Has the Wedding Between Economics and
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ECONOMIC THEORY AND POLYGAMY

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The new family economics traces its lineage at least to pioneering work by Becker (1973, 1974). Since then, the family tree of family economics has grown and branched, most recently to include issues in macroeconomics and economic development (Becker, 1988). In addition, the tree's branches have overlapped those of disciplines like anthropology which also study the family.

Ten years ago, Grossbard (1978) proposed marriage between the theory of family economics and the large family of empirical material compiled by anthropologists. Grossbard derived one set of implications by analyzing anthropological material on multiple marriage using family economic theory, extending these results in other research (Grossbard, 1976; Grossbard-Shechtman, 1980).

As is typical in exploring a new field, a number of issues remain unresolved. One issue involves the decision by some cultures to forbid multiple marriage. In addition, the rich body of data across cultures compiled by anthropologists remains largely unexploited. Although the engagement between economics and anthropology has lasted ten years, a true marriage is yet to be consummated.

The next section of this paper reviews family economic theory as it applies to multiple marriage. Following the theory, the remainder of the paper uses the unique cultural data from the Human Relations Area Files to confirm the theory's implications. In particular, the data show that cultures which restrict polygyny make women worse off but that this action may be justified since it favors men who would otherwise not marry in cultures where this method of transferring income is relatively efficient.

I. Multiple Marriage

Following the new household economics, household members i combine inputs of time t_i and other resources x_i to produce valuable goods Z.

(a) $Z = Z(t_i, x_i)$

The function is different for each household depending on individual member characteristics and the number of members in the household. A man wishes to marry a first wife if the man's share of the output within a marriage Z_{mw1} is larger than his output when single Z_m.

Similarly, a woman accepts a proposal if her share of the output within a marriage is larger than her income when single. Marriage occurs because the total value of output in a marriage exceeds the sum of the values of output of unmarried individuals.

In general, marriage is an attractive alternative because men and women provide complementary inputs to production of household goods like children and companionship. Married couples can also exploit gains from specialization and specialized investments in human capital. The production of household public goods also favors marriage over single living.

A man's decision to propose marrying a second woman is a simple extension of that for a monogamous union. The man wishes to marry a second woman if he receives any part of the additional output the second wife produces. The woman accepts such a proposal if her share of the additional output at least equals her alternative income.

Symmetric analysis applies as well to the situation where a woman considers marrying two or more men. Polyandry (multiple husbands) is so rare among cultures, however, that it will not be treated explicitly here.

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Considering the above, each man's demand for a first wife is the marginal product of that wife, defined as the difference between his single output and the output of the household with one wife. The most he is willing to pay for a first wife is the additional output she produces.

(b) $MP_{mw1} = Z_{mw1} - Z_m$

Demand for each subsequent wife (n) is the marginal product of that wife.

(c) $MP_{mw(n)} = Z_{mw(n)} - Z_{mw(n-1)}$

If men are identical, the market demand for wives is a step function. Given the reasonable assumption that the marginal product of wives in a given household diminishes, the demand function steps downward.

More realistically, the market demand slopes continuously downward. Demand is continuous because men (and their household production functions) are different, because men can vary the quantity of wives by marrying at a different age, and because each woman can alter the quantity of services offered.

In the simplest case and if women are identical, the market supply of wives is perfectly elastic at price equal to women's alternative income Z_f and perfectly inelastic at the quantity of women of marriageable age. More likely, however, the actual supply curve slopes upward continuously. Women have different alternative incomes and women can vary their output of wife services by changing the age at which they marry, for example. Interaction between supply and demand in the market determines the price of wife services and, by implication, compensation to each wife.

Restrictions on this market reduce potential gains from trade. Grossbard (1978, p. 35) explains how restrictions on polygamy, for example, distort the marriage market: "The legal imposition of monogamy can be viewed as an

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interference in the marriage market curtailling the aggregate demand men have for wife services, . . ." Such a restriction makes women and at least some men worse off.

II. Restrictions on Polygyny

An interesting question is why a society forbids polygamy. Becker (1981, p. 39) sidesteps the issue by asserting that such restrictions are meaningless: "Doctrines encouraging monogamy are attractive only when the demand for polygyny is weak; . . ." Becker avoids the question of why some cultures outlaw polygyny. After all, if the demand for an activity is weak, why outlaw it? The reason proposed in this paper is that a polygyny may impose an external cost on certain individuals, an external cost to which the market has no incentive to respond without government or social sanction.

As the simple model shows, women are worse off in a society which would otherwise practice polygyny but which forbids it. Who is better off if polygyny is forbidden? As both Becker (1981) and Grossbard (1980) show, men who otherwise would marry one wife are better off due to the lower cost of all wives. However, this gain to men is offset by the income loss to the women in these same households. Those men who would otherwise wed multiple wives may be better off due to the lower price of the first wife, although this is unlikely (Becker 1981, p. 45). Even if true, however, the gain is again offset by the loss to the woman in the same household.

Most dramatically affected by a prohibition on polygyny are men who would otherwise not marry. If the sex ratio of marriageable aged individuals is roughly equal to one, all of these men now are able to marry. Figure 1 illustrates the effect of a prohibition on polygyny in a culture that would otherwise engage in the practice.
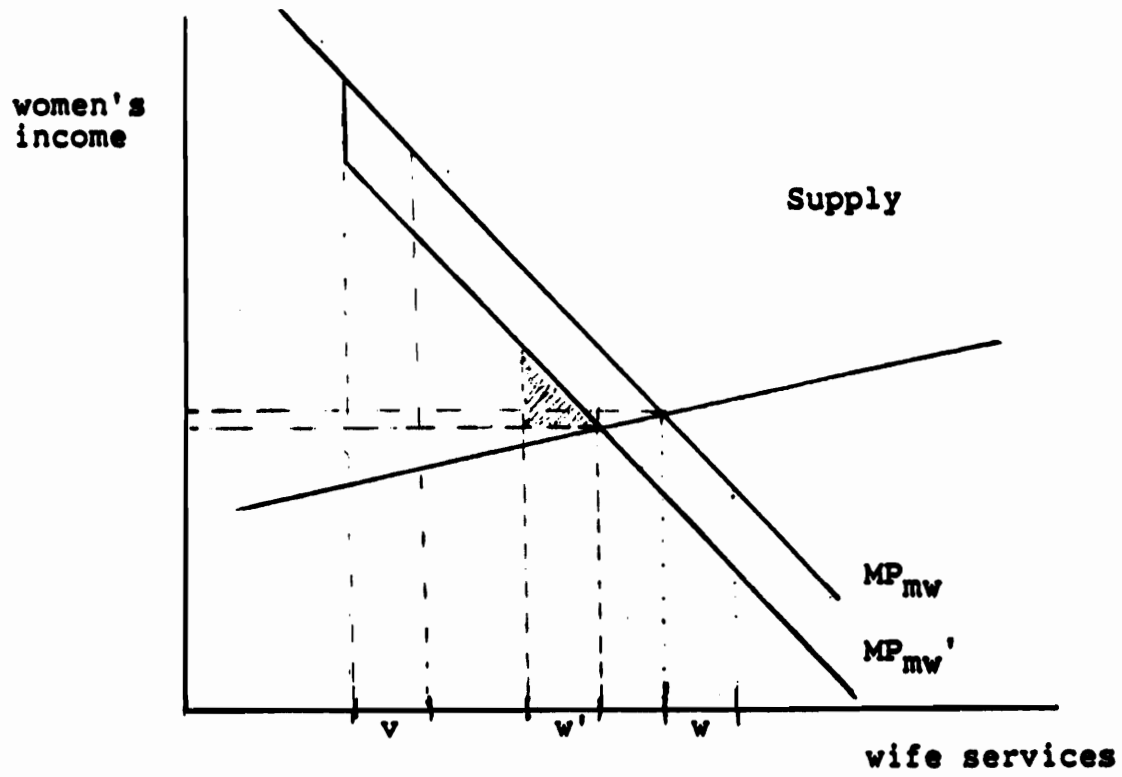
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women's income

Supply

MP_{mw}

MP_{mw}'

wife services

v   w'   w

FIGURE 1

All women are assumed to marry. The area of interest along the supply curve is characterized by changes in the quantity of individual wife services rather than a change in the number of wives. For simplicity, demanders of second and subsequent wives are assumed to be grouped along distance v on the demand curve. Because the sex ratio equals one, the v number of demanders of multiple wives equals the w men who remain unmarried in an unrestricted market. The men who remain unmarried might also represent poor men who must marry significantly later in life. That income and age at marriage for Americans are inversely related is shown by Becker et al. (1977, p. 1173).

When polygyny is prohibited, the v demanders are eliminated and the remaining tail of the demand curve shifts to the left by distance w. The former single men are now married and represent distance w'. Distance w' is actually smaller than distance w by the proportion each woman reduces her quantity of services. This small difference is not shown in Figure 1 and does not alter its implications.

The previously unmarried men gain because polygyny is prohibited. Their income increases by the difference between the additional output and the payments to wives in the households. This area is shaded in Figure 1. As drawn, the gain to previously unmarried men is larger than the loss of income to their wives.

Whether the gain to men exceeds the loss to their wives in general depends on the elasticity of supply and the slope of the demand curve. Since the elasticity of supply reflects in part the degree to which women can alter their quantity of wife services, societies with more advanced economies are more

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likely to prohibit polygyny, other things being equal. In these societies, women's production functions are more complex and so women can more dramatically alter their output (Grossbard, 1984).

An additional factor may increase the value of a wife to otherwise unmarried men, a factor not reflected in the ordinary demand curve. In particular, a wife allows a man to perpetuate his lineage. Of course marriage provides the same to women. In this example, however, all women are married but some men remain single if polygyny is permitted.

Especially in primitive societies, a lineage provides social insurance, "brand name" capital, and additional intangible benefits (Posner, 1980; Becker, 1981, p. 240). Importantly, many of these benefits cannot be transferred. In addition, a poor man may not be able to accumulate sufficient capital to offer to a potential wife the present value of the lineage. Even sophisticated capital markets may refuse to offer loans with lineage as collateral, and few economies even have sophisticated capital markets.

If lineage has significant nontransferrable value, the value to otherwise unmarried men of a prohibition on polygyny is larger than the shaded area in Figure 1. The actual value includes the area under a demand curve above that given in the figure reflecting value that cannot be transferred in the market.

A prohibition on polygyny in a culture where polygyny would otherwise occur results in a transfer of wealth to men who would otherwise not marry. It is reasonable to suppose that these men are relatively poor. As Grossbard (1976) shows, wealth is a very important element in determining the marginal product of an additional wife and the probability that a man will have multiple wives.

Cultures might transfer wealth to the poor for reasons of alturism. In addition the non-poor may be willing to allow forced transfers to the poor in order to reduce crime rates, disease rates, and potential social disorder.

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Individuals allow forced transfers because the free rider problem discourages voluntary transfers.

Why might cultures choose to transfer wealth in this particular manner, that is, through a prohibition on polygamy? Ordinarily, we imagine governments transferring income to deserving groups. If the government transfers income to poor men who would otherwise not marry in polygynous societies, these men now are more likely to participate in the marriage market. In addition, these government transfers reduce the reliance on lineage to provide social insurance and so reduce the problem of poor men being excluded from the marriage market. By implication, cultures choose a prohibition on polygyny when central governments are relatively weak or unimportant.

III. Empirical Results

The Human Relations Area Files (HRAF) is a comprehensive source of information on human culture. The HRAF provides a detailed index and system of cross-referencing seven hundred categories of information from ethnographies written by anthropologists about more than three hundred cultures.

Some of this textual material has been coded by sociologists and anthropologists, the first important example being the Ethnographic Atlas (Murdock, 1967). Subsequent researchers have coded material for a subset of of cultures labelled the Standard Cross-Cultural Sample. Its cultures are chosen according to a variety of criteria including that all cultural types be represented, that territories not overlap, and that relatively comprehensive information be available (Murdock and White, 1969; Lagace, 1977).

Some of the statistical results are summarized in Table 1, which requires explanation. Each column applies to a set of cultures with a certain degree of polygyny. The few cultures with polyandry do not appear in this sample.

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Column (A) cultures prohibit polygyny. Polygyny is permitted but absent in column (B) cultures, infrequent in column (C) cultures, and common in column (D) cultures.

Each table row is a cultural characteristic variable. For each variable, cultures are placed in a ranked category. See the appendix for a description of the variables and their ranked categories. The means of these ranked categories are listed in the body of the table.

[Table 1 about here]

The table allows us to test implications of the family economic theory applied to polygyny and this paper's additional implications. One important implication of the Becker-Grossbard model is that a prohibition on polygyny reduces the value of a wife. The PRICE variable in the first row of the table shows that cultures which prohibit polygyny are significantly more likely to use dowry or no bride payment than to employ bridewealth. That is, the quantity control on multiple wives reduces the value of a wife, exactly as predicted by the theory.

As the WEALTH variable shows, cultures which prohibit polygyny are also significantly poorer than cultures where polygyny is common. The theory also predicts this as a result of losses of potential gains from trade.

The variables MONEY, TRANSPORT, and TRADE measure the complexity of the economy. As family economic theory predicts, when the economy becomes more complex, polygyny is less likely. Families can substitute quality for quantity of children. In addition, women are relatively more productive outside the home in more complex economies.

The above variables likely operate simultaneously to influence a wife's value. Table 2 shows a probit analysis of the dependent variable PRICE.

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TABLE 1--MEAN VALUES OF CULTURAL VARIABLES

	FORBID	NO POLY	SOME POLY	COMMON
PRICE	1.75(abc)	1.20(a)	1.24(b)	1.28(c)
WEALTH	5.43(a)	5.70	5.86	7.38(a)
MONEY	3.00(a)	3.12	2.57	1.91(a)
TRANSPORT	2.31(a)	2.28	1.85	1.41(a)
TRADE	3.00(x)	2.27	2.29	1.91(x)
AGE-DIFF	3.91	3.83	3.82	4.64
P-LEVELS	1.69(a)	2.78(a)	2.00	1.64
AD-LEVELS	2.08(a)	3.39(a)	2.34	2.14
INHERIT	3.11(x)	2.65(x)	2.76	3.05

a, b, or c after a pair of means indicates that the pair of means in that row are significantly different at five percent. x indicates ten percent.

[Table 2 about here]

The probit analysis shows that, of the variables available, the most important in determining a wife's value is whether the society forbids polygyny. This result represents dramatic confirmation of the Becker-Grossbard implication, although the potential for mutlicolinearity among independent variables remains.

Another implication of the theory is that women will marry earlier and men later in polygynous societies, reflecting the relatively high value of women. This in turn implies a greater age difference at first marriage for polygynous societies. Values of the HRAF variable AGE-DIFF are consistent with this result, although the differences between culture types are not statistically significant.

Several important implications of the standard family economic theory are confirmed using the HRAF data. However, the standard theory fails to address the question of why societies choose to forbid polygamy. The standard theory in fact predicts that societies that forbid polygamy should be very similar to those in which polygamy is permitted but absent. In the variables discussed to this point, the implication is generally true, with the exception of PRICE which is significantly different for societies which forbid polygamy.

Differing from the standard theory, this paper hypothesizes that cultures forbid polygyny to transfer income to poor men. The variables P-LEVELS and AD-LEVELS measure the complexity of the culture's government. Notice that cultures which forbid polygyny possess significantly less complex governments than cultures which permit but do not practice polygyny. This result directly contradicts the standard theory, but is consistent with the income transfer hypothesis.

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TABLE 2--PROBIT ANALYSIS OF VALUE OF A WIFE

dependent variable	CONSTANT	FORBID	WEALTH	TRADE	fraction explained
PRICE	2.07 (4.00)**	1.37 (3.21)**	--	--	0.57
	4.48 (2.51)*	2.04 (2.63)**	0.29 (1.61)	-0.02 (-0.09)	0.61

Numbers in parentheses are the ratios of the coefficient and its asymptotic standard error, distributed normally for large samples. Small sample characteristics are unknown.

 * indicates asymptotically significant at five percent, two-tailed.

** indicates asymptotically significant at one percent, two-tailed.

One additional result also (weakly) supports the income transfer hypothesis. The variable INHERIT indicates that women are more likely to inherit valuable property in cultures which forbid polygyny and in cultures where polygyny is common than in cultures where polygyny is uncommon or is absent. Apparently the quantity control on wives is not completely effective at reducing the otherwise substantial value of a wife. Once again, cultures which forbid polygyny are significantly different from those where polygyny is permitted but not practiced.

Table 3 shows results of probit and multinomial probit analyses of cultures which prohibit and which permit polygyny. The variable Q-POLY combines the three sets of cultures which permit polygyny and ranks them in ascending order, cultures with common polygyny having the highest rank.

[Table 3 about here]

Once again cultures which prohibit polygyny are different than those in which polygyny is permitted but does not occur. The P-LEVELS and AD-LEVELS variables in Table 3's first set of probit equations indicate that an increase in the complexity of government either has insignificant effect or reduces the frequency of polygyny (Q-POLY) in the culture. Complex governments tend to provide the social insurance otherwise provided by complex families and the two government variables may be serving as proxy for overall wealth and complexity of the economy.

By contrast, the P-LEVELS and Q-LEVELS variables in the second set of probit equations show that cultures with complex governments are much less likely to forbid polygyny. In other words, cultures with simple governments are more likely to forbid polygyny but, as the first equations show, are more

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TABLE 3--PROBIT ANALYSIS OF POLYGYNY

dependent variable	CONSTANT	P-LEVELS	AD-LEVELS	WEALTH	TRADE	fraction explained
Q-POLY	-1.83 (-2.20)*	--	-0.60 (-2.40)*	--	0.39 (1.51)	0.60
	-1.35 (-2.07)*	-0.49 (-2.17)*	--	--	0.25 (1.12)	0.58
	-0.86 (-0.55)	--	-0.49 (-1.45)	0.13 (0.62)	0.28 (1.05)	0.56
	-0.33 (-0.24)	-0.47 (-1.53)	--	0.17 (0.80)	0.23 (0.94)	0.56
FORBID	0.94 (1.95)	--	-0.34 (-2.58)**	--	0.39 (2.36)*	0.67
	0.91 (1.87)	-0.39 (-2.20)*	--	--	0.36 (2.18)*	0.66
	-1.27 (-0.94)	--	-0.65 (-2.62)**	-0.32 (-1.52)	0.52 (1.89)	0.74
	-1.64 (-1.14)	-1.11 (-2.41)*	--	-0.35 (-1.46)	0.57 (1.90)	0.76

Numbers in parentheses are the ratios of the coefficient and its asymptotic standard error, distributed normally for large samples. Small sample characteristics are unknown.

 * indicates asymptotically significant at five percent, two-tailed.

** indicates asymptotically significant at one percent, two-tailed.

likely to have extensive polygyny if they permit polygyny. Thus, the prohibition on polygyny occurs in cultures that are otherwise similar to those that have extensive polygyny. The prohibition is altering behavior, rather than simply reflecting existing practice, as the standard theory predicts.

The hypothesis here is that cultures with simple governments prohibit polygyny to transfer wealth to men who otherwise would not marry. Notice in Table 3 that the WEALTH variable is negative, albeit only weakly significant, in the second set of equations. Poorer cultures are more likely to prohibit polygyny. This result is consistent with the theory especially if poor cultures also have greater variation in wealth.

IV. Caveats

Although the statistical results lend an encouraging degree of support to family economic theory and its extension here, several caveats are in order. First, in compiling the data, coders read text about a culture and assign a number according to some prearranged scheme. Such a process is obviously subjective. Some researchers address this problem by employing multiple coders, Ellis, Lee, and Petersen (1978) being an example.

Second, aside from the relatively small fraction of culture in the sample for which complete data are available, the Standard Cross-Cultural Sample is not a random sample. As mentioned, cultures are chosen based on other criteria. This is a serious problem if the sample is biased in some way. For example, because of the emphasis of anthropological research, modern western industrial cultures may be underrepresented.

These problems ought not prevent economics researchers from exploiting the Human Relations Area Files. We claim our theories apply universally but

typically restrict our empirical investigation to modern industrial societies. Research like this represents an attempt to redress the imbalance.

V. Summary

Family economic theory is an important extension of economic theory. This paper uses data from the Standard Cross-Cultural Sample of the Human Relations Area Files to test implications of family economic theory related to multiple marriage. As the theory predicts, actions which interfere with the marriage market make most participants worse off. In particular, in those cultures which forbid polygyny, the value of a wife falls. Polygyny disappears in more complex economies, economies in which the value of the quantity of children is relatively less important than the quality of children.

Importantly, cultures which forbid polygyny are different from those which permit but do not practice polygyny. A prohibition on polygyny transfers income to poor men who would otherwise not marry. The value of this restriction is greater when lineage is valuable but not transferable. Cultures without complex central governments are more likely to prohibit polygyny. Central governments would otherwise transfer income to deserving groups.

This paper is an attempt to continue the engagement between economics and anthropology. If the marriage between economics and anthropology is to succeed, economists must exploit the vast store of data compiled in the Human Relations Area Files. This paper is a first attempt to do so.

Appendix: VARIABLES USED IN STATISTICAL ANALYSIS

Name	Source	Range	Definition
FORBID	(4)	na	These 13 cultures forbid polygyny. No polygyny occurs in these cultures.
NO POLY	(4)	na	These 18 cultures permit polygyny, but no polygyny occurs.
SOME POLY	(4)	na	These 32 cultures permit polygyny and roughly twenty percent or fewer marriages are polygynous.
COMMON	(4)	na	These 22 cultures permit polygyny and more than roughly twenty percent of marriages are polygynous.
PRICE	(1)	1-2	One indicates significant bridewealth is used. Two indicates no payment or dowry.
WEALTH	(2)	2-10	Overall standard of living. Ten indicates high standard of living.
MONEY	(3)	1-5	Complexity of currency in the economy. Five indicates a fully developed and specialized currency.
TRANSPORT	(3)	1-5	Complexity of land transportation. One indicates human carriers. Five indicates motorized vehicles.
TRADE	(3)	1-5	Complexity of methods of trading imported food. Five indicates shops, markets, and barter are used.
AGE-DIFF	(4)	1-5	Relative ages of spouses at marriage. One indicates women older. Five indicates men more than 4 years older.
P-LEVELS	(5)	1-4	Levels of political sovereignty above the local level. One indicates none. Four indicates three levels.
AD-LEVELS	(5)	1-5	Complexity of administrative hierarchy. One indicates no hierarchy. Five indicates territorial administrators supervised by supreme state executive.
INHERIT	(4)	1-4	Which sex inherits valuable property? One indicates men, four women.

(1) Murdock, 1967.
(2) Ellis, Lee, and Petersen, 1978.
(3) Murdock and Morrow, 1970.
(4) Whyte, 1978.
(5) Tuden and Marshall, 1972.

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