Modeling consumption, marital status and gender

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Abstract

The concepts of Work-In-Household (WIH) and its compensation are integrated into a theory of individual consumer choice in which it is assumed that individuals demand WIH to obtain home-produced private goods and that there are competitive markets for WIH. Testable implications include that the elasticity of individual demand varies with ability to depend on spouse's home production and that sex ratios in marriage markets influence consumption. For example, it is predicted that in countries with more emigration of men than women, women will be expected to make higher contributions to newlyweds' costs of housing. It is also predicted that there will be compensating differentials in marriage. For instance, women married to considerably older men are expected to consume relatively more compared to women married to men close to their own age. Assuming traditional gender roles male/female differences in consumption and elasticity of demand depend on marital status, percentage married and income of other men and women in the same location. In particular, it is predicted that relative to women's demand, men's demand for consumer products replacing household production will be more price elastic. This helps explain why women are charged more for dry-cleaning and why the demand for certain products is more elastic than others. The model also leads to the well-established generalization that consumption in marriage depends on the individual income of each marriage partner, rather than on a pooled household income.

WIH is defined as an activity that (1) has an opportunity cost, implying that it is not an individual's favorite activity; and (2) benefits another household member who could potentially compensate the individual for these efforts (defined as 'spousal labor' in Grossbard-Shechtman 1993). Here they are integrated into a theory of individual consumer choice. In contrast, some of the most commonly used models of individual consumption in couples (such as McElroy and Horney 1981; Chiappori 1988) have ignored household production, thereby precluding effects of substitution between commercial and home-produced goods. Earlier consumption models that had considered

home production—starting with Mincer (1962) and Becker (1965)—examined *household* consumption rather than *individual* consumption by household members.

The model shares common features with Becker's (1973) Demand and Supply model of marriage, [1] Lundberg and Pollak (1993), Apps and Rees (1997), Chiappori (1997), and Chen and Woolley (2001), all models that analyze individual consumption in households and that make room for home production. However, while these other models recognize that husbands and wives typically have different economic interests with respect to consumption they assume that both spouses agree that the wage in the labor force captures the opportunity cost of time in home production. These other models don't consider exchanges of work in household production for money. In contrast, in my model men and women can also bargain about what work they do for each other and at what quasi-wage such work is compensated within the household, the quasi-wage being influenced by equilibrium values in hedonic markets for WIH.

By introducing the concepts of WIH and its compensation and assuming such compensation is exogenously established in marriage markets my model can identify factors that can influence individual consumption and don't appear in other models. The elasticity of individual demand is shown to depend on the ability to depend on spouse's home production time, sex ratios, and compensating differentials in marriage. This leads to interesting predictions regarding male/female differences in consumer behavior, assuming traditional gender roles. In particular, it is predicted that relative to women's demand, men's demand for consumer products replacing household production will be more price elastic and that men's elasticity of demand with respect to own wage is more likely to be positive than women's own wage elasticity of demand. The model also leads to the well-established generalization that consumption in marriage depends on the individual income of each marriage partner, rather than on pooled household income.

Demand by married individual consumers when marriage markets are competitive

The WIH model presented here is similar to the model presented in Chapter 2 and assumes that all consumption by marriage partners is private. In contrast to the model in Chapter 2 it is assumed that the individual who consumes and uses WIH does not work at WIH for the benefit of a spouse. At the end of this chapter I present a second model in which goods are consumed jointly with a (potential) spouse rather than privately. The problem is:

(1)
$$\left(\begin{array}{l} Max\,\mathrm{U}(Z_i)\,subject\ to \\ Z_i = Z_i(x_i, s_i, m_j) \\ 1\ = h_i + s_i \\ I_i + w_i h_i = y_j m_j + p_i x_i \end{array} \right.$$

where *Z* is a vector of privately consumed goods that can be produced with three inputs: a

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[1] Becker's (1973) theory of marriage also contains other models. See also Becker (1991).

vector of commercial inputs x, leisure time s, and m_j, WIH supplied by a (potential) spouse j. The production function is assumed to have constant returns to scale. Total time available to an individual is set to 1. h work is for a firm, w wage, I non-wage income, y the wage for a spouse's WIH, and π the implicit price of the composite good consumed by the individual. Price p of the vector of commercial inputs and equilibrium quasi-wage for the relevant type of WIH are assumed to be given. The individual is selfish in the sense that (potential) spouse's private consumption does not affect own utility. All couples are heterosexual.

Using Becker's (1965) definition of full income the time and income constraints can be restated as full income constraint $F_i = I_i + w_i = \pi_i Z_i$.

Appendix A solves Problem 1 and derives Equation 2, an individual demand for commercial product x_i:[2]

$$\dot{x}_i = \frac{I_i}{F}\dot{I}_i - (\alpha_x^Z + \alpha_s^Z \sigma_{xs} + \alpha_m^Z \sigma_{xm})\dot{p}_i + [\frac{w}{F} + (\sigma_{xs} - 1)\alpha_s^Z]\dot{w} + (\sigma_{xm} - 1)\alpha_m^Z \dot{y}, \qquad (2)$$

where dotted letters are percentage changes, σ_{xs} is the elasticity of substitution in production between goods x and own time s, α^Z the share of WIH costs in producing Z, and σ_{xm} the elasticity of substitution between commercial inputs x and m (WIH). The way this demand is formulated allows us to easily identify an income elasticity, a price elasticity, a wage elasticity and a quasi-wage elasticity: the income elasticity is the coefficient of the percentage change in I ($\dot{I}_i$), the price elasticity is the coefficient of the proportional change in price $\dot{p}_i$, and the coefficient of the percent change in wage $\dot{w}$ is the wage elasticity. The last term in Equation 2 is the elasticity of demand with respect to y, the quasi-wage for WIH (m_j) that individual i's has to pay for a spouse's WIH.

As expected, the income elasticity is positive and the price elasticity is negative. Both the price and the wage effect depend on elasticities of substitution between time and goods and on shares of the various inputs in the household production function. I now examine the determinants of each of these elasticities in more detail, with an emphasis on testable implications. The order of the discussion follows that of Equation 2.

Income effect.

The WIH system 1 includes own non-work income but not the spouse's income, by assumption. The income effect in Equation 2 is thus the effect of the WIH-user's income on demand for goods. Individual income elasticity of demand for commercial products x is represented in the coefficient of the percentage change in income ($\dot{I}_i$). It is a function of the size of individual (non-work) income relative to full income.

I have assumed that the individual's own non-work income I, own wage w and the quasi-wage y paid to a spouse are all given exogeneously. In reality, own income (from

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[2] The model also leads to a demand for WIH contributed by a spouse, mj, and a supply of labor hi. An extended model including utility from work can also lead to the derivation of a supply of own WIH mj.

work and other sources) and quasi-wage y charged by a spouse are likely to be endogenous. This will be the case if the quasi-wage is not simply given to the individual, as was assumed, but is partially determined by bargaining among the spouses. If individual bargaining power is in part a function of the individual income that both partners bring to the marriage then own income and quasi-wage earned by the spouse are related and the income effect will be more complex than what is conveyed in Equation 2.

The WIH model leading to demand Equation 2 assumes that the individual uses a spouse's WIH but does not supply WIH to the spouse. It gets more complicated if both supply WIH to each other and demand WIH from the other.

It follows that w*hen analyzing effects of income on consumption one has to consider the effects of the income of each spouse separately.* Couples are unlikely to completely pool their incomes. That consumption is a function of individual--rather than household—income follows from this theory as well as from bargaining theories, all theories with individual utility functions and private consumption entering these utility functions. Bargaining theories focus on conflicts of interest regarding the *distribution* of goods. They model a spouse's relative income as a function of that spouse's relative consumption due to bargaining based on each partner's individual income and other resources. My model also leads to predicted effects of relative income on consumption via possible effects on quasi-wage, as is explained later in the chapter.

The model presented here has an advantage over most bargaining theories: it integrates household production and most of the bargaining models ignore household production.[3] Next, I present some innovative insights regarding price elasticity obtained with the help of the unique assumptions regarding WIH and its compensation.

Price elasticity of demand

The price elasticity of x_i (the coefficient of $\dot{p}_i$ in Equation 2) is composed of three components, all of which take on a negative sign: *a full income* effect that is a function of the weight of commercial goods in Z, an effect of *substitution in production* between commercial products and own time (including term σ_{xs}) and an effect of *substitution in production* between commercial products and spouse's WIH (including term σ_{xm}). Equation 2 leads to two new insights regarding the law of demand, i.e., the price effect.

The elasticity of demand x_i *will be larger* (*in absolute terms*) *the higher the elasticity of substitution in production between commercial product x and WIH.* This implies that the more consumers can rely on a spouse to satisfy their needs (maximize Z), the higher the price elasticity. The elasticity of demand is therefore a function of marital status and relationship status (in case live-in partners are not married) since people who live alone don't have the option of using WIH to produce goods that are an alternative to commercial goods.

In turn, the lower the elasticity of demand, the higher the prices of restaurant meals and other WIH-substitutes are likely to be to the extent that suppliers of these commercial goods and services have some degree of monopoly (perhaps local monopoly). This is one

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[3] Exceptions are Lundberg and Pollak (1993), Apps and Rees (1997), Chiappori (1997), and Chen and Woolley (2001).

of the reasons why one is likely to find more expensive restaurants where more people are single than in places where more people are married. A testable prediction is that, after controlling for income and other factors, *the demand for restaurant meals will be more inelastic in cities with high proportions of singles (such as Manhattan) than in a small towns where most adults are married*. Limited data on WIH are an obstacle when it comes to testing this theory, but my prediction regarding marital status and relationship status differentials in price elasticity can easily be tested.

Another testable prediction is that *commercial products that can possibly be produced with WIH will have a more elastic demand than products that cannot possibly be produced with WIH*. For instance, the demand for restaurant meals is expected to be more elastic than the demand for movies or bar services.

Furthermore it is also the case that *the effect of the elasticity of substitution in production on the <u>price elasticity of demand</u> for commercial goods is weighted by other factors' share in the costs of production*. According to Equation 2 the effect of σ_{xm}, the elasticity of substitution in production between commercial products x and WIH, on the price elasticity of demand depends on α_m^Z, the share of WIH costs in production. It follows that the more an individual i relies on WIH in the production of Z the more elastic his demand. For instance, if Z is clean garments, the more WIH the individual plans to use to get clean garments the more her demand for commercial laundry services will be elastic. Also, the more an individual intends to employ a spouse's WIH in food production in order to obtain good nutrition, the more elastic his demand for frozen dinners. Generally, it is predicted that the more people can rely on spouses to perform WIH benefiting them, the less they will be willing to pay for commercial WIH-substitutes. Accordingly, this theory can help explain gender differentials in consumption and demand elasticity.

It has been documented that women engage in considerably more domestic chores than men (e.g. by Hersch 2003, 2009; Gimenez-Nadal and Sevilla-Sanz 2012). To the extent that this implies that men rely on WIH more than women the share of WIH costs will be lower for women and, *relative to men, women will have lower price elasticities of demand for commercial goods that serve as WIH-substitutes*. This can be tested. I have not seen scientific evidence in support of this statement, but circumstantial evidence can be offered.

Dry cleaning is an example of a WIH-substitute: relative to men, women do more laundry in general and laundry benefiting a spouse (a form of WIH) in particular. It follows from this theory that women's demand for dry cleaning will be more inelastic than men's. Assuming that dry cleaners have some discriminating monopoly power, they are expected to take advantage of customers who systematically have a less elastic demand. Consequently my theory helps explain why dry cleaners often charge more for women's blouses than for men's shirts, even if they require the same cost of production:[4]

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[4] Barbara Bergmann, personal communication. Her observation is based on data she collected with the help of students in the Washington, DC area. Some states, including California, have banned gender-based price differentials in dry-cleaning services (see also Cohen, 1999).

dry cleaners may act as discriminating monopolies and charge higher prices from women if their demand is less elastic than that of men.[5],[6]

Along the same lines I expect that men's demand for frozen dinners will be more elastic than women's and that frozen meals designed for women will be more expensive than comparable meals designed for men.[7] It also follows that if women typically engage in more home cleaning than men, men's demand for commercial maid services will be more elastic than women's and women may need to pay more than men for a given quantity of commercial maid services. However, empirically it will be very difficult to distinguish between the demand for housecleaning services by married men and women (one possibility being to distinguish between couples in which the woman is the main earner and those in which the man is the main earner).

Conversely, if car maintenance or carpentry and home maintenance products are designed separately for men and women, I expect products designed for women to have a higher demand elasticity than comparable products geared to men, since women are more likely to rely on WIH in these areas than men (Hersch 2009; Sevilla-Sanz et al. 2010).

Furthermore, that women's demand for cigarettes is less elastic than men's (Chaloupka and Pacula, 1998) may also be interpreted in light of this analysis. When the price of cigarettes increases smoking habits become more costly and people may be more motivated to purchase goods or services getting them into a "non-smoking habit". A "non-smoking habit" can also be produced with a significant other's WIH: nagging spouses and anti-smoking commercial products are substitutes. If women can rely less than men on this kind of WIH they will find it more difficult to free themselves from smoking after the price of cigarettes rises. In addition, women's demand for commercial anti-smoking products and services is expected to be less elastic than men's.[8] [see Joni Hersch JRU 2000 paper on gender and smoking]. I also discuss the possible role of income pooling; email from her received on

These insights apply not only to married individuals, but also to those who are single and expect to be in couple later in life. Singles may have a sense of how much WIH they will obtain from a partner in the future and this may influence their current consumption.

Wage effects

Equation 2 also includes an elasticity of demand for *x* with respect to own wage, i.e., the coefficient of $\dot{w}_i$. This elasticity contains a real income effect and an effect of substitution in the production of private good Z.

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[5] Women thus seem to get penalized twice by men's unwillingness to do their wives' laundry. First, women rarely have the option of relying on that form of help in the home. Second, they may get charged more for commercial services if they go to the cleaners, as a result of their lower elasticity of demand which in turn is partially explained by the low levels of WIH that men supply.

[6] I thank Ed Lazear for pointing that out.

[7] Again, this assumes that sellers can take advantage of buyers' less elastic demand. The demand for frozen dinners aimed at children is also expected to be very price-elastic as both mothers and fathers may possibly substitute for their children's cooking activities.

[8] A spouse's time is likely to be a better substitute for the time of professional services than is the case with own time.

Own wage elasticity of demand depends on the share of various factors of production in the costs of producing Z and on the elasticity of substitution in production between own time and commercial goods.

The positive effect of own wage on demand for consumption goods *via* an effect of substitution in production is a function of the share of own time costs α_s^Z in producing Z. The larger α_s^Z the more it is likely that this substitution effect will dominate and reinforce the positive income effect. To the extent that married men are less likely to engage in WIH than married women, *this share α_s^Z is likely to be larger for women than for men. It follows that the elasticity of demand for private consumption goods with respect to own wage is more likely to be positive for women than for men.*

Consumption and Quasi-Wages for a Spouse's WIH

It also follows from Equation 2 that the demand for commercial products is a function of the quasi-wages y_j that individuals pay for their spouses' WIH. Were it possible to measure these quasi-wages, their predicted effects on individual consumption are stated in Equation 2. It can be seen that the coefficient of $\dot{y}$, the elasticity of demand with respect to spouse's quasi-wage, varies with α_m^Z, the share of WIH in costs of production. The more WIH the individual uses the more his demand for commercial goods is likely to respond to changes in quasi-wages. We can also see a negative real income effect and a positive effect of substitution in production between commercial and home-produced goods.

There are no data on quasi-wages and this elasticity can't be estimated. Nevertheless, this part of the theory is also valuable if it helps understand how other variables affect individual consumption. Next, I show how two factors influencing marriage market conditions can affect consumption via potential effects on quasi-wages: income of potential spouses and sex ratios.

Effects of Others' Income.

Bargaining theories have modeled couples as engaged in conflicts over the allocation of income to consumer goods and the allocation of time to leisure. Accordingly, the higher own income relative to spouse's income, the higher individual bargaining power and the more an individual marriage partner is likely to obtain her preferred consumption package. For example, bargaining theorists Lundberg and Pollak explained why English men opposed their government's decision to pay child subsidies to mothers rather than to fathers as follows (see Lundberg et al., 1997): the subsidy increased women's income relative to men's and consequently reduced men's bargaining power and relative consumption of goods.

The same conclusion also follows from my analysis: the UK policy switch led to higher incomes *I* for women and lower incomes for men. Were each individual man or woman to maximize utility according to Problem 1 increased income would lead women to consume and decreased income would lead men to consume less than before the switch. The policy switch thus leads to a decrease in men's relative private consumption.

Household production is ignored in most bargaining theories. The model presented in this chapter has introduced household production, by assuming that people either produce their own goods (time use *s*) or obtain household production time from a spouse (time use *m* or WIH) at given quasi-wages. Problem 1 leads to the derivation not only of a demand for goods (Equation 2) but also of a demand for a spouse's WIH (*m*) at given quasi-wages, assuming that supply is available at that quasi-wage. Demands for WIH are similar to demands for commercial goods *x*, given that WIH and goods enter consumers' utility functions in similar ways (see Chapter 2). Assuming normal income effects it follows that individuals with higher incomes will demand more WIH.

The same individuals who are demanding a spouse's WIH often also supply WIH to that very spouse. Bringing in the supply side implies additional effects of income changes on consumption. Problem 1 could be replaced with the fuller problem that was used in Chapter 2. There the same individuals possibly supplied their own WIH and had a demand for their spouse's WIH. Quasi-wages for both were assumed to be given when individual demands and supplies were derived. Chapter 2 also included a macro-economic analysis of markets for WIH assuming traditional gender roles, competition among men on the demand side, and competition among women on the supply side. Such macro-level analysis leads to equilibrium quasi-wages where aggregate demands and supplies intersect. When all relevant (hedonic) markets for WIH are in equilibrium a range of equilibrium quasi-wages for WIH are established for individual WIH-users and WIH-suppliers with various characteristics.

According to such fuller model the U.K. policy switch involving lower incomes for men and higher incomes for their female partners implies that men's demands for WIH and women's WIH supplies will decrease (more income from other sources reduces women's willingness to work). As a result the total time that women will supply to WIH is expected to decrease. The net effect of the policy switch on equilibrium quasi-wages is not clear. As a result, when incomes that used to be men's become women's the net effect of such switch on women's relative consumption will not be as large as the direct income effects of the switch in government transfers: women lose part of their income as suppliers of WIH to men and men's net decrease in real disposable income (after paying for their wives' WIH) will be smaller in absolute value than the decrease in government transfers to the extent that their quasi-wage payments to women decrease.

This suggests that if macro-level WIH markets are taken into account and women are more likely to be paid for WIH than men, the actual effects of changes in government transfers on consumption will not be as large as would be expected based on bargaining models that ignore WIH transactions. Furthermore, the more traditional the gender roles and the higher women's quasi-wages the smaller the expected impact of a transfer of welfare benefits from men to women. Consider the example of the traditional 'whole wage' system under which husbands hand over most of their paychecks to their wives. In the past this arrangement was very common among the British and U.S. middle class (Pahl 1983, Woolley 2003) [cite for pahl in woolley] and it still prevails in Japan. [add cite] Under such system there was less incentive for women to lobby for a change in welfare beneficiaries: the switch also involved a considerable loss of WIH income for women.

More generally, assuming traditional gender roles (but not necessarily a whole wage system) the predicted effects of changes in (potential) *spouses'* income on men and

women are not symmetric. For traditional women who plan to be WIH-suppliers increases in the income of their potential spouses i are not necessarily harmful and could even be add to wellbeing. Increased incomes of men (WIH-users) contribute to a higher demand for WIH and higher quasi-wages for women (WIH-suppliers), allowing women to consume more.[9] In contrast, for traditional men with a demand for women's WIH an increase in (potential) spouses' income is likely to reduce wellbeing. With higher non-work incomes women will reduce their supply of WIH and thus men will obtain less WIH or pay more for it. Increases in women's income are likely to translate into lower consumption and wellbeing for men whereas increases in men's incomes are likely to be associated with higher consumption by women.

This helps explain why historically men have used collective action to limit women's earnings opportunities via laws preventing them from being employed (or from being employed after marriage, see Goldin 1988, 1990), but are there any recorded instances of women using collective action to limit men's earning opportunities (Folbre 1994)? The more countries emphasize traditional gender roles in household production the more firms and governments are likely to institute pro-men biases, not necessarily because men dominate all institutions (as in the patriarchy arguments) but due to traditional women being paid high quasi-wages and having a vested interest in protecting male earnings that are mostly transferred to them.

Tensions between income effects on demand and supply of WIH could lead to more demand for commercial products and services that are WIH-substitutes and capable of easing such tensions. Early in the twentieth century rising incomes in the U.S. have been associated with rapid increases in employment of servants, implying a high income elasticity of servants' services (Stigler, 1946). Servants were one form of WIH-substitutes. More recently, as servants have become prohibitively expensive for most households, frozen meals have become a more commonly used WIH-substitute. The rapid growth in their consumption may derive from their contribution to bridging the gap between quantity of WIH demanded and supplied by men and women from the same social classes and educational levels. In both periods, WIH- substitutes have thus facilitated matches between high income men and women, by alleviating some of the household production conflicts that such sorting may create.

Effects of sex ratios

The higher the quasi-wage for women's WIH, the higher women's disposable income and the more they are expected to consume relative to men. As explained in the previous chapter higher sex ratios (when men are scarce relatively to women in the same marriage market) are expected to be associated with higher quasi-wages for women's WIH.

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[9] This effect of income on the supply of household products consumed in marriage has been overlooked by previous models such as Gronau (1977), where neither individual agency in marital consumption nor individual agency in marital production were taken into account, and by bargaining theories assuming either unitary marital production (e.g., McElroy and Horney, 1981) or no household production at all (e.g., Chiappori, 1992).

Therefore, *the higher the sex ratio the more women will consume relative to men*. This is expected to affect both individual consumption in marriage and consumption by singles preparing themselves for marriage.

This prediction also derives from a number of other theories of marriage, including Becker (1973), McElroy (1990), and Chiappori et al. (1998). Our theories are all in agreement as far as the prediction that sex ratios affect individual bargaining power in marriage, and therefore personal access to consumption goods by men and women living in couples. It also follows from the theory presented here that sex ratios will affect the consumption of unmarried men and women.

Whoever plans to marry—whether it is a first marriage or a later marriage—anticipates certain levels of quasi-wages for WIH after marriage and is likely to develop spending habits based on their expected earnings from WIH (if WIH-suppliers) or expenses (if WIH-users). For instance, given a traditional division of labor in the home, young single women expecting high quasi-wages for WIH (due to a high ratio of males to females) will spend a higher portion of their current income on private consumption (e.g., expensive clothing, and travels abroad) than comparable women expecting lower quasi-wages. In contrast, unmarried men expecting to pay high quasi-wages will spend less on themselves and save more if they intend to marry (Grossbard and Pereira 2010).

Hedonic Marriage Markets and Compensating Differentials

Any personal characteristic that increases the value of WIH to many WIH users is expected to be associated with a higher demand for WIH. WIH-suppliers with *higher human capital* are likely to obtain higher quasi-wages for WIH and therefore to consume relatively more both before and after marriage. In contrast, the higher the quasi-wage, the smaller the disposable income left for WIH-users and the lower their expected consumption both before and after marriage.

Factors associated with higher productivity in home production include most characteristics known to be associated with labor productivity in general, such as knowledge and health. It follows from Becker's theory of marriage that married individuals who are more productive in household production will consume relatively more. This also applies to consumption by singles anticipating marriage.

It also follows that if additional substitutable WIH workers enter a given marriage market (e.g., because they have invested in their human capital or migrated), this will reduce the quasi-wage available to the existing WIH workers they compete with, thus reducing those people's consumption before and after marriage.

Compensating differentials in markets for WIH are likely to help explain relative consumption by men and women. Chapter 2 analyzed how such differentials are associated with variation in labor supply. The analysis was based on expected differentials in quasi-wage for time spent producing WIH: less attractive WIH-users are expected to pay WIH-workers more to get them away from the more attractive WIH-users they compete with (see Grossbard-Shechtman, 1984, 1993). For instance, if most people consider good looks, health, and intelligence as attractive traits, then WIH users lacking these traits will have to pay quasi-wages for WIH that exceed the quasi-wages paid by good-looking smart WIH-users. It follows that assuming traditional gender roles one expects that men who are substantially older than their wife will pay compensating

differentials in quasi-wage for WIH.[10]

It follows that *ceteris paribus the personal consumption of women married to substantially older men is expected to be higher than the personal consumption of women married to men closer to their own age*. There is evidence supporting this proposition in Browning et al. (1994). Also consistent with the prediction is Wooley's (2003) finding that in Ottawa, Canada, women married to substantially older men were more likely to be in charge of withdrawing cash from bank accounts than women married to men who are closer to them in age. Presumably, whoever is more likely to withdraw cash is also more likely to consume what they prefer relatively to what their spouse prefers. This finding supports the idea that women who are substantially younger than their husbands are in a relatively more advantageous bargaining position in their marriage, relative to women married to men close to their age. Older men (at least 5 years older) apparently pay compensating differentials.

The prediction of compensating differentials in marriage does not follow from matching models of marriage that assume a continuum of individual men and women varying in their characteristics, such as Becker's matching model (1974, 1981) and Roth and Oliveira Sotomayor (1990), nor does it follow from household production models where individual producers of household production—what I call WIH-suppliers—do not own portable general human capital and therefore cannot move from one marriage to the next.

The theoretical perspective presented here also leads to the prediction that unmarried young women willing to be WIH-suppliers who enter marriage markets can expect large disposable incomes if they are willing to marry older men. Anticipating such future income, they may also consume more even when single. In contrast, men who intend to use the WIH work of substantially younger women will have to accumulate sufficient assets prior to marriage in order to afford high quasi-wage payments after marriage. Likewise, men with facial features considered unattractive and who want to use women's WIH may have to pay higher quasi-wages to women relative to men with pleasant facial features.

Anecdotal evidence about less attractive grooms paying higher quasi-wages for women's WIH can be traced back three centuries: in the 18th century British novelist Laurence Sterne's wrote about Tristram Shandy's grandparents need to pay an appropriate financial compensation for the deficiency of Mr. Shandy in the nose department (Sterne, 1760).[11] The grandparents were paying a form of brideprice, which is likely to be positively associated with women's quasi-wages (see more on that topic in Chapter xx). Contemporary data on premarital payments in the Western world is more difficult to obtain. Today premarital financial agreements are uncommon in the West but data on pre-nuptial agreements can be collected in the U.S. and on type of marriage contract in France (Laferrere, 2001), for example. This opens the door for interesting further studies of consumption and marriage based on a theory incorporating WIH and quasi-wages.

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[10] Differences in the age at marriage of men and women are an interesting phenomenon that economists have also tried to explain. For instance, Bergstrom and Bagnoli (1993) and Danziger and Neuman (1999).

[11] John Treble contributed this citation.

Model's Extensions

In Grossbard-Shechtman (2003) the model was extended to the case of two private consumption goods rather than one. Next, the basic WIH model is extended by assuming that consumption goods are household public goods rather than private goods.

A model with consumption of household public goods.

The following model assumes that marriage *only* entails jointly consumed goods or commonwealth goods (also called marital public goods). Let us call the commonwealth good in an individual's utility function Z_i^q and the time that a spouse contributes towards the production of such public good m^q. This is another form of WIH. The individual counts on a given amount Z_{j0}^q of the good to be produced by potential mate j at no cost to the WIH-user. Beyond that level, it is assumed that the individual can obtain more Z^q from a spouse j by paying spouse j some "quasi-wage" y_j^q. For simplicity, it is assumed that the individual does not contribute own time to the production of Z_i^q. The problem is modeled as follows:

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\begin{cases}
Max\, U\,(Z_{ij}^q)\,subject\,to \\
Z_{ij}^q = Z_{j0}^q + Z_i^q,\, Z_{j0}^q > 0, \\
Z_i^q = Z_i^q(x_i^q, m_j^q) \\
1 = h_i \\
I_i + w_i h_i = p^q x_i^q + y_j^q m_j^q \\
x_i^q = x_{ij}^q - x_{j0}^q,
\end{cases}
$$

where x_{j0}^q is the amount of commercial products contributed by the (potential) spouse, and production function Z_i^q is characterized by constant returns to scale. The quasi-wage y_j^q that the individual expects to pay to a (potential) spouse j in this case may be lower than the quasi-wage y paid for private WIH in Problem 1. This follows from the fact that equilibrium quasi-wages are established in competitive markets and people are more willing to supply WIH if it contributes to household public goods than if it contributes solely to spouse's private goods.

In comparison to the previous model there is an additional source of full income: the value of goods contributed by (potential) spouse j. The time and income constraints considered by individual i can be rewritten as full income constraint $F_i = I_i + w_i + \bar{\pi} Z_{j0}^q = \pi Z_{ij}^q$, where π is the implicit price faced by i. When evaluating Z_{j0}^q, partner's contribution to that good, the individual attributes a value of $\bar{\pi}$ to it.[12]

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[12]This model shares some common features with Lundberg and Pollak (1993).

To derive i's demand for the commonwealth good we replace $\dot{F}$ by its components and use the results obtained in the Appendix to this chapter. As a result, the demand for all commercial products needed to produce Z_{ij}^q --regardless of who produces them—is:

$$\dot{x}_{ij}^q = \frac{I_i}{F}\dot{I}_i + \frac{w}{F}\dot{w} + \frac{\bar{\pi}Z_{j0}^q}{F}\dot{\bar{\pi}}Z_{j0}^q - (\alpha_x^q + \alpha_m^q\sigma_{xm})\dot{p}_i^q + (\sigma_{xm} - 1)\alpha_m^q\dot{y}_j^q. \tag{4}$$

The amount of commercial goods the individual is willing to pay for is the difference $x_i^q = x_{ij}^q - x_{j0}^q$, and i's own demand for goods x_i^q (expressed in percentage growth) is:

$$\dot{x}_i^q = \beta\ \dot{x}_{ij}^q - (1-\beta)\ \dot{x}_{j0}^q, \tag{5}$$

where $\beta = (x_{ij}^q / x_i^q)$ is the inverse of the proportion of commercial products entering the commonwealth good that is paid by individual i. It is assumed that this proportion is given, possibly based on customs and bargaining by previous generations of men and women.

It follows from this model that the positive income effect on the demand for goods includes the effect of the value of commonwealth goods that the potential spouse is expected to contribute. At the same time, individual i's demand for commercial goods decreases as a function of the commercial goods x_{j0}^q contributed voluntarily by the spouse. Even if the elasticity of substitution in production between commercial goods and WIH is the same in Problems 1 and 3, *one expects less individual demand for commercial goods when Z is a public good than when it is a private good*.[13] The implication is that consumption will be affected by cultural preferences for private versus public goals. Consumption depends on preferences that are influenced by 'culture' via language, nationality, ethnicity, religion, etc. Culture affects demand and supply of WIH and therefore it affects consumption not only directly but indirectly *via* its effects on equilibrium conditions in markets for WIH. Culture can be manipulated with the goal of getting higher consumption for oneself and others in the same position with respect to the WIH markets.

For example, it is in the best interest of WIH-users to convince WIH-suppliers that they can also consume what they produce, i.e. encourage them to consider their spouse's private Z as a household public good Z^q. If WIH-suppliers view the meals they produce as contributing to the commonwealth rather than to the WIH-user's private well-being then WIH-users will get cheaper home-cooked meals (market supplies of WIH increase and quasi-wages go down). The promotion of good homemaking in the 19th and 20th Century (Folbre?) can be reframed as an attempt to get people to supply more home produced goods by making them appreciate more how their clean home contributes to the household commonwealth. Betty Friedan's *Feminine Mystique* was in part a rebellion against some of this reframing.

It is also in the best interest of WIH-suppliers to make WIH-users want their services more. Cultural promotion of the "good provider" role as a goal for men raises men's willingness to pay for women's WIH and to invest in their income-earning human capital so they can afford higher quasi-wage payments. Cultures may also make demands on

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[13] The elasticity of substitution may differ in the two models.

men to provide particular goods such as housing in order to qualify for marriage. This has been the case in Italy more than in many other countries, and helps explain why until recently Italians, including single men, tended to save more than people in some other Western European countries[14], the U.S., Canada, Australia, Japan and Korea.

Conclusions

The concepts of WIH and its compensation, the quasi-wage, are theoretical constructs on which we currently lack data. Nevertheless, by integrating these concepts into a theory of individual consumer choice valuable insights regarding consumption can be derived. Many of those are testable, including predictions regarding gender and marital status differences in consumption levels and demand elasticities of commercial products. Predictions regarding consumption effects of sex ratios and compensating differentials are also testable. That individual income matters more than household income follows from this theory as well as from other theories, and it has extensively been confirmed empirically. It is evident from this chapter that the concepts of WIH and quasi-wage have a bigger role to play in explaining variation in consumption and savings than has been realized in the past.

APPENDIX

SEE THE APPENDIX TO Shoshana Grossbard-Shechtman. "A Consumer Theory with Competitive Markets for Work in Marriage." *Journal of Socio-Economics*, 31(6): 609-645, 2003 http://www-rohan.sdsu.edu/faculty/sgs/documents/consumption_paper_JSE2003.pdf

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[14] In particular, in the late 1980s Italians saved more than their counterparts in Austria, Belgium, Finland, France, West Germany, the Netherlands, Norway, Spain and the U.K.

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