Schooling and the Intergenerational Transmission of Values

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Abstract

We present a model in which schooling transmits the values of a host society to the children of a minority community that cares about its traditional values. The evolution of community values is governed by a dynamic process that is driven by the extent to which parents expose children to formal education. It is shown that the dynamic process can lead to separation, assimilation, or a melting pot. Separation arises when the community choose not to participate in formal education in order to preserve traditional values but at the cost of perpetually low incomes. If all families in the community choose education then the steady state is either assimilation (the convergence of the community values to the fixed values of the host society) or a melting pot (the values of the host society adjust to those of the community). The steady state level of education may be non-unique, and are Pareto-ranked with the highest steady state level being Pareto-dominant. Simulations are used to illustrate the dynamic paths that can arise.

Key words: values, education policies, overlapping generations.

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1 Introduction

Immigration has featured as an increasingly important political issue in European debates over the past two decades, and the integration of migrants into their host societies is a subject raising anxieties both in the recipient countries

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and amongst the migrants themselves. One of the most important channels for integration is the schooling process. In the United Kingdom, nearly three quarters of teachers (72%) regard the promotion of British values as part of a teacher’s role, with one in five teachers (21%) seeing this as a central part.\(^1\) This is despite the fact that the poll found that there were a significant proportion of teachers (36%) who did not identify strongly as being British.\(^2\) For many immigrant communities the consequence of schooling is that their values and the values of the host society gradually converge over time until the community is assimilated within the host. One remarkable example is the history of the Jewish community that developed in the East End of London from 1880 onwards. Approximately 120,000 immigrants from Eastern Europe settled in Spitalfields between 1881 and 1914 with the concentration such that the population of some districts was up to 95 per cent Jewish; the area had over 40 synagogues, and Yiddish was the predominant language on street signs and in newspapers. However, according to the Board of Trade report of 1894, “children left the Jews’ Free School on Bell Lane ‘almost indistinguishable’ from English children. Religious rituals also gradually became less distinctive, and fewer people spoke Yiddish.”\(^3\) This once large, vibrant and distinctive community has now been entirely absorbed into British society and, in the East End, only the historical record remains.

This paper models how the values of the host society, promoted by the system of education, and the values of a migrant community interact in shaping the identity of the new generation of the community members. The analysis shows how values change across generations when children’s values are shaped both by their families and their schooling, so that the reference norms for each new generation can be different from those of the previous one. We trace the dynamic interaction between the values and show when the process will lead to either assimilation of the community or lasting separation between the community and the host society. The important policy conclusion is that separation results from the education of community children being restricted by their parents to prevent or minimize exposure to host society values. This leaves the community in a permanently disadvantaged economic position due to the low level of education that is chosen.

There exists a large literature looking at the social and economic position of migrants and their children in Europe and North America (for a comprehensive review see Corak, 2004; and for a recent study of the Canadian case see Aydemir et al., 2009 and 2013). The common finding is that some socioeconomic outcomes are transmitted from immigrant parents to their children, though convergence to host society outcomes also occurs over time. For example, Blau et

\(^1\) Data from YouGov research, commissioned by Teachers TV.
\(^2\) Press release of Teachers TV published online (http://www.teachers.tv/node/29223). Research was conducted online by YouGov Plc between 17th and 22nd September 2008. YouGov interviewed 643 primary and secondary school teachers. Results have not been weighted. YouGov is a member of the British Polling Council.
al. (2008) found that after two generations education and labour supply of immigrants converge to those of the host population (between 4 and 13 per cent of education and between 3 and 4 per cent of labour supply shortfall); fertility, however, shows more persistence (between 16 and 42 per cent of excess fertility remains).

Research on the evolution of ethnic identity by immigrants shows that values are important to the process of creating an ethnic identity and the latter is then an important determinant of economic choices. Constant et al. (2009) define ethnic identity as ‘the balance between commitment or self-identification with the culture and society of origin and commitment or self-identification with the host culture and society, achieved by an individual after migration’ (p.276), and discuss possible outcomes of the process in terms of assimilation (cultural and social conformity), integration (strong identification with ethnic culture and social conformity to host society), marginalization (weak cultural identification and weak social conformity), and separation (strong identification to culture of origin and weak involvement in host society). Reese (2001) discusses the adaptive struggle faced by Mexican immigrants in the United States trying to raise children who would do well economically but not fall prey to the ‘moral dangers’ of the host society. These processes are not uniform across immigrant communities and depend on a variety of factors, including children’s gender: Patel et al. (1996), for example, show for the case of Gujarati immigrant families in the US that parental attitudes and behavior are affected differently by factors such as modernity, acculturation, and time in the US, depending on parent’s and child’s gender.

These and similar findings in the sociological and economic literature provide evidence of a process of values transmission across generations, influenced by the values of the host society and mediated by various policy channels addressing social inclusion. In this paper we concentrate on the effect of education, and, in particular, on the mitigation of the degree of conformity with school norms by the conformity with community norms (a reflection of the ethnic and social mix of the neighborhood of residence). In our model the frame of reference for each generation are the norms of their parents and those of the host society. Social norms and values have long featured in explanations of individual and group behavior by economists since the early work on social norms and conformism by Akerlof (1980) and Jones (1984). At the same time, the role of identity in individual welfare and decision-making has only relatively recently featured in economic models. Our approach falls within the tradition of the economics of social norms and identity (Akerlof and Kranton, 2000) in which norms act as motivating devices and the inherent sociability of humans creates a loss of utility from not conforming with the prevailing norms. The key assumption in our model is of two-way interaction of values between a minority community and the host society. This interaction occurs through the system of education, so that the evolution of values over time is determined endogenously. This is in contrast to the approach introduced by Bisin and Verdier (2001) and developed, for example, in Saëz-Martí and Sjogren (2008) and Corneo and Jeanne (2009, 2010), who model the evolution of values as a random process with exogenously
fixed probability distribution. Dasgupta and Kanbur (2005, 2007) consider a similar interaction between the values of two coexisting communities. In their framework values are modelled as a local public good, with members of the community affecting them directly by choosing their contributions towards its provision. In our model the behavior of agents affects the values indirectly, through the choice of education.

In the next section we present our model of educational choice and characterize the potential steady state equilibria. Section 3 explores multiplicity of equilibria in more detail using numerical simulations. In Section 4 we discuss the policy implications of the results and provide conclusions. All proofs are in the Appendix.

2 The Model

Consider a community of \( n \) families whose traditional values differ from the values of the host society outside the community. This could, for example, be a community of immigrants or a religious minority. To analyze the dynamics of the community values when new generations are exposed to the external society values through the education process we use a two-period overlapping generations model. Schooling is received in the first period of life, and in the second period each adult works. Each adult has only one child, and so there is no population growth. Earnings depend on education received, and are divided between consumption and investment in the education of the child. There is intergenerational altruism which motivates the provision of education; there are no bequests.

In the first period of life each individual receives education with the amount chosen by their parent. There is a minimal level of education, or basic skills, that can be obtained by home schooling at no cost; without loss of generality we normalize it to zero. Any formal education beyond this minimal level has a material cost. In the second period each individual works and divides their earnings between consumption and investment in education of their offspring. The formal education system is maintained by the host society and performs two roles: an academic role and a social role. In the academic role education enhances a student’s skills and, therefore, increases his or her future labour earnings. In the social role it promotes the values of the host society and, therefore, affects the identity of a student. Parents care about their offspring’s future wealth, as well as about preserving traditional values of the community. In particular, they dislike their children’s values deviating from the values currently prevailing in the community.

The adult member of family \( i \) at time \( t \) has values given by \( \theta_i^t \). The parameter \( \theta_i^t \) can be interpreted as an aggregate of a number of factors (for example, respect for elderly, status of women, tolerance to pre-marital relationships, religiosity). The community mean value is the mean of the values of the adults alive at time
\[ t \]

\[ \theta_i^C = \frac{1}{n} \sum_{i=1}^{n} \theta_i^i. \]  

(1)

The preferences of adult \( i \) at time \( t \) are described by

\[ U_i^t = u (x_i^t) + v (w_{i+1}^t) - g \left( \left[ \theta_{i+1} - \theta_i^C \right]^2 \right), \]

where \( x_i^t \) is consumption of the adult, \( w_{i+1}^t \) the wage that their child receives in \( t+1 \), and \( \theta_{i+1}^t \) measures the child’s values. We impose the standard assumptions that \( u', v', g' > 0 \), and \( u'', v'' < 0 \). We also assume that \( g (0) = 0 \) and \( g > 0 \) everywhere else.

The child’s value of \( \theta_{i+1}^t \) depends on the education received, \( e_i^t \), the parent’s values, \( \theta_i^t \), and the values prevailing in the host society and promoted by the schooling system, \( \theta_i^H \). We model \( \theta_{i+1}^t \) as a weighted sum of \( \theta_i^t \) and \( \theta_i^H \):

\[ \theta_{i+1}^t (e_i^t) = \left[ 1 - \lambda \left( e_i^t \right) \right] \theta_i^t + \lambda \left( e_i^t \right) \theta_i^H. \]  

(2)

The weighting function, \( \lambda \left( e_i^t \right) \), is assumed to satisfy

\[ \lambda (0) = 0, \lambda' (e) > 0, \lambda'' (e) \leq 0, \lambda (e) \leq 1 \forall e \geq 0. \]  

(3)

Thus, when community members are not exposed to education outside the community their values do not change. This assumption is consistent with findings from longitudinal studies of the children of immigrants. Furthermore, the assumption that the weight on host society values increases at a decreasing rate with education implies that primary education (\( e_i^t \) close to zero) has the strongest leverage on values. Thus, for a given a level of education, an individual will develop values closer to the community if the leverage of primary education on values is small and they are further from school norms (Akerlof and Kranton, 2002). Conversely, an individual will develop values closer to those of the host society values if the leverage of primary education on values is large (Phinney et al., 2000) and they have a better initial fit with school norms (Goldin and Katz, 1997; Alesina et al., 1999).

The adult in family \( i \) at time \( t \) chooses \( x_i^t \) and \( e_i^t \) to maximize their utility, \( U_i^t \), subject to

\[ e_i^t \geq 0 \text{ and } w (e_{i-1}^t) \geq x_i^t + c (e_i^t), \]

where \( c (e) \) is the cost of education and \( w (e) \) is the relationship between the wage and education. We assume that

\[ w (0) = w_0 > 0, \quad w' > 0, \quad w'' \geq 0, \quad c (0) = 0, \quad c' > 0, \quad c'' > 0. \]

At the optimum the budget constraint binds, and the optimal \( e_i^t \) is determined by the first order condition along with the complementary slackness condition,

\[ \begin{cases} -u' c' (e_i^t) + v' w' (e_i^t) - 2g' \lambda' (e_i^t) \leq 0, \\ e_i^t \geq 0. \end{cases} \]  

(4)

5
where

\[ L(\theta_i^t, e_i^t) = \left[ \theta_i^H - \theta_i^t \right] \left[ \theta_i^t - \theta_i^C \right] + \lambda \left( e_i^t \left[ \theta_i^H - \theta_i^C \right] \right)^2. \] (5)

At an interior optimum the first condition becomes an equality so the chosen level of education equalizes the marginal benefit from education to the marginal cost of education comprised of the physical cost of education and the marginal disutility from the change in the offspring’s values caused by school education. When marginal cost exceeds marginal benefit a \( e_i = 0 \) the optimal choice of education is zero.

It follows from the individual choice of education level that we can write

\[ e_i = e \left( \theta_i^t, \theta_i^C, \theta_i^H \right). \]

The evolution of individual values conditional on the process \( \theta_i^H \) is then given by the \( n \) first-order difference equations

\[ \theta_{i+1}^t = \left[ 1 - \lambda \left( e \left( \theta_i^t, \theta_i^C, \theta_i^H \right) \right) \right] \theta_i^t + \lambda \left( e \left( \theta_i^t, \theta_i^C, \theta_i^H \right) \right) \theta_i^H, \]

and the solutions combine to give the mean value (1). The process \( \theta_i^H \) and the difference equations determine the dynamics of values starting from any initial position \( \{e_{-1}, \theta_0, \theta_0^H\} \).

We consider two scenarios for the process \( \theta_i^H \):

1. \( \theta_i^H \) is exogenously fixed.
   \[ \theta_i^H = \theta^H \forall t = 0, 1, \ldots \]
   In this scenario the values of the host society promoted by the educational system are not influenced by the community nor do they change over time.

2. \( \theta_i^H \) evolves according to the process
   \[ \theta_{i+1}^H = f \left( \theta_i^H, \theta_i^C \right). \]
   This process is intended to describe a situation when the community is influential, perhaps, because of its large size or the scope of activities, so that its values affect the values of the host society.

2.1 Steady state: separation and assimilation

We define a steady state of the economy as one characterized by a constant level of education across the generations in the same family, and constant community and social values. It is now shown that there are several possible types of steady state with different implications for social structure.

The first result shows that an extreme outcome is possible in which the community remains separated from the host society. To state the result succinctly, let \( F \left( \theta_0^H \right) \equiv -w'c' \left( 0 \right) + v'w' \left( 0 \right) - 2g'x' \left( 0 \right) \left[ \theta_0^H - \theta_0^C \right] \left[ \theta_0^H - \theta_0^C \right] \).
Lemma 1 (Separation) If $H_t$ follows process 1 and, at time 0, $F(\theta_0^H) < 0$ for all $i = 1, ..., n$, then $e_i^t = 0$ and $\theta_i^t = \theta_0^H$ for all $i = 0, ..., n$ and $t \geq 0$.

The outcome described in Lemma 1 is one in which no family in the community chooses to invest in education. As a consequence the values of the families in the community remain constant from generation to generation, and remain at a constant distance from the values of the host society. This steady state represents separation between the community and the host society. Moreover, because no education is undertaken the incomes of the community members remain at the minimum level. The families in the community rationally make the choice to accept low living standards in order to prevent the erosion of traditional community values.

It should be noted that a necessary condition for the outcome in lemma 1 to occur is that

$$-u'c'(0) + v'w'(0) < 0,$$

because either $\theta_0^H = C_0^C$ for all $i = 1, ..., n$, or else $\theta_0^H - C_0^C < 0$ for some $i$ and $\theta_0^H - C_0^C > 0$ for some $i$. This shows that the outcome with separation may occur when education is prohibitively expensive, or the returns to education are low.

The result that no one in the community chooses to obtain formal education is a very strong one, and, perhaps, unlikely to be observed in practice. It is more interesting to explore which of the families in the community will choose to obtain education in those cases where some, but not all, choose to do so. In what follows we choose the index for the community members so that $1 \leq 0 \leq 2 \leq \cdots \leq n$, and choose the measure for $\theta$ such that $\theta_0^C \leq \theta_0^H < \theta_0^H$. We then define

$$\theta^* = \frac{\theta_0^H + \theta_0^C}{2}.$$

Lemma 2 If $F(\theta^*) < 0$ and $e_0^i > 0$ for any $i$, then $e_0^1 > 0$ and/or $e_0^n > 0$.

Lemma 2 shows that the community families choosing to educate their children will be drawn from those farthest from the community value on either side, that is, those farthest from both the community and the society, and those farthest from the community but closest to the society value. One group choose education so that their children move closer to the community value, while the other group are educated because they are already close to the society value so do not suffer a significant utility loss from the socializing effect of education. Surprisingly, the families at the core of community, or the representatives of community values, will be those who do not choose education. The continuation of the process from period 1 onward is hard to pin down since the value of

\[ \text{The closest well-documented example to this outcome are the Amish communities in the United States. The Amish are one of the most conservative religious sects in America. They teach their children in their own schools up to the eigh grade level and do not encourage education above this level: “The Amish feel that a child who achieves a level of scholarship beyond the fundamentals of the primary grades is likely to leave the community and be lost to the church. More importantly, if a child spends the great part of his day at the high school, there is less chance he will learn to appreciate the Amish way of life.” (Knudsen, 1974.)} \]
\{\theta_i^c\} cannot be tracked without further details on the education choices. However, no matter how \(\theta_i^c\) evolves the families choosing education will be drawn from one or both ends of the value distribution.

Modifying slightly the conditions of the previous argument provides an interesting case for which it is possible to describe the initial change in \(\theta_i^c\). Assume that \(F(\theta^*) < 0\) for all \(i\) with \(\theta_i^0 \geq \theta^*,\) and \(F(\theta_i^1) > 0\). Then there will be some value \(\tilde{\theta}, \tilde{\theta} < \theta^*,\) such that \(F(\tilde{\theta}) = 0\). Now partition the set of individuals into the sets \(C^1 = \{i : \theta_i^0 < \tilde{\theta}\}\) and \(C^2 = \{i : \tilde{\theta} \leq \theta_i^0\}\). The monotonicity of \(F(\theta_i^0)\) implies that for all \(i \in C^1\) we have \(e_i^0 > 0\), so that \(\theta_i^1 > \theta_i^0\). Similarly, for all \(i \in C^2\) we have \(e_i^0 = 0\) so \(\theta_i^1 = \theta_i^0\). These imply that \(\theta_i^C = \frac{1}{n} \sum \theta_i^0 < \frac{1}{n} \sum \theta_i^1 = \theta_i^C\). It is now observed that the position at time 1 looks just like that at time 0. Two outcomes can then occur. The first possibility is that the increase in \(\theta_i^C\) may result in \(F(\theta_i^0) > 0\). The families with values closest to the social value will then enter education because the loss from moving further from community values is reduced. The situation then mirrors that of lemma 2. The second possibility is that the movement in values of the community families with \(\theta_i^1 < \theta_i^C\) will eventually cause them to withdraw from education. Hence, education may initially be chosen by some of the community but then the community withdraws from education. Partial education initially can lead to an ultimate outcome of separation.

The next set of results are built on the assumption that all families in the community choose education so that \(e_i^1 > 0\) for all \(i = 0,...,n\) and all \(t\). Define \(\theta_i^*\) by

\[
\theta_i^* = \theta_i^C + \frac{[1 - 2\lambda(e_i^1)] \theta_i^H}{2 \left[1 - \lambda(e_i^1)\right]}.
\]

It is then possible to characterize how the choice of education level depends on family values \(\theta_i^*\).

**Lemma 3** At time \(t\) the level of education \(e_i^1 = e(\theta_i^1; \theta_i^C, \theta_i^H)\) is strictly decreasing in \(\theta_i^1\) for \(\theta_i^1 < \theta_i^*\) and strictly increasing in \(\theta_i^1\) for \(\theta_i^1 > \theta_i^*\).

The next lemma shows that if society values are constant, or always adjust towards the community values, there will be monotonicity over time in the mean level of community values over time and convergence of society and community values.

**Lemma 4** (i) If process 1 applies (so \(\theta_i^H = \theta^H\)) then \(\left\{\theta_i^H - \theta_i^C\right\}\) is a decreasing sequence, \(\left\{\theta_i^C\right\}\) is an increasing sequence, and \(\left\{e(\theta_i^1; \theta_i^C, \theta_i^H)\right\}\) is an increasing sequence. (ii) If process 2 applies (so \(\left|\theta_i^H - \theta_i^C\right| < f(\left|\theta_i^H - \theta_i^C\right|)\)) then \(\left\{\theta_i^H - \theta_i^C\right\}\) is a decreasing sequence, \(\left\{\theta_i^C\right\}\) is an increasing sequence, and \(\left\{e(\theta_i^1; \theta_i^C, \theta_i^H)\right\}\) is an increasing sequence.
The results in lemma 4 show that the lowest level of formal schooling that might be chosen at time $t$ increases over time. In addition, for any value of $\theta^i_t$, the value of $L(\theta^i_t, e^i_t)$ is decreasing in $\theta^i_t$. This causes an increase in education at every level of $\theta$. It should be made clear that this result does not determine the change over time of the level of education, $e^i_t$, because the value of $\theta^i_t$ also changes for each family. For some families (generally, those with the lowest $\theta^i_t$) these changes will be offsetting.

The main theorem of this section provides a description of the steady state when a positive level of education is chosen by each generation.

**Theorem 1** At a steady state with $\hat{e}^i_t > 0$ for all $i = 1, ..., n$, it must be the case that $\hat{e}^i_t = \hat{\theta} > 0$ and $\hat{\theta}^i = \hat{\theta}$ all $i = 1, ..., n$, and $\hat{\theta}^H = \hat{\theta}^C = \hat{\theta}$.

The result described in Theorem 1 describes two alternative outcomes dependent on the process for social values. If $\hat{\theta}^H$ is fixed then the steady state involves assimilation because the values of the community change with education until they eventually become equal to the (unchanging) values of the society. Alternatively, if $\hat{\theta}^H$ follows an adaptation process then the steady state is a melting pot with convergence of community and social values to a common final value with $\hat{\theta} \in (\theta^C_0, \theta^H_0)$.

From (9) we have that in any steady state with $\hat{\theta} > 0$ the level of education solves

$$v' w' (\hat{e}) = u' c' (\hat{e}) .$$

(6)

Since $v'' < 0$, $w'' > 0$, $u'' < 0$, and $c'' > 0$, this equation may have more than one solution, and different solutions can have different local and global stability properties. Each solution will be a steady-state level of education, $\hat{e}$. Note that this condition (6) does not contain $f$ and $\lambda$, and therefore the level of $\hat{e}$ is independent of the process of adjustment. Since the community and social values are equalized it follows that $\hat{\theta}^C - \hat{\theta}^H = 0$. However, the level of the common values $\hat{\theta}$ achieved in the steady state depends on how fast the the community’s and the host society’s values change, and therefore does depend upon $f$ and $\lambda$. Under Scenario 1 for $\hat{\theta}^H$ the unique steady state value of $\hat{\theta}^C$ is $\theta^H$ for all steady state levels of $\hat{e}$. Under Scenario 2 for $\hat{\theta}^H$ each steady state value of $\hat{e}$ may have its own steady state value of $\hat{\theta}^C$.

If there are multiple steady states they are characterized by the different levels of education that obtained. The next theorem shows that the steady-state equilibria can be Pareto ranked.

**Theorem 2** For any two steady state levels of education $\hat{e}_1$ and $\hat{e}_2$, with $\hat{e}_1 < \hat{e}_2$, $W (\hat{e}_1) < W (\hat{e}_2)$.

2.2 Transition paths

In section 2.1 we characterized potential steady-state equilibria of the dynamic process determining values. For a policy analysis it is not just the steady state
that matters. The period of transition to the steady state may be long so that it becomes important to investigate the path that the society follows to reach the steady state. In this section we investigate an example in more details using specific functional forms for preferences and for the weighting function. The example has the property that the community can become isolated and locked in a poverty trap, or, conversely, can become integrated into the host society. Which of these alternatives occurs depends on the degree of inclusiveness of the schooling system.

For the example we assume the following functional forms:

\[
\begin{align*}
    u(x) &= \ln x, \\
    c(e) &= re + \frac{p}{2} e^2, \\
    v(w) &= \beta \ln w, \\
    \lambda(e) &= ae - \frac{b}{2} e^2, \\
    g(z^2) &= \frac{q}{2} z^2, \\
    w(e) &= w_0 \exp(\rho e), \\
    f(z) &= -c \cdot z + \frac{d}{2} z^2
\end{align*}
\]

where \(a, b, p, q, r, \beta, \rho\) are non-negative constants. In particular, we assume that the values of \(a\) and \(b\) are chosen such that assumption (3) holds everywhere along the path and in the steady state.

The parameter \(q\) in the utility function measures the importance of community values for its adult members. In the analysis this is assumed to be constant across individuals.\(^5\) Parameter \(a\) in the weighting function \(\lambda\) captures the leverage of primary education on values (thus smaller magnitudes of \(a\) correspond to higher segregation), whilst parameter \(b\) represents how fast the effect of school norms on students' values weakens at higher levels of education, so that a higher magnitude of \(b\) reflects a poorer fit of students with the school norms.

With these functional forms the evolution of the economy is described by the following system of equations

\[
\begin{align*}
    \theta_{t+1} &= \left(1 - ae_t + \frac{b}{2} e_t^2\right) \theta_t + \left(ae_t - \frac{b}{2} e_t^2\right) \theta_t^H, \\
    \theta_{t+1}^H &= \theta_t^H - c \left(\theta_t^H - \theta_t^C\right) + d \frac{(\theta_t^H - \theta_t^C)^2}{2 \theta_t^H}, \\
    e_t &= \max \{0, \tilde{e}\}
\end{align*}
\]

where \(\tilde{e}\) solves

\[
\beta \rho = \frac{r + p \tilde{e}}{w_0 \exp(\rho e_{t-1}) - r \tilde{e} - p \tilde{e}^2/2 + q \left(a \tilde{e} - \frac{b}{2} \tilde{e}^2\right) \left(\theta_t^H - \theta_t^C\right) + \theta_t - \theta_t^C} \left(a - b \tilde{e}\right) \left(\theta_t^H - \theta_t^C\right).
\]

\(^5\)In the simulations we allow this parameter to vary by assuming that each family is characterized by its own value of \(q\), drawn randomly from a uniform distribution.
The solution describes the dynamics of the values of the community, given the initial conditions \( \{ e_{i-1} \}, \{ \theta^H_0 \}, \theta^H_0 \).

There is a possibility, observed in the simulation below, that the realized dynamic path of the host society value is non-monotone: the host society may have a tendency to distance itself from the community at first, and then gradually become more tolerant and make steps towards integration. This can be done through schools that are willing to adjust to the diverse student body. The values can also diverge; the outcome depends on the initial values, as well as the model parameters. Note that the evolution of \( \theta^H_t \), when rewritten as

\[
\frac{\theta^H_{t+1} - \theta^H_t}{\theta^H_t} = -\frac{\theta^H_t - \theta^C_t}{2} \left[ c - d \frac{\theta^H_t - \theta^C_t}{\theta^H_t} \right],
\]

describes either partial adjustment at a diminishing rate or divergence at an increasing rate. In the analysis below we refer to the situation with \( c = d = 0 \) as the ‘static case’.

One can see that in this economy the steady state described in lemma 1 with \( e_t = e_0 = 0 \) may exist in the static case when the preferences are such that \( \beta \) is small (parents put low weight on their children’s welfare) or \( q \) is large (the parents’ discontent with the change in children’s values is strong). It is more likely to happen when \( \rho \) is small (low returns to education), \( r \) and/or \( p \) are large (the material cost of formal education is high), or \( a \) is large (the effect of primary schooling on children’s values is strong), or when \( (\theta^H_0 - \theta_0) \) is large (the initial gap between the values of the community and those of the host society is wide).

The situation with adjustment is fundamentally different from the static case. Given the same configuration of parameters, when the school, or, indeed, the host society, particularly through an inclusive schooling policy, is willing to adjust its values toward the community, it is possible that the gap between their values shrinks from \( t = 0 \) to \( t = 1 \). Thus, in conformity with lemma 4, given \( \theta^C_1 = \theta^C_0 \) when \( e_0 = 0 \) is chosen, is it easy to obtain the condition

\[
\frac{\theta^H_1 - \theta^C_1}{\theta^H_0} < 1 \text{ if } \frac{1 - c}{d/2} < \frac{\theta^H_0 - \theta^C_0}{\theta^H_0} < \frac{c}{d/2}.
\]

With a sufficient reduction in the distance between the values, and therefore a sufficient reduction in the ‘marginal discontent’, it may become optimal for the new generation of parents to choose \( e_1 > 0 \). In the next period the gap will shrink even more as \( \theta^H_2 \) approaches \( \theta^C_2 \), which in turn induces higher \( e_2 \), and so forth. The process of convergence may, however, reverse, in particular, if the effectiveness of indoctrination at school weakens significantly at higher levels of education (\( b \) is sufficiently large relative to \( a \)). Thus, the outcome depends on both the schooling effect and the degree of influence of the community.

We now briefly analyze the existence of the steady state and the welfare implications of multiplicity of the steady states for this economy, assuming that
the community members have identical preferences, so that $\theta^C_t = \theta_t$. Using the
chosen functional forms we can rewrite (6) as

$$
\frac{v'(w(\bar{e}))}{u'(w(\bar{e}) - c(\bar{e}))} w'(\bar{e}) = c'(\bar{e}),
$$
or

$$
w_0 \exp (\rho \bar{e}) = \frac{r}{\beta \rho} + \left( \frac{p}{\beta \rho} + r \right) \bar{e} + \frac{p \bar{e}^2}{2},
$$

(7)

where $\bar{e}$ is the steady state level of education. Both sides of the equation are
strictly increasing and convex in $\bar{e}$. It is easy to see that three different cases
are possible:

(i) There is no solution if $w_0 > \max \left\{ \frac{r}{\beta \rho}, \frac{r}{\beta \rho} + \frac{p}{\beta \rho^2} \right\}$;

(ii) There is a unique solution if $\frac{r}{p} > \frac{1}{(1-\beta) \rho}$ (this ensures $\frac{r}{\beta \rho} > \frac{r}{p} + \frac{p \bar{e}^2}{\beta \rho^2}$) and $\frac{r}{p} + \frac{p}{\beta \rho^2} < w_0 < \frac{r}{\beta \rho}$;

(iii) There are two solution if $\frac{r}{p} < \frac{1}{(1-\beta) \rho}$ and $\frac{r}{\beta \rho} < w_0 < \frac{r}{p} + \frac{p}{\beta \rho^2}$.

There are also knife-edge situations when $w_0 = r/(\beta \rho)$ or
$w_0 = r/(\rho) + p/(\beta \rho^2)$ but these are of lesser interest. In case (iii) the two
steady states are characterized by different levels of education.

The local stability property of a steady state, when it exists, is characterized
in the following theorem.

**Theorem 3** If a steady state with strictly positive education $\bar{e}$ exists then it is
locally stable if and only if

$$
\bar{e} < \frac{1-\beta (1+r \rho)}{\beta r \rho} \left[ 1 + \sqrt{1 + \frac{p \bar{e} [p + r \rho (1-\beta)]}{[1-\beta (1+r \rho)]^2}} \right].
$$

**3 Simulation results**

In this section we present the results of simulations of the model with a het-
erogenous community ($q$ is drawn from a uniform distribution\(^6\)) for different
combinations of the magnitudes of the model parameters. The simulations are
used to discuss alternative outcomes with respect to integration, as well as how
the outcome can be influenced by policy.

\(^6\)We also ran simulations for a heterogenous community with different levels of education
in the first generation, drawn from a uniform distribution. The results differ only in levels,
while the shapes of the paths are essentially the same.
On the graphs below we plot the choice of education, the resulting shifts in the values of the community (blue lines) and the host society (red lines) over time, and the path of welfare. Our simulations for various configurations of parameter values appear to result robustly in a number of different scenarios, some of which are illustrated in the figures below, as the most interesting representative cases. In all simulations presented in this section we use $w_0 = 1$, $\rho = 0.25$, $p = 0.2$, $r = 0.1$, $\theta_0^H = 3$, $\theta_0^C = 1$, $c_0 = 0$, $\beta = 0.75$, $c = 0.1$.

The first set of figures represent simulations for $E[q] = 0.1$, while in the second set $E[q] = 0.5$ so the average disutility from the future deviation of children’s value from the parents’ values is higher in the second case. It is clear that in the second case, for which it can be said that the community is more conservative, the parent’s choice of education for their child is substantially lower relative to the first case. Consequently, the values in the community do not change much over time. In addition, the first set of figures use two different values of $b$ (reflects the fit of students with the school norms), while the second set does so for two values of $d$ (willingness of the host society to accommodate the community).

In Figure 1 the solid curves correspond to $a = 1/3$ and $b = 9/5$, and the dashed curves correspond to $a = 1/3$ and $b = 2/3$; in both cases $c = 0.1$ and $d = 0.5$. The choice of education is higher in the second case, but the difference between the two cases is relatively small. The shifts in the values, however, are very different: in the first case, characterized by a higher $b$, or a poorer fit with school norms, the values of the community and the host society diverge, while in the second case the gap between values shrinks over time. Thus, the first situation describes a community that is well-educated but is immune to the effects of the outside culture and is not willing to integrate into the host society; this attitude causes the initial trend in the host values towards the community to eventually reverse. As the community is alienated from the host society, the latter distances itself from the community even more. In the second case, when the effect of schooling diminishes slowly, the gradual shift of community values towards the host society is met by a reciprocal shift in the host society values. The gap between values eventually shrinks: the two cultures embrace each other. The welfare of the community is higher in the second case, primarily because of the smaller loss of utility due to the more gradual change in values.

The solid lines in figure 2 correspond to $c = 0.1, d = 0.5$ and the dashed lines to $c = 0.1, d = 0.25$. The higher value of $d$ in the first case means that the host society is less willing to accommodate the community when the difference in values is large relative to the first case with lower $d$. (In both cases we used $a = 4/3$ and $b = 2/3$, so that the effect of schooling does not diminish very much as the amount of education increases.)

It can be seen that in the first case the distance between the community and the host society increases over time, while education remains at a rather low level. This is because the disutility from changing values is relatively low, so the community moves towards the host society. However, at the same time the society moves away from the community. This describes a low-skilled community trying to imitate and become integrated into the host culture, while
Figure 1: Affluent isolation or affluent melting pot?
the schooling system, or, indeed, the host society continues to emphasize the
difference and maintains, or even increases, the distance from the community.
In the second case the host society adjusts to the community, and both the edu-
cational outcomes and welfare are strikingly higher – the latter not only due to
the higher earnings, but also because with the adjusting host society its values,
instilled in children through schooling, are now closer to the community values
and so do not cause discontent to the parents. This describes the situation when
the willingness of the host society to embrace the values of the community is
reinforced by the willingness of the community to adjust.

Figure 2: Deprived isolation or affluent melting pot?

Although the model provide only a simple representation of the relationship
between values and education it is capable of generating a variety of different
scenarios of cultural integration or segregation of minority groups. These sce-
narios are characterized by different patterns of human capital accumulation and
welfare. The outcomes for the community under these scenarios are summarized
in Table 1.

4 Conclusions

This paper has presented a model of the transmission of values across genera-
tions and communities and of the effect that different education and integration
Table 1: Simulation outcomes

<table>
<thead>
<tr>
<th>Parameters</th>
<th>high $d$, low $q$</th>
<th>high $d$, high $q$</th>
<th>low $d$, high $q$</th>
</tr>
</thead>
<tbody>
<tr>
<td>high $b$</td>
<td>high-skill, reclusive</td>
<td>high-skill, integrated</td>
<td>high-skill, reclusive</td>
</tr>
<tr>
<td>low $b$</td>
<td>high-skill, integrated</td>
<td>low-skill, rejected</td>
<td>high-skill, integrated</td>
</tr>
</tbody>
</table>

attitudes can have on the welfare of communities, as well as on cultural integration. We have characterized alternative steady states and, using simulations, have compared educational and socioeconomic outcomes in different scenarios generated by the different relative importance attributed by parents to their traditional values and to their children’s future earnings, as well as different school norms.

The analysis has investigated both the dynamics of the process of value adjustment and the steady state of the process. It is possible for a steady state with separation to arise. In such a case the community gives such importance to values that its members prefer not to engage in education in order to prevent any change in the traditional values. The community essentially isolates itself from the host society. This steady state only arises under strong assumptions. If there is dispersion of values within the community then some may choose education for two distinct motives. Those with values far from those of the community, and even further from society, will choose education to move their children’s values closer to community values. Conversely, those with values closest to society will be more concerned with the increase in children’s income than with the change in values. If all members of the community choose education then all steady states must involve the values of the community becoming equal to the values of society. This can be achieved through assimilation or convergence.

Policies to reduce segregation in communities through schooling appear to be effective in raising the educational attainment of immigrants’ children in the long run. For a discussion of the role of institutional and social capital in migrants’ integration and well-being see Della Giusta and Kambhampati, (2006). Our simulations demonstrate that community values adjust and eventually converge to society values only if segregation is relatively low and the fit between students and school norms is relatively high. The model is necessarily simple compared to the complex reality of minority communities but it permits different evolutions of individual values and their effect on broader community outcomes and reveals why social inclusion is not always attained.

References


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Appendix

Proof of Lemma 1

Observe that when \( e_{i-1} = 0 \), \( \theta_i^0 (0) = [1 - \lambda (0)] \theta_i^j + \lambda (0) \theta_i^H = \theta_i^0 \). Substituting this into (4) shows that \( F (\theta_i^0) < 0 \) implies \( e_i^0 = 0 \), \( \forall i \). From the adjustment process (2) it follows that \( \theta_i^1 = \theta_i^0 \). Hence, \( F (\theta_i^1) = F (\theta_i^0) < 0 \) and \( e_i^1 = 0 \) \( \forall i \).

Iterating the argument shows \( F (\theta_{i+1}) = F (\theta_i^1) < 0 \) \( \forall i, t \).

Proof of Lemma 2

By definition \( \theta^* \) maximizes \( 2g' (0) \left[ \theta_i^0 - \theta_i^0 \right] \left( \theta_i^0 - \theta_i^C \right) \). Since \( F (\theta_i^0) \) is continuous in \( \theta_i^0 \), there will be an interval \( I^* \) around \( \theta^* \) such that \( F (\theta_i^0) < 0 \) for \( \theta_i^0 \in I^* \). For all \( i \) such that \( \theta_i^0 \in I^* \) it follows that \( e_i^0 = 0 \). Furthermore, \( 2g' (0) \left[ \theta_i^0 - \theta_i^0 \right] \left( \theta_i^0 - \theta_i^C \right) \) is monotonically increasing in \( i \) if \( \theta_0 < \theta^* \), and monotonically decreasing in \( i \) if \( \theta_i^0 > \theta^* \). Hence, if \( F (\theta_i^0) > 0 \) there will be a connected interval \( I^L = \left[ \theta_i^0, \theta_i^0 \right] \) such that \( e_i^0 > 0 \) if \( \theta_i^0 \in I^L \). Alternatively, if \( F (\theta_i^0) > 0 \) there will be a connected interval \( I^R = \left[ \theta_i^0, \theta_i^0 \right] \) such that \( e_i^0 > 0 \) if \( \theta_i^0 \in I^R \).

Proof of Lemma 3

The first-order condition for the interior educational choice at time \( t \) is

\[
-u'c' (e_i^t) + v'w' (e_i^t) - 2g' \lambda (e_i^t) L(\theta_i^t, e_i^t) = 0, \tag{8}
\]

where \( L(\theta_i^t, e_i^t) \) is defined in (5). Observe that \( L(\theta_i^t, e_i^t) \) has a maximum at

\[
\theta_i^t = \frac{\theta_i^C + [1 - 2\lambda (e_i^t)] \theta_i^H}{2 [1 - \lambda (e_i^t)]},
\]

and at this maximum

\[
L(\theta_i^t, e_i^t) = \frac{[\theta_i^H - \theta_i^C]^2}{4 [1 - \lambda (e_i^t)]} > 0.
\]
Furthermore, \( L(\theta_i^l, e_i^l) \) is strictly increasing in \( \theta_i^l \) for \( \theta_i^l < \theta_i^r \), strictly decreasing in \( \theta_i^l \) for \( \theta_i^l > \theta_i^r \), and, since \( \lambda'(e_i^l) > 0 \), \( L(\theta_i^l, e_i^l) \) is strictly increasing in \( e_i^l \). These properties of \( L(\theta_i^l, e_i^l) \) imply the claims for \( e(\theta_i^l; \theta_i^C, \theta_i^H) \).

**Proof of Lemma 4**

(i) From (2) and the fact that \( e_i^l > 0 \) it follows that \( |\theta^H - \theta_{i+1}^l| < |\theta^H - \theta_i^l| \) for all \( i \). In addition, \( \theta_{i+1}^C > \theta_i^C \) and that \( \theta_{i+1}^r > \theta_i^r \). These observations demonstrate the first two statements. By definition

\[
L(\theta_i^r, e) = \frac{[\theta^H - \theta_i^C]^2}{4[1 - \lambda(e)]} > 0.
\]

But since \( \theta_{i+1}^C > \theta_i^C \) is follows that

\[
L(\theta_{i+1}^r, e) < L(\theta_i^r, e)
\]

for all \( e \). As a consequence \( e(\theta_{i+1}^r; \theta_{i+1}^C, \theta^H) > e(\theta_i^r; \theta_i^C, \theta^H) \) and the lowest chosen level of formal education (over \( \theta \) at time \( t \)) is increasing over time. The proof extends obviously to (ii).

**Proof of Theorem 1**

The community members have identical preferences. Consequently, in a steady state with a positive level of education, then \( e_i^l = \widehat{e} > 0 \). The values of \( \widehat{e}, \widehat{\theta}^C, \) and \( \widehat{\theta}^H \) will satisfy

\[
v'w'(\widehat{e}) = u'e'(\widehat{e}) - 2g'\lambda'(\widehat{e})\left[\widehat{\theta}^C - \widehat{\theta}^H \right]^2 \lambda(\widehat{e}),
\]

and

\[
\widehat{\theta}^C = \left[1 - \lambda(\left(e(\widehat{\theta}^C, \widehat{\theta}^H)\right)\right) \widehat{\theta}^C + \lambda(\left(e(\widehat{\theta}^C, \widehat{\theta}^H)\right) \widehat{\theta}^H.
\]

**Proof of Theorem 2**

The steady state level of utility is given by

\[
W(\widehat{e}) = u(\widehat{w}(\widehat{e}) - c(\widehat{e})) + v(\widehat{w}(\widehat{e})).
\]

Differentiation with respect to \( \widehat{e} \) gives

\[
W'(\widehat{e}) = u'(\widehat{w}(\widehat{e}) - c(\widehat{e})) [w'(\widehat{e}) - c'(\widehat{e})] + v'(\widehat{w}(\widehat{e})) w'(\widehat{e}) = u'(\widehat{w}(\widehat{e}) - c(\widehat{e})) w'(\widehat{e}) > 0.
\]

This establishes the result.
Proof of Theorem 3

The local stability of a given steady state is determined by the magnitude of $\frac{de_t}{de_{t-1}}$ at the point $e_t = e_{t-1} = \hat{e}$. Straightforward calculations give

$$\left. \frac{de_t}{de_{t-1}} \right|_{e^*} = \frac{w'(\hat{e})}{c'(\hat{e}) + \frac{p}{\beta p}} = \frac{\rho w' \left( \frac{p}{\beta p} \right)}{c'(\hat{e}) + \frac{p}{\beta p}} = \frac{\rho \left[ c(\hat{e}) + \frac{c'(\hat{e})}{\beta p} \right]}{c'(\hat{e}) + \frac{p}{\beta p}},$$

where the last equality follows from (7). The steady state is locally stable when this quantity is between zero and one; for this to be the case $\beta$ has to be sufficiently large, $\rho$ sufficiently small, and $\frac{p}{\beta p}$ sufficiently small. The stability condition can be rewritten as

$$\beta p p \hat{e}^2 - 2 \left[ 1 - \beta (1 + r p) \right] \hat{e} - \frac{p}{\rho} - r (1 - \beta) < 0. \quad (11)$$

The discriminant of the quadratic polynomial in $\hat{e}$ in (11) is given by

$$\frac{D}{4} = \left[ 1 - \beta (1 + r p) \right]^2 + \beta p \left[ p + r p (1 - \beta) \right] > 0,$$

assuming $\beta < 1$. Therefore, the polynomial in (11) has two real-valued roots, and the inequality in (11) holds for $\hat{e} \in (e^-, e^+)$, where

$$e^\pm = \frac{1 - \beta (1 + r p) \pm \sqrt{\left[ 1 - \beta (1 + r p) \right]^2 + \beta p \left[ p + r p (1 - \beta) \right]}}{\beta p p}.$$

Clearly, $e^+ > 0$ and $e^- < 0$, and so the steady state with $\hat{e} < e^+$ is locally stable, whereas the steady state with $\hat{e} > e^+$ is locally unstable.