

# A Model of Demand for Health and Caregiving Incorporating Marriage Markets

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It is now more than fifty years since Michael Grossman first published models of demand for health (Grossman 1972a, 1972b), thereby pioneering analyses of various health-related behaviors by households such as parental investments in children's human capital, the schooling-health relationship, unhealthy behaviors, formal and informal home care, and the opportunity cost of time in health-related investments. The model, still in use after more than 50 years, accounts for substitution between producing health at home and purchasing commercial goods and services that contribute to individual health. It was inspired by Gary Becker and Jacob Mincer, Grossman's professors at Columbia in the late 1960s, who were then publishing ground-breaking articles on allocation of time, household production, and consumption (e.g. Mincer 1963, Becker 1965). These household models by Becker,

Mincer and Grossman are 'unitary': they assume that multi-agent households, such as couples, make decisions as if they were a single unit, overlooking possible conflicts of interest between members of a couple and ignoring conditions in marriage markets that may affect intra-household allocation of resources and individual well-being.

In the early seventies Becker published marriage models (Becker 1973) with individuals deciding choice of match and consumption and households deciding about household production. In terms of who makes decisions, individuals, or multi-person households, these are hybrid models. His student at the University of Chicago during this period and starting with Grossbard (1976), Grossbard developed marriage models that also have individuals make decisions about marriage and consumption but in contrast to the earlier hybrid models, she assumes that individuals make all decisions, including those regarding production at home. She models production as resulting from matches between workers and employers, completing the

analogy between household and firms emphasized by Margaret Reid (1934), Becker, Mincer, and Grossman.

The choices available to a health consumer (or investor) according to Grossman (and Becker and Mincer) and Grossbard are shown in Figure 1. Grossman's 'household' has a two-way choice between producing a good in the household and purchasing it. Grossbard's individual has a three-way choice between purchasing a good, producing it at home by oneself, or getting a spouse or partner to produce it at home. Singles may act as future employers of spouses/partners who work in household production for their benefit or as future workers in home production benefiting a spouse.

[ Insert Figure 1 Here]

By dividing the population into workers and employers, Grossbard facilitates the application of standard labor models to household economics. Productive units coordinate the activities of workers and employers, with prices contributing to such coordination. In the case of labor relations these prices are wages. In the case of households, prices for work in household production benefiting a spouse are not observable. However, how marriage market conditions may affect individual consumption,

including health-related consumption, can be predicted due to the presumed effect of these conditions on prices. Here we present a summary of the Grossbard approach and some testable implications regarding demand for health-related goods and services and amount of time devoted to health-related caregiving by relatives as a function of sex ratios and heterogeneity among marriage market participants. More health-related implications from this approach can be found in Grossbard and Hakak (2022).

## **I. Summary of the modeling approach**

WiHo is defined as Work in Household Production for the benefit of a spouse (Grossbard-Shechtman 1984). This includes caring for a spouse, a spouse's children (possibly joint children) or other people a spouse cares about such as an older parent. Variation in the price of WiHo is expected to have the following effects.

A. Demand for WiHo by employers is expected to be a negative function of the price of WiHo. The more expensive WiHo the more WiHo employers are likely to rely on substitutes for WiHo, such as commercial or government health services, hired help at home, or own time. Higher WiHo prices may

also affect the tasks employers want WiHo workers to do.

B. Supply of WiHo by workers is expected to be a positive function of the price of WiHo, i.e. their supply is likely to be upward-sloping. Supply of some tasks may be more sensitive to the price of WiHo than others.

C. Many participate in markets for such work, on the demand side and the supply side. Prices for WiHo are established where demand and supply intersect. The larger the supply of WiHo workers relative to the demand, the lower the equilibrium price of a WiHo worker implying that the worker will have less access to consumption goods. Conversely, lower prices of WiHo are likely to raise the well-being of WiHo employers.

Many observable factors could possibly affect the price of WiHo, and consequently lead to testable implications for health behaviors. One such factor is the sex ratio, i.e. the ratio of men to women, as discussed in the next section. How prices of WiHo may vary across separate markets for WIHO defined by heterogeneous traits of individual WIHO market participants, with implications for observable health behaviors, is the subject of Section III.

## **II. Testable implications regarding health behaviors and sex ratios**

The predicted effect of sex ratios on health outcomes is clearer if one assumes heterosexuality and traditional gender roles: women are WiHo workers and men employ WiHo. Then higher sex ratios imply that there is relatively more demand by men and/or less supply in markets for women's WiHo, which in turn implies a (unobservable) higher price of women's WiHo (see Grossbard and Hakak 2022). The net expected effect of higher WiHo prices on amount of WiHo depends on size of shifts in demand and supply and may differ depending on whether individuals are already in couple or not, exogeneous social norms regarding gender roles, and proportion of heterosexual couples.

The net amount of WiHo work supplied by women may increase to the extent that a shift in demand dominates. At higher prices of WiHo men may learn to rely less on women's WiHo and women may require higher compensation per task of WiHo performed, possibly performing fewer unpleasant tasks such as cleaning floors (norms regarding gender norms may to some degree be endogenously related to conditions in markets for WIHO).

An example of testable prediction is that at higher sex ratios and higher price of WiHo it is more likely that women are the caregivers of needy parents-in-law. However, when and where sex ratios are higher married women may perform fewer difficult tasks, such as taking a handicapped mother-in-law to the toilet.

As for possible effects on demand for commercial alternatives to WiHo, it is predicted that under the same assumption of a traditional society, where sex ratios are higher it is more likely that older parents will be cared for in institutions substituting for at-home care. Informal care by paid non-relatives may also be more common.

The more traditional the society, the less it is likely that variation in WiHo prices will lead to changes in existing social norms regarding demand and supply of WIHO. Instead, higher WIHO prices may feed the demand for health services supplied by third parties outside the couple. Hence, within highly unequal societies, wealthier families may avoid changing norms as a result of changes in WiHo prices to the extent that upper-class women's WIHO work may cheaply be substituted with paid work by low-income women.<sup>1</sup>

<sup>1</sup> According to Costa et. al. (2016), in Brazil, a country with high income inequality, 92% of paid domestic workers are women.

### **III. Testable implications regarding health behaviors and heterogeneity in marriage**

Individuals vary in traits such as race, education, youth, body weight, and religion.<sup>2</sup> Traits of self and (potential) partner are likely to be associated with health behaviors, as was recognized by Grossman (1972b). However, Grossman has not modeled demand for health services or propensity to care for others as a function of the combination of individual traits of two members of a couple. The Grossbard perspective takes into consideration the presumed effect of individual traits on the price that WiHo workers may earn and that WiHo employers may pay in each WiHo market defined by a particular combination of traits of workers and employers. Taking account of this heterogeneity leads to novel predictions regarding demand for health and amount of caregiving. To simplify the exposition, we focus on the case of markets for traditional women willing to do WiHo work for the benefit of traditional men. We consider one trait of each partner at a time, leaving the other traits constant.

Consider Couple A, where the man ranks lower than the woman on a particular trait, and Couple B where both members have the same

<sup>2</sup> We focus on observable individual traits; data on individual income and wealth is often hard to get.

rank. It is expected that relative to the woman in Couple B the woman in Couple A will obtain a higher price for her WiHo. In turn, a higher price of WiHo implies that *ceteris paribus* (including controls for the partners' individual income and education) she is likely to do fewer of the unpleasant tasks involved in WiHo such as care for a needy parent-in-law. She may also have more leisure and the couple may spend more time in joint leisure. Now consider another couple, Couple C where the woman ranks lower than the man on that same trait. It is predicted that the woman in Couple C will obtain a lower price for her WiHo than the woman in the other two couples, and therefore that the woman in Couple C will engage in more unpleasant tasks such as some of the caring for a needy parent-in-law.

How valuable is an individual trait on marriage markets? Prior research about marriage rates or other outcomes related to marriage market conditions could be useful here. For example, the value of darker skin in marriage markets could be inferred from data on likelihood of being married. Goldsmith et al. (2007) found that in the USA women with darker skin are less likely to be married, which may be another indication of racism in the USA. Assuming traditional gender roles, a prediction that follows from that is that white women in couple with black men will do fewer

unpleasant caregiving tasks than women in all-white couples.

Another individual trait that appears to be valuable on marriage markets is relative youth (Grossbard-Shechtman and Neuman 1988). People who are substantially younger than their partner may obtain higher prices for their WiHo than those closer to their partner's age. It follows that in a traditional society much younger women may perform fewer unpleasant caregiving tasks than women close to their partner's age.

Our perspective may also throw light on how demand for health goods and services, is likely to vary with individual traits of men and women. An example is the prediction that, assuming traditional gender roles and controlling for income and all other relevant traits, in couples composed of black men and white women there will be more use of paid caregiving services than in all-white couples.

#### IV. Conclusions

In this paper we shed new light on the determinants of household demand for paid caregiving and other health services by modeling these services as substitutes for own caregiving and caregiving by a spouse or partner. We summarize Grossbard's Work-In-Household (WIHO) model, which applies to the analysis of various forms of caregiving. The

model recognizes that those who do caregiving within families often expect to be compensated financially by other household members who benefit from their work directly or indirectly, a point ignored by earlier economic models about household production and its alternatives.

The model leads to testable implications, including one about how sex ratios may affect demand for health and propensity to care for relatives and another about how demand for health and propensity for in-family caregiving may be a function of individual traits of men and women who form couples. These new insights are valuable in aging societies where increases in life expectancy are likely to lead to rising needs for elder care.

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## IV. Figure

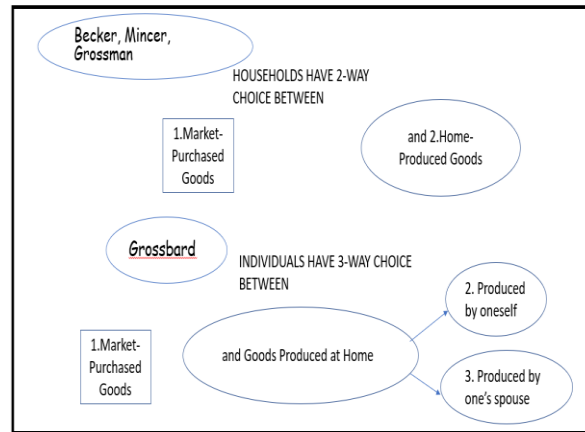


FIGURE 1. ADDING GROSSBARD TO GROSSMAN