

# Narratives and the Economics of the Family\*

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## Abstract

We augment Becker’s classic model of the family by assuming that, in addition to caring about consumption, the family wishes to further a subjective story, or narrative, that captures its idiosyncratic goals. Our focus is on two stories that in many ways are polar opposites. The first one—the *protector narrative*—gives rise to a type of traditional family where gender roles are distinct, men and women are pushed towards “separate spheres,” and men are expected to be tough and authoritarian. The second one—the *fulfillment narrative*—gives rise to a type of modern family where roles are less distinct, family members have greater latitude in their decisions, and marriages are based to a greater extent on romantic love. We derive a rich bundle of behaviors associated with each story, and using survey data, we show that our findings are consistent with a variety of empirical patterns.

*JEL Classification:* D10, Z10

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# I. Introduction

An American family of a century ago would be downright puzzled by the choices of many families today. Cohabitation, for instance—once considered highly shameful—is now commonplace (e.g. Manning and Stykes, 2015). While a century ago most women were expected to be housewives, today the majority work outside the home. Single parenthood has also skyrocketed, and as recently as 2015, gay marriage was legalized. Attitudes today, while different from a century ago, are by no means uniform: families strongly disagree on issues such as abortion, pre-marital sex, and gender roles. These patterns may reflect, in part, differences in economic conditions, but they also seem to originate from more fundamental differences in what families value.<sup>1</sup>

In this paper, we augment the classic economic model of Becker (1981) to allow for such differences across families. We take the view that, in addition to caring about standard economic goods, the family holds a subjective story—or narrative—that impacts its goals. In our model, stories take a simple reduced form: they enter as an additional term—either convex or concave—in the family’s utility function.<sup>2</sup>

Our focus will be on two stories that in many ways are polar opposites of each other. The first story, the *protector narrative*, which enters as a convex utility term, produces a type of traditional family where there are strong gender norms and where members are cast into two distinct roles: “pure individuals” who are, to varying degrees, kept cloistered (so as to protect them from the world’s most corrupting aspects); and “protectors,” who are the main breadwinners of the family, acquire worldly knowledge, and act tough and authoritarian. This arrangement allows the family to exploit convexities brought about by the narrative. The second story, the *the fulfillment narrative*, which enters as a concave term, produces a type of modern family where gender norms are weak and all adult members hold similar roles.<sup>3</sup>

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<sup>1</sup>See Goldin (1990) for a discussion of the role of changing economic conditions, such as the increase in women’s education and the expansion of the service sector.

<sup>2</sup>The stories we consider can be viewed as a source of identity at the family level. In this sense our work connects to the literature on identity (see especially Akerlof and Kranton, 2000).

<sup>3</sup>In our model, families may engage in a variety of non-economic practices. For instance, they may sacrifice the careers and happiness of women for the sake of maintaining their purity (which Betty Friedan calls “the problem that has no name”); they may underinvest in women’s human capital and assign members to roles based on gender rather than talent; or they may forbid children from entering marriages of the same sex.

Our paper is a marriage between economic theory, which emphasizes parsimony and rigor, and sociology, whose core methodology involves understanding peoples' behavior through the lens of their narratives. We aim to take such narratives seriously, albeit modeled in a simple reduced-form fashion, and uncover their interaction with economic forces.

Our main contribution is to show that the proposed convex/concave addition to the family's objective has the potential to explain a variety of differences across families, including reactions to economic shocks. We also document a number of empirical patterns that are consistent with the model, including that family behaviors indeed bundle together into packages of the type predicted by our theory. Taken together, these patterns suggest that something akin to the utility terms we have added indeed motivate behavior. Our goal, to be sure, is not to perform a final test of the theory, but rather to provide suggestive evidence that illustrates the applicability of the framework.

The two narratives we focus on are meant to capture long-held views in sociology, anthropology, and political science.<sup>4</sup> As we shall see, these narratives are able to produce gender norms of varying strength, forms of bigotry, political preferences, and a variety of other forces that have been invoked to understand family behavior and differences in gender outcomes. For example, they lead to sexist behaviors without directly assuming sexism and to a number of behaviors that can be attributed to "culture"—such as gender roles and patriarchies—without the need to directly assume any particular cultural prescriptions.

Our paper relates to a largely empirical literature within economics on the relationship between culture and family behavior (see, for example, Goldin, 1994, Fernandez and Fogli, 2006, 2009, Guiso et al., 2008, Carvalho, 2012, Alesina et al., 2013, Bertrand et al., 2015, and Becker, 2018, and see Jayachandran, 2015, Giuliano, 2018, and Bertrand, 2020, for reviews). These papers show that a family's cultural inheritance has a significant impact on such outcomes as female labor force participation, divorce rates, and fertility. Our contribution to this literature—which we further touch on below—lies in our attempt to trace differences in family types back to differences in the curvature of their respective objective functions. Doing so will ideally help shed further light on complex behaviors and produce new testable hypotheses

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<sup>4</sup>In practice, there are of course more than two narratives. Our focus on two is just an initial step: it is the simplest way to demonstrate the importance of narratives in guiding family behavior.

on the basis of family type.

There is of course a long history in economics of deriving behavior from the curvature of the objective function. In the area of social economics, this approach has been applied by Robson (1992), Becker et al. (2005), and Ray and Robson (2012) to derive consequences of the status race for risk preferences and by Michaeli and Spiro (2015) and Clark and Oswald (1998) to understand social conformity and social deviancy. This work differs from our own in that it focuses on individual choices rather than a team problem within a family.

Our treatment of gender norms relates to work on identity (e.g. Akerlof and Kranton, 2000), and especially to contemporaneous work by Carvalho and Pradelski (2020) who endogenize the prescriptions attached to identities. Like us, they assume that activities are more identity-appropriate when more members of the identity group engage in them. Our work differs in that we consider the interaction between narratives and identity prescriptions, and we focus particularly on gender.

There is also a literature outside of economics on “family models” which argues that families come in well-defined types. For example, Lakoff (1996, 2008) contrasts a “strict father model,” which prizes obedience in children, with a “nurturant parent model,” which favors independence; Stiehm (1982) and Young (2003) describe a model where the (male) head of household has the duty to provide for the family and protect them from harm.<sup>5</sup> These treatments view a family’s type as reflecting its narrative, as we do. However, these treatments lack a formal model; and they do not derive patterns of interest from first principles, as we do. In addition, they do not take a stance on how families with different narratives will respond to changes in their economic conditions.

Also related is recent work in economics that seeks to identify important dimensions along which preferences and ideologies differ. For instance, Enke (2019) argues that societies vary in kinship tightness, with associated differences in moral values; and Draca and Schwarz (2018) suggest that voters differ ideologically in their trust in institutions. Notably, as we briefly discuss in the conclusion, our empirical classification of families correlates with Enke (2019)’s classification of kinship.<sup>6</sup>

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<sup>5</sup>Lakoff suggests that American conservatives largely adhere to the strict father model while liberals largely adhere to the nurturant parent model. In related work, Cahn and Carbone (2010) contrast “red families” with “blue families.”

<sup>6</sup>Another related paper is Bandiera et al. (2020), which classifies CEOs according to their management style.

Finally, we contribute to a growing literature that explores the impact of narratives on various aspects of the economy (see, for instance, Akerlof and Shiller, 2015, Morson and Schapiro, 2017, Shiller, 2017, Bénabou et al., 2018, Mukand and Rodrik, 2018, Michalopoulos and Xue, 2019, Eliaz and Spiegler, 2020, and Kets and Sandroni, 2020). The relationship between narratives and the family is only beginning to be explored. Most related to us is Hoff et al. (2020), who show that performances by an Indian theater group (*Jana Sanskriti*)—which aims to promote female empowerment—reduce spousal abuse and increase women’s role in household decision-making. To our knowledge, our paper is the first to explore theoretically how narratives affect the family.

We open the paper by documenting some stylized facts that serve as motivation for our analysis. Specifically, we show that families tend to come in different types in the sense that their behaviors (and beliefs) bundle together into rather specific packages. We then construct our model in steps, by gradually adding complexity to the family’s objective and choice set. As we add more complexity, we obtain a richer bundle of behaviors for each family type. Throughout our analysis, we interweave our theoretical results with empirical applications.

Because we aim to be parsimonious, our model cannot possibly capture the full heterogeneity in peoples’ thinking, and in particular we do not wish to suggest that all families we term “traditional”—or all families we term “modern”—think the same or are fully captured by our model.<sup>7</sup>

## II. Family Types

This section, for motivation, presents a stylized fact: family behaviors and beliefs tend to bundle together into specific packages.

Table 1 presents the results of a simple exercise: using data from the General Social Survey (GSS), years 1977 to 2016, we apply an unsupervised learning algorithm to classify Americans into two types.<sup>8</sup> We use two attitudinal questions to cluster respondents. These questions respectively concern views on premarital sex

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<sup>7</sup>Note also that our exercise is purely positive: the aim is not to pass judgments.

<sup>8</sup>Two types alone will, of course, not capture the full heterogeneity in peoples’ attitudes and behaviors; but it does expose that these characteristics tend to come in packages.

**Table 1: Classification Exercise (GSS)**

Variable	(1)	(2)
	Modern (average)	Traditional – Modern (average)
Sex before marriage: always wrong <sup>†</sup>	-0.661	1.924***
Better for man to work, woman tend home: strongly agree <sup>†</sup>	-0.274	0.796***
Being a housewife as fulfilling as paid work: strongly agree	-0.103	0.315***
Bad marriage better than none at all: strongly agree	-0.083	0.227***
Homosexual sex relations: always wrong	-0.333	0.933***
Can people be trusted: can't be too careful	-0.024	0.071***
Should children be obedient or think for themselves: obedient	-0.176	0.491***
Favor spanking to discipline child: strongly agree	-0.110	0.328***
Ever married <sup>‡</sup>	0.720	0.136***
Age when first child born <sup>‡</sup>	24.265	-0.795***
Percentage of same gender in occupation <sup>‡</sup>	0.678	0.036***
Have gun in home <sup>‡</sup>	0.391	0.066***

GSS respondents are classified as modern or traditional using the k-means algorithm (see Online Supplement for further details). Questions used to cluster are marked with <sup>†</sup>. All variables without <sup>‡</sup> have been standardized. Response after the colon (:) corresponds to the largest numeric value of the variable. Standard errors are heteroskedasticity robust. \*\*\* 0.01, \*\* 0.05, \* 0.1.

and whether men should work and women should tend home.<sup>9</sup>

We term the first type of individual “traditional” and the second type “modern.” On average, traditional types are less accepting than modern types of premarital sex and are more likely to believe that men should work and women should tend home (the difference between types is 1.9 and 0.8 standard deviations respectively). Being a traditional type predicts a variety of other beliefs: for instance, these types are more likely to believe that a bad marriage is better than none at all, that gay marriage is wrong, that children should be obedient rather than think for themselves, and that people cannot be trusted. Type is also predictive of behavior. For example, traditional types are more likely to be married, to have children at a young age, to be in gendered professions, to favor spanking their kids, and to own guns; and traditional women are 38.7 percent more likely than modern women to be housewives (p-value 0.000).<sup>10</sup> Over the past four decades, traditional types have become less prevalent: they constituted only 26 percent of families in 2016 compared to 44 percent in 1977.<sup>11</sup>

Table 2 performs a similar clustering exercise using World Value Survey (WVS)

<sup>9</sup>For an extended version of Table 1 and a version with various controls, see Tables S.1 and S.3 in the Online Supplement.

<sup>10</sup>See Table S.4 in the Online Supplement.

<sup>11</sup>See Figure A.1 in the Appendix.

**Table 2: Classification Exercise (WVS)**

Variable	(1) Modern (average)	(2) Traditional – Modern (average)
If jobs are scarce, men have more right: agree <sup>†</sup>	-0.480	0.783***
Being a housewife as fulfilling as paid work: agree strongly <sup>†</sup>	-0.117	0.188***
Prostitution: never justifiable <sup>†</sup>	-0.783	1.269***
Divorce: never justifiable <sup>†</sup>	-0.821	1.343***
Homosexuals as neighbors: would not like <sup>†</sup>	-0.631	1.030***
Sex before marriage: never justifiable	-0.728	1.202***
Homosexuality: never justifiable	-0.778	1.263***
Most people can be trusted: can't be too careful	-0.104	0.168***
Unmarried couples as neighbors: would not like	-0.313	0.543***
Woman as a single parent: disapprove	-0.381	0.613***
Obedience in children: important	-0.150	0.244***
Independence in children: important	0.115	-0.183***
Ever married <sup>‡</sup>	0.624	0.090***
How many children do you have <sup>‡</sup>	1.591	0.481***

WVS respondents are classified as modern or traditional using the k-means algorithm (see Online Supplement for further details). Questions used to cluster are marked with <sup>†</sup>. All variables without <sup>‡</sup> have been standardized. Response after the colon (:) corresponds to the largest numeric value of the variable. Standard errors are heteroskedasticity robust. \*\*\* 0.01, \*\* 0.05, \* 0.1.

data that spans 90 countries. The two types (“traditional” and “modern”) closely resemble their US counterparts and, as before, a respondent’s type predicts numerous attributes. We also observe substantial cross-country variation in prevalence of types. For example, the percentage of modern types is 92.4% in Sweden, 65.3% in the US, 47.3% in Chile, and just 0.7% in Jordan. For the full list of countries, see Table A.1 in the Appendix.<sup>12</sup>

Notable is not just the existence of bundles, but also the fact that seemingly unrelated behaviors—such as high marriage rates and spanking, or opposition to same-sex marriage and gun ownership—frequently go together. We shall argue that one can make sense of both the existence of bundles and their contents by bringing an additional term into the family’s objective. Our model, to our knowledge, is the first formal attempt to explain these patterns.

<sup>12</sup>For an extended version of Table 2, see Table S.2 in the Online Supplement.

### III. Model

We begin with a simple model, which will be progressively expanded as the paper unfolds. By design, our results will initially be very close to our assumptions, though this distance will grow as we introduce more elements. A family must choose a job for each of its  $N \geq 2$  members. A job is described by its wage  $w$ , with job  $w = 0$  representing “no work.” Family members are equally capable, each qualified to work any job in the interval  $[0, w_{\max}]$ .<sup>13</sup> Let  $w_i$  denote the job selected for family member  $i$ ; let  $\bar{w}$  denote the average wage within the family; and let  $w_0$  denote per capita unearned income. Income is split equally across family members, so each one receives  $\bar{w} + w_0$ ; and income is devoted entirely to consumption.

The choice of jobs results in an “outcome”  $V_i$  for each member. This outcome has two components:

$$V_i = \underbrace{u(\bar{w} + w_0)}_{\text{consumption utility}} + \underbrace{S(w_i)}_{\text{story utility}},$$

where  $u(\cdot)$  is increasing and strictly concave and  $S(\cdot)$  comes from the family’s story. Thus, we take the view that stories are a source of utility, and in particular, they provide meaning to each occupation.<sup>14</sup> For most of our analysis, we treat the family’s story as exogenously given.

We assume that family members fully internalize each other’s outcomes. Thus, the family’s objective is to maximize the average outcome:

$$\bar{V} = u(\bar{w} + w_0) + \bar{S},$$

where  $\bar{S}$  denotes the average value of  $S(w_i)$ . Observe that  $\bar{V}$  depends upon the family’s job selection only through the average wage  $\bar{w}$  and average story utility  $\bar{S}$ .<sup>15</sup>

For a given story of interest, we solve the family’s problem in two steps:

1. Obtain the family’s “production-possibility frontier” (PPF) by finding the max-

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<sup>13</sup>We make this assumption in order to emphasize that the differences in individual roles that arise in our model do not stem from differences in capabilities.

<sup>14</sup>Story utility differs from a standard Beckerian commodity because it is a side effect of the family members’ occupational decisions, rather than something family members produce directly.

<sup>15</sup>If we eliminate story utility from our model, it becomes a Becker-style model in which all forms of production are fully substitutable.



imum achievable value of  $\bar{S}$  for every value of  $\bar{w}$ .

2. Find the point  $(\bar{w}, \bar{S})$  on the PPF that maximizes  $\bar{V}$ .

We shall begin by solving this baseline model under two alternative stories: the “protector narrative,” which will give rise to a type of traditional family (Section IV), and the “fulfillment narrative,” which will give rise to a type of modern family (Section V). Each story will be captured by a different function  $S(\cdot)$ .

We will then add further elements to the model in order to obtain a rich bundle of behaviors for each family type. In particular, we will show how gender norms are shaped by the narrative (Section VI), derive implications for marriage (Section VII), and explore how the narrative influences the toughness of family members and the allocation of authority within the household (Section VIII).

Our two stories are meant to capture prominent narratives that are widely studied in disciplines such as sociology, anthropology, and political science. While in practice, there are many narratives, we focus on just these two as a starting point and because, as we shall argue, they serve to make the case for bringing narratives into economic theory.

## IV. The protector narrative

Here we put forward our first story: the “protector narrative.” Informally, it goes as follows:

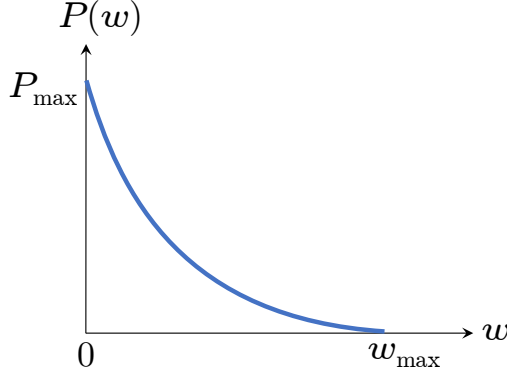
*Purity (lack of corruption) is valuable and worthy of protection. The world is a dangerous place, full of corrupting influences.*

Narratives concerning purity and pollution are widespread and well studied (see Douglas (1966) and Kristeva (1980) for seminal treatments, and Haidt (2012) for a discussion of the relationship between purity and morality). Virtually every culture has specific ideas of what is “dirty” (some related to health, others quite arbitrary) as well as rituals and prescriptions for avoiding contamination. Sources of pollution may include sexual contact, immoral acts (e.g. treason or murder), which are often seen as “stains,” exposure to “untouchable” individuals, and certain forms of knowledge.<sup>16</sup>

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<sup>16</sup>For Kristeva (1980), notions of pollution are closely linked to a distinction between “self” and “other.” Thus, both bodily secretions and individuals outside one’s group can be considered impure.

**Figure 1: The Purity Function**



Purity may be protected, for example, by avoiding the opposite sex, maintaining virginity, veiling, adopting a restricted diet, or remaining ignorant of certain aspects of the world.

Formally, we shall equate story utility with purity and let  $P(w)$  denote the purity associated with each job  $w$ , so that member  $i$ 's outcome is  $V_i = u(\bar{w} + w_0) + P(w_i)$ . In order to obtain concrete predictions, we shall postulate a particular shape for the  $P$  function, namely, that it is decreasing and convex ( $P' < 0, P'' > 0$ ), as illustrated in Figure 1. (We normalize the minimum achievable purity to zero and denote the maximum achievable purity by  $P_{\max}$ .)  $P' < 0$  captures the idea that, holding constant an individual's human capital, and after removing jobs that are not on the purity-wage frontier, higher salary jobs involve greater exposure to "corrupting elements" (e.g. members of the opposite sex, knowledge, foreign cultures).  $P'' > 0$  captures the idea that even small degrees of exposure might be highly damaging. In the Garden of Eden story, for instance, innocence is lost after just a single bite of the forbidden fruit. Our best evidence for this exact shape, however, will only be indirect, based on the predictions it produces.

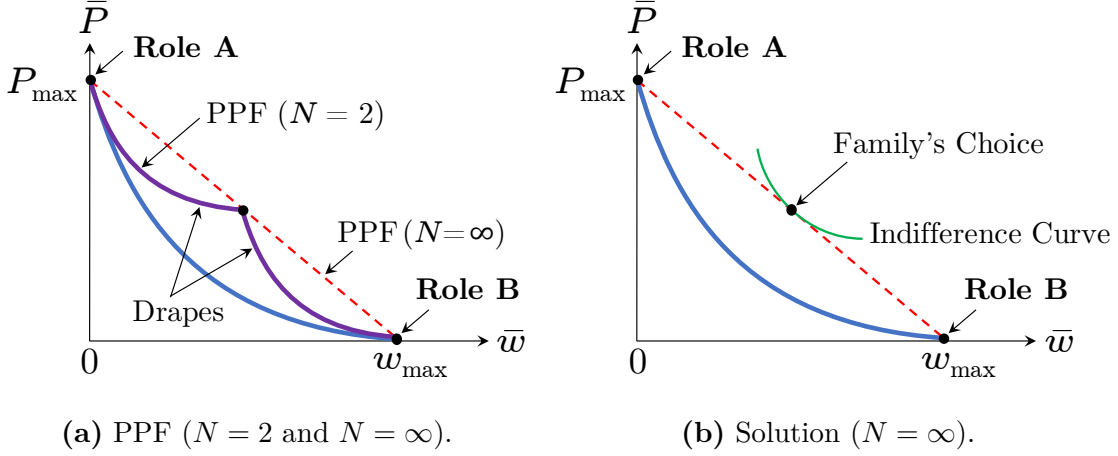
#### *A. Occupational Choice under the Protector Narrative*

Under the protector narrative, the family's problem is to maximize:

$$\bar{V} = u(\bar{w} + w_0) + \bar{P},$$

where  $\bar{P}$  is the average value of  $P(w_i)$ . We are now ready to solve this problem.

**Figure 2: PPF and Family's Choice**



*Step 1: Obtaining the family's PPF.* When the family is large ( $N = \infty$ ), the PPF is simply the line segment connecting the two extreme points of the purity function (i.e. the concavification of the function), as depicted in Figure 2(a). The family reaches this frontier by splitting its members between two extreme roles: a high-purity/low-wage role (A) and a low-purity/high-wage role (B). Intuitively, given that purity is roughly all-or-nothing, exposure to a higher-wage job has diminishing costs. Consequently, it is best to concentrate all exposure on a subset of family members and keep the remainder maximally pure.

When instead  $N$  is finite the PPF consists of a series of “drapes” (see again Figure 2(a)). To derive it, notice that because exposure has diminishing costs, the family will still assign *at least*  $N - 1$  family members to the extreme roles A and B. Thus, we can trace the PPF by gradually moving members, one at a time, from Role A to Role B.<sup>17</sup> As  $N$  grows, the number of drapes grows and the PPF more-and-more closely resembles the  $N = \infty$  case.

Going forward, we shall focus on the simpler  $N = \infty$  case with the understanding that it merely approximates the more realistic finite case. This simplification helps improve the exposition and, fortunately, does not have any meaningful impact on our predictions.

*Step 2: Finding the optimal point on the PPF.* Once we focus on the  $N = \infty$  case,

<sup>17</sup>When  $N = 2$ , for instance, we begin by assigning both family members to Role A. Next, leave member 1 in Role A and gradually raise the wage of member 2 until that member reaches Role B. This traces the first drape of the frontier. Finally, leave member 2 in Role B and gradually raise the wage of member 1. This traces the second drape.

the family’s problem boils down to choosing the split of its members between the two extreme roles. Provided the optimal split is interior, it equates the slope of the PPF with the marginal rate of substitution between the two goods, as illustrated in Figure 2(b). In particular, letting  $\mu$  denote the optimal fraction of family members in Role B, we obtain:<sup>18</sup>

$$\mu = \frac{1}{w_{\max}} \left[ (u')^{-1} \left( \frac{P_{\max}}{w_{\max}} \right) - w_0 \right].$$

Note that families with higher endowments focus more on purity and less on bread-winning ( $\mu$  is decreasing in  $w_0$ ).

### B. “Separate Spheres”

Although gender is currently absent from the model, for reasons that will become clear in Section VI, there is a strong tendency for roles to become gendered. Thus, this simple model helps us understand an ideology that has held sway in many societies, over many time periods: that women and men should occupy separate spheres. A woman’s “proper place,” according to this view, is the domestic sphere while a man’s is the public sphere. In the United States, the separation of spheres became more pronounced in the nineteenth century, fueled in part by this ideology and in part by the Industrial Revolution, which led to a rise of work outside the home.<sup>19</sup>

A critical component of the ideology—termed the “cult of domesticity” by historians—is that women should be embodiments of virtue: pious, chaste, and innocent even to the point of being childlike. Women, in other words, are supposed to occupy Role A. According to Welter (1966), “the nineteenth-century American man was a busy builder of bridges and railroads, at work long hours in a materialistic society...he occasionally felt some guilt that he had turned this new land...into one vast countinghouse. But he could salve his conscience by reflecting that he had left

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<sup>18</sup>To see why, notice that the slope of the PPF is  $-\frac{P_{\max}}{w_{\max}}$  and the marginal rate of substitution is  $-\frac{\partial \bar{V}/\partial \bar{w}}{\partial \bar{V}/\partial P} = -u'(\bar{w} + w_0)$ . Therefore, the optimum is interior whenever  $u'(w_0) > \frac{P_{\max}}{w_{\max}} > u'(w_{\max} + w_0)$ . Moreover, in any interior solution,  $\bar{w} = (u')^{-1} \left( \frac{P_{\max}}{w_{\max}} \right) - w_0$ . The result then follows from the observation that  $\mu = \frac{\bar{w}}{w_{\max}}$ .

<sup>19</sup>See Welter (1966) and Cott (1977).

**Figure 3: 1959 Bell Telephone Advertisement**



behind a hostage not only to fortune, but to all the values which he held so dear and treated so lightly. Woman...was the hostage in the home.”<sup>20</sup>

The idea of separate spheres remained widespread in 1950s America. The post-war boom, according to Cherlin (2014), meant that many working-class families were able to “attain the middle-class ideal of the male-breadwinner family: husbands doing most of the earning, and wives focusing on homemaking, child-rearing, and emotional support.”<sup>21</sup> This ideal was widely depicted in television shows, such as “Leave it to Beaver” and “Ozzie and Harriet,” as well as magazine advertisements (see Figure 3).

### *C. Comparison with a Labor-Leisure Model*

Note that, mathematically, the model we have presented thus far is equivalent to a Beckerian model where family members specialize into “market production” and “leisure production.” Two points are worth making. First, protector-narrative families divide into distinct roles—breadwinner and homemaker—because they hold a particular, subjective story, rather than because of a more fundamental preference for leisure. Thus, by varying the story, we will be able to account for heterogeneity across families in the extent of role division. Second, in our telling, Role A’s do not enjoy having idle time; in fact, absent purity motives, they would choose to work *more*. This difference in interpretation will become more and more consequential as we add greater richness to the family’s problem.

Our interpretation fits with Betty Friedan’s depiction of the 1950s housewife in

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<sup>20</sup>Welter (1966), p. 151.

<sup>21</sup>Cherlin (2014), p. 1.

*The Feminine Mystique*. She describes, in particular, a widespread affliction (“the problem that has no name”): many American housewives, despite being married with children, living in material comfort, and having plenty of free time, felt dead inside. Among the upper-middle class women she interviewed, she found that a surprising number had been hospitalized for depression, took tranquilizers, or had attempted suicide. In Friedan’s view, these women were suffering from a lack of meaningful work. As one older woman put it to her: “I think it would be the most wonderful thing in the world to work, to be useful. But I don’t know how to do anything. My husband doesn’t believe in wives working.”<sup>22</sup>

#### *D. Protected Occupations*

Some occupations in the economy, such as working on a family farm or teaching in an elementary school may be attractive, in part, because they involve particularly low levels of exposure. At the same time, these occupations may not pay especially well. To formally capture this possibility, suppose family members have access to two types of jobs, “regular” and “protected” (see Figure 4(a)). We assume that protected jobs are less damaging to purity but also have a lower maximum wage ( $w_L$  as opposed to  $w_{\max}$ ).

Each family member now faces an (effective) purity function equal to the upper envelope of the original two. As a result, depending upon the relative attractiveness of the two types of jobs, the family’s PPF is either: a single line segment connecting Roles A and B, as before; or two line segments, one connecting Roles A and A’, and the other one connecting Roles A’ and B, as depicted in Figure 4(b). In the former case, protected jobs are irrelevant and family members are split between Roles A and B, as in the baseline model; in the latter case, they are either split between Roles A and A’, or A’ and B, depending on the family’s preferences.

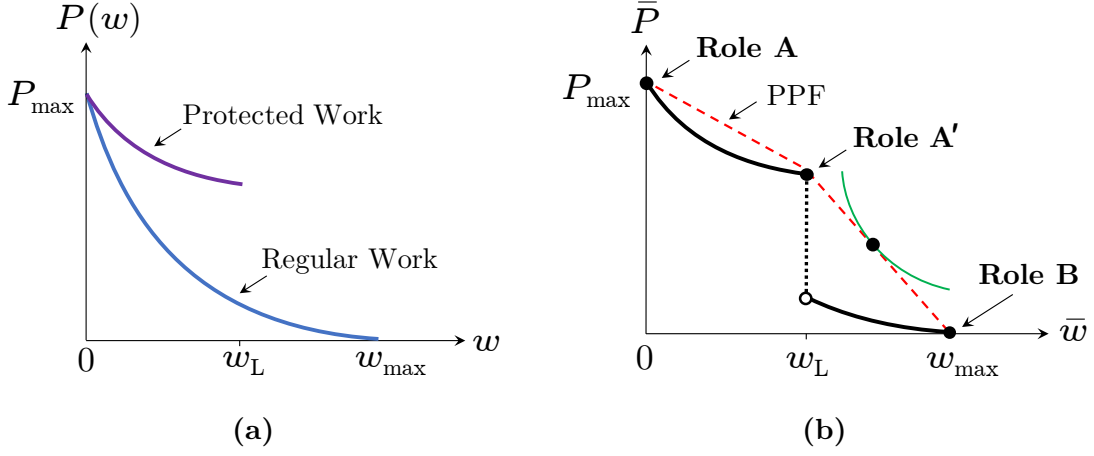
The new Role A’ (a “protected worker”) is a compromise between purity and income. This role emerges when either protected work is sufficiently appealing (i.e. either  $w_L$  or  $P(w_L)$  are high), or regular work is sufficiently unappealing (i.e. either  $w_{\max}$  or  $P(w_{\max})$  are low), or some combination of the two.

Broadly speaking, we can think of “protected work” as work, or other valuable activities, carried out under a set of restrictions, such as working only with children

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<sup>22</sup>Friedan (1963), p. 257.

Figure 4: Protected Occupations



or with people of the same sex. An important example of such a restriction is wearing a veil. We shall discuss this practice in Section VIII.

## V. The fulfillment narrative

We now put forward our second story: the “fulfillment narrative.” Informally, it goes as follows:

*Fulfilling individual desires is important. The world is full of opportunity.*

This narrative shifts emphasis away from ideas of purity and corruption; instead, it encourages the pursuit of individual desires and views the outside world as a place where these desires can be fulfilled. At a deeper level, this narrative emphasizes “naturalness” over “purity.” Desires, being part of one’s nature, are seen as valid.<sup>23</sup>

Scholars argue that, in the United States, this type of narrative shot to prominence in the 1960s and was the impetus behind the period’s countercultural movements, including the Women’s Movement and the Hippie Movement. This period marked the rise of “late modern” or “post-modern” thought, which emphasized personal expression over acting out socially imposed roles (see Bellah et al., 1985. Gid-

<sup>23</sup>The protector narrative takes the opposite view of human nature. For instance, in St. Augustine’s interpretation of the Garden of Eden story, man’s very nature is corrupted by Adam and Eve’s original sin: a schism (“concupiscence”) opens between what man naturally longs for and what is virtuous. Thus, man’s nature must be denied.

dens, 1991, Bauman, 1992, and Beck and Beck-Gernsheim, 2002).<sup>24</sup> Psychotherapists, for instance, drawing on the work of Carl Jung, Donald Winnicott, and Erik Erikson, encouraged “self realization” and the search for one’s “true self.”

Friedan, a student of Erikson’s, ignited the Women’s Movement with *The Feminine Mystique*. In her thinking, rather than being boxed into a homemaker role, women needed to be free to find their true selves through careers—and thereby obtain a measure of fulfillment. The Hippie Movement, likewise, encouraged people to get in touch with their true natures. Hippies saw traditional roles (A and B) as “square.” They invited people to eschew the rat race, engage in artistic and sexual experimentation, harmonize with nature, engage in communal living, and use recreational drugs.<sup>25</sup>

In recent years, notions of fulfillment have fueled the rise of “workism”—particularly among the rich and college-educated. Mirroring Friedan, workism emphasizes career as the primary source of identity and meaning in one’s life. As noted by Derek Thompson (2019) in *The Atlantic*, rich college-educated millennials “are reared from their teenage years to make their passion their career and, if they don’t have a calling, told not to yield until they find one.” Consequently, in the words of Robert Frank (2007), “for many of today’s rich there is no such thing as ‘leisure’ in the classic sense—work is their play.”<sup>26</sup>

Because jobs differ in their opportunities for fulfillment, this type of narrative has important consequences for career choice. There are a variety of views regarding the aspects of an occupation that matter most for fulfillment. For Friedan, fulfillment is closely related to professional achievement; for the hippies, it derives more from personal enrichment, social impact, and enjoyment; and for some millennials it may

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<sup>24</sup>Bellah et al. (1985) contrast an older form of American individualism (“utilitarian individualism”), which emphasized the pursuit of materialistic ends, with a newer form—ascendant in the 1960s—that placed emphasis on self discovery. Benjamin Franklin, with his expression “early to bed and early to rise makes a man healthy, wealthy, and wise,” is emblematic of utilitarian individualism while the writings of Emerson, Whitman, and Thoreau are early examples of the latter form.

<sup>25</sup>Steven Spielberg’s classic 1977 film *Close Encounters of the Third Kind* dramatizes the challenge that the fulfillment narrative poses to the traditional 1950s-style family. It tells the story of Roy Neary, an unhappily married father of three who, like Friedan’s housewives, feels trapped in a role that does not suit him. A unique-looking mountain that Neary becomes obsessed with after a close encounter with a UFO is the symbol for his unfulfilled desires. Neary’s decision to build a replica of the mountain in the family’s living room, out of dirt from the garden, represents his embrace of his desires—and its polluting effect on the home.

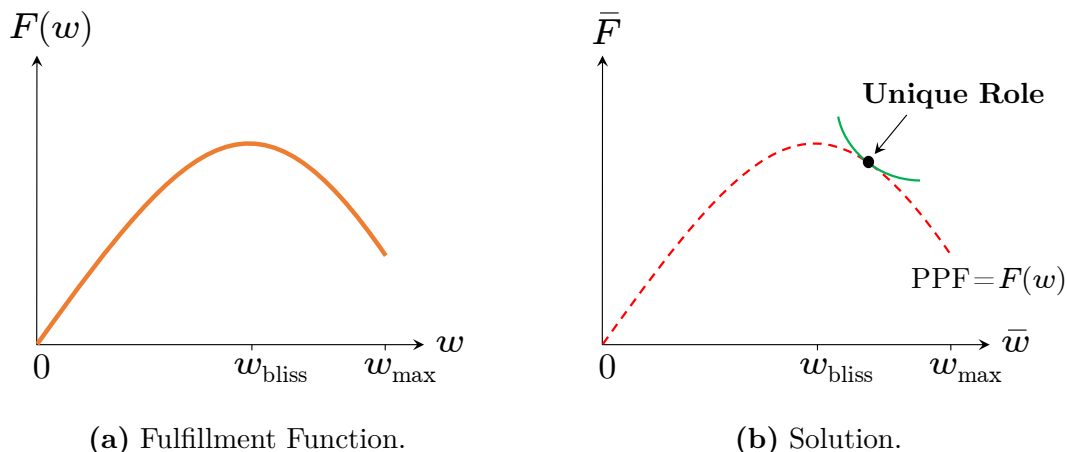
<sup>26</sup>Indeed, the richest married men (those in the top decile) had the shortest workweek in 1980 but, by 2005, had the longest (see McGrattan and Rogerson, 2008).



be a combination of all of these factors. Regardless, some form of work or engagement with the world is necessary to be fulfilled; at the same time, a remunerative career, in and of itself, lacks meaning. The pursuit of fulfillment therefore rationalizes a woman's choice of a legal career over marrying young and having children, or a college graduate's choice of an academic career over a more lucrative one.

In terms of the model, we equate story utility with fulfillment, denoted  $F(w)$ , and postulate a specific shape for this function: that it is concave with an inverse-U form, as shown in Figure 5(a). The increasing portion of  $F(w)$  captures the idea that an occupation is important for fulfillment. The decreasing portion reflects the idea that the most lucrative occupations are not typically the most fulfilling.<sup>27</sup> As was the case for the purity function, our best evidence for this exact type of fulfillment function is only indirect, based on the predictions it produces.

**Figure 5: Occupational Choice under the Fulfillment Narrative**



### A. Occupational Choice under the Fulfillment Narrative

Under the fulfillment narrative, the family's problem is to maximize:

$$\bar{V} = u(\bar{w} + w_0) + \bar{F},$$

where  $\bar{F}$  is the average value of  $F(w_i)$ .

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<sup>27</sup>As we shall see, it is not essential for our conclusions that  $F(w)$  is everywhere concave or that it has a decreasing portion.

As shown in Figure 5(b), the family’s PPF is equal to the fulfillment function (since it is already concave). The family reaches any given point  $(\bar{w}, \bar{F})$  on the frontier by assigning all family members to the same intermediate-wage role. Thus, provided the solution is interior, the optimal (single) role solves the following first-order condition:<sup>28</sup>

$$F'(\bar{w}) = -u'(\bar{w} + w_0).$$

Observe that the optimal role has a positive wage ( $\bar{w} > 0$ ): there is no reason to assign family members to job  $w = 0$ , which is both less fulfilling and less lucrative than intermediate-wage jobs. This positive wage may literally represent money, but it may also represent some other commodity valued by the family, such as acquiring knowledge.<sup>29</sup>

## B. “Individualized Marriage”

Consistent with this simple prediction, the institution of marriage in the United States has been changing in tandem with the rise of the fulfillment narrative. The early- to mid-twentieth century’s dominant form of marriage, which Cherlin (2009) calls “companionate,” is being replaced by a more egalitarian form, which he calls “individualized,” where husbands and wives occupy similar roles. In an influential study, Cancian (1987) examines how the marital advice in magazines such as *McCall’s* and *Ladies’ Home Journal* has changed. With increasing frequency, she argues, this advice has emphasized individual fulfillment and role flexibility: “Through most of the twentieth century, there has been a trend towards more fluid, androgynous family roles and more involvement in self-development and personal life. Americans have become more concerned with individual happiness and pleasure, more tolerant of alternative life styles, more committed to equality for women and men.”<sup>30,31</sup>

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<sup>28</sup>If  $u'(w_{\max} + w_0) + F'(w_{\max}) > 0$ , then the optimal wage is  $w_{\max}$ .

<sup>29</sup>If  $F(w)$  was not everywhere concave, mixing might take place between more fulfilling and more lucrative jobs; but, importantly, all family members still have an occupation.

<sup>30</sup>Cancian (1987), p. 30.

<sup>31</sup>One indicator of American marriages becoming more egalitarian is men doing more of the housework (see Kan et al., 2011).

## VI. Gender Norms

There is an extensive literature suggesting that gender norms—and even our very conceptions of gender—are, to a large extent, socially constructed (for a survey, see Cherlin, 2017, Chapter 3). As such, gender norms differ across and within societies, and they change over time.<sup>32</sup>

Here we begin to enrich our model by incorporating the impact of norms. We first take norms as given and explore how they affect the family’s decisions; we then endogenize them and argue that narratives play a critical role in determining these norms.

For modeling purposes, we restrict to the case of binary gender identities (“male” and “female”) and abstract away from any biological differences across individuals. We take as our primitive assumption that individuals have a desire to “fit” their respective genders. Therefore, if a particular activity is perceived of as “male,” men will have a desire (at the margin) to engage in that activity and women will have a desire (at the margin) to shy away from it. This assumption is standard in the economic literature on identity (see Akerlof and Kranton, 2000). To endogenize gender norms, we further assume that activities are perceived of as more “male” (“female”) when more men (women) engage in them.

This enriched model will make two core predictions. First, protector families will assign genders to roles according to a pecking order; by contrast, fulfillment families will follow no such order as all members occupy fundamentally the same type of intermediate-wage role. Second, in equilibrium, gender norms will be stronger—and gender differentiation greater—in protector families than in fulfillment ones.

### A. *Modeling Gender Norms*

Suppose that in addition to caring about consumption and story utility, the family cares about the “gender fit”  $\Phi_i$  of each of its members. To capture the idea that fit

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<sup>32</sup>Within economics, there is a large literature showing that gender norms differ across societies and profoundly shape behavior, influencing for example, competitiveness (e.g. Niederle and Vesterlund, 2007; Gneezy et al., 2009), education (e.g. Guiso et al., 2008; Carlana, 2019; Dossi et al., 2019), self-confidence (e.g. Bernaldo et al., 2019), labor force participation (e.g. Algan and Cahuc, 2007; Bursztyn et al., 2020), and entrepreneurship (e.g. Field et al., 2010). See Giuliano (2018) and Bertrand (2020) for reviews.

is both about being *like* one's own gender and *unlike* the opposite gender, we set

$$\Phi_i = - \underbrace{\frac{1}{2} (w_i - W_i)^2}_{\text{distance from own gender}} + \underbrace{\frac{1}{2} (w_i - W_{-i})^2}_{\text{distance from opposite gender}},$$

where  $W_i$  denotes the average wage in the broader population of people of the same gender as  $i$  and  $W_{-i}$  denotes the average wage of people of the opposite gender.

Assuming the broader population is half male and half female, this gender fit simplifies to:

$$\Phi_i = \Delta_i \cdot w_i - \Delta_i \cdot W,$$

where  $\Delta_i = W_i - W_{-i}$  is defined as the gender wage differential from the perspective of person  $i$  and  $W$  is defined as the average wage in the overall population. Notice the following properties:

1.  $\Phi_i$  is linear in  $w_i$ . As a result, in contrast to  $S(w_i)$ , gender fit does not add concavity/convexity to the family's objective.
2.  $\Phi_i$  is increasing in  $w_i$  for the gender with the higher wage ( $\Delta_i > 0$ ) and decreasing in  $w_i$  for the gender with the lower wage ( $\Delta_i < 0$ ). Hence, any non-zero wage differential motivates family members to specialize along gender lines.
3. The marginal impact of  $w_i$  on  $\Phi_i$ , which measures the strength of gender norms, depends only on the gender wage differential. As this differential grows, norms become stronger and family members are under greater pressure to specialize along gender lines.

Observe that the behavior that maximizes gender fit is extreme in nature. For instance, assuming men earn more than women, their gender fit is greatest when they earn the maximum possible amount ( $w_{\max}$ ) rather than the average amount for their gender. This constitutes a drive towards hyper-masculinity and femininity, and may in practice apply to other features besides earnings.

The outcome  $V_i$  of each family member is now:

$$V_i = \underbrace{u(\bar{w} + w_0)}_{\text{utility from consumption}} + \underbrace{S(w_i)}_{\text{utility from story}} + \underbrace{\lambda \cdot \Phi_i}_{\text{gender fit}},$$

where the parameter  $\lambda \geq 0$  denotes the importance of gender fit. We will refer to

the sum of the second and third terms as “net story utility.”

## B. *Single Family’s Problem*

Consider a family that takes the wage differential in the overall population as given and best responds to it. For concreteness, we assume that males earn more than females on average so the male-female wage differential, denoted  $\Delta$ , is positive.

*Protector Narrative.* Figure 6(a) plots the purity function ( $P(w)$ ) and the “net purity functions” ( $P(w) + \lambda \cdot \Phi_i(w)$ ) for each gender. Notice that the net purity functions are rotations of  $P(w)$  (clockwise for women and counter-clockwise for men). Figure 6(b) depicts gender-specific PPFs (i.e. PPFs for families where all members are the same gender) as well as the PPF for a generic family composed of both men and women.<sup>33</sup>

As before, the family splits its members between Roles A and B. In addition, because of its desire to adhere to gender norms, it follows a *pecking order* in the assignment of roles, whereby women are assigned to Role A before men and men are assigned to Role B before women.

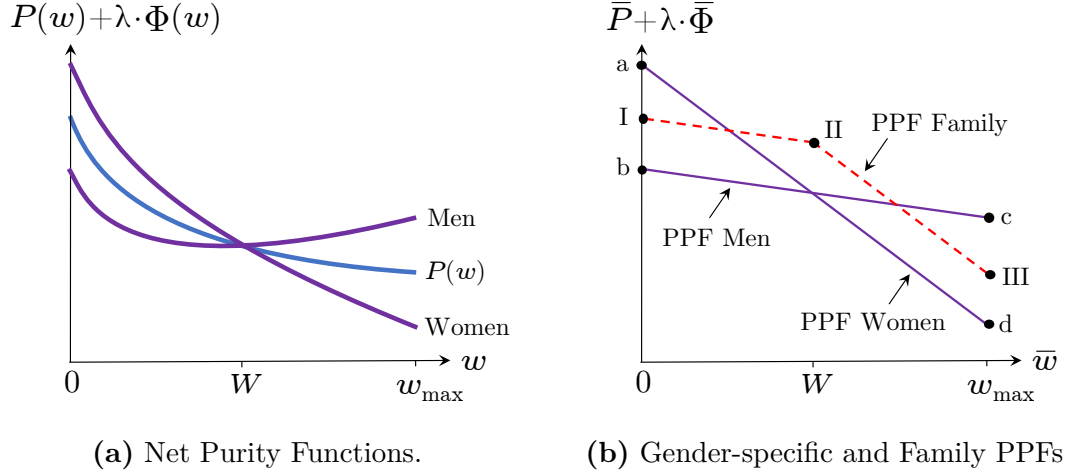
This model is akin to a Ricardian trade model where each gender represents a country and a planner wishes to maximize the average welfare of the two countries. In this model, men have a comparative advantage at wage production while women have a comparative advantage at purity production. Because of these comparative advantages, men are assigned to Role A only after every woman has been assigned to Role A, and women are assigned to Role B only after every man has been assigned to Role B.

Observe that point II on the PPF, where there is a perfect gender split across roles, is a kink point. Thus, because of bunching, a significant fraction of families may opt to assign all women to Role A and all men to Role B.

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<sup>33</sup>The generic family PPF is traced as follows. First, assign all members to Role A. This delivers point I, which is a weighted average of points a and b on the gender-specific PPFs. The weights are determined by the fractions of men and women in the family. Next, gradually move men from Role A to B until all men are assigned to Role B. This traces the line segment connecting points I and II. Point II on the PPF is a weighted average of points a and c on the gender-specific PPFs. Finally, gradually move women from Role A to Role B, until all family members are assigned to Role B. This traces the line segment connecting points II and III. Point III is a weighted average of points c and d on the gender-specific PPFs.

**Figure 6: Gender Norms and the Protector Narrative**

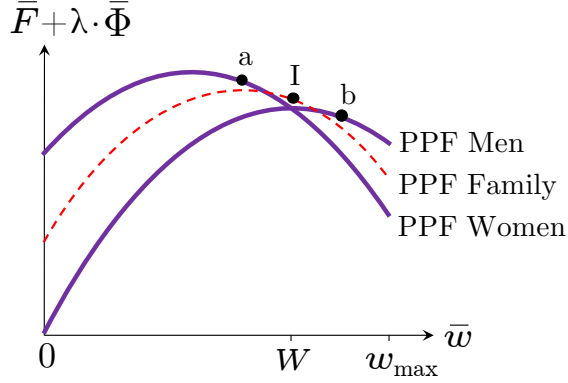


Observe also that, because of the pecking order, the death of a husband (or, more generally, a decline in the family's male share) constitutes a negative income shock and a positive purity shock. Consequently, the family optimally reacts by assigning (weakly) more women to Role B. Assigning women to Role B is not without cost, however, as it violates gender norms. In line with this idea, many traditional societies make special allowances for widows. For instance, in Medieval Europe, while women were not normally permitted to enter guilds, an exception was made for widows wishing to take the place of deceased husbands (referred to as *Witwenprivilegien* in Germany). In early modern Castile, according to De Backer (2010), p.111, "Women regularly set up independent households upon widowhood and took on the duties once accorded their husbands....[They] had enormous potential to wield significant power in Castilian society." Yet the chaste widow devoted to prayer and abstinence was still held up as the ideal (see Bilinkoff, 1999). In his 1523 text *The Instruction of a Christian Woman*, for example, Juan Luis Vives advised women to practice devotion to their husbands even in widowhood: "A good widow ought to suppose that her husband is not utterly dead but liveth both with life of his soul, which is the very life, and beside with her remembrance."<sup>34</sup>

Similarly, the model suggests that a family will be more likely to assign daughters to Role A when it has more male children. This is consistent with the findings of Brenøe (2020), who shows that when a daughter's younger sibling is male, she is

<sup>34</sup>As quoted in Todd (1999), p. 69.

**Figure 7: Gender Norms and the Fulfillment Narrative**



more likely to be brought up to occupy a traditional female role.

*Fulfillment Narrative.* Analogous to the protector case, the “net fulfillment functions” for each gender are rotations of the original  $F(w)$  function. Figure 7 depicts gender-specific PPFs (i.e. PPFs for families where all members are the same gender) as well as the PPF for a generic family composed of both men and women.<sup>35</sup>

As in the protector case, the model is akin to a trade model where each gender represents a country, with its own comparative advantage, and a planner wishes to maximize average welfare. What differs is that we now have concave production frontiers (as in a Heckscher-Ohlin model). Hence, it is optimal to equate the marginal rates of transformation (i.e. the slopes of the PPFs) across genders.

Along the PPF there is some degree of differentiation between the genders—but it is not extreme. Indeed, all family members still occupy the same fundamental role, with each producing a combination of fulfillment and wages. The reason is that, while gender fit considerations push towards gender specialization (with women placing more emphasis on fulfillment and men on earnings), the narrative itself pushes against it.

<sup>35</sup>The gender-specific PPFs are equal to the gender-specific net fulfillment functions (given that the concavification of a concave function is the function itself). Each point on the generic PPF is obtained by taking a weighted average of points of equal slope on the gender-specific PPFs. For instance, point I in Figure 7 is a weighted average of points a and b. (When it is not possible to equate the slopes, at least one gender will be at an extreme.) As a result, the family’s PPF is also concave, with a peak at an intermediate wage.

### C. Population Equilibrium

Here we propose a way to endogenize the wage differential  $\Delta$  and argue that protector societies will be prone to larger differentials—and therefore stronger gender norms—than fulfillment ones.

Suppose there is a large population of identical families and let  $BR(\Delta)$  denote the wage differential that arises inside these families when they best respond to a given population differential  $\Delta$ . An equilibrium differential is any  $\Delta$  such that  $BR(\Delta) = \Delta$ .

Propositions 1 and 2, whose formal proofs are in Appendix B, show that the protector narrative can generate much stronger gender norms. These propositions restrict attention to “stable equilibria” that are robust to small perturbations in  $\Delta$ .<sup>36</sup>

**Proposition 1.** *Suppose all families hold the protector narrative and suppose that, absent gender fit considerations, they choose an interior solution where they assign members to both Roles A and B. Then, every stable equilibrium has a positive wage differential and hence there is pressure to specialize along gender lines.*

In protector societies, a zero wage differential cannot be a stable outcome because, owing to the pecking order, any initial nonzero wage differential in the population (no matter how small) induces a sizable wage differential inside each family, which is then further magnified as families react to it.

**Proposition 2.** *Suppose all families hold the fulfillment narrative and let  $w^*$  denote the optimal wage absent gender fit considerations. Then, there is a stable equilibrium with zero wage differential, and hence zero pressure to specialize along gender lines, provided:*

$$\lambda < -F''(w^*)/4.$$

The inequality in the proposition is met when the curvature of the fulfillment function is large relative to the family’s concern about gender fit  $\lambda$ . This inequality highlights the tradeoff faced by fulfillment families: while gender fit considerations

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<sup>36</sup>To define such equilibria, assume that families live for many periods, with each period representing a generation, and the wage differential at time 0 is  $\Delta_0$ . In each subsequent period, families best respond to the previous period’s wage differential, so that the wage differential at time  $t$  is  $\Delta_t = BR^t(\Delta_0)$ . We then say that an equilibrium  $\Delta^*$  is stable if, for all  $\Delta_0$  close to  $\Delta^*$ , the wage differential converges to  $\Delta^*$  as  $t \rightarrow \infty$ .



push towards gender specialization, the curvature of the fulfillment function pushes towards a common wage for all members. When the second force dominates, families react to small population wage differentials with even smaller differentials of their own. Consequently, a zero wage differential is stable.

Societies might also be composed of both protector and fulfillment families. In such cases, we shall assume that gender norms are narrative-specific: protector families (respectively, fulfillment families) look primarily at the gender wage gap in other protector (fulfillment) families. This captures the idea that people compare themselves most with people they frequently interact with, and that these people tend to share the same narrative (see Section IX for further discussion).

As documented by Goldin (2014), the roles of men and women in the United States appear to be converging. Our finding that gender norms are weaker under the fulfillment narrative, combined with the increasing prevalence of this narrative, may help account for this finding. Below, we present some other results that are consistent with our predictions.

#### *D. Labor Force Participation*

Figure 8 shows the relationship across countries between earning potential (as measured by GDP per person employed) and labor force participation, with a separate panel for each gender. Making use of our WVS clustering exercise, we have sorted countries into three equal-size groups according to their share of traditional types (most traditional, medium traditional, least traditional).

In the most traditional countries (red), for both women and men, labor force participation falls as earning potential grows. Moreover, the fall is much sharper for women than it is for men. This finding is consistent with an income effect, which allows the family to assign more members to Role A as Role B's earn more, in combination with a pecking order, which prioritizes assigning women to Role A. In contrast, in the most modern countries (blue), this negative relationship vanishes (and even becomes positive for women). The lack of a negative relationship is consistent with work being a source of fulfillment for modern families, which makes labor force participation less subject to an income effect.<sup>37</sup>

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<sup>37</sup>The positive relationship for women might be due to the positive correlation between earning potential and a country's share of modern families, as can be seen in Figure 9.

(a) Female.

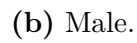
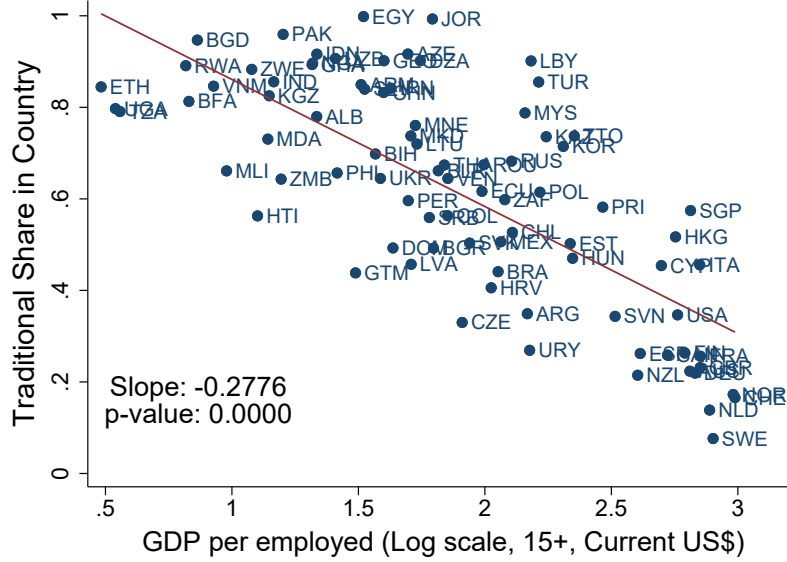


Figure 9: Relationship between Narrative and Income



Observe also that female labor force participation is on average higher in modern countries than in the wealthiest traditional countries. This result is also consistent with our model: in wealthy traditional families women can afford to occupy Role A, whereas in modern families work can be attractive regardless of wealth.<sup>38</sup>

Notably, modern countries tend to be wealthier than traditional ones. This can be seen in Figure 8 and, in greater detail, in Figure 9. We shall return to this point in Section IX, where we consider the endogenization of narratives.<sup>39</sup>

To be sure, a complete discussion of labor outcomes would also need to consider dynamic feedback effects between labor force participation and culture (as suggested by Becker and Murphy, 2009 and Fernández, 2013). While such a discussion is beyond our current scope, our analysis suggests that differences in family types, and the evolution of these types over time, may play an important role in these dynamics.

<sup>38</sup>Bertrand (2020) argues, like we do, that a country's cultural views are correlated with female labor force participation. She finds, in particular, that more sexist countries have lower female labor force participation. Our approach differs in how we measure cultural views and how these views affect not just the level of female labor force participation but also its slope.

<sup>39</sup>As first noted by Boserup (1970) and Goldin (1994), the overall relationship between female labor force participation and income is U-shaped. Figures 8(a) and 9 suggest that taking the narrative into consideration may be useful in accounting for this shape. Goldin (1994) has proposed that, as income rises, women may first work less due to an income effect and then work more due to greater availability of attractive jobs (e.g. those in the service sector). Our model suggests that narratives may also play a role.

### *E. Gender in Professions*

Gender norms in our model arise specifically around earnings; but one can equally imagine them arising around occupations, with some occupations considered more male and others more female.<sup>40</sup>

Table 1 (Section II) showed that traditional individuals are in professions where, on average, more people are of the same gender, which is suggestive of their facing stronger gender norms. To further illustrate this finding, consider nurses in the US. In our GSS sample, the vast majority (95%) are female, and among the small minority of male nurses, the vast majority (90%) are modern. By comparison, only 63 percent of female nurses are modern. At the other extreme, the vast majority of firefighters (84%) are male, and all female firefighters in our sample are modern. In contrast, only 59 percent of male firefighters are modern.

## VII. Marriage

Here we continue to enrich the bundle of behaviors associated with each narrative by considering marriage. Suppose that a pair of individuals who hold the same narrative and have the same earning potential must decide whether to marry. If they do, each receives a payoff of  $\bar{V} + \alpha$ , where  $\bar{V}$  denotes the pair's average outcome and  $\alpha$  denotes an “affinity” payoff. If they instead stay separate, individual  $i$  receives the autarky payoff  $V_i$ . For now, we assume individuals do not care about adhering to gender norms ( $\lambda = 0$ ).<sup>41</sup>

Observe that the pair may choose to marry both because of the affinity term and because of potential gains from specialization. In fulfillment families, where there is a single role and therefore no gains from specialization, marriage takes place if and only if the pair has positive affinity ( $\alpha > 0$ ). By contrast, under the protector narrative, where such gains do exist owing to the existence of different roles, the

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<sup>40</sup>For example, for a protector family, an intermediate-wage job such as a nurse or schoolteacher might be viewed as protected work, making it prone to be female-gendered. By contrast, for a fulfillment family, this same job might simply be viewed as a fulfilling one for both men and women, making it less prone to be gendered.

<sup>41</sup>We do not attempt to model the distinction between marriage and cohabitation. One key difference, of course, is that marriage is a long-term contract (see Matouschek and Rasul, 2008). It is plausible that marriage also involves more internalization of the partner's outcome ( $V_i$ )—or, put differently, more of a common family identity. A benefit of cohabitation may be that it allows a couple to share affinity ( $\alpha$ ) without internalizing each other's outcomes.

affinity threshold for marriage is negative. Proposition 3 summarizes.

**Proposition 3.** *Suppose individuals do not care about gender fit. Then:*

1. *Under the fulfillment narrative, marriage occurs if and only if there is positive affinity:  $\alpha > 0$ .*
2. *Under the protector narrative, provided married individuals adopt an interior solution, the affinity threshold for marriage is less than zero.*

The lower affinity threshold for marriage under the protector narrative is consistent with our empirical finding that traditional individuals have higher marriage rates. In the GSS sample, traditional types are 13.6 percentage points more likely to be married, and in the WVS sample, traditional types are 9 percentage points more likely to be married (see Tables 1 and 2).<sup>42</sup>

Figure 10 shows that husbands and wives have a smaller average age difference in more modern countries. Our model can help explain this finding: under the fulfillment narrative, where affinity is the sole basis for marriage, we would expect to see a smaller average age gap if, as seems likely, age gaps reduce affinity.

In line with Proposition 3, scholars argue that romantic love has only recently come to be seen as a proper basis for marriage. According to Cherlin (2017): “To most...nineteenth century women and men, marrying someone because of strong romantic feelings was considered risky. Passionate, romantic love was thought to be a base emotion that faded quickly, leaving little support for the couple.”<sup>43</sup> Furthermore, the modern system of dating—which shifted power in matchmaking away from parents—only became widespread in the early to mid twentieth century (see Bailey, 1988 and Modell, 1989).

### *A. Gender Norms and Marriage.*

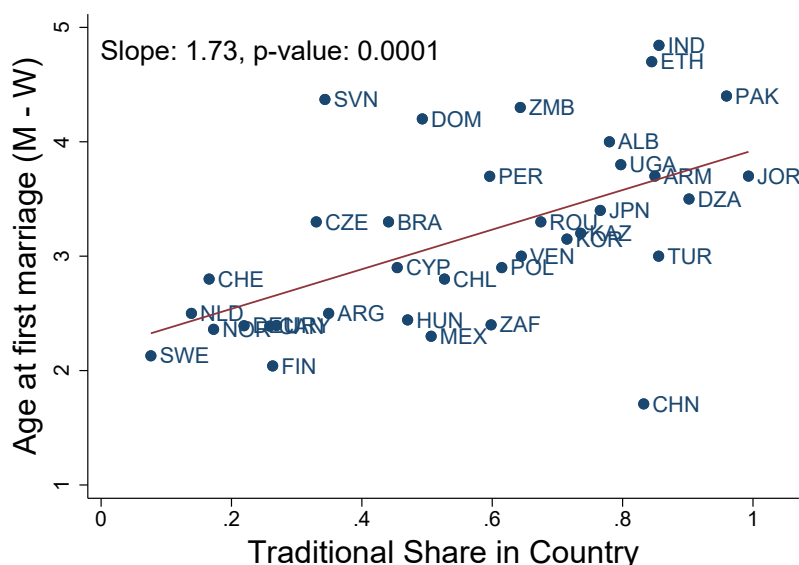
Gender norms create additional gains from specialization and so may serve as an additional reason to marry. The reason is that men and women best meet their norms by differentiating.

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<sup>42</sup>Even after controlling for income, age, gender, education, and year, the difference in marriage rates between traditional and modern types is highly significant (see Table S.3 in the Online Supplement).

<sup>43</sup>See Cherlin (2017), p. 182.

Figure 10: Age at First Marriage (Men-Women)



These gains are especially large under the protector narrative where norms are stronger. Indeed, if gender norms require women to stay home and require men to work, then to meet these norms, a woman needs a man to provide income and a man needs a woman to provide purity.<sup>44</sup>

There are some important exceptions, however, where gender norms instead act as an impediment to marriage. Two examples follow.

*Crisis of Masculinity.* While there has been a general decline in marriage in the US, there has been a particularly pronounced decline for the working class: the marriage rate of men aged 40-44 with high school education or less has dropped by more than 20 percentage points over the past forty years, compared to 6 percentage points for those with college education (see Coile and Duggan, 2019). Recent empirical work suggests this large decline is linked to deteriorating labor market outcomes. For example, Autor et al. (2018) and Bertrand et al. (2015) show a causal impact on marriage, respectively, of declines in manufacturing employment and shocks that reduce the ability of men to out-earn women.<sup>45</sup>

<sup>44</sup>Consistent with a pressure to conform to gender norms, Bursztyn et al. (2017) find that single female MBA students, to make themselves more marriageable, try to appear less ambitious; and Murray-Close and Heggeness (2018) show that households where the wife earns more than the husband have a tendency to deflate the wife's and inflate the husband's earnings.

<sup>45</sup>According to Binder and Bound (2019), between 1973 and 2015, real earnings of 25-54 year-old

Our model provides one possible explanation. Among protector individuals, who are subject to strong gender norms, a man with low earning potential is an unattractive marriage partner because he performs “poorly” in *both* roles (in Role B because of his low earnings, and in Role A because he is not considered sufficiently “manly”). Indeed, if the earning potential ( $w_{\max}$ ) of a given man is weakly below that of his prospective female partner, and weakly below the average earnings of their peer group ( $W$ ), then the net purity function of this man lies strictly below that of his prospective partner; thus, absent a sufficiently large affinity gain, she will be better off not marrying him.

This explanation is in line with a large literature in sociology which argues that working class men are suffering from a “crisis of masculinity.” Manufacturing jobs that allowed men to be the main providers for their families were an important source of dignity and respect (see Komarovsky, 1964, Rubin, 1976, Halle, 1984, and Lamont, 2000). Sociologists argue that the absence of such jobs, and the corresponding challenge to male identity, has profoundly impacted these men’s relationships (see Edin and Nelson, 2013 and Cherlin, 2014). Our model suggests that the decline of manufacturing poses a particular threat to traditional families because gender norms make it hard for men and women to share the family’s breadwinning responsibilities.

*Same-sex marriage.* In both the GSS and WVS samples, traditional types are considerably less tolerant of homosexuality than modern types. In the GSS sample, for instance, traditional types are more likely to say homosexual relations are wrong (difference of 0.93 standard deviations,  $p = 0.000$ ) and more likely to oppose gay marriage (difference of 0.95 standard deviations,  $p = 0.000$ ).

In line with these patterns, our model suggests that protector-narrative marriages will produce lower gains from specialization, other things equal, when the couple is of the same sex. This is because once the couple specializes into Roles A and B, as favored by the narrative, one member must violate a gender norm. Thus, while gender norms create gains from specialization for heterosexual couples, they have the opposite effect for same-sex ones.<sup>46</sup>

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high-school-educated men have declined by 18.2 percent in real terms.

<sup>46</sup>This, of course, may not be the only reason for protector individuals’ disapproval of same-sex relationships: such relationships might simply be regarded as impure. Note also that the difficulties same-sex couples face under the protector narrative may draw them towards the fulfillment narrative (see Section IX for further discussion of the choice of narratives).

## VIII. Additional Behaviors

So far we have shown that family members will occupy very different roles depending on their family’s narrative and wealth and also, within protector families, depending on their gender. Associated with these different roles may be a variety of additional behaviors that are not yet part of the model. Here we consider two specific examples.<sup>47</sup>

### *A. Toughness and authoritarianism.*

There is a type of purity-impacting human-capital investment that is akin to vaccination. Investments of this sort expose the individual to pollution, but at the same time, they offer protection against further corruption and loss of purity. Examples include learning to be tough (e.g. how to fight, shoot a gun, or speak in a commanding tone), sexual education, and learning about how the world works (e.g. how to manage finances or choose a marriage partner). Since these investments are themselves polluting, they lower purity in low-wage jobs; but since they are protective against further corruption, they raise purity in high-wage jobs, which are more exposed.

We model such investments, which we broadly refer to as investments in “toughness,” as a counter-clockwise rotation of the purity function for the particular family member making the investment, as shown in Figure 11(a). Each member may now choose between two purity curves (the one with and the one without the investment) and hence faces an effective purity function equal to the upper envelope of these two curves. Figure 11(b) depicts this upper envelope as well as the solution to the protector family’s problem for the baseline case without gender norms. As before, the solution involves splitting members between Roles A and B; on top of that, Role B’s (but not Role A’s) will choose to become tough. Moreover, when we add gender norms to the model, and thus a pecking order, it will be men who on average invest more in toughness.<sup>48</sup>

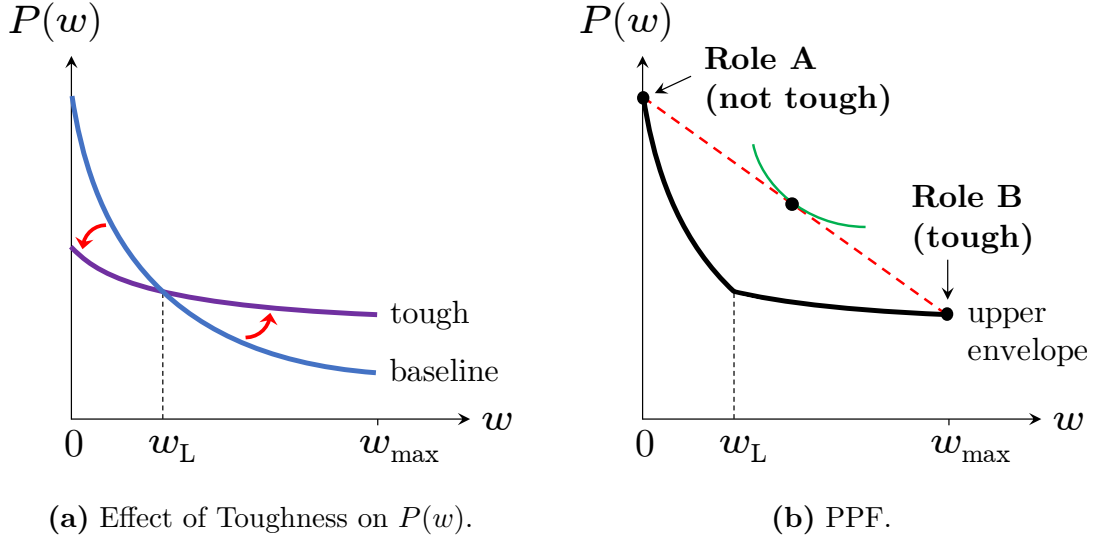
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<sup>47</sup>These examples merely scratch the surface in terms of analyzing the rich bundle of behaviors that may accompany each type of role. Section X provides some ideas for how to further enrich these bundles.

<sup>48</sup>This version of the model makes the stark prediction that only Role B’s invest in toughness. In a richer model, family members in Roles A and A’ may invest in various forms of toughness that convey occupation-specific benefits, provided these investments are not overly damaging to purity; along these dimensions, they may be tougher than family members in Role B. For example, a nurse



Figure 11: Toughness



Ideas of toughness are embedded in the concept of being “macho.” Macho, which literally means “male” in Spanish, is often defined as an exaggerated masculinity. Integral characteristics include strength, courage, and bravery (e.g. Mirandé, 2018).<sup>49</sup>

Men in fulfillment families have less reason to be tough as purity is not a concern. Consistent with this idea, Kimmel (2017) notes that running in parallel to the Women’s Movement was a reaction among men to the traditional macho concept of masculinity. For instance, the Berkeley Men’s Center fought against having “to live up to an impossible oppressive masculine image—strong,...unemotional, successful, master of women.”<sup>50</sup> By the same token, women in fulfillment families have less reason to avoid being tough. As a result, we can expect less of a systematic difference across genders.

Our survey data suggests that toughness investments indeed correlate with narrative. Recall, for instance, that in our GSS sample, traditional types are more likely to have a gun in the home (see Table 1). Table 3 looks at another type of toughness investment: sex education. It shows that traditional types are more opposed to sex education in general—but particularly so when they have daughters. Traditional types with daughters are 23.65 percentage points more opposed to sex education

in Role A’ may be especially tough when it comes to dealing with sickness.

<sup>49</sup>For a study of additional manifestations of masculinity norms, see Baranov et al. (2020).

<sup>50</sup>As quoted by Kimmel (2017), p. 185.

**Table 3: Attitudes Towards Sex Education**

	Sex Education in Public Schools: Oppose
Traditional	0.0947 (0.0579)
Daughters	-0.0426 (0.0304)
Traditional x Daughters	0.142** (0.0665)
Constant	0.0917*** (0.0277)
Traditional + Traditional x Daughters	0.2365*** (0.0327)
Sample Size	697

Individual-level linear regression using GSS data. The dependent variable is equal to 1 if the respondent is opposed to sex education and 0 if the respondent is in favor. “Daughters” is equal to 1 if the respondent has a daughter and 0 otherwise. Standard errors, reported in parentheses, are heteroskedasticity robust. \*\*\* 0.01, \*\* 0.05, \* 0.1.

than modern types with daughters.<sup>51</sup>

*Authoritarianism.* Asymmetries in toughness across family members—particularly asymmetries in their knowledge—can generate power imbalances. Thus, in protector families, we can expect that Role B’s will be authoritarian towards Role A’s.<sup>52</sup>

The “cult of domesticity,” for instance, considered it the job of men to look after and dictate to women. According to the thinking, a pure, innocent woman is easy prey for slick tricksters. Thus, women were expected to be submissive and follow orders (e.g. Welter, 1966). For example, *The Young Lady’s Book*, published in 1830, advises its readers: “whatever situation of life a woman is placed from her cradle to her grave, a spirit of obedience and submission, pliability of temper, and humility of mind, are required of her.”<sup>53</sup>

A similar logic suggests that protector families should adopt a more authoritarian parenting style. Previous work by Doepke and Zilibotti (2017) shows that a society’s

<sup>51</sup>Innocence has historically been considered a key feminine virtue. For example, Victorian marriage advice books such as *Whisper to a Bride*, published in 1851, are notable for their complete absence of intimate information.

<sup>52</sup>There is a large literature on bargaining within families, which argues that family members’ power depends upon their outside options (e.g. Manser and Brown, 1980). Power imbalances in our framework arise regardless of these considerations. In practice, both channels are arguably important (e.g. Ashraf et al., 2006).

<sup>53</sup>Hosmer (1854), p. 28.

**Table 4: Parenting Styles**

<i>Dep Var: Authoritarian</i>	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Inequality	1.787*** (0.316)	1.113 (0.104)	1.718*** (0.313)	1.208 (0.269)	1.718*** (0.304)	1.188** (0.104)	1.845*** (0.313)	2.330*** (0.543)
Traditional	2.527*** (0.141)	2.564*** (0.121)	2.489*** (0.153)	2.516*** (0.125)	2.323*** (0.123)	2.403*** (0.111)	2.150*** (0.15)	2.110*** (0.141)
N	31,666	31,666	23,131	23,131	31,367	31,367	32,998	32,998
Country FE	NO	YES	NO	YES	NO	YES	NO	YES

The table performs the same exercise as Table 1 of Doepke and Zilibotti (2017) only with an additional regressor: whether the respondent is a traditional type. All columns are individual-level multinomial logistic regressions. Columns (1) and (2) are based on the whole sample; columns (3) and (4) restrict to parents; columns (5) and (6) control for religiosity; and columns (7) and (8) use alternative classifications of parenting styles. For full procedural details, see Doepke and Zilibotti (2017). Standard errors, reported in parentheses, are clustered at the country level. \*\*\* 0.01, \*\* 0.05, \* 0.1.

level of income inequality correlates with an authoritarian parenting style.<sup>54</sup> In Table 4, we run a version of their main regression augmented with narrative as an additional explanatory variable. We find that, in all versions of their specification, having an authoritarian style is significantly correlated with being traditional, as well as a country’s level of inequality. Thus, both economics and narrative seem to play a role.

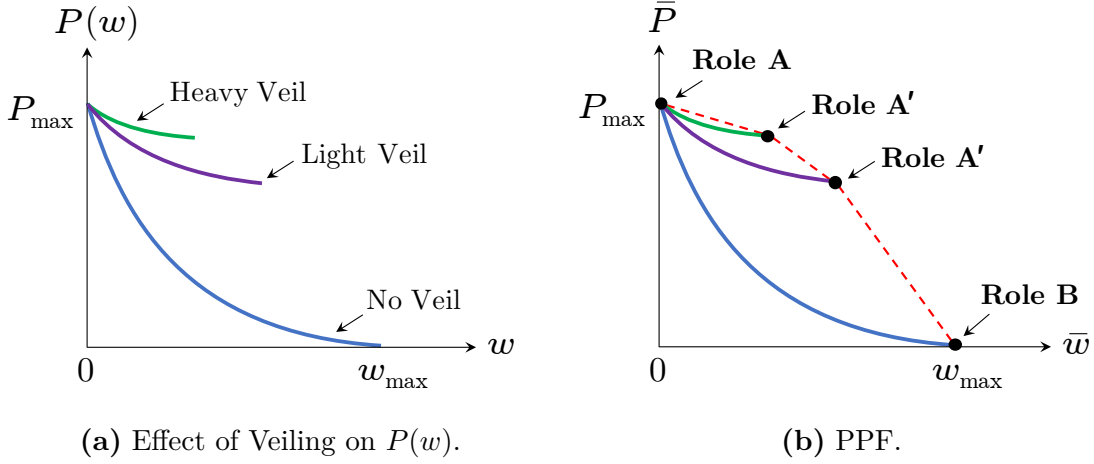
## B. Veiling

Here we revisit our model of protected work (Section IV.D) to think formally about veiling. Veiling can be viewed as a restriction that increases purity. In Islam, veiling stems from standards of modesty or *Haya*. According to Hadith (the sayings of Muhammad): “Allah...is forbearing, modest and concealing, and He loves modesty and concealment” (Sunan an-Nasa’i 406).

Because veiling potentially reduces earnings, it is analogous in our model to engaging in protected work. Thus, in protector families, those in Role A’ will veil while those in Role B will not. Perhaps not surprisingly, in the Islamic countries in our WVS sample, there is a significant positive correlation between the share of

<sup>54</sup>Doepke and Zilibotti label parents “authoritarian” if they list obedience as one of the five qualities most desired in children. They propose that, in more unequal societies, there are greater returns to effort during childhood; in order to secure this effort, parents will be more authoritarian.

Figure 12: Veiling



individuals who veil and the share classified as traditional.<sup>55</sup>

There are many types of veils, ranging from full body coverings that reveal little of the face (e.g. *burqa*) to veils that cover large parts of the body but not the face (e.g. *chador*) to simple, often colorful, headscarves (e.g. *eşarp*). In Carvalho (2012)'s analysis, an intermediate level of veiling strikes a compromise between the desire to be out in the world and concern over the approval of one's family and community.

In our model, there is also a value to having multiple veiling options. Figure 12 presents a version of our protected-work framework with more than one type of veil: a "light veil" that is less protective of purity but also permits greater earnings, and a "heavy veil" that is more protective but also more constraining. In this case, two variants of Role A' emerge, with the less heavily veiled one also producing higher earnings. (Of course, there might be more than two veiling options and these options may or may not reach the PPF.) Notice that Role A can be thought of as a limit where veiling is very intense and earnings very low. Notice also that as the earning potential  $w_{\max}$  of Role B members grows, the family will tend towards heavier and heavier veils.

<sup>55</sup>A one percentage point increase in a country's traditional share is associated with a 2.055 percentage point increase in the share of women who veil (p-value 0.0006, R-squared 0.517).

## IX. Endogenous Narratives

Throughout the paper, we have treated each family’s narrative as given. Here we offer a preliminary (and informal) discussion of how families might choose their narratives in the first place. Specifically, we suggest that two forces—both previously identified in the literature—may play an important role in this choice (see especially Bénabou and Tirole, 2011, and Akerlof, 2017).

The first force (“self esteem”) is a desire to do well relative to other families in producing story utility, as measured by the family’s own story. That is, a protector (respectively, fulfillment) family will compare its purity (respectively, fulfillment) level against that achieved by other families it interacts with, and receive utility or disutility on the basis of this comparison. Because it is difficult for families to perform well under both the protector and fulfillment metrics at once, they will tend to specialize on a single objective and hence adopt a single narrative (protector or fulfillment, but not both). Other things equal, the chosen narrative will be the one where the family has a comparative advantage.<sup>56</sup>

The second force (“peer esteem”) is a desire to be well perceived by peer families, as measured by the stories of peer families. That is, a family that interacts with protector (respectively, fulfillment) families will be judged by these families on the basis of how well it performs along the purity (respectively, fulfillment) dimension, and will receive utility or disutility on the basis of this judgment. This force, which can be understood as a desire for acceptance and belonging, pushes families toward conformity: other things equal, families will tend to specialize on what their peers happen to value, and hence adopt the same narratives.

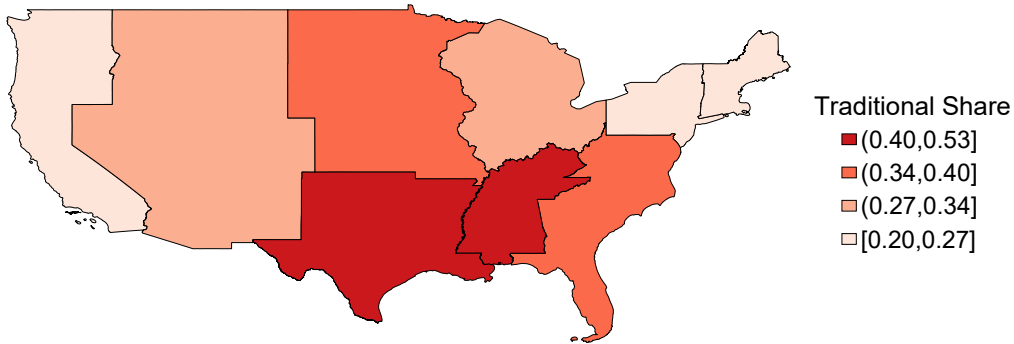
If social classes differ on average in their comparative advantages, the first force (a desire for self-esteem) has the potential to produce class differences in narratives.<sup>57</sup> In line with this possibility, in our GSS sample, modern types have higher socioeconomic status on average, as measured by a socioeconomic index (0.15 standard deviations higher,  $p = 0.000$ ), years of schooling (1 additional year,  $p = 0.000$ ), and individual income (0.12 standard deviations higher,  $p = 0.000$ ). One way to rationalize this

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<sup>56</sup>A very wealthy family, however, may be able to perform well under both narratives at once, and may therefore choose to hold both. One example would be a wealthy family that opens an art gallery, which may at once provide protected work *and* fulfillment.

<sup>57</sup>Furthermore, if families tend to interact with families of the same class, the second force will generate within-class conformity, and hence exacerbate these class differences.

**Figure 13: Geographical Variation in Narratives**



pattern is to assume that an individual’s access to high-wage jobs that are also highly fulfilling is dependent on having high human capital. In this case, on average, middle- and upper-class families may have an advantage relative to working class families at generating some forms of fulfillment. A similar mechanism might help explain the cross-country correlation between narrative and GDP observed in Figure 10 (Section VI.D).

The second force (a desire for peer esteem) has the potential to produce a geographical clustering of narratives (with close neighbors likely sharing the same narrative). Of course, when income differs across regions, the first force might magnify this effect. Figure 13 shows geographical clustering from our GSS sample and, analogously, Table A.1 shows geographical clustering from our WVS sample.

## X. Conclusion

Our stories create a rich and distinctive bundle of behaviors for each type of family. Our first story, the protector narrative, generates two highly gendered roles and pushes men and women towards “separate spheres”; one role (the breadwinner) is expected to be tough and authoritarian whereas the other (the pure individual) is expected to either stay at home or engage in protected work, remain innocent, and in some cases veil. This story also generates strong pressure to marry—except in cases of same-sex relationships and cases where men have low earning potential. Our second story, the fulfillment narrative, generates behaviors that are in many ways the polar opposite: roles within the family are far less distinct and gender norms weaker, there is no particular pressure on men to be tough or women to be innocent,

and marriages are based to a greater extent on romantic love.

Our model, by necessity, remains incomplete. Perhaps most notably, we only touched on some of the implications of the protector and fulfillment narratives. Other potential implications include matters of fertility, such as age of child bearing, quantity-quality trade-offs, and abortion; as well as family formation and disintegration, including divorce, remarriage, and the use of dowries. While stories, and their interaction with economic motives, no doubt play a key role in these choices, each one calls for a judicious treatment of its own.

Also left unexplored are the broader implications of narratives for society. In some extreme cases, for instance, a protector-style narrative might be used as a justification for corruption. According to Saviano (2019), among the mafia of southern Italy, “Even the Fifth Commandment may be suspended...when murder serves a higher purpose, namely the safeguarding of the clan; in such cases, killing will be understood and forgiven by Christ by virtue of its necessity.” In a similar vein, Banfield (1958) argues in his classic study of Chiaromonte, Italy (aka “Montegrano”) that the priority of protecting one’s clan—which he termed “amoral familism”—impeded sustained cooperation and public good contribution.

Finally, our two stories capture only a subset of the narratives that exist and are relevant for understanding families. Moreover, there are a variety of narratives that are distinct from our two and yet may correlate with them. An example is Enke (2019)’s distinction between loose and tight kinship societies, which appears to correlate with the classification in our model. For instance, in our GSS sample, traditional families are generally less trusting (0.071 standard deviations, p-value 0.000) but more trusting of family (0.117 standard deviations, p-value 0.103); and Enke (2019) finds that tight kinship is correlated with concern about sexual purity (see Enke, 2019, Figure IV). A richer understanding of the full variety of stories—and the links between them—is left for future work.

## Appendix A

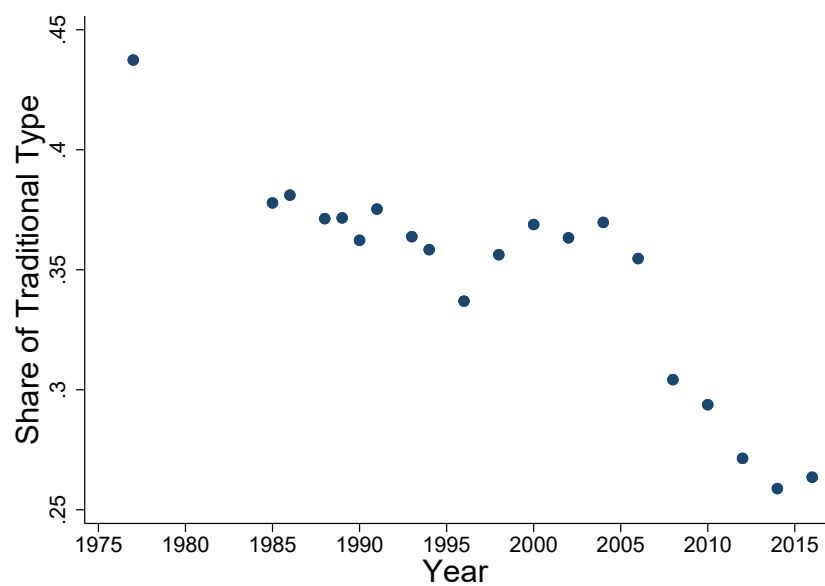
**Table A.1: Share of Modern-Type Respondents by Country**

Country	Share	Country	Share	Country	Share
Andorra	94.0%	Hong Kong	48.3%	Montenegro	24.0%
Sweden	92.4%	Chile	47.3%	Japan	23.4%
Netherlands	86.1%	Serbia	44.1%	Albania	22.0%
Switzerland	83.4%	Haiti	43.7%	Malaysia	21.2%
Norway	82.7%	Colombia	43.7%	Tanzania	20.9%
New Zealand	78.5%	Singapore	42.6%	Uganda	20.3%
Germany	78.1%	Puerto Rico	41.8%	Burkina Faso	18.7%
Australia	77.7%	Peru	40.4%	Kyrgyzstan	17.5%
United Kingdom	76.9%	South Africa	40.2%	China	16.8%
France	74.4%	Taiwan	39.3%	El Salvador	16.0%
Canada	74.1%	Poland	38.5%	Iran	15.8%
Spain	73.8%	Ecuador	38.4%	Ethiopia	15.5%
Finland	73.7%	Zambia	35.7%	Vietnam	15.4%
Uruguay	73.1%	Venezuela	35.5%	Armenia	15.0%
Czech Rep.	67.0%	Ukraine	35.5%	Turkey	14.5%
Slovenia	65.7%	Philippines	34.3%	India	14.4%
United States	65.3%	Mali	33.9%	Zimbabwe	11.7%
Argentina	65.1%	Belarus	33.9%	Rwanda	10.9%
Croatia	59.4%	Thailand	32.6%	Ghana	10.7%
Guatemala	56.2%	Romania	32.5%	Nigeria	10.4%
Brazil	55.9%	Russia	31.8%	Libya	9.9%
Cyprus	54.6%	Bosnia Herzegovina	31.5%	Georgia	9.8%
Italy	54.4%	SrpSka Republic	29.0%	Algeria	9.8%
Latvia	54.3%	South Korea	28.5%	Uzbekistan	9.3%
Hungary	53.0%	Bosnia	28.3%	Indonesia	8.4%
Bulgaria	50.8%	Lithuania	28.0%	Azerbaijan	8.4%
Dominican Rep.	50.7%	Moldova	26.9%	Bangladesh	5.3%
Estonia	49.8%	Kazakhstan	26.4%	Pakistan	4.1%
Slovakia	49.7%	Trinidad and Tobago	26.3%	Jordan	0.7%
Mexico	49.4%	Macedonia	26.2%	Egypt	0.2%

WVS respondents are classified as modern or traditional using the k-means algorithm (see Online Supplement for further details).



Figure A.1: Share of Traditional Type in US by Year



Note: the data in the figure comes from our GSS clustering exercise.

## Appendix B

Proof of Proposition 1.

Recall that families assign members to extreme roles and follow a pecking order when doing so. Consequently, for all  $\Delta \neq 0$ ,  $|BR(\Delta)|$  is bounded below by  $\min\{\mu, 1 - \mu\} \cdot 2w_{\max} > 0$ , where  $\mu$  denotes the optimal fraction of family members assigned to Role B when  $\Delta = 0$ . It follows that  $\Delta = 0$  cannot be a stable equilibrium.

Proof of Proposition 2.

We begin with the case where, absent gender norms, the family's optimum wage is interior (i.e.  $w^* < w_{\max}$ ). Now suppose the family encounters norm  $\Delta_{t-1}$  (without loss  $\Delta_{t-1} \geq 0$ ) and chooses  $w_f, w_m$  for period  $t$ . Provided  $\Delta_{t-1}$  is small,  $w_f, w_m$ , both of which are functions of  $\Delta_{t-1}$ , remain interior and satisfy the following first-order conditions (which are sufficient because the family's objective is strictly concave):

$$u(\bar{w} + \bar{w}_0) + \frac{1}{2}F'(w_f) = \lambda\Delta_{t-1} \text{ and } u'(\bar{w} + \bar{w}_0) + \frac{1}{2}F'(w_m) = -\lambda\Delta_{t-1},$$

where  $\bar{w} = (w_f + w_m)/2$ .

Now apply the Implicit Function Theorem and rearrange terms to obtain

$$\begin{pmatrix} \frac{dw_f(\Delta_{t-1})}{d\Delta_{t-1}} \\ \frac{dw_m(\Delta_{t-1})}{d\Delta_{t-1}} \end{pmatrix} = A^{-1} \begin{pmatrix} 2\lambda \\ -2\lambda \end{pmatrix},$$

where

$$A = \begin{pmatrix} u''(\bar{w} + \bar{w}_0) + F''(w_f) & u''(\bar{w} + \bar{w}_0) \\ u''(\bar{w} + \bar{w}_0) & u''(\bar{w} + \bar{w}_0) + F''(w_m) \end{pmatrix}.$$

Because  $u'', F'' < 0$  this matrix has a non-zero determinant, and hence the derivatives  $\frac{dw_f}{d\Delta_{t-1}}, \frac{dw_m}{d\Delta_{t-1}}$  are well defined. Moreover, when  $\Delta_{t-1} = 0$  we have  $w_f, w_m, \bar{w} = w^*$  and hence

$$\begin{pmatrix} \frac{dw_f(\Delta_{t-1})}{d\Delta_{t-1}} \\ \frac{dw_m(\Delta_{t-1})}{d\Delta_{t-1}} \end{pmatrix} = \begin{pmatrix} 2\lambda/F''(w^*) \\ -2\lambda/F''(w^*) \end{pmatrix}.$$

Since  $u''$  and  $F''$  are continuous, it follows that whenever  $\Delta_{t-1}$  is small,  $-\frac{dw_f(\Delta_{t-1})}{d\Delta_{t-1}}$  and  $\frac{dw_m(\Delta_{t-1})}{d\Delta_{t-1}}$  are each close to  $-2\lambda/F''(w^*)$ , which by assumption is strictly smaller

than  $1/2$ . Therefore, there exists a constant  $\delta > 0$  such that for all small  $\Delta_{t-1}$ ,

$$\frac{d\Delta_t(\Delta_{t-1})}{d\Delta_{t-1}} := \frac{d(w_m(\Delta_{t-1}) - w_f(\Delta_{t-1}))}{d\Delta_{t-1}} < 1 - \delta.$$

Since  $\Delta_t = \int_0^{\Delta_{t-1}} \Delta'_t(x) dx$ , it follows that whenever  $\Delta_{t-1}$  is strictly positive and small,  $\Delta_t < \Delta_{t-1} (1 - \delta)$ . As a result, for all small  $\Delta_t \geq 0$  we have  $BR^\infty(\Delta_t) = 0$ , as desired.

Finally, the case where  $w^* = w_{\max}$  is very similar. The only difference is that in this case at least one of the wages  $w_f, w_m$  is always equal to  $w^*$ .

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