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Veiling

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Abstract

Veiling among Muslim women is modeled as a commitment mechanism that limits temptation to deviate from religious norms of behavior. Our analysis suggests that veiling is a strategy for integration, enabling women to take up outside economic opportunities while preserving their reputation within the community. This accounts for puzzling features of the new veiling movement since the 1970s. Veiling also has surprising effects on the intergenerational transmission of values. Compulsory veiling laws can lead to a *decline* in religiosity. Bans on veiling can inhibit social integration and *increase* religiosity.

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One recent phenomenon incomprehensible to many observers of the Egyptian scene today is the visible presence of a new Egyptian woman: the young urban college student on her way to or from the university campus – carrying her books, wearing eye glasses, alone or in the chatting company of other college women, and completely "veiled"– face and body.

(El Guindi 1981)

1 Introduction

There has been a dramatic and widespread rise in veiling since the 1970s, known as the 'new veiling movement'. By veiling, we mean the various concealing forms of headcovering and dress worn by Muslim women. In 1969, veiled women were rarely seen in Cairo's public spaces (Abu-Lughod 1971). By 2000, over 80 percent of Cairene women wore some form of headcovering (Bayat 2007). This pattern has been repeated in other Muslim societies and among Muslim minorities around the world.[1] The new veiling movement has important economic consequences for women's educational and labor market choices.[2] It also exhibits several puzzling features which defy conventional theories of religion and identity. Most strikingly, the movement appears to have originated among *urban, educated, working, middle-class* women (e.g. El Guindi 1981, Hoodfar 1991, Mule & Barthel 1992, Smith-Hefner 2007).

Consequently, veiling has become a focal point for debate about multiculturalism and religion. In 2004, France introduced bans on the Muslim headscarf in public schools. This was followed by more comprehensive bans on full face veils in France and Belgium and political moves to restrict veiling in the Netherlands, Denmark, Italy, Switzerland and Egypt (e.g. Bremner 2010). The political interest, however, has outpaced our understanding of why women veil.

This paper introduces the new veiling movement to the economics of identity literature (Akerlof & Kranton 2010, Austen-Smith & Fryer 2005, Fang & Loury 2005), which includes work on related phenomena such as "acting white" among African Americans. Our aim is to explain the origins of the new veiling movement and determine the effects of regulating veiling. In attempting to do so, we draw upon developments in behavioral

[1] In many cases, the new veiling movement has reversed previous trends toward deveiling. In countries such as Indonesia, veiling was not customary until relatively recently (Brenner 1996, p. 674).

[2] For example, veiled women are routinely screened out by foreign firms and employers in lucrative fields such as televised media, hospitality and tourism, in predominantly Muslim societies such as Egypt, Turkey, Lebanon and Indonesia (Mule & Barthel 1992, Brenner 1996, Blaydes & Linzer 2008). See also Meyersson (2010) on female education in Turkey.

economics and modern game theory that have economists well placed to contribute to such a debate.

In our model of social identity, veiling acts as a commitment mechanism which limits temptation to violate religious norms of behavior.[3] Agents who succumb to temptation experience regret and/or social disapproval. Social influence operates in a novel way: agents care about the opinions of other members of their community, even if these opinions proceed from different values to their own. The greater the prevalence of religious types, the more heavily religious values weigh in community opinions. Hence the demand for veiling is highest among women from highly religious communities who interact in irreligious (high-temptation) environments.

This enables us to link the new veiling movement to economic and social changes experienced by Muslim women around this time. The most important changes were urbanization and migration, especially to Europe and the United States, as well as the related influx of women into formal education and employment, which broke down the customary segregation of the sexes. These developments created a tension. Exploiting new economic opportunities meant exposure to environments in which liberal mores and opportunities for religiously prohibited behavior prevailed. Hence, the price of economic integration might have been social disapproval. Veiling emerged as a strategy to balance these competing concerns, by publicly committing an individual to religious standards of behavior. Hence, our theory provides a unified framework for understanding certain patterns of veiling in predominantly Muslim and non-Muslim societies. It suggests one possible explanation for the prominent role played by urban, educated, working women in the new veiling movement, especially those from traditional rural backgrounds (MacLeod 1991).

To study the effects of regulating veiling, we explore a dynamic extension of our model, in which parents invest in transmitting religious values to their children. This kind of analysis was pioneered by Bisin & Verdier (2000, 2001). The result is a complex interactive process in which the distribution of values determines veiling, which in turn feeds back into values. We show that compulsory veiling laws, such as in Iran and Saudi Arabia, can lead to a *decline* in religiosity by reducing variation in behavior across religious and secular types and thereby reducing returns to religious education of children.[4] The same

[3] In Akerlof and Kranton's (2000, 2010) seminal work on the economics of identity, what an agent takes to be her ideal behavior is a function of her social identity. Here, adopting the identity associated with one's ideal behavior, reduces temptation to deviate from this behavior.

[4] Throughout the paper, we make the distinction between religious and secular values. These terms are open to a wide range of interpretations, but we could not locate a better terminology. To be precise,

applies to bans on veiling.

When agents choose not only their social identity but also their environment, however, the opposite can occur. Bans on veiling aimed at secularization and cultural assimilation can be self defeating, inhibiting social integration and *increasing* religiosity. If the returns to education and formal employment are low relative to the personal and reputational costs of deveiling, then a ban on veiling induces religious types to forego economic opportunities and segregate in their local community as a (costly) substitute for veiling. This can accentuate differences in behavior across types and thereby raise returns to religious education. On the other hand, if the economic opportunities available to Muslim women are attractive enough for them to continue to integrate without veiling, then bans on veiling do indeed lead to secularization. Of course, the right policy on veiling is a broader matter of justice, beyond the scope of this paper. But our framework does suggest that the effects of a ban on veiling may depend on the economic opportunities available to Muslim women.

Before proceeding, let us point out the relationship to and departures from existing work. In the social norms literature (e.g. Schelling 1978*a*, Elster 1989, Young 1996), agents *choose* to conform or deviate from established norms. In our model, agents are *tempted* to violate social norms. Deviant behavior is not deliberate, but a matter of imperfect self control. Unlike the literature on time-inconsistent preferences (e.g Schelling 1978*b*, Thaler & Shefrin 1981, O'Donoghue & Rabin 1999), agents face social disapproval when succumbing to temptation. Social pressure can in turn limit temptation via identity choice. As in Akerlof and Kranton's framework (Akerlof & Kranton 2000, 2010), different types of agents sort into different identities. In our dynamic analysis, an agent's type is endogenously determined, shaping and being shaped by her social identity. This is a small step toward addressing outstanding issues raised at the end of Akerlof and Kranton's (2010) recent book: "Where do norms and identity come from? How do they change and evolve?"[5] Our paper is also related to the literature on ethnic identification in which the pressure to engage in ethnically significant activities (such as veiling) increases with the degree of community participation in these activities (see Kuran 1998). Blaydes &

what we mean by this distinction is differences in attitudes toward appropriate behavior for women, especially when it comes to gender roles and interactions with the opposite sex. We do not mean differences in political values, attitudes toward technology etc. In their analysis of World Values Survey data, Norris & Inglehart (2004) conclude that "the basic cultural fault line between the West and Islam does not concern democracy – it involves issues of gender equality and sexual liberalization" [p. 155].

[5]The closest paper in this regard is by Horst et al. (2007). In their paper, individual traits coevolve with group composition, as agents attempt to conform to their desired self-image by joining groups in which their desired trait is prevalent.

Linzer (2008) attribute women's support for veiling and other forms of gender inequality to marriage market concerns. **?** develops an (informal) signaling theory of veiling based on marriage market concerns and increasing returns to adoption.

We depart from the literature on ethnic identification, and indeed the larger social norms literature, in the way we model social influence. *Inter alia*, our approach can be used to clarify the new veiling movement's place in the broader Islamic revival since the 1970s.[6] How could the spread of (private) religious values have gained (public) expression through increased veiling, not only among religious types, but also through *increased pressure on secular types to veil*? Existing theories of social norms that have proved powerful in other settings do not perform well here. Increasing-returns/tipping-point models (Schelling 1978*a*, Kuran 1995, 1998) build in social pressure to go against one's intrinsic preferences and can produce rapid shifts in behavior. However, these behavioral cascades are inherently unpredictable and not closely tied to either changes in the environment or shifts in values. Standard social signaling models are also problematic in our setting, because the ideal type that agents want to mimic is exogenous.[7] For example, if the ideal type is secular, then agents continue to mimic secular behavior, even as the population becomes completely religious. In our framework, the ideal type is endogenous; it is based on people's opinions and thus closely tied to the distribution of types. This leads to a social signaling model with a difference. As religious values spread in the population, social approval switches from secular to religious behavior, and eventually even secular types attempt to conform to religious standards of behavior by veiling. We remark that even a minority can exert significant social influence in our model if they intensely disapprove of one behavior or the other.

The remainder of the paper is structured as follows. In Section 2, we identify puzzling features of the new veiling movement and propose an alternative view of veiling. Section 3 introduces the model and uses the comparative statics of veiling to account for the origins of the new veiling movement. Section 4 studies the effect of veiling on the intergenerational transmission of values, by introducing religious education. This allows us to explore the long-run implications of bans on veiling. Section 5 concludes.

[6] On the broader rise in religious values and participation known as the Islamic revival, see Hunter (1988), Esposito (1999), Lapidus (2002), Bayat (2007), Carvalho (2009).

[7] For example, in standard models, one wants to be a high ability type (Spence 1973), a wealthy type (Bagwell & Bernheim 1996), an altruistic type (Levine 1998) or a sociable type (Austen-Smith & Fryer 2005), *regardless of the distribution of types in the economy.*

2 Veiling

Veiling, a broad interpretation of the term *hijab* (Esposito 2004), has numerous gradations and forms including the *chador* which is the semi-circle of fabric Iranian women wear wrapped around their heads and bodies, the *jilbab* which is a concealing coat, the *khimar* which is a sheer headscarf or wrap, the *niqab* which is the face veil commonly worn in the Persian Gulf states, and the *burqa* associated with Afghanistan which covers the entire head and body, usually with an area of mesh around the eyes.

Veiling is often advocated as a religious duty by citing Quar'anic passages that instruct women to "be modest in thy bearing" (verse 31: 19) and "wear their head-coverings over their bosoms, and not display their ornaments" (verse 24: 31). Despite the static nature of scriptural injunctions to veil, norms of veiling have been subject to substantial change over the twentieth century. To our knowledge, there do not exist any hard statistical data on patterns of veiling among Muslim women. We proceed on the basis of extant ethnographic, historical and survey-based studies of veiling.[8]

2.1 The New Veiling Movement

Veiling was abandoned by non-Muslim minorities in the Middle East during the 19th century (Stillman 2003). Muslim women began this process later and more gradually. Modest standards of European dress were first adopted, including European-style face veils, as a transition from traditional norms of dress to Western fashion (Stillman 2003). In 1923, an upper-class Egyptian woman named Huda Shaarawi publicly removed her face veil, upon returning from an international meeting of feminists (Shaarawi & Badran 1987). This initiated a deveiling movement, featuring organized marches by unveiled women in the streets of Cairo. Abu-Lughod (1971) writes of Cairo in 1969: "One rarely sees *jalabiyyah* (plural of *jilbab*)... Almost no women are veiled" [p. 239].

Since the 1970s, however, there has been a dramatic and widespread rise in veiling among Muslim women—the new veiling movement.[9] Conducting a set of informal surveys in public spaces, Bayat (2007) claims that in 2000 veiled women in Cairo constituted "a staggering majority of over 80 percent." Similarly, veiling was rarely seen in many parts

[8] Akerlof and Kranton's (2010) work is also motivated by ethnographic evidence, and they justify this approach on p. 116-117.

[9] This sharp rise in veiling does not represent a reversion to traditional forms of dress worn by peasants, but rather a move to distinctly modern modes of covering (Hoodfar 1991, Stillman 2003).

of Turkey during the 1970s (see Breu & Marchese 2000), where the religious headcovering had been prohibited in public universities and Turkish government institutions since 1924. Yet, prior to the repeal of the prohibition in 2008, 45 percent of Turkish women surveyed in a Gallup Poll reported wearing the headscarf in public (Rheault 2008). In Indonesia, Smith-Hefner (2007) estimates that the percentage of the Muslim female student population wearing an Islamic headcovering on campus in the nation's oldest and second-largest university rose from less than three percent in the late 1970s to more than 60 percent by 2002.[10]

The rise in veiling in the United States and Europe seems to have begun in the 1990s among second and third generation Muslim immigrants (e.g. Alvi et al. 2003, Ali 2005). In a survey of Muslim women in the mid-1980s, Haddad & Lummis (1987) report that "few if any Muslims born in the U.S. wear *hijab* (headcovering) or *jilbab*, and most migrants who came wearing such conservative clothing gradually change to more typical American style clothing"[p. 132]. In contrast, 36 percent of American Muslims surveyed in a 2002 poll wear a religious headcovering daily; only half of respondents never wear a form of headcovering (Hamilton College 2002). A 2006 Pew Global Attitudes Poll reports that 53 percent of female Muslim respondents in Great Britain, 45 percent in Spain, 44 percent in Germany and 13 percent in France wear a headscarf every day (Morin & Horowitz 2006).

Perhaps the most striking fact is that, in many countries, the new veiling movement appears to have originated among urban, educated, middle-class women who work outside the home.[11] In Indonesia, Smith-Hefner (2007) notes that "the new veiling is particularly prevalent not among the old and traditional but among young, well-educated, and socially assertive members of the urban middle class." [p. 389]. In Egypt, the movement began in universities and is pronounced among women occupying (lower-level) white-collar public sector jobs. MacLeod (1991) writes: "Voluntary support of the new veiling, by educated, working women, part of the modernizing middle classes, presents a paradox, for why would women who are already on the path to modernized life choose to resurrect a symbol which seems to portray and encourage their subordination?" [p. 4].

This pattern of veiling is difficult to reconcile with existing club goods theories of religion (Iannaccone 1992, Berman 2000).[12] Firstly, veiling is a widespread phenomenon and

[10]In Java, we cannot speak of a 'revival' in veiling, since veiling in many parts of Java was until recently quite limited (Brenner 1996, p. 674).

[11]See for example Brenner (1996) p. 675; El Guindi (1981) p. 465, 480-3; Mule and Barthel (1992), p. 323, 328-329; and Hoodfar (1991).

[12]Indeed, this theoretical framework has not been specifically applied to veiling.

many veiled women are not members of a religious group. Secondly, veiling does not seem to limit the time women spend on secular activities. Instead, veiling among the urban, educated, working, middle class suggests that the practice may actually *reduce* the costs a woman faces when taking up economic opportunities outside her community. Accordingly, we develop a theory in which veiling enables agents to exploit outside economic opportunities, while avoiding social disapproval in her community.

2.2 Veiling as a Commitment Mechanism

We model veiling as a costly commitment that reduces temptation to engage in religiously prohibited behavior. This could function in several ways, which are consistent with ethnographic evidence. First, veiling may limit opportunities for religiously prohibited behavior. A subject in Read and Bartkowski's (2000) study of veiled women in Austin, Texas, claims that, "The veil keeps us [Muslim women] from getting mixed up in American culture" [p. 407]. Droogsma (2007) reports the following response in her interviews, "Nobody's ever offered me drugs... nobody offered me a drink once I became Muslim... So [veiling is] a protection. I don't have to have the strength to say 'No,' it's just for the most part, the opportunities are not presented to me" [p. 304].

Second, veiling may help to resist temptation when faced with an opportunity to engage in religiously prohibited behavior. Smith-Hefner (2007) reports that for many women in Indonesia veiling is "a constant physical reminder, one that helps keep them from overstepping the bounds of moral propriety" [p. 401-402]. As a physical reminder, veiling could override cognitive processes that are susceptible to temptation.[13] As a public signal, veiling can also subject women to harsher (immediate) sanctions for 'irreligious' behavior. For example, Smith-Hefner (2007) reports that veiled women "out after evening prayers or walking in the company of men who were not close relatives" were berated for "besmirching the name of the *jilbab* (headscarf)." Some "women had their veils pulled off; in several cases, their male companions were beaten" [p. 413-414].[14] All of these effects can be captured by the simple assumption that veiling reduces the likelihood that an agent engages in religiously prohibited behavior.

[13]See Benhabib & Bisin (2005) for a model in which agents invest in costly cognitive control to override decision processes that are subject to temptation.

[14]One of the women interviewed by Omkar (2007) in London recounts how her parents "were fine with my going to uni because they know that dressed like this I can't get into trouble. It's not like I'll go clubbing or drinking with men" [p. 79]. In Droogsma's (2007) interviews with veiled women, one respondent reports, "For me to think of myself going into a bar as a [woman who wears *hijab*], it just doesn't seem right, so it kind of helps you stay away from places you're not supposed to be" [p. 304].

3 A Model of Veiling

Let us turn to the model of veiling. Agents have time-inconsistent preferences and are subject to social approval/disapproval. Religious types know they may be tempted to engage in religiously prohibited behavior (e.g. mixing with the opposite sex, drinking, attending bars). If they succumb, they experience regret and also disapproval by other religious types (but not secular types). By veiling they can reduce temptation to violate religious standards of behavior, and thereby limit the potential for regret and social disapproval.

3.1 The Model

Types. Consider a community I, which is a continuum of agents with unit mass. Each agent i is endowed with either religious values, $i = r$, or secular values, $i = s$. For now, fix the *proportion of religious types in the community* at $q \in (0, 1)$. An agent's type is private information, but q is common knowledge.

Social interactions take place over three dates:

Identity. At date 0, agent i observes her type and chooses a degree of veiling $v \in [0, 1]$ which is publicly observable.[15] In doing so, she is aware that she may have time-inconsistent preferences and be subject to temptation at date 1. Veiling entails a (direct) cost $c(v)$, which is the same for both types and reflects concerns such as discomfort and discrimination.[16] We assume that $c'(.) > 0$ and $c''(.) > 0$. In addition, to ensure interior veiling equilibria, we assume that $c'(0) = 0$ and $\lim_{v \to 1} c'(v) = \infty$.

Temptation. At date 1, each agent may get an opportunity to engage in religiously prohibited behavior. Religiously prohibited behavior is tempting. Let the joint probability that an opportunity arrives and the agent chooses to engage in religiously prohibited behavior be $p(1 - v)$, regardless of the agent's type, where $p \in [0, 1]$.[17] We conceive of p

[15] Rather than analyzing the choice between discrete forms of headcovering (headscarf, *chador*, *niqab* etc.), we model veiling as a continuous variable which reflects the overall modesty of a woman's appearance (Esposito 2004; see also El Guindi 1981, p. 474-5).

[16] See footnote 2 on labor market discrimination against veiled women. In non-Muslim societies, veiled women are also subject to verbal/phsyical harassment (e.g. Ali 2005, Read & Bartkowski 2000, Omkar 2007).

[17] We might expect religious types to be less likely to engage in religiously prohibited behavior, for any given degree of veiling. This leads to a more complicated analysis, in which veiling not only regulates behavior but also signals an agent's type. We conducted this analysis in a previous version of the paper and did not find additional results of any import. The equilibrium structure resembles that in Figure 1.

as the *degree of temptation* to engage in religiously prohibited behavior, and treat it as a property of the environment. The main assumption of the paper is that the likelihood of engaging in religiously prohibited behavior is decreasing in veiling (see Section 2.2 for a motivation).

With complementary probability $1-p(1-v)$, the agent does nothing and gets an intrinsic payoff normalized to zero. We assume the intrinsic payoff to religiously prohibited behavior is $\lambda_s > 0$ for a secular type and $\lambda_r < 0$ for a religious type. Hence, a religious type would regret engaging in religiously prohibited behavior, whereas a secular type would regret not doing so. The *intensity of regret* is parameterized by the magnitude of λ_i.

Social Influence. At date 2, all other agents in community I form an *opinion* of agent i and payoffs are received.

Ethnographic evidence suggests that the opinions of family members, peers and other members of an agent's community have a significant influence on an agent's decision to veil (e.g. Brenner 1996, p. 675; Smith-Hefner 2007, p. 400-401; Omkar 2007, p. 54).[18] Without social influence in our model, a religious type always veils (to avoid regret) and a secular type never veils, regardless of how religious the community is. Yet a major concern in the political debate about veiling is the intense social pressure on secular women to veil (see Kuran 1995, p. 8-9, 16), yielding what Kuran (1998) refers to as 'ethnic preference falsification' [p. 649-50]. Some form of social influence is required to induce such dissimulation.

We propose a novel framework for social influence in which agents care about what other members of their community think of them, even though these opinions may proceed from different values to their own. Suppose j believes that i will engage in religiously prohibited behavior. Agent j takes this action and evaluates it using her utility function, yielding λ_j. That is her *opinion* of agent i's behavior. Now agent i cares about j's opinion (along with the opinions of other community members), so that j's evaluation of i's action enters i's (extended) utility function. Social payoffs are generated by integrating the opinions of all members of the community. We believe that this yields an intuitive and disciplined model of social influence, which is based solely on the utility functions of the players.

Agent i's date-0 expectation of her payoff can thus be written:

[18] Bayat (2007) identifies an active interest in the conduct of others as a key feature of the contemporary Islamic movement in Egypt: "Unlike the passively pious who remained indifferent about other people's religiosity, the actively pious began to judge others for what and how they believed" [p. 150].

$$U_i = \underbrace{p(1-v)\lambda_i}_{\text{intrinsic payoff}} + \underbrace{qp(1-v)\lambda_r + (1-q)p(1-v)\lambda_s}_{\text{social payoff}} - c(v). \tag{1}$$

Inter alia $\lambda_r < 0$, so that agents engaging in religiously prohibited behavior are subject to disapproval by religious types. The greater the proportion of religious types in the community, q, the more heavily disapproval by religious types weighs in social opinions, and the greater the incentive to avoid religiously prohibited behavior by veiling.

We remark that the agent's payoff in (1) is the same regardless of whether or not her date-1 behavior is observable by the community.[19] Nevertheless, the interpretation of social influence differs depending on whether behavior is public. When community members cannot observe whether an agent has engaged in religiously prohibited behavior, they form an expectation of the agent's behavior from her choice of veiling. In particular, they infer that higher degrees of veiling reduce the likelihood that the agent engages in religiously prohibited behavior. When behavior is observable, agents veil to regulate their public behavior and avoid acting in way that would meet with social disapproval.

3.2 Equilibrium Veiling

Let us now introduce the first set of results by pointing out two ways in which our model departs from standard signaling models of social influence.

First, the Spence-Mirrlees sorting condition is not directly imposed—the marginal cost of veiling $c'(v)$ is the same for both types. Nevertheless, religious types adopt a higher degree of veiling than secular types in our model, because only religious types experience regret when engaging in religiously prohibited behavior. Recall that their expected intrinsic payoff is $p(1-v)\lambda_r < 0$. Hence, religious types have an intrinsic motivation to veil in order to avert temptation. On the other hand, the expected intrinsic payoff to secular types is $p(1-v)\lambda_s > 0$, so that they have no such motivation to veil. Indeed, veiling causes secular types to forego profitable opportunities for religiously prohibited behavior.

Second, we abandon the notion of an exogenous 'ideal type' (e.g. a wealthy type) that every agent wants to mimic, regardless of the distribution of types in the economy. In

[19] If behavior is publicly observable, then j's opinion of i's behavior is λ_j if i engages in religiously prohibited behavior (which occurs with probability $p(1-v)$) and zero otherwise, yielding an expected opinion (formed at date 0) of $p(1-v)\lambda_i$. If behavior is not public, then j forms an inference about i's behavior from i's veiling. Given veiling v, i engages in religiously prohibited behavior with probability $p(1-v)$, yielding an opinion (of i's expected behavior) of $p(1-v)\lambda_i$.

our model, the ideal type is endogenously determined by the distribution of preferences.[20] This will be critical for our explanation of the new veiling movement. As religious values proliferate in the population, and/or the disapproval of religiously prohibited behavior by a minority becomes more intense, the ideal type switches from secular to religious. To see this, differentiate the agent's social payoff in (1) with respect to v to get:

$$-p\left[q\lambda_r + (1-q)\lambda_s\right]. \tag{2}$$

Veiling is met with social approval if this expression is positive, which occurs if and only if:

$$q > \widetilde{q} \equiv \frac{\lambda_s}{\lambda_s - \lambda_r} \in (0,1). \tag{3}$$

In other words, as the proportion of religious types becomes sufficiently large, the ideal type switches from secular to religious. As the composition of the community changes, an agent finds herself being judged by more religious types. To avoid disapproval from these types, she begins to veil in order to limit temptation to engage in religiously prohibited behavior. Thus we have developed a *type-dependent* model of social influence which closely links veiling norms to the distribution of preferences in the economy.[21]

We can now state the following result:

Proposition 1 *There exists a unique equilibrium degree of veiling v_i^* for each type.*

(i) A religious type chooses a positive degree of veiling v_r^* if and only if $q > \underline{q} \equiv \frac{\lambda_s+\lambda_r}{\lambda_s-\lambda_r}$,

(ii) A secular type chooses a positive degree of veiling v_s^* if and only if $q > \overline{q} \equiv \frac{2\lambda_s}{\lambda_s-\lambda_r}$.

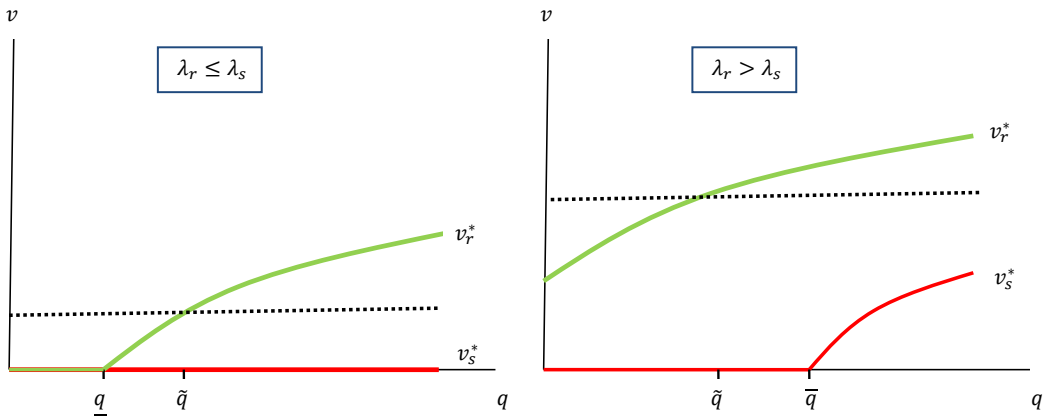
In addition, whenever $v_r^* > 0$, $v_r^* > v_s^*$.

Proofs of this and all further propositions are contained in the Appendix.

Proposition 1 can be summarized by Figure 1, which depicts how veiling v_i^* depends on q under two regimes: when disapproval by religious types is (a) less intense than

[20] In matching models with a signaling component (e.g. Hopkins forthcoming), the equilibrium structure tends to vary with the distribution of types. But the type that one wants to mimic (e.g. high ability) does not vary.

[21] This is in contrast to *behavior-dependent* increasing-returns and tipping-point models of social influence (Schelling 1978*a*, Kuran 1995, 1998).



(a) Low-veiling regime

(b) High-veiling regime

Figure 1: Veiling v as a function of the proportion of religious types q in the community, for secular types (*dark*) and religious types (*light*). The dotted line represents veiling by religious types in the absence of social payoffs.

disapproval by secular types and (b) more intense than disapproval by secular types. The equilibrium structure varies in a non-trivial way with the distribution of types in the population. We see that social influence amplifies veiling by religious types when the proportion of religious types in the community is greater than the threshold $\widetilde{q}$ [defined in (3)]; otherwise, social influence dampens veiling. If the proportion of religious types is sufficiently low, even religious types stop veiling [in regime (a)] in order to gain social approval from the secular members of their community. Symmetrically, if the proportion of religious types is sufficiently high, even secular types veil [in regime (b)] in order to conform to religious standards of behavior and gain social approval from religious types.

3.3 A Theory of the New Veiling Movement

Comparative statics. The following results form the basis of our explanation for the new veiling movement.

Proposition 2 *Whenever positive, equilibrium veiling for each type is:*

(i) strictly increasing in the degree to which the community is religious, q,

(ii) strictly increasing in the degree of temptation, p,

(iii) strictly increasing in the intensity of regret/disapproval by religious types, $|\lambda_r|$,

(iv) strictly decreasing in the intensity of regret/disapproval by secular types, λ_s.

We have already studied how veiling norms vary with the distribution of types in the economy q. The role of the other parameters can be understood as follows. Agents only veil when they want to avert temptation. Hence, the greater an agent's exposure to temptation p, the greater her incentive to veil. In addition, veiling is increasing in the intensity of regret/disapproval of religious types and decreasing in the intensity of regret/disapproval of secular types. We remark that a minority can exert significant social influence if they intensely disapprove of one behavior or the other. For example, the ideal type that all agents want to mimic could be religious even though the majority of the population is secular.[22] We believe that this is an advance on increasing-returns models in which social pressure is based on a count of the number of agents taking a particular action.

Testable implications. Our theory predicts that veiling is highest among women from highly religious communities who interact in irreligious environments.[23] For example, in a non-Muslim society, a random assignment of individuals from a single local community to different schools should lead to higher veiling among individuals allocated to schools with fewer Muslim pupils. A possible test in Muslim societies could be whether veiling rose at the neighborhood level with the introduction of television.

Demographic patterns. If we recognize that taking up education and work outside one's community exposes an agent to opportunities for religiously prohibited behavior, which can be resisted by veiling, our theory can explain veiling among urban, educated working, middle-class women. In short, these women face a higher p environment. While standard increasing-returns/tipping point models can generate rapid, unpredictable shifts in behavior, they cannot explain high degrees of veiling by this demographic group.[24]

Temporal patterns. We suggest that the rise in veiling since the 1970s is related to (a) the spread of religious values in Muslim societies and (b) changes in the economic and social environment faced by Muslim women which increased temptation to engage in religiously prohibited behavior.

[22] By (3), as $\lambda_r \to -\infty$, the threshold value of q above which the ideal type is religious goes to zero. Conversely, as $\lambda_s \to \infty$, the threshold value goes to one.

[23] Because both religious and secular types veil only when temptation is costly to them, the converse is not true. Women from highly secular communities also adopt higher degrees of veiling in high-temptation environments.

[24] For example, the model developed by Kuran (1998) leads to an illuminating account of ethnic identification and conflict in general, but it does not explain why ethnic identification may be higher among educated, middle-class women.

The sociological and historical literature points to a strengthening of religious values among Muslims since the 1970s, as part of a broad Islamic revival (see for e.g. Hunter 1988, Esposito 1999, Lapidus 2002, Bayat 2007, Carvalho 2009). This can be represented in our model by a rise in both q and the ratio $|\lambda_r|/\lambda_s$. Our model suggests a mechanism by which the spread of (private) religious values comes to be (publicly) expressed through higher degrees of veiling. Not only are there are more religious types that seek to limit temptation by veiling, but also religious values weigh more heavily in social opinions, so that even secular types begin to veil to avoid social disapproval.

The main changes in the environment faced by Muslim women were caused by migration (internal and external), increased female educational and labor market participation and increased exposure to Western cultural products (television shows, movies, magazines). Rural-urban migration in countries such as Egypt and Turkey and similarly emigration to Europe and the United States placed many Muslim women from conservative backgrounds into new environments with greater exposure to liberal attitudes and opportunities for religiously prohibited behavior. The related influx of Muslim women into formal education and employment since the 1970s, especially urban-based women from rural backgrounds (e.g MacLeod 1991), eroded the traditional segregation of sexes.[25] Finally, the proliferation of Western cultural products increased exposure to secular lifestyles and might be seen as cues for engaging in religiously prohibited behavior (see Mule & Barthel 1992, Hoffman 1995).[26,27] All of these changes can be represented in our model by a rise in p. Veiling acts as a religious commitment which substitutes for a religious environment.

Ethnographic evidence. We hope that these and other hypotheses in this paper are the subject of statistical testing. For the moment, however, we can point to ethnographic evidence that is consistent with this account of the new veiling movement. According to El Guindi (1981):

> [A] more balanced proportion of men and women on university campuses means that for nine months of the year young women are out in overcrowded streets, and

[25]For example, the enrollment of Egyptian women in secondary school increased from 7% in 1950 to 58% in 1987. Female enrollment rates at tertiary level increased from 1.6% to 14.8% (UNESCO *Statistical Yearbook*, 1970, 1971, 1990). This appears to be part of a broader integration of women into public life.

[26]For a cue-based theory of temptation, see Bernheim & Rangel (2004).

[27]Rohde (2008) surveys a controversial debate over female sexuality and social norms played out in the Iraqi print media in the late 1960s and early 1970s. A German film depicting a woman 'searching for sexual freedom' was shown in Baghdad in 1971, with the explicit aim of changing attitudes toward sexuality. A series of articles calling for sexual liberalization, free mixing of the sexes and gender equality were printed in state newspapers. Rohde (2008) concludes that "during the late 1960s and early 1970s a general mood of departure from established social norms existed in Iraq that bore connotations of sexual freedom" [p. 145].

> on public transportation and campuses, with men. These are the same women who are socialized to stay apart from men, protect their virginity and honor, and remain controlled by their male relatives until marriage. So on the one hand there is a tradition to keep the sexes apart, and on the other a social reality which does not.

A content analysis conducted by Mernissi (1987) of 402 letters to a religious counseling service on Moroccan state television reveals a preoccupation with issues of sexuality arising from mixing of the sexes. For example, women asked whether swimming unveiled on a mixed-sex beach or kissing a man outside of marriage is acceptable. Smith-Hefner (2007, p. 401) writes:

> [A]t Gadjah Mada University [in Indonesia], the proportion of women veiling increases dramatically between the first year of schooling and later years. Many female students describe themselves as having been confused and insecure when they first came to the university and experienced its overwhelming freedom and diversity. Campus religious organizations, friends and family members, religious teachers, and Islamic publications all reinforce a message of the dangers of free interaction between the sexes and press the case for veiling as the solution.

Bayat (2007) suggests that, "Affluent Muslim women, in comparison with men, the poor, and non-Muslims, showed a greater inclination to piety because their class position and lifestyle were more closely associated with "sin" and therefore caused guilt" [p. 158]. Accordingly, Mule & Barthel (1992, p. 324) write of educated women who take up formal employment, "It was not simply a case of their having the world to gain, as they claimed individual rights and autonomy, and freed themselves from patriarchy. They also had a world to lose: the world of traditional societal esteem" [p. 324]. As in Mule and Barthel's (1992) work, veiling in our model is a strategy for taking advantage of outside economic opportunities, while maintaining esteem within the community.

4 Identity and Values

So far, we have treated the distribution of types in the population q as exogenous. In this section, we study the effect of veiling on the intergenerational transmission of values. In this way, we make the distribution of types endogenous and study the coevolution of identity and values. Our ultimate purpose is to analyze the implications of regulations on veiling.

There are several channels by which veiling could feed back into religious values. For example, it could be easier to transmit religious values to a child when her mother veils.

The implications of this assumption are relatively clear, *a priori*. Regulations mandating a high degree of veiling increase the spread of religious values. Bans on veiling inhibit the spread of religious values.[28] We shall instead explore a more subtle feedback channel, which has some surprising implications for regulations on veiling.

4.1 Cultural Transmission of Values

We study an overlapping generations model with discrete time periods $t = 0, 1, 2, \ldots$ Let q^t be the proportion of religious types in the population at the beginning of period t. We embellish our model by assuming that at the end of each period t, every agent gives birth to one child, chooses an investment $e \geq 0$ in transmitting religious values to her child, and then dies. We think of e as representing various forms of religious education. With probability $\tau(e)$, the agent's child begins the next period with religious values. We assume that $\tau(e) \in (0, 1)$, $\tau'(e) > 0$ and $\tau''(e) \leq 0$ for all e. The cost of investment e is $k(e)$, where $k'(e) > 0$ and $k''(e) > 0$ for all e, $k'(0) = 0$ and $k'(e) \to \infty$ as $e \to \infty$.

We assume that a religious (resp. secular) type receives the payoff $\lambda_r < 0$ (resp. $\lambda_s > 0$) when her child engages in religiously prohibited behavior, and zero otherwise. This evaluation of one's child's behavior accords with the way in which people judge others in our model. It is also consistent with Bisin and Verdier's 'imperfect empathy' formulation of cultural transmission (see Bisin & Verdier 2000, 2001).

Therefore, a religious parent invests in religious education for her child to limit the chances of her child engaging in religiously prohibited behavior. The channel from religious education to religious behavior is an indirect one, which runs through identity. Only religious types regret religiously prohibited behavior. Hence they adopt higher degrees of veiling to regulate their behavior. In choosing religious education e_t then, a parent needs to calculate the difference between the degree of veiling adopted by a child with religious values and the degree of veiling adopted by a child with secular values in period $t + 1$. This difference, will depend on the parent's conjecture about the proportion of religious types at $t + 1$, which we denote by $\widehat{q}^{t+1}$. We assume that agents have rational expectations, so that $\widehat{q}^{t+1} = q^{t+1}$ in equilibrium.

Given her conjecture $\widehat{q}^{t+1}$, agent i chooses e_t to maximize the following expected payoff from her child's period $t + 1$ behavior:

[28] In a previous version of this paper, however, we demonstrated that this is not necessarily the case when agents can choose their environment, as well as their identity.

$$\tau(e_t)p\big[1-v_r^*\big(\widehat{q}^{t+1}\big)\big]\lambda_i+\big(1-\tau(e_t)\big)p\big[1-v_s^*\big(\widehat{q}^{t+1}\big)\big]\lambda_i-k(e_t), \tag{4}$$

where $v_j^*(q^t)$ is the degree of veiling adopted by a type-j child in state q^t.

Proposition 2 linked the (exogenous) spread of religious values to a rise in veiling. When religious education is introduced, we find that there are feedback effects in which veiling shapes the formation of religious values. The first-order condition for an interior investment in religious education is:

$$-\tau'(e_t^*)p\lambda_i\big[v_r^*\big(\widehat{q}^{t+1}\big)-v_s^*\big(\widehat{q}^{t+1}\big)\big]=k'(e_t^*), \tag{5}$$

which clearly depends on the difference between veiling by religious and secular types. This condition determines an agent's best response, in terms of religious education, to her conjecture $\widehat{q}^{t+1}$.

Proposition 3 *Fix a conjecture $\widehat{q}^{t+1}$. There exists a unique optimal level of religious education in period t for each type:*

(i) Religious types choose $e^*\big(\widehat{q}^{t+1}\big)$, which is positive if and only if $\widehat{q}^{t+1}>\underline{q}$.

(ii) Secular types choose zero education.

Secular parents do not invest in religious education, because they would disapprove of a religious child's attempts to limit religiously prohibited behavior by veiling. Religious types too may refrain from investing in religious education, but for a different reason. By inspection of (5), this occurs only when both types adopt the same degree of veiling, which in turn occurs only when neither type veils (i.e. when $q^{t+1}\leq\underline{q}$, by Proposition 1). The intuition is as follows: it is the gap between veiling by religious and secular types that drives differences in their behavior. Were there to be no variation in behavior between religious and secular types, there would be no reason to make a costly investment in instilling religious values. This is a simple idea, but one can deduce quite a lot from it.

Rational expectations requires that agents' conjectures are confirmed in equilibrium. Note that:

$$q^{t+1}=q^t\tau\big(e^*\big(\widehat{q}^{t+1}\big)\big)+\big(1-q^t\big)\tau(0)\equiv h\big(e^*(\widehat{q}^{t+1}),q^t\big). \tag{6}$$

The belief $\widehat{q}^{t+1}$ is *self-confirming* if $\widehat{q}^{t+1} = h\big(e^*(\widehat{q}^{t+1}), q^t\big)$. In each period t, q^{t+1} is determined by a self-confirming belief. A steady state, denoted by q^*, has an additional property: $q^* = h(e^*(q^*), q^*)$.

Proposition 4 *The evolution of religiosity is characterized as follows:*

(i) In each period t, there exists at least one self-confirming belief $\widehat{q}^{t+1} = q^{t+1}$,

(ii) There exists at least one steady state q^*.

In addition, every self-confirming belief and steady state is interior, i.e. both types are present.

The process q^t can exhibit several forms of complexity. Firstly, there could be multiple self-confirming beliefs in a given period, so that changes in behavior could be induced by self-fulfilling shifts in expectations regarding future religiosity. Secondly, there could be multiple steady states. Thirdly, we cannot rule out limit cycles in certain cases. The important point is that such complexity is due entirely to veiling. In the absence of veiling, there is a unique steady state and it is globally asymptotically stable.[29] Hence, in a dynamic setting with endogenous values, veiling generates a complex interactive process. Despite this complexity, we can say quite a lot about the effects of regulating veiling.

4.2 Regulating Identity

The dynamic model can be used to analyze how different policies affect the religiosity of the population. We continue to denote the state of the process under unrestricted veiling by q^t. For the counterfactual, denote the state of the process when veiling is regulated by Q^t. We can present the following result:

Proposition 5 *Prior to religious education in period $T > 0$, announce a regulation that sets veiling at some common level v for all agents and all $t > T$. Then $Q^t \leq q^t$ for all $t > T$, regardless of v.*

[29] Without veiling, behavior would be the same across religious and secular types. This implies that no investment in religious education is undertaken by either type. As such, the state in period $t+1$ would be $q^{t+1} = q^t\tau(0) + (1-q^t)\tau(0) = \tau(0)$, regardless of q^t. Hence, there would be an immediate transition to the unique steady state $q^* = \tau(0)$ from any initial state.

If at least one type would have veiled in the absence of regulation in some period $t > T$, then the inequality is strict for some $t > T$.

Hence a ban on veiling, $v = 0$ for all agents, dampens religiosity, as does a policy mandating full veiling, $v = 1$ for all agents.

Once again, variation in veiling drives a wedge between the behavior of religious and secular types and thereby induces religious parents to invest more heavily in religious education for their children. Hence the *level* of veiling prescribed by a regulation does not matter as much for religious values as the *variation* in veiling that it induces. Any regulation that sets veiling at some *common* level for all agents, regardless of the level, leads to the same steady-state proportion of religious types $Q = \tau(0)$, which is less than the proportion of religious types in any state in which at least one type would veil.

The only difference between the effect of a ban on veiling $v = 0$ and mandatory veiling $v = 1$ is the effect on behavior. In our model, higher standards of veiling lead to lower levels of religiously prohibited behavior, and they do so uniformly across types. Still changes in the distribution of types induced by regulations on veiling may matter. Laws mandating high degrees of veiling for all women, as in Iran and Saudi Arabia, may yield benefits, from the perspective of religious authorities, in terms of lower levels of religiously prohibited behavior. However, our analysis suggests that there are also potential costs in terms of a lower demand for religious educational services, and the consequent spread of secular values which could undermine political support for religious organizations (something that is outside the scope of our model). This is consistent with some ethnographic and survey-based research and warrants further investigation. In his comparative study of religiosity in Iran and Egypt, Bayat (2007) argues that Egyptians, who face no restrictions on veiling, tend to have stronger religious values than Iranians. Accordingly, Hassan (2007) presents survey evidence that 49 percent of Egyptians read the Quar'an several times or more per week, compared to 25 percent of Iranians.

We shall now take a second look at the implication that bans on veiling lead to secularization. If our model is embellished slightly, so that agents can choose their environment as well as their identity, then the opposite may occur. We demonstrate that, under certain conditions, bans on veiling may actually inhibit social integration by religious types and trigger the spread of *religious* values.

4.3 Integration and Bans on Veiling

Suppose that agents choose whether to *segregate* by interacting only in their community or *integrate* by taking up study/work outside the community. Denote the integration decision by $\ell \in \{0, 1\}$, where $\ell = 0$ is segregation and $\ell = 1$ is integration. Let the (additive) return to integration in period t be b_t, which might reflect higher wages, superior leisure opportunities, etc. There is also a potential cost to integration. Denote the degree of temptation by p_ℓ, where $p_1 > p_0 = 0$ so that integration exposes an agent to a more tempting environment. In other words, segregation can serve as a (costly) substitute for veiling, by limiting an agent's temptation to engage in religiously prohibited behavior.[30]

In each period, social integration is characterized as follows:

Proposition 6 *For each q^t, there exist thresholds $\underline{b}(q^t)$ and $\overline{b}(q^t)$, such that:*

(i) If $b_t \leq \underline{b}(q^t)$, then both types segregate in period t,

(ii) If $\underline{b}(q^t) < b_t \leq \overline{b}(q^t)$, then religious types segregate and secular types integrate in period t,

(iii) If $b_t > \overline{b}(q^t)$, then both types integrate in period t.

When the return to integration is sufficiently low (resp. high), both types segregate (resp. integrate). When the return to integration lies in an intermediate range, however, secular types integrate while religious types segregate. Secular types are more inclined to integrate because they do not experience regret from engaging in religiously prohibited behavior, so the move to a more tempting environment is less costly for them.

Now suppose that a ban on veiling in public spaces (e.g. schools, universities) is introduced. When integrating a woman must choose veiling $v = 0$. We can compute the corresponding thresholds for integration under the ban. Denote these thresholds by $\underline{\beta}(q^t)$ and $\overline{\beta}(q^t)$, respectively.

Proposition 7 *A ban on veiling inhibits integration in the following way:*

(i) If $q^t > \overline{q}$, then $\underline{\beta}(q^t) > \underline{b}(q^t)$. Otherwise, $\underline{\beta}(q^t) = \underline{b}(q^t)$.

[30] The results hold for any p_0 less than p_1, as long as a lower p environment induces a lower level of religiously prohibited behavior.

(ii) If $q^t > \underline{q}$*, then* $\overline{\beta}(q^t) > \overline{b}(q^t)$*. Otherwise,* $\overline{\beta}(q^t) = \overline{b}(q^t)$*.*

In addition, $\overline{\beta}(q^t) > \underline{\beta}(q^t)$ *for all* q^t*.*

Agents in our model veil to avoid personal regret and/or social disapproval. A ban on veiling imposes a cost on agents who would otherwise integrate and veil. They can no longer use veiling to preserve their reputation within the community, while taking up economic opportunities outside the community. Hence a ban on veiling inhibits social integration.

We shall now show that a ban on veiling can also lead to higher levels of religiosity:

Proposition 8 *Prior to religious education in period* $T > 0$*, announce a ban on veiling for all* $t > T$*, so that agents who integrate must choose* $v = 0$*. Suppose that without the regulation, at least one type would integrate and choose a positive degree of veiling in period* $T + 1$*.*

(i) If $\underline{\beta}(Q^t) < b_t \leq \overline{\beta}(Q^t)$ *for all* $t > T$*, then* $Q^t > q^t$ *for all* $t > T$*. That is, the ban increases religiosity in every period after it is introduced.*

(ii) If $b_t > \overline{\beta}(Q^t)$ *for all* $t > T$*, then* $Q^t \leq q^t$ *for all* $t > T$ *and the inequality is strict for some* $t > T$*. That is, the ban reduces religiosity.*

The proposition begins by supposing that, in the absence of regulation, at least one type would integrate and veil in the period in which the ban is introduced. This is the relevant case for policy analysis. If no type would integrate and veil, then a ban on veiling in public spaces would be moot. Proceeding from such a state, we have shown that if the return to integration lies in some intermediate range, then a ban on veiling can increase religiosity in the community. This works as follows. If the return to integration is high enough so that after introducing the ban secular types continue to integrate without veiling, but low enough that religious types segregate, then the ban accentuates the difference between veiling/behavior by religious and secular types. This induces religious parents to increase investment in religious education, leading to an increase in Q. In our model, women use veiling as a strategy for taking up outside economic opportunities while maintaining esteem within their community. The effect of a ban on veiling depends on whether removing the option to veil induces agents to adopt more costly substitutes for veiling such as segregation.

Empirical evidence suggests that this is a genuine consideration. In recent work, Meyersson (2010) uses a regression discontinuity design, to compare the economic outcomes of elections where an Islamic party won or lost municipal mayor seats by a narrow margin. He finds that rule by an Islamic party leads to higher female (secular) education, particularly in poorer and more religious areas. Islamic rule also leads to greater female labor force participation and shifts in female employment from agriculture to services. Meyersson provides evidence that ruling Islamic parties increased provision of religious "add ons" such as Qur'anic study centers, prayer rooms and dormitories where the headscarf could be worn, creating a more religious educational environment that induced conservative Muslims to send their daughters to state schools, where the headscarf is banned. This suggests that one's choice of veiling and one's general environment are substitutes.

The effect of a ban on veiling could still go the other way, however. A ban on veiling homogenizes behavior among agents who continue to integrate and thereby reduces returns to religious education. Hence, if the economic opportunities available to Muslim women are attractive enough for them to continue to integrate without veiling, then a ban on veiling would lead to lower levels of religiosity. We remark that this in turn reduces the social disapproval of integration in subsequent periods, so that a lower b_t is required to induce both types to integrate. Hence a ban on veiling can lead to secularization when combined with even a *temporarily* high return to integration for Muslim women. Indeed, there are historical examples of successful state attempts at secularization, from Ataturk's creation of a secular class in Turkey to the widespread secularization effected in Communist Eastern Europe (e.g McCleary & Barro 2006, p. 163).

These results call for further empirical work on the effects of regulating social identity. For example, one could assess the impact of the 2004 French headscarf ban in public schools on educational participation and religiosity among Muslims in France. Ultimately, the right veiling policy is a broader matter of justice. But our analysis does suggest that the consequences of banning veiling depend on the economic opportunities faced by Muslim women.

5 Conclusion

The new veiling movement is missing from the list of canonical case studies in the economics of identity (see Akerlof & Kranton 2010). Features of the movement defy conventional theories of identity and religion, leading us to introduce a new notion of social

identity and an alternative framework for modeling social influence. We believe that treating veiling as a commitment mechanism, which limits temptation to violate social norms, provides a useful framework for understanding contemporary patterns of veiling in both predominantly Muslim and non-Muslim societies. Nevertheless, veiling is a highly complex phenomenon; we do not pretend to understand it completely, nor do we suggest that other motivations play no role in veiling. We have developed a formal model that suggests one possible explanation for veiling among educated, working women and also contributes new insights to the debate over bans on veiling. In particular, we suggest that attempts to regulate veiling can turn out to be counterproductive, regardless of whether they are motivated by secular or religious objectives. We hope the analysis provides some guidance for future theoretical and empirical work on the economic consequences of veiling, in terms of the educational and labor market transitions of Muslim women. Finally, we believe the notion of social identity and model of social influence introduced here may yield some broader insights in future research.

Appendix

Proof of Proposition 1. Differentiating the agent's payoff given by (1) with respect to v yields the following first-order condition for an interior solution:

$$-p\big[\lambda_i + q\lambda_r + (1-q)\lambda_s\big] \;=\; c'(v). \tag{7}$$

As $c'(v) > 0$, the term in square brackets must be negative at an interior solution. This requires that $q > \underline{q} \equiv \frac{\lambda_s+\lambda_r}{\lambda_s-\lambda_r}$ for $i = r$ and $q > \overline{q} \equiv \frac{2\lambda_s}{\lambda_s-\lambda_r}$ for $i = s$. Otherwise, $dU_i/dv < 0$ for all v, so that equilibrium veiling is zero.

To establish that an interior solution to (7) is unique, recognize that the left-hand side (LHS) is a positive constant. The RHS is strictly increasing (as c is strictly convex) and by assumption goes through the positive real line as v goes through the unit interval. Therefore, there is a unique value of v that satisfies (7), as well as the second-order condition for a maximum. □

Proof of Proposition 2. The comparative statics are derived by implicit differentiation of (7). First, with respect to p, we have:

$$\frac{dv}{dp}c''(v) \;=\; -\big[\lambda_i + q\lambda_r + (1-q)\lambda_s\big]. \tag{8}$$

Recall that $\left[\lambda_i + q\lambda_r + (1-q)\lambda_s\right] < 0$ at an interior solution. In addition, $c''(v) > 0$ by assumption. Therefore, sign$\{dv/dp\}$ equals the sign of the RHS of (8), which is positive.

The results for q, $|\lambda_r| = -\lambda_r$ and λ_s are derived in the same manner. □

Proof of Proposition 3. Consider the first-order condition, (5). On the RHS, $k'(e_t)$ goes from zero to ∞ as e_t goes through the unit interval. For there to be a positive solution $e_t^* > 0$ to (5) then, the LHS must be greater than zero.

Recall that both p and $\tau'(e_t)$ are positive, by assumption. By Proposition 1, $v_r^*\big(\widehat{q}^{t+1}\big) - v_s^*\big(\widehat{q}^{t+1}\big) > 0$ if $\widehat{q}^{t+1} > \underline{q} \equiv \frac{\lambda_s+\lambda_r}{\lambda_s-\lambda_r}$ and zero otherwise. In addition, $\lambda_s > 0 > \lambda_r$. Taken together, these imply that the LHS is positive, and hence $e^*\big(\widehat{q}^{t+1}\big) > 0$, if and only if the agent is a religious type and $\widehat{q}^{t+1} > \underline{q} \equiv \frac{\lambda_s+\lambda_r}{\lambda_s-\lambda_r}$. In this case, the LHS is decreasing in e_t, by the concavity of τ, and the RHS is strictly increasing in e_t, because $k''(e_t) > 0$ for all e_t by assumption. Therefore, there exists a unique value of e_t that satisfies (5), as well as the second-order condition for a maximum.

If $\lambda_i = \lambda_s > 0$ or $\widehat{q}^{t+1} \leq \underline{q}$, then the parent's payoff is decreasing in e_t, so that optimal religious education is zero. □

Proof of Proposition 4. (i) Recall that:

$$q^{t+1} = q^t \tau\big(e^*(\widehat{q}^{t+1})\big) + \big(1-q^t\big)\tau(0) \equiv h\big(e^*(\widehat{q}^{t+1}), q^t\big). \tag{9}$$

By assumption, $0 < \tau(e) < 1$ for all e. Hence, $0 < h(e,q) < 1$ for all (e,q). Therefore, every self-confirming belief $\widehat{q}^{t+1} = h\big(e^*(\widehat{q}^{t+1}), q^t\big)$ satisfies $0 < \widehat{q}^{t+1} < 1$.

We claim that h is a continuous function of $\widehat{q}^{t+1}$. Then the fact that $h\big(e^*(\widehat{q}^{t+1}), q^t\big) \in (0,1)$ implies that for each q^t there exists at least one fixed point of h, by Brouwer's fixed-point theorem. The claim holds because $\tau\big(e^*(\widehat{q}^{t+1})\big)$ is continuous in $e^*(\widehat{q}^{t+1})$ by assumption, which equals $e^*(q^{t+1})$ in equilibrium. In turn, $e^*(q^{t+1})$ is continuous in $v_r^*(q^{t+1})$ and $v_s^*(q^{t+1})$ [see (5)], and $v_r^*(q^{t+1})$ and $v_s^*(q^{t+1})$ are both continuous in q^{t+1} [see (7)].

(ii) In a steady state, $q^* = h\big(e^*(q^*), q^*\big)$. Once again, $0 < h(e,q) < 1$ for all (e,q). Therefore, every fixed point of h satisfies $0 < q^* < 1$.

As before, we can show that $h\big(e^*(q^*), q^*\big)$ is a continuous function of q^*, so the fact that $0 < h\big(e^*(q^*), q^*\big) < 1$ implies that there exists at least one fixed point of h, by Brouwer's fixed-point theorem.

This establishes the proposition. □

Proof of Proposition 5. By assumption, $\tau'(e) > 0$ for all e. Therefore, $q^t\tau(0) + \big(1 - q^t\big)\tau(0) = \tau(0)$ is a lower bound on q^{t+1}, which is independent of q^t. We claim that $Q^t = \tau(0)$ for all $t > T$. It follows that $Q^t \leq q^t$ for all $t > T$.

To establish the claim, inspect the first-order condition (5). If veiling is the same for both types in period t, then $e^*_{t-1} = 0$, so that Q^t is equal to $\tau(0)$. The regulation imposes a common degree of veiling across types for $t > T$. Therefore, $Q^t = \tau(0)$ for all $t > T$.

If religious types would have veiled at some $t > T$ without regulation, then at such a t, $v^*_r(q^t) > v^*_s(q^t)$ by Proposition 1, so that $e^*_{t-1} > 0$. Note that $q^{t-1} > 0$ for all $t - 1 > 0$ because $\tau(0) > 0$. By hypothesis, $t - 1 \geq T > 0$. Therefore, $q^t > Q^t = \tau(0)$. □

Proof of Proposition 6. Denote agent i's equilibrium degree of veiling when integrating by v^*_i. The expected payoff to agent i from integrating in period t is $b_t + p_1(1 - v^*_i)[\lambda_i + q^t\lambda_r + (1 - q^t)\lambda_s] - c(v^*_i)$. The expected payoff from segregating is zero, because $p_0 = 0$ so that agents do not veil. Therefore, agent i integrates if and only if:

$$b_t > -p_1(1 - v^*_i)[\lambda_i + q^t\lambda_r + (1 - q^t)\lambda_s] + c(v^*_i). \tag{10}$$

Denote the RHS of (10) by $\underline{b}(q^t)$ for $i = s$ and $\overline{b}(q^t)$ for $i = r$, so that secular types integrate if and only if $b_t > \underline{b}(q^t)$ and religious types integrate if and only if $b_t > \overline{b}(q^t)$.

Finally, $\overline{b}(q^t) > \underline{b}(q^t)$ if:

$$-p_1(1-v^*_r)[\lambda_r+q^t\lambda_r+(1-q^t)\lambda_s]+c(v^*_r) > -p_1(1-v^*_s)[\lambda_s+q^t\lambda_r+(1-q^t)\lambda_s]+c(v^*_s). \tag{11}$$

Recall that v^*_s is the unique minimizer of the RHS of (11). Hence, (11) is satisfied if:

$$-p_1(1-v^*_r)[\lambda_r+q^t\lambda_r+(1-q^t)\lambda_s]+c(v^*_r) > -p_1(1-v^*_r)[\lambda_s+q^t\lambda_r+(1-q^t)\lambda_s]+c(v^*_r), \tag{12}$$

which in turn holds because $\lambda_r < \lambda_s$. □

Proof of Proposition 7. When integrating $v = 0$, so that agent i now integrates if and only if:

$$b_t > -p_1[\lambda_i + q^t\lambda_r + (1 - q^t)\lambda_s] + c(0). \tag{13}$$

Denote the RHS of (13) by $\underline{\beta}(q^t)$ for $i = s$ and $\overline{\beta}(q^t)$ for $i = r$. Notice that $\overline{\beta}(q^t) > \underline{\beta}(q^t)$ because $\lambda_s > \lambda_r$.

If $q^t > \underline{q}$, then $v_r^* > 0$ by Proposition 1(i). As v_r^* is, by definition, the unique minimizer of the RHS of (10):

$$-p_1[\lambda_r + q^t\lambda_r + (1-q^t)\lambda_s] + c(0) > -p_1(1-v_r^*)[\lambda_r + q^t\lambda_r + (1-q^t)\lambda_s] + c(v_r^*). \quad (14)$$

This implies that, for $i = r$, the RHS of (10) is less than the RHS of (13), so that $\overline{\beta}(q^t) > \overline{b}(q^t)$.

If $q^t \leq \underline{q}$, then $v_r^* = 0$ zero by Proposition 1(i), so that the RHS of (10) equals the RHS of (13) for $i = r$, i.e. $\overline{\beta}(q^t) = \overline{b}(q^t)$. This establishes part (ii) of the proposition.

The same argument can be applied to $i = s$ to establish part (i). □

Prior to proving Proposition 8, let us establish the following lemma. Let E_t^* (resp. e_t^*) denote optimal religious education by religious types in period t under (resp. without) the ban on veiling hypothesized in Proposition 8.

Lemma 1. If $\underline{\beta}(Q^t) < b_t \leq \overline{\beta}(Q^t)$ for all $t > T$, then:

(i) $E_T^* > e_T^*$,

(ii) $E_t^* \geq e_t^*$ for all $t > T + 1$.

Proof. (i) If $\underline{\beta}(Q^t) < b_t \leq \overline{\beta}(Q^t)$ for all $t > T$, then religious types segregate and secular types integrate in each period $t > T$, under the ban, by Proposition 7. As before, secular parents choose zero religious education. Since religious types segregate, they don't engage in religiously prohibited behavior. Religious education by religious parents is then given by the solution to the first-order condition:

$$-\tau'(E_t^*)p_1\lambda_r = k'(E_t^*) \quad (15)$$

for $t \geq T$. Notice that $-p_1\lambda_r > 0$, because $\lambda_r < 0$. Therefore, $E_t^* > 0$ for $t \geq T$.

In the absence of the ban, at least one type would have integrated and veiled in period $T + 1$, by hypothesis. This leaves two possible cases.

Case 1: Religious types (and hence secular types) would have integrated in period $T + 1$. Religious education by religious parents is given by:

$$-\tau'(e_T^*)p_1[v_r^* - v_s^*]\lambda_r = k'(e_T^*). \quad (16)$$

We know that $v_r^* < 1$. Therefore, $p_1\lambda_r > p_1[v_r^* - v_s^*]\lambda_r$, so that $E_T^* > e_T^*$.

Case 2: Secular types would have integrated and veiled and religious types would have segregated in period $T+1$. Religious education by religious parents is given by:

$$-\tau'(e_T^*)p_1(1-v_s^*)\lambda_r = k'(e_T^*). \tag{17}$$

As $v_s^* > 0$, $p_1\lambda_r > p_1[1-v_s^*]\lambda_r$, so that $E_T^* > e_T^*$.

This establishes part (i) of the lemma.

(ii) For $t > T$, E_t^* is given by (15). We need to show that $E_t^* \geq e_t^*$ for all $t > T$. In cases 1 and 2 above, we have shown that $E_t^* > e_t^*$. Two cases remain. Firstly, if both types would have segregated, neither would have engaged in religiously prohibited behavior (because $p_0 = 0$), so that $e_t^* = 0 < E_t^*$. Secondly, if secular types would have integrated and chosen $v_s^* = 0$, and religious types would have segregated, then e_t^* is given by:

$$-\tau'(e_T^*)p_1\lambda_r = k'(e_T^*), \tag{18}$$

so that $e_t^* = E_t^*$. This establishes the Proposition. □

Proof of Proposition 8. (i) Recall that $q^{T+1} = q^T\tau(e_T^*) + \big(1-q^T\big)\tau(0) > 0$. By Lemma 1(i), $E_T^* > e_T^*$. This implies that $Q^{T+1} = q^T\tau(E_T^*) + \big(1-q^T\big)\tau(0) \equiv h(E_T^*, q^T) > h(e_T^*, q^T) \equiv q^{T+1}$, since $\tau'(e) > 0$ for all e by assumption.

By Lemma 1(ii), $E_t^* \geq e_t^*$ for all $t > T$. Recall that $E_t^* > 0$ for all $t \geq T$. Combined with Lemma 2, this implies that $Q^{T+2} \equiv h(E_{T+1}^*, Q^{T+1}) > h(E_{T+1}^*, q^{T+1}) \geq h(e_{T+1}^*, q^{T+1}) \equiv q^{T+2}$.

Iterating this argument yields the result, $Q^t > q^t$ for all $t > T$.

(ii) By hypothesis, $b_t > \overline{\beta}(Q^t)$ for all $t > T$. Therefore, both types integrate in each period $t > T$ by Proposition 7. Under the ban they choose the same degree of veiling $v = 0$ in each period. Hence $E_t^* = 0$ for all $t \geq T$.

By hypothesis, at least one type would have integrated and veiled in period $T+1$, without the ban. As above, this leaves two cases. By (16), $e_T^* > 0$ in case 1, because $v_r^* > v_s^*$ whenever one type veils, by Proposition 1. By (17), $e_T^* > 0$ in case 2, because $v_s^* < 1$. Hence, $e_T^* > 0$. Therefore, $Q^{T+1} \equiv h(0, q^T) < h(e_T^*, q^T) \equiv q^{T+1}$.

Because $E_t^* = 0$ for all $t > T$, $E_t^* \geq e_t^*$ for all $t > T$. Hence, $Q^{T+2} \equiv h(0, Q^{T+1}) \leq h(e_t^*, Q^{T+1}) \leq h(e_t^*, q^{T+1}) \equiv q^{T+2}$.

Iterating this argument yields the result, $Q^t \leq q^t$ for all $t > T$ and $Q^t < q^t$ for some t, including $t = T + 1$. □

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