This work is also of significance to policy makers, as a deeper understanding of the behaviors and motivations of the parties to a marriage will allow for the development of more effective policies designed to enhance and support marriage.

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