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Social diversity and bridging identity

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Social Diversity and Bridging Identity

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Social Diversity and Bridging Identity*

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Abstract

We investigate within a model of cultural transmission the conditions under which increased social diversity within a population – e.g. due to the inflow of immigrants – raise the potential for conflict as opposed to harmonious social diversity. Drawing on evidence from psychological studies, we develop the concept of 'bridging identity', an individual trait that (i) directly affects utility in culturally diverse social groups but is immaterial in culturally homogeneous social groups; (ii) is fostered (probabilistically) in those born in culturally diverse social groups but not in those born in culturally homogeneous social groups. We find first, increased cultural diversity within a population can lead to more mixed social groups or increased segregation depending on the pace of change. This is in contrast to Schelling's models of residential segregation which would always predict increased segregation. Furthermore, a temporary negative shock to bridging identity can trigger a dynamic process of segregation in the form of outmigration from culturally diverse social groups. But, paradoxically, if the shock is severe enough, its effects are mitigated.

JEL classification numbers: D10, J13, J15, A14, Z1.

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Non-technical summary

A shared social identity is potentially an important element in ensuring cooperation and the coordination of actions among individuals when formal institutions for achieving these ends are weak. But the construction of group identity also leads to the creation of in-groups and out-groups and thus, the possibility of conflict as people born and raised with diverse identities are compelled to interact due to resource competition, market forces, etc.

These contrasting ideas lead to the following question: Under what conditions do increased social diversity within a population -- e.g. due to migration, market penetration -- raise the potential for conflict as opposed to harmonious social diversity? If `group identity' plays a key role in shaping conflict and cooperation, a related question that requires consideration is as follows: How does increased social diversity affect identity?

To shed light on these questions, we develop a model of cultural transmission with three key features:

(i) individuals carry multiple identities -- an immutable `cultural identity' and a `bridging identity' that facilitates cooperation as opposed to conflict across different cultural identities;
(ii) identities are transmitted from parent to offspring and via social groups;
(iii) adults choose which social group to join; and this choice determines the individual's access to club groups, individual experience of conflict, and identity of one's offspring.

Our analysis points to three key results. First, increased cultural diversity within a population -- e.g. due to immigration -- can lead to more (culturally) mixed social groups or increased segregation (along cultural lines) depending on the pace of change. Second, our model predicts a version of the Immigrants' Paradox -- offsprings of immigrants being worse off than their parents -- when immigrants with high levels of bridging identity join a population that is culturally segregated. Third, a temporary negative shock to bridging identity can trigger a dynamic process of segregation in the form of outmigration from culturally diverse social groups.

We argue that the theoretical results are consistent with empirical findings on recent episodes of migration and "identity shocks" that have been shown to affect cross-cultural interactions within European countries.

1 Introduction

A shared social identity is potentially an important element in ensuring cooperation and the coordination of actions among individuals when formal institutions for achieving these ends are weak. In particular, 'group identity' can provide social groups with an evolutionary advantage – by encouraging its members to treat others within the group as 'one's own', thus promoting cooperation, reducing the scope of internal conflict and fostering group solidarity in the face of external threats (Henrich and Henrich 2006; Bowles and Gintis 2011; Eaton, Eswaran and Oxoby 2011).

But the construction of group identity also leads to the creation of in-groups and out-groups and thus, the possibility of conflict as people born and raised with diverse identities are compelled to interact due to resource competition, market forces, etc. This argument is supported by a large body of empirical evidence which shows that ethnic divisions increase the risk of conflict (e.g. Montalvo and Reynal-Querol 2005; Esteban, Mayoral and Ray 2012); and lower public good provision (e.g. Easterly & Levine 1997; Alesina et al. 2003; Banerjee, Iyer & Somanathan 2005). On the other hand, there are also examples of cross-cultural collaboration that improve prosperity and reduce conflict. For example, Jha (2013) argues, in the context of South Asia, that medieval overseas trading ports were characterised by greater cooperation across religious groups because of inter-group complementarities in production and provides evidence that these ports were five times less prone to religious riots than other parts of the subcontinent over several generations.[1]

These contrasting narratives lead to the following question: Under what conditions do increased social diversity within a population – e.g. due to migration, market penetration – raise the potential for conflict as opposed to harmonious social diversity? If 'group identity' plays a key role in shaping conflict and cooperation, a related question that requires consideration is as follows: How does increased social diversity affect identity?

Insights into these questions can potentially be obtained by a growing psychological

[1] Relatedly, Catalonia and Quebec have been presented as examples of successful intercultural dialogue which allows for diverse yet cohesive society even when faced with immigration and economic crises (e.g. Bello 2017; Cantle 2012; Conversi and Jeram 2017).

literature on the adaptation of the children of immigrants to their present environment – given that they typically experience, while growing up, a greater level of social diversity than their parents. The literature highlights that second generation immigrants have lower levels of adaptation than first generation immigrants (e.g. Sam and Berry 2010; Noels and Clement 2015), a phenomenon often referred to as the "Immigrant's Paradox". Relatedly, the recent medical literature provides evidence that second generation immigrants have a higher risk of psychosis than first generation immigrants (Kirkbride 2017).

To shed light on these questions, in this paper we develop a model of cultural transmission (Cavalli-Sforza and Feldman 1981; Boyd and Richerson 1986; Bisin and Verdier 2001) with three key features:

(i) individuals carry multiple identities – an immutable 'cultural identity' and a 'bridging identity' (discussed at greater length below) that facilitates cooperation as opposed to conflict across different cultural identities;

(ii) identities are transmitted from parent to offspring and via social groups;

(iii) adults choose which social group (e.g. neighbourhood, workplace, club) to join; and this choice determines the individual's access to club groups, individual experience of conflict, and identity of one's offspring.

Group selection brings about its own dynamics and, often, unexpected outcomes, as first pointed out by Schelling (1969, 1971). But we propose to introduce an added dimension to this process by allowing the social groups to play a role in cultural transmission. The concept of a 'bridging identity' is based on a growing literature in psychology that documents the creation of 'dual identities' as a strategy for adaptation to a new, diverse, cultural environment that enhances creativity and problem-solving (see Gocłowska and Crisp 2014 for a review). We formalise this concept as an individual trait that (i) directly affects utility in culturally diverse social groups but is immaterial in culturally homogeneous social groups; (ii) is fostered (probabilistically) in those born in culturally diverse social groups but not in those born in culturally homogeneous social groups.

Our analysis points to three key results. First, increased cultural diversity within a population – e.g. due to immigration – can lead to more (culturally) mixed social groups

or increased segregation (along cultural lines) depending on the pace of change. This is in contrast to Schelling's models of residential segregation (Schelling 1969, 1971) which would always predict increased segregation. Second, our model predicts a version of the Immigrants' Paradox – offsprings of immigrants obtaining lower utility than their parents – when immigrants with high levels of bridging identity join a population that is culturally segregated. Third, a temporary negative shock to bridging identity can trigger a dynamic process of segregation in the form of outmigration from culturally diverse social groups. But, paradoxically, if the shock is severe enough, its effects are mitigated.

Our theoretical analysis is closely linked to ongoing policy debates on immigration and the social integration of immigrants; particularly in OECD countries where inward migration of minority groups have led to growing concerns about social cohesion and national identity. For example, Cantle (2012) argues that while populations are increasingly composed of people from different cultures, faiths and ethnicities as a result of globalisation, existing policies have failed to respond to these changes adequately, and a paradigm shift is necessary if governments are to formulate policies that maintain social cohesion in diverse societies. Similar arguments have been made by the The Council of Europe (2008) and UNESCO.[2].

In this context, our theoretical results resonate with some key policy recommendations to emerge from recent sociological studies. As an example, Kauffman and Harris (2014) use longitudinal household surveys, focus group discussions, and local election results to study trends in attitudes towards immigrants in the UK; and conclude that "mass concern over immigration is driven by the rate of change in the non-white British population ... Gradual, diffuse increases in diversity [through housing and refugee resettlement policy] are preferable. Concern dissipates over time as members of the ethnic majority become used to a larger immigrant presence" (p. 10). Our theoretical model yields similar predictions and recommendations when we consider how an influx of immigrants from a minority group affects identity and location choice within a population.

The rest of the paper is organised as follows. We discuss the related literature in Section 2. The theoretical model is introduced and developed in Section 3. In Section 4, we construct

[2]See, for example, https://en.unesco.org/themes/intercultural-dialogue

hypothetical examples based on the theoretical model and compare with recent episodes of migration and "identity shocks" that have been shown to affect cross-cultural interactions within European countries. Conclusions are provided in Section 5.

2 Related Literature

This paper is related to a number of distinct strands in the literature which we highlight and discuss briefly in this section. A large literature – going back to the seminal work by Schelling (1969, 1971) – has looked at the question of residential segregation by race, in particular the type of initial conditions and preferences that generate such patterns or reverse it. Recent work in this literature include Zhang (2011), which confirms Schelling's key insights for a wide class of models, and Dubois and Miller (2017) which introduces individual preferences regarding the minority, separately from individual preferences regarding each social group. Our main contribution to this literature is that we endogenise preferences using the concepts of cultural transmission, imperfect empathy and bridging identity. A subset of this literature has also looked at how changes in social inequality affects social segregation (e.g. Sethi and Somanathan 2004; Bayer, Fang and McMillan 2014). While we do not have a notion of social inequality in our theoretical model, this is a natural extension to the setup we introduce, which we leave to future work.

Our work follows a literature on intra-generational transmission of identity where children are assumed to acquire identity traits from their parents and the social environment (e.g. Bisin and Verdier 2000; 2001; Bisin, Patacchini, Verdier and Zenou 2011; 2015; see Bisin and Verdier 2011 for a review). But, given our interest in issues related to immigration and identity, we propose additional structure to preferences that goes beyond the canonical cultural transmission model. Within the cultural transmission literature, Bisin, Patacchini, Verdier and Zenou (2011) (henceforth BPVZ) comes closest to our work as it investigates how social interactions between distinct cultural groups affect identity. As in our model, children inherit their parents' cultural identity in the BPVZ framework and have a secondary identity which may be 'mainstream' or 'oppositional' (which has some parallels with our concept of

'bridging identity').

However there are a number of key differences in their approach and our own. First, within the BPVZ framework, there is no scope for identity to evolve within the mainstream cultural group (all the dynamics occur within the minority group) while in our model, both cultural groups have to evolve (towards a higher level of 'bridging identity') if the society is to achieve higher social integration. Second, the main strategic decision available to individuals in our model – that shapes current utility and the preferences of the next generation – is which social group to join (similar to the literature on residential segregation discussed above), while in the BPVZ framework individuals do not choose social groups but, instead, make investments in the 'intensity' of their own identity.

Finally, our work is related to the literature initiated by Akerlof and Kranton (2000, 2002, 2005) introducing endogenous identity within economic models. While identity is endogenous in our model, our approach differs in the way that identity affects utility. More precisely, in the Akerlof-Kranton models, deviating from the 'ideal' specific to an identity category creates disutility while, in our case, increasing the 'distance' in the social identity between two interacting individuals generates disutility.

3 Theoretical Model

3.1 Setup

Here we describe the setup of our theoretical model. We provide a discussion on our key assumptions and their relation to the existing literature in the next subsection before proceeding to the analysis of the model.

Consider a population of N individuals indexed by $i \in \{1, 2, .., N\}$. Each individual is described by two traits or 'identities'. We call these 'cultural identity' denoted by $q_i \in \{\text{A,B}\}$ and 'bridging identity' denoted by $p_i \in [0, 1]$. Individuals choose to join 'social groups' (we specify the timing of these decisions below) indexed by $j \in \{1, 2, .., J\}$. We denote by Q_j^A and Q_j^B the fraction of individuals in social group j from cultural groups A and B respectively.

The level of utility obtained by individual i from joining social group j is given by

$$U\left(P_{ji}, Q_j\right)$$

where

$$Q_j = \min\left\{Q_j^A, Q_j^B\right\} \tag{1}$$

and

$$P_{ji} = \begin{cases} \boxed{1 - Q_j + Q_j p_i \text{ if } i \text{ belongs to the majority culture in social group } j} \\ \boxed{Q_j + (1 - Q_j)\, p_i \text{ if } i \text{ belongs to the minority culture in social group } j} \end{cases} \tag{2}$$

Thus $Q_j \in [0, 0.5]$ is a measure of cultural diversity in social group j, while P_{ji} is intended to capture the fraction of people within the social group j with whom individual i will 'get along'. We assume that i will get along with anyone from his or her own cultural group and a fraction p_i of individuals from the other cultural group. We assume that the function $U(.)$ is twice continuously differentiable and increasing and concave in each argument.

Each individual i has an offspring o after joining a social group. The transmission of identities from one generation to the next occurs as follows. We assume that $q_o = q_i$, i.e. the offspring inherits the parent's cultural identity. Furthermore, with exogenous probability $\alpha \in (0, 1)$, we have $p_o = p_i$; and, with probability $(1 - \alpha)$, we have $p_o = \tau\left(Q_j\right)$ where $\tau(.)$ is a continuously differentiable, monotonic function with $\tau(0) = 0$ and $\tau(0.5) = 1$. Thus, with some probability, the offspring inherits the parent's bridging identity; otherwise, the offspring's bridging identity depends on the level of cultural diversity within the parent's social group.

Then, the level of cultural diversity within a social group that would maximise the utility of an individual i is given by

$$\hat{Q}\left(p_i\right) = \arg\max_{P_{ji}, Q_j} U\left(P_{ji}, Q_j\right) \text{ subject to } P_{ji} = 1 - Q_j + Q_j p_i \tag{3}$$

The optimisation problem is similar to a standard consumer optimisation problem where the 'price' of P_{ji} is equal to 1 and the 'price' of Q_j is equal to $(1 - p_i)$; thus, individuals with

a higher level of 'bridging identity' pay a lower price for cultural diversity.[3] An individual's actual choice of social group is complicated by two factors not captured in (3), which we discuss below.

First, we assume that each individual cares not only about her own utility but also the welfare of the child using 'imperfect empathy', i.e. the parent evaluates the child's outcome using her own preferences (Bisin and Verdier, 2001). To formalise this notion, we let

$$W(p_i, p_o) = U(1 - Q_k + Q_k p_i, Q_k) \text{ where } Q_k = \hat{Q}(p_o)$$

and assume that each individual i has the following objective function:

$$U(P_{ji}, Q_j) + \mathbf{E}W(p_i, p_o) \tag{4}$$

Second, we assume that, when joining a social group, individuals must choose from the set of existing social groups rather than the set described by the condition (2). The set of existing social groups is determined endogenously by past choices of other individuals.

The timing of events within each period is as follows.

1. Each adult i in the population decides which social group to join from an existing set $\{1, 2, .., J\}$. These decisions are made simultaneously and without coordination. For simplicity, we assume that individuals base their decisions on the characteristics of the social groups in the previous period and do not anticipate any changes in their composition.

2. Each adult i produces an offspring o. Offsprings inherit their parents' cultural identity and their bridging identity is determined by that of their parents and the characteristics of their social group.

3. Offsprings become adults and 'replace' their parents in the population. The offsprings make their own social group decision as described in (1) above and the process continues.

[3]Note that the optimisation problem in (3) implicitly assumes that, in i's optimal social group, i will always belong to the majority culture. The assumption is valid given that, for any social group in which i would belong to the minority culture, i experiences a higher level of utility from an alternative social group with the same level of cultural diversity where she belongs to the majority culture.

3.2 Discussion on Key Assumptions

In the setup above, children inherit their parents' cultural identity, while their bridging identity is determined by the cultural composition of the social group in which they are raised. We assume, implicitly, that the boundaries of cultural identity are exogenously given and that they are hereditary. While this may be a strong assumption, we believe that it is a reasonable approximation when looking at transitions from one generation to the next as any changes in the boundaries of cultural identity are likely to happen very gradually.

We also assume, implicitly, that identity is established in young life. In making this assumption, we are following the recent literature on the transmission of identity (see, for example, Bisin et al. 2011) and a literature on the potential effects of education on cognitive and non cognitive skills (Kautz, Heckman and Diris 2014) which shows that these skills can be shaped more easily in childhood and early adult life due to higher plasticity of the brain. Relatedly, Bauer et al. 2014 find that the experience of external conflict is more influential in shaping behaviour towards the in-group for children than for adults.

We interpret the link between the cultural diversity of a social group and the bridging identity of children raised within it as follows. Children observe the social interactions across cultural groups in their surroundings and witnessing these interactions can potentially shape their level of bridging identity. In a socially homogeneous group, children would observe no social interactions across cultural groups. Therefore, these children risk acquiring no bridging identity at all, which is why we assume that $\tau(0) = 0$. While it would be reasonable to assume that the bridging identity of children is affected not only by cultural diversity within the social group but also the level of bridging identity of the adult group members, we abstract away from this possibility for reasons of tractability. Nevertheless, it will become apparent in the next section that, in equilibrium, there is a high degree of correlation between the level of cultural diversity and the bridging identity of group members across social groups, and so the former can serve as a rough proxy for the latter.

The assumption of 'imperfect empathy' as represented by the objective function in (4), is adopted from Bisin and Verdier (2000, 2001), and Bisin et al. (2011). It captures the

notion that parents care about their children's utility but are incapable of fully putting themselves in their place; therefore they evaluate their children's utility through their own identity or cultural lenses. An alternative expression of the same idea is that parents are characterised by some degree of 'cultural intolerance', a utility loss arising from their children being different from them. In order to decrease the possibility of identity loss, parents will change their behaviour whenever it can affect the identity transmission channels.

While existing models in the cultural transmission literature allow parents to invest directly in the identity of their children (e.g. Bisin and Verdier, 2001; Bisin et al. 2011), we abstract away from these investments and focus specifically on how parents can influence the socialisation process for their children by their choice of social group. The choice in question may relate to the neigbourhood in which the children are raised, the school which they attend, the social ties which provide them with alternative role models.

We assume that cultural diversity within a social group positively affects the utility of group members as a concise way to capture the idea that, ceteris paribus, a group of individuals with a more diverse set of skills – which may be due to cultural diversity – will be more productive in the production of club goods. In recent work, Desmet, Gomes and Ortuño-Ortin (2016) find that while linguistic fractionalisation within a country lowers public good provision, mixing across linguistic groups at the local level mitigates this negative impact, which provides some empirical support for this assumption.

3.3 Analysis

Optimal Social Groups: Before investigating how social groups and individual identity evolves in the model, we analyse what social group an individual with a given set of characteristics would find 'optimal' – i.e. the social group that would maximise his or her objective function (ignoring whether such a social group is available to join). Characterisation of the optimal social group will facilitate the analysis of social dynamics in the next section.

Let us denote by $Q^*(p_i)$ the level of cultural diversity in the optimal social group for person i; i.e. the social group characteristics that maximise the objective function in (4). We can show that the term $W(p_i, p_o)$ is single-peaked, attaining its maximum at $p_o = p_i$;

i.e. at $Q_j = \tau^{-1}(p_i)$; and $U(1 - Q_k + Q_k p_i, Q_k)$ is single-peaked in Q_k, attaining its its maximum at $\hat{Q}(p_i)$. Therefore, $Q^*(p_i)$ must lie between $\tau^{-1}(p_i)$ and $\hat{Q}(p_i)$:

Proposition 1 *The optimal social group for individual i has a level of cultural diversity in the interval* $\left(\min\left\{\hat{Q}(p_i), \tau^{-1}(p_i)\right\}, \max\left\{\hat{Q}(p_i), \tau^{-1}(p_i)\right\}\right)$.

Recall that the optimisation problem in (3) is akin to a consumer choice problem where P_{ji} and Q_j are consumption goods with prices 1 and $(1 - p_i)$ respectively. Thus, an individual with a higher level of bridging identity faces a lower 'price' for cultural diversity. Therefore, if cultural diversity is an 'ordinary good', $\hat{Q}(p_i)$ is increasing in p_i. Furthermore, we have argued above that the term $W(p_i, p_o)$ attains its maximum at at $Q_j = \tau^{-1}(p_i)$, which is also increasing in p_i. As the individual's objective function is a weighted average of the two terms, we obtain the following result:

Proposition 2 *If cultural diversity is an 'ordinary good', the optimal social group $Q^*(p_i)$ is weakly increasing in p_i. Furthermore, $Q^*(1) = 0.5$.*

Stable Groups: Next, we provide a characterisation of social groups that are stable in the sense that no-one would choose, individually to leave his or her own social group and join another.

Definition 1 *A set of social groups $\mathcal{J}$ is <u>stable</u> if no one member of one social group can improve utility by joining another.*

Note that the social group preferences of an individual i are defined by the identity characteristics q_i and p_i. Therefore, two individuals i and i' who belong to the same cultural group (i.e. $q_i = q_{i'}$) and have similar levels of bridging identity (i.e. p_i is close to $p_{i'}$) will also have similar preferences across social groups. This implies that stable social groups have a distinct pattern as described by the following proposition.

Proposition 3 *Given a stable set of social groups, if individual i belongs to social group j then all individuals i' from the same cultural group as i (i.e. $q_{i'} = q_i$) and bridging identity in some interval $\left[\underline{p}, \overline{p}\right] \ni p_i$ either belong to social group j or another group j' identical in terms of cultural diversity (i.e. $Q_j^A = Q_{j'}^A$, $Q_j^B = Q_{j'}^B$ etc.).*

Recall that if $p_i > p_{i'}$, then individual i pays a lower 'price' than i' for cultural diversity. Therefore, if i and i' belong to the same cultural group but opt for social groups with different levels of cultural diversity, it must be that i opts for a higher level of cultural diversity:

Proposition 4 *Suppose i and i' come from the same cultural group (i.e. $q_{i'} = q_i$) and i has a higher level of bridging identity (i.e. $p_i > p_{i'}$). Given a set of stable social groups, if i and i' belong to two different social groups j and j' respectively and $Q_j \neq Q_{j'}$, it must be that $Q_j > Q_{j'}$.*

Suppose that social groups j and j' are such that $Q_j^A = Q_{j'}^B > 0.5$. Thus, the two social groups have the same level of cultural diversity but different majority groups. It follows that for person i belonging to cultural group A, we have $U(P_{ji}, Q_j) > U(P_{j'i}, Q_{j'})$. Thus, i would always be less inclined to join social group j where his cultural group is in the minority compared to another with a similar level of cultural diversity in which his cultural group is in the majority. This observation raises the question whether and to what extent we can have culturally diverse groups – where some individuals willingly join groups in which they belong to the minority culture – in a set of stable social groups. Given a set of stable social groups $\mathcal{J}$, if individual i belongs to a social group where his cultural group are in the minority, it must be that there is no social group in $\mathcal{J}$ with the same level of cultural diversity in which his cultural group is in the majority. It must also be that among the social groups in $\mathcal{J}$ where i's cultural group are in the majority, either (i) cultural diversity is lower than that in j' or (ii) that if i joins any of these groups, i's offspring will have a higher expected level of bridging identity than p_i due to the cultural transmission process. The reason is that if neither of these conditions hold true, then i would be better off joining such a social group as compared to joining social group j'. Formally, we can summarise these results as follows.

Proposition 5 *Given a set of stable social groups, if individual i from cultural group A has opted for social group j and $Q_j^A < 0.5$, then for all groups k such that $Q_k^A \in (Q_j^A, 1 - Q_j^A]$ we must have $p_i < \tau(Q_k)$. The corresponding result holds if i belongs to cultural group B.*

It follows from Proposition 5 that a set of stable social groups cannot be 'symmetric'

in the sense that two social groups have opposite majority and minority groups but are otherwise identical. This result is summarised below.

Definition 2 *A set of social groups $\mathcal{J}$ is symmetric if for each $j \in \mathcal{J}$, there exists a j' such that $Q_{j'} = Q_j$, $Q^A_{j'} = Q^B_j$ and $Q^A_j = Q^B_{j'}$.*

Proposition 6 *A symmetric set of social groups $\mathcal{J}$ is not stable if $Q_j \in (0, 0.5)$ for some $j \in \mathcal{J}$.*

Group Dynamics: Next, we provide some results relating to the dynamics of social groups. We focus on situations where the existing social groups are close to being stable or optimal and investigate how social groups and individual identity evolve from that point onwards. The following definitions will facilitate the subsequent discussion.

Definition 3 *A social group j is self-replicating if offsprings born within the social group have the same preferences as their parents.*

Definition 4 *A set of social groups $\mathcal{J}$ is stationary if, in each period, offsprings will choose to remain with the groups in which they were born.*

Then we obtain the following results.

Proposition 7 *A social group j is self-replicating if and only if $\alpha = 1$ or $p_i = \tau(Q_j)$ for each group member i.*

Proposition 8 *Given a set of social groups $\mathcal{J}$, if $\hat{Q}(p_i) = \tau^{-1}(p_i) = Q_j$ for each individual i in social group j, then each social group j is self-replicating and the set $\mathcal{J}$ is stationary.*

Proposition 9 *A stationary set of social groups is also stable.*

When social groups are not stationary, we can make predictions about the type of social groups to which offsprings would wish to migrate as adults if they are available. This is described in the proposition below:

Proposition 10 *Consider an individual i in social group j who produces offspring o. Either $Q^*(p_o) = Q^*(p_i)$ or $Q^*(p_o) \lesseqgtr Q_j$ according to $Q_j \lesseqgtr \hat{Q}(\tau(Q_j))$.*

According to Proposition 10, an offspring o born in social group j which satisfies the equation $Q_j = \hat{Q}(\tau(Q_j))$ would choose to remain in the social group in which he or she was born. However, if $Q_j < \hat{Q}(\tau(Q_j))$, o would prefer to migrate to a less culturally diverse social group while if $Q_j > \hat{Q}(\tau(Q_j))$, then o would prefer to migrate to a more culturally diverse social group. These migration decisions would also affect the composition of existing social groups as described in the following remarks.

Remark 1 *(i) When a social group experiences out-migration by an individual of the majority cultural group, it becomes more culturally diverse. When a social group experiences in-migration by an individual of the majority cultural group, it becomes less culturally diverse.*

(ii) When a social group experiences out-migration by an individual of the minority cultural group, it becomes less culturally diverse. When a social group experiences in-migration by an individual of the minority cultural group, it becomes more culturally diverse.

With these results, we can construct specific scenarios – in terms of social group composition and bridging identity – and investigate the social dynamics. We discuss three such scenarios in the following section.

4 Historical Examples and Hypothetical Exercises

In this section, we consider whether and, if so, how the theoretical model can explain historical examples of social interactions across cultural groups, in particular the impact of migration inflows and 'identity shocks'. Until recently, data of individual attitudes towards social diversity, with consistent measures over time and across populations, has been scarce. But there have been recent attempts to improve the quality of data. The European Social Survey, for example, now provides data on attitudes over a reasonable time span, enabling us to detect changes in social attitudes across generations.

4.1 Influx of Newcomers

Kauffman and Harris (2014) use longitudinal household surveys and local election results to study trends in cross-cultural interactions, and attitudes towards minorities and immigrants, in the UK. They find that while minorities are leaving their areas of concentration in favour of culturally mixed communities, the British white population are avoiding or leaving mixed communities for relatively white areas. Strikingly, "white conservatives and liberals, racists and cosmopolitans all move to relatively white areas at similar rates" but they also find that, controlling for other factors, the British white with a high share of minorities in their neighbourhood have more positive views on immigration. They argue that this last piece of evidence supports the *contact hypothesis* (e.g. Pettigrew and Tropp 2006; 2008) for a review of this literature) that "when white English people have the chance to interact positively with minorities and immigrants in their locale, they form a better opinion of them and feel less threatened". Moreover, the authors argue that as

> "young people ... grow up in a more diverse environment and view ... as the 'new normal', a state of affairs in which minorities are a legitimate part of English society, and hence the civic nation ... minorities and whites come to share an English and British national identity, though the two remain ethnically distinct". Kauffman and Harris 2014, p. 14.

Kaufman and Harris' notion that an individual's degree of exposure to social diversity (in the local environment, especially in youth) shapes her or his preferences regarding other cultural groups, is one of the driving mechanisms of our proposed model. Thus, it is useful to examine the model's predictions regarding cross-cultural attitudes and social diversity when there is an influx of immigrants from minority groups, and how they relate to the patterns uncovered by Kauffman and Harris for the UK. This is the purpose of our first exercise.

Example 1 Suppose that, initially, there are three types of social groups: (i) social groups in which $Q_j^A = 1$, $Q_j = 0$, and $p_i = 0$ for all group members i, labelled $J1$; (ii) social groups in which $Q_j^B = 1$, $Q_j = 0$, and $p_i = 0$ for all group members i, labelled $J2$; (iii) social

groups in which $Q_j = Q$ where Q satisfies $Q = \hat{Q}(\tau(Q))$, $p_i = \tau(Q_j)$ for all group members i and $Q_j^A \in (0.5, 1)$, labelled $J3$. Thus, the $J1$ and $J2$ social groups include only individuals from cultural groups A and B respectively, while the $J3$ social groups are mixed, but individuals from cultural group A are in the majority. By Proposition 7, social groups $J1$, $J2$ and $J3$ are all self-replicating. The three types of social groups are depicted in Figure 2.

Next, let us suppose there is an influx of individuals from cultural group B into the population, with varying levels of bridging identity, who decide which of the existing social groups to join. None will join the social groups in $J1$ above, as they will have a strict preference for social groups in $J2$. But those who have a sufficiently high level of bridging identity may prefer the $J3$ social groups to the $J2$ social groups. More specifically, there will be a threshold level of bridging identity such that newcomers with identity levels above this threshold will opt for the $J3$ social groups.

Let us assume that (i) a subset of the newcomers have a level of bridging identity above the threshold; (ii) that they spread themselves evenly across the $J3$ social groups; (iii) that the social groups thus formed (henceforth labelled $J4$) still have cultural group A in the majority. (The last two assumptions are not essential but they simplify the analysis).

Next, individuals in all social groups produce offsprings whose bridging identities are shaped by cultural transmission. The offsprings raised in social groups in $J1$ and $J2$ have a bridging identity of 0 because their parents had no bridging identity and because they have grown up in homogeneous social groups. Because the offsprings raised in the $J4$ social groups experienced a cultural mix higher than that in $J3$, a subset of them (depending on the size of α) have a higher level of bridging identity than their parents (who were raised in the $J3$ social groups); let us label them $J4_1$. The remainder have the same level of bridging identity as their parents due to direct vertical transmission; let us label them $J4_2$.

When these offsprings become adults and choose their own social groups, those raised

in social groups $J1$ and $J2$ will remain within the social groups of their parents (or join identical social groups). Next, we consider those from cultural group A raised in social groups $J4$. Those who experience direct vertical transmission from their parents, i.e. the $J4_2$, would prefer the $J3$ social groups to the $J4$ social groups as the former are, by construction, optimal for them. But the $J3$ social groups no longer exist – they have become more culturally mixed because of inward migration. The larger is the size of migrant influx, the lower is the expected utility the $J4_2$ individuals will experience in social groups $J4$. Therefore, if the influx is sufficiently large, these individuals will opt for the social groups in $J1$. This movement will increase the proportion of individuals from cultural group B in social groups $J4$ and the process will repeat itself in the next period. Over time, these social groups may become dominated by individuals from cultural group B while a large proportion of individuals of cultural group A opt to live in social groups of type $J1$. Thus, a one-time influx of migrants would lead to higher levels of segregation in the society.

On the other hand, if the size of the initial migrant influx is sufficiently small, then the social groups in $J4$ remain similar to those in $J3$ in terms of their cultural composition. Then everyone raised in the social groups in $J4$, even those who experience direct vertical transmission, prefer to remain in the $J4$ social groups rather than move to the $J1$ or $J2$ social groups. As the $J4$ social groups are more culturally mixed than the $J3$ social groups which preceded them, the influx of migrants lead to a higher level of cultural mixing and bridging identity within the society.

The implications of these results is that the influx of immigrants from a minority group can either help or harm social interactions across cultural groups. When the influx of migrants is large, individuals from the majority cultural group move away from the culturally mixed social groups ($J3$) towards groups where their own culture dominates. We can also show that if, as a result of this movement, the proportion of individuals from cultural group B in these social groups increase sufficiently, then they will be joined by individuals from the $J2$ social groups.

These patterns are similar to the recent trends in the UK documented by Kauffman and Harris (2014) – the British white leaving mixed communities for relative white areas, even as minority groups leave their areas of concentration for more mixed communities. By contrast, when the influx is small, it raises bridging identity within the most culturally mixed social groups without leading to outmigration from the majority group. It follows that repeated influx of newcomers, if it occurs on a sufficiently small scale, would also increase cultural diversity and bridging identity within these social groups without leading to instability. The theoretical results also mirror the conclusion reached by Kaufmann and Harris (2014) regarding immigration to the UK, that "mass concern over immigration is driven by the rate of change in the non-white British population ... Gradual, diffuse increases in diversity are preferable. Concern dissipates over time as members of the ethnic majority become used to a larger immigrant presence." (p.10)

4.2 Immigrant's Paradox

There is growing empirical evidence on the wellbeing and attitudes of second generation immigrants compared to that of their parents. A surprising finding in this literature is that indicators of social integration are often – although not always – lower for second generation immigrants relative to their parents, a phenomenon commonly referred to as the "Immigrant's Paradox". For example, recent studies in psychology highlights that second generation immigrants have lower levels of adaptation than first generation immigrants (e.g. Sam and Berry 2010; Noels and Clement 2015). The Indicators of Immigrant Integration (2015) shows that, in the European Union, one-fifth of young people born in the host country to foreign-born parents report belonging to a group that feels discriminated against on the grounds of ethnicity or nationality. In fact, they are more likely to report being discriminated against than young immigrants. For non-EU OECD countries, the reverse is true. In our next example we consider whether, and under what conditions, the theoretical model generates the Immigrant's Paradox.

Example 2 As in our previous example, suppose that, initially, there are three types of social groups as described above. Next, let us suppose there is an influx of individuals from

cultural group B into the population, with varying levels of bridging identity, who decide which of the existing social groups to join. We refer to them as first generation immigrants. There will be a threshold level of bridging identity such that newcomers whose identity levels are above this threshold will opt for groups in $J3$. As discussed, this influx will change the cultural diversity in at least some of the social groups in $J3$, thereby creating the social groups in $J4$.

Those born in social groups in $J4$ will experience either oblique cultural transmission (i.e. briding identity determined by the cultural diversity of the parental social group) or vertical cultural transmission from their parents. Consider immigrants in some social group $j \in J4$ with bridging identity above $\tau(Q_j)$. A fraction $(1-\alpha)$ of their children will experience oblique cultural transmission. These children will obtain a lower level of bridging identity and, consequently, experience a lower level of utility, than their parents if they remain within the same social group. This generates a version of the Immigrant's Paradox in our model.

Under what circumstances is the Immigrant's Paradox more likely to arise? Note that the children of immigrants who experience oblique cultural transmission in fact end up with a higher level of bridging identity than their parents who are *below* $\tau(Q_j)$. Therefore, the Immigrant's Paradox is generated by those above the threshold. Ceteris Paribus, the lower the initial level of cultural diversity in social groups in $J3$, the higher the proportion of first generation immigrants who are above the threshold $\tau(Q_j)$ and, thus, the higher the proportion of second generation immigrants who fare worse than their parents.

4.3 Identity Shocks

Next, we consider how "identity shocks" affect social interactions between cultural groups. By an "identity shock", we mean an exogenous event that affects an individual's own sense of identity, their perceptions about the identity of others, or beliefs about how they themselves are being perceived. One example of such an event are the terror attacks in the United States

on 11 September 2001, which potentially affected perceptions of Muslim immigrants as well their own beliefs about how they were being perceived. Gould and Klor (2016) document a rise in hate crimes against Muslims in the United States following the 9/11 attacks, and use variation in the increase across states to show that the backlash "made the Muslim community in America more cohesive and traditional."

Another example of an identity shock is the "Swiss minaret initiative" of 2009 – a national ballot in which Swiss citizens voted on whether the construction of minarets should be prohibited. A clear majority voted in favour of the prohibition, against the prediction of leading pollsters. Slotwinski and Slutzer (2015) argue that the outcome of the vote provided immigrants with new information about how Swiss citizens perceived foreigners, and show that that it decreased movement of immigrants into municipalities that opposed minarets most strongly relative to prior predictions. Relatedly, Rudert, Janke and Greifeneder (2017) report that the Swiss minaret vote negatively affected attitudes of high-skilled immigrants towards Swtizerland as well as their reported life satisfaction.[4]

In our third exercise, we represent a negative identity shock as a temporary decline in bridging identity, and consider how it affects movements across social groups, and cross-cultural interactions within social groups, over time.

Example 3 *A Negative Shock to Bridging Identity:* Let us consider again the starting point described in the first example, with three types of social groups.

Let us suppose that there is a temporary negative shock to bridging identity. Formally, suppose that the process of oblique cultural transmission is given by $p_i = \tau(\sigma Q_j)$ where σ is a random variable. In normal times, $\sigma = 1$ and, therefore, cultural transmission follows the process described above. However, during a period of conflict, σ may fall below one such that offsprings who experience oblique cultural transmission end up with a lower level of bridging identity than they would acquire from their social group during normal times. This is depicted in Figure 4. To be concrete, let us suppose that

[4]Kaufman and Harris (2014) present some interesting historical examples of positive identity shocks such as the impact that the ecumenical movement in Christian churches may have had on the integration of Protestants and Catholics in Northern Ireland.

the negative shock lasts for one period exactly.

Note that this shock does not affect cultural transmission in social groups in $J1$ and $J2$ above. But it lowers bridging identity among offsprings who experience oblique cultural transmission in social groups in $J3$. Consequently, these offsprings may prefer to migrate to social groups in $J1$ and $J2$ according to their cultural identity. If the same proportion of offsprings of each cultural group choose to exit, then the cultural diversity in social groups in $J3$ remain unchanged. Then we can show that, in the next period, there are no further dynamics. More precisely, the set of social groups become stationary.

However, as individuals from cultural group B are in the minority in social groups in $J3$, they experience a lower level of social cohesion than those from cultural group A for the same level of bridging identity. Therefore, the negative shock (decline in σ) may be low enough that the offsprings from the minority group choose to exit while those from the majority group do not. In the next period, cultural diversity within these social groups decline. As a result, offsprings would acquire a lower level of bridging identity even in the absence of a shock. And so the process of outward movement from these social groups will continue. Thus, a temporary shock to bridging identity triggers a dynamic process which lowers cultural diversity over time.

In summary, a temporary shock to bridging identity may trigger short-term outward movement from culturally diverse groups or produce a dynamic process of exit which continues beyond the period of the shock. The first case occurs when the shock is severe enough to produce exit from both the majority and minority groups. The second case occurs when the shock is less severe, such that it induces outward movement from the minority group only but not from the majority group.

The theoretical example illustrates, first, how a temporary shock to bridging identity can have long-term effects on cross-cultural interactions. Second, it shows that those adversely affected are the ones with the highest levels of bridging identity within the society, with little change experienced by individuals who have low levels of bridging identity and live in

segregated social groups.

We consider how these theoretical results compare with empirical findings on identity shocks. Gould and Klor (2016) find that, following the 9/11 attacks in the United States, Muslim immigrants living in states with the sharpest increase in hate crimes exhibit lower English proficiency; which is suggestive of reduced interactions with the (majority) English-speaking population. Furthermore, this effect is concentrated among immigrants who arrived in the United States before the age of 20, with no statistically significant effects for those who arrived as adults. To the extent that immigrants raised and schooled in the United States have more exposure to the majority culture, this is consistent with the theoretical result that the effects of the identity shock are concentrated among those with high levels of bridging identity.

The theoretical model also reproduces the basic finding by Slotwinski and Slutzer (2015) that the Swiss vote on minarets reduced movement of foreign immigrants into municipalities that voted most strongly in support of prohibition (relative to expectations). Additionally, they find that high-skilled foreigners were the most sensitive to the vote in terms of their location choice decisions. Rudert et al. (2017) also find evidence of a strong effect of the vote on high-skilled migrants' self-reported life satisfaction and attitudes towards Switzerland. If high-skilled foreign migrants also have high levels of bridging identity, these findings are consistent with the predictions of the model.

The negative effects of the vote reported by Rudert et al (2017) were mitigated for immigrants who had a higher proportion of Swiss friends. Relatedly, Slotwinski and Slutzer (2015) observe that Swiss-born immigrants were less sensitive to the vote relative to foreign-born immigrants. We argue that these groups of people exhibited a weaker response to the vote as they would have alternative sources of information about the bridging identity of Swiss residents in different communities – therefore, the outcome of the vote was less akin to an identity shock.

5 Conclusions

Changes to the composition the population and shocks to the environment, which may pitch identifiable cultural groups against each other, can have a significant impact on the wellbeing of individuals. In particular, for young individuals, it may affect their evaluation of social interaction in a society at a time when their individual identities are being shaped. This can have consequences not just for the individual but also for society at large (Singh and vom Hau 2016). Ethnic diversity has often been linked to poor public good provision and conflict. However, it is often segregation rather than diversity which may be behind those problems (Corvalan and Vargas 2015). It is therefore important to understand the individual reasons and external shocks which may lead societies to become more or less segregated. Civic participation is affected by conflicts at the time of migration, through immigrants' self-selection and migration irreversibility, whereas country opportunity structures and policies aimed at immigrant political incorporation are positively associated with immigrants' civic participation (see Aleksynska 2011 and Bracco et al. 2015).

We have constructed a model which allows social groups in which parents interact to play a role in the identity formation of their children. In our model the creation of dual identities becomes a strategy for adaptation to a change in the cultural environment. We formalise the concept of bridging identity as an individual trait that (i) directly affects utility in culturally diverse social groups but is immaterial in culturally homogeneous social groups; (ii) is fostered (probabilistically) in those born in culturally diverse social groups but not in those born in culturally homogeneous social groups.

We find, first, that increased cultural diversity within a population can lead to more mixed social groups or increased segregation depending on the pace of change. Second, when immigrants with high levels of bridging identity join a population that is culturally segregated, their children experience a higher level of everyday conflict and, consequently, are worse off than themselves. Finally we show that a temporary negative shock to bridging identity can trigger a dynamic process of segregation in the form of exit from culturally diverse social groups. We argue that these theoretical results are consistent with empirical

findings on recent episodes of migration and "identity shocks" that have been shown to affect cross-cultural interactions within European countries.

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6 Appendix

The expression $\mathbf{E}W(p_i, p_o)$ can be written as

$$U(P_{ji}, Q_j) + W(p_i, p_i) + (1-\alpha)\left[W(p_i, \tau(Q_j)) - W(p_i, p_i)\right]$$

Proof. of Proposition 5: By construction, for all groups k for which $Q_k^A \in (Q_j^A, 1-Q_j^A]$, we have $Q_k > Q_j$ and $P_{ki} > P_{ji}$. It follows that $U(P_{ki}, Q_k) > U(P_{ji}, Q_j)$. Therefore, if i has opted for social group j, it must be that $\mathbf{E}W(p_i, \tau(Q_k)) < \mathbf{E}W(p_i, \tau(Q_j)) \leq \mathbf{E}W(p_i, p_i)$ for each k. Therefore, $\tau(Q_k) \neq p_i$. Since $0.5 \in (Q_j^A, 1-Q_j^A)$ and $\tau(0.5) = 1$, we cannot have $p_i > \tau(Q_k)$. Therefore, it must be that $p_i < \tau(Q_k)$. We can establish the corresponding result for cultural group B using the same type of reasoning. ■

Proof. of Proposition 7: First note that, by assumption, all offsprings inherit their parents' cultural identity. If $\alpha = 1$ then, by construction, all offsprings inherit their parents' bridging identity. And therefore, the social group is self-replicating. If $p_i = \tau(Q_j)$, then offsprings either inherit their parents' bridging identity (with probability α) or acquire a bridging identity of $p_o = \tau(Q_j) = p_i$ (with probability $1-\alpha$). Therefore, the social group is, once again, self-replicating. If $\alpha < 1$ and $\tau(Q_j) \neq p_i$, then with some probability offsprings have a bridging identity $p_o = \tau(Q_j) \neq p_i$. Therefore, the social group is not self-replicating. ■

Proof. of Proposition 6: Consider a social group $j \in \mathcal{J}$ for which $Q_j \in (0, 0.5)$. Let us suppose, without loss of generality, that $Q_j^A > 0.5$. As $\mathcal{J}$ is symmetric, there exists a social group j' such that $Q_{j'} = Q_j$ and $Q_{j'}^B = Q_j^A$. As $Q_j > 0$, it contains at least one individual from cultural group B. Consider such an individual i. By construction, $P_{j'i} > P_{ji}$. Therefore, $U(P_{j'i}, Q_{j'}) = U(P_{j'i}, Q_j) > U(P_{ji}, Q_j)$. Therefore i can improve utility by moving to cultural group B. Therefore, the set of social groups $\mathcal{J}$ is not stable. ■

Proof. of Proposition 8: Suppose offspring o is born of individual i in social group j where i's cultural group is in the majority. By construction, $p_o = \tau(Q_j) = p_i$. Therefore, social group j is self-replicating. Then, using Proposition 1, $Q^*(p_o)$ lies between $\hat{Q}(p_o)$ and $\tau^{-1}(p_o)$ which is the same as between $\hat{Q}(p_i)$ and Q_j. By assumption, $\hat{Q}(p_i) = Q_j$. Therefore, $Q^*(p_o) = Q_j$. Therefore o will choose to remain in social group j or join an identical social group. Therefore, the set of social groups $\mathcal{J}$ is stationary. ■

Proof. of Proposition 10: By assumption, with probability α, we have $p_o = p_i$. Therefore, $Q^*(p_o) = Q^*(p_i)$. Otherwise, with probability $1-\alpha$, we have $p_o = \tau(Q_j)$. Then, using Proposition 1, $Q^*(p_o)$ lies between $\hat{Q}(p_o)$ and $\tau^{-1}(p_o)$ which is the same as between $\hat{Q}(p_o)$ and Q_j. Therefore, if $\hat{Q}(p_o) = Q_j$, we have $Q^*(p_o) = Q_j$. If $\hat{Q}(p_o) > Q_j$, then $Q^*(p_o) > Q_j$ and if $\hat{Q}(p_o) < Q_j$, then $Q^*(p_o) < Q_j$. Substituting for p_o with $\tau(Q_j)$ in these results gives us the statement of the proposition. ■

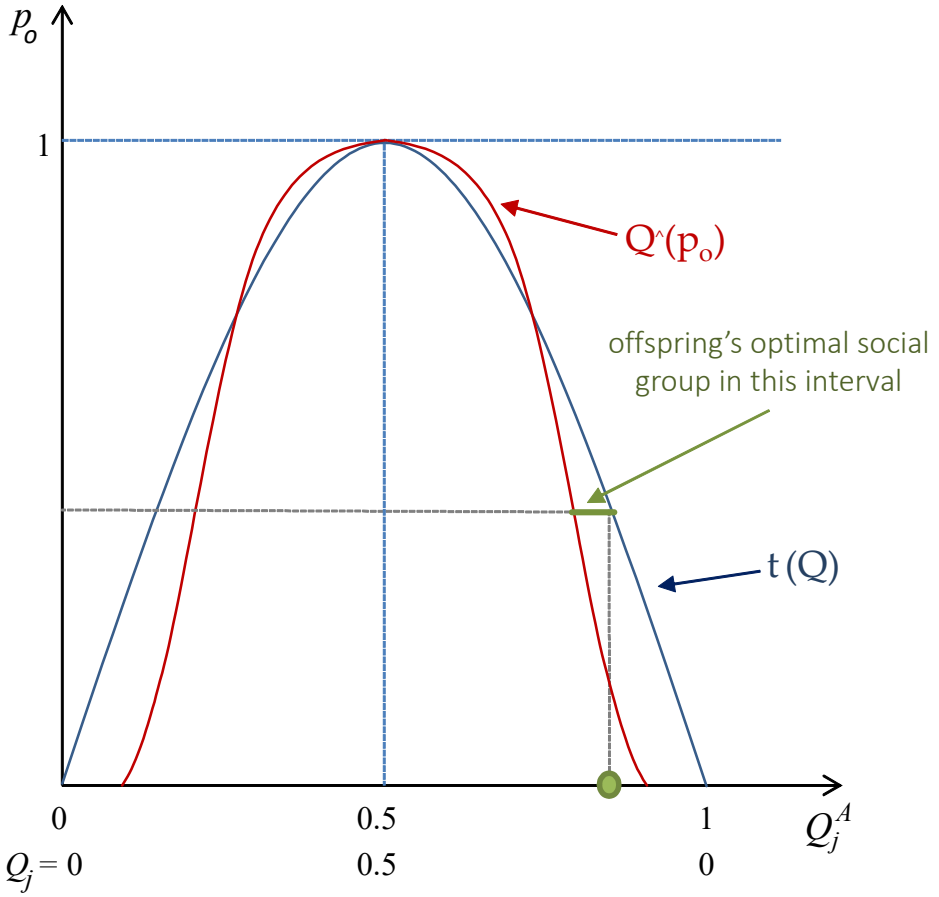

Figure 1: Optimal Choice of Social Group

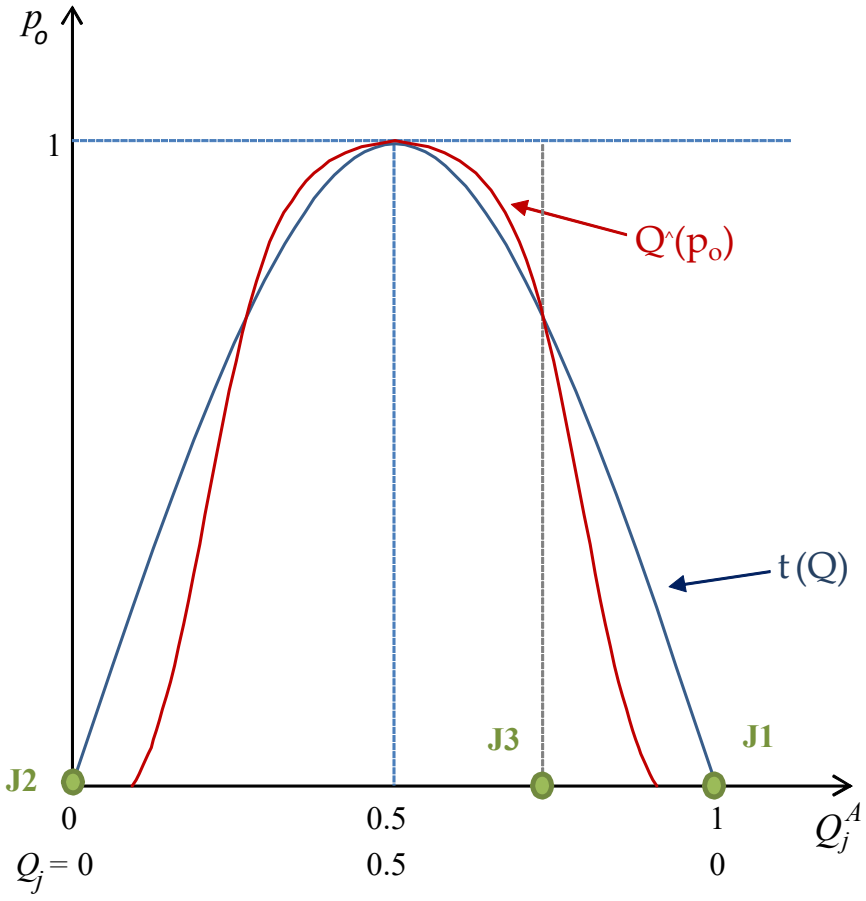

Figure 2: Stable Social Groups

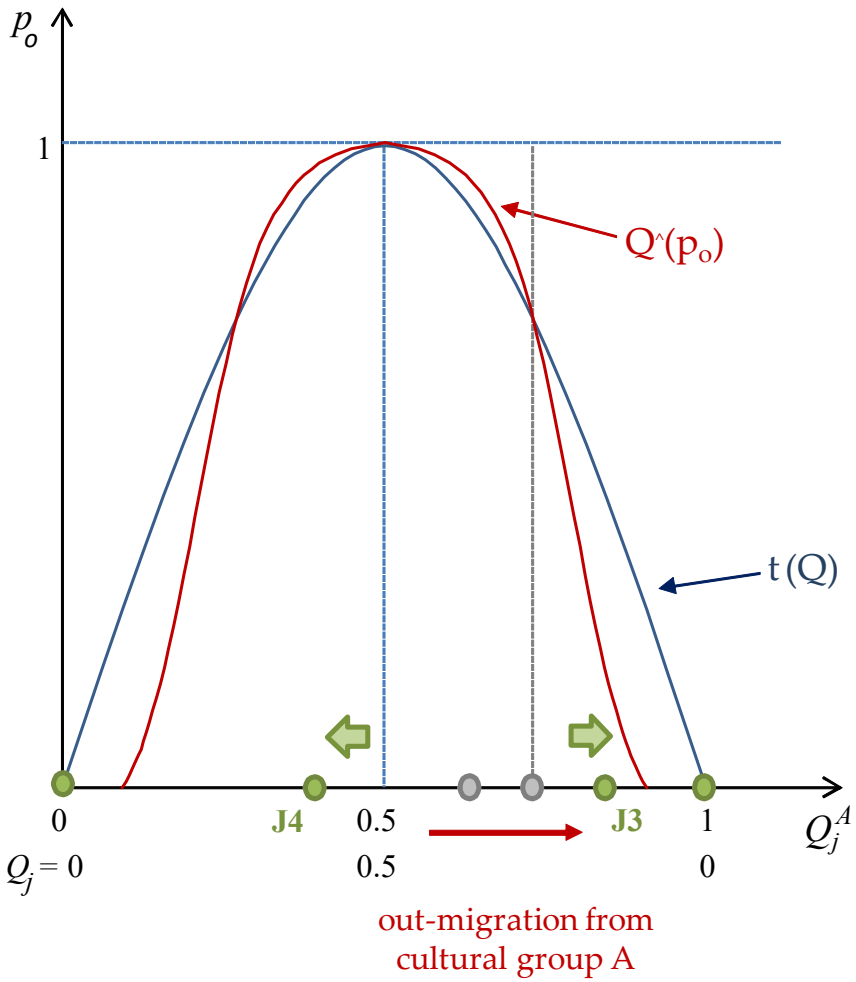

Figure 3: How Immigration Affects Social Groups

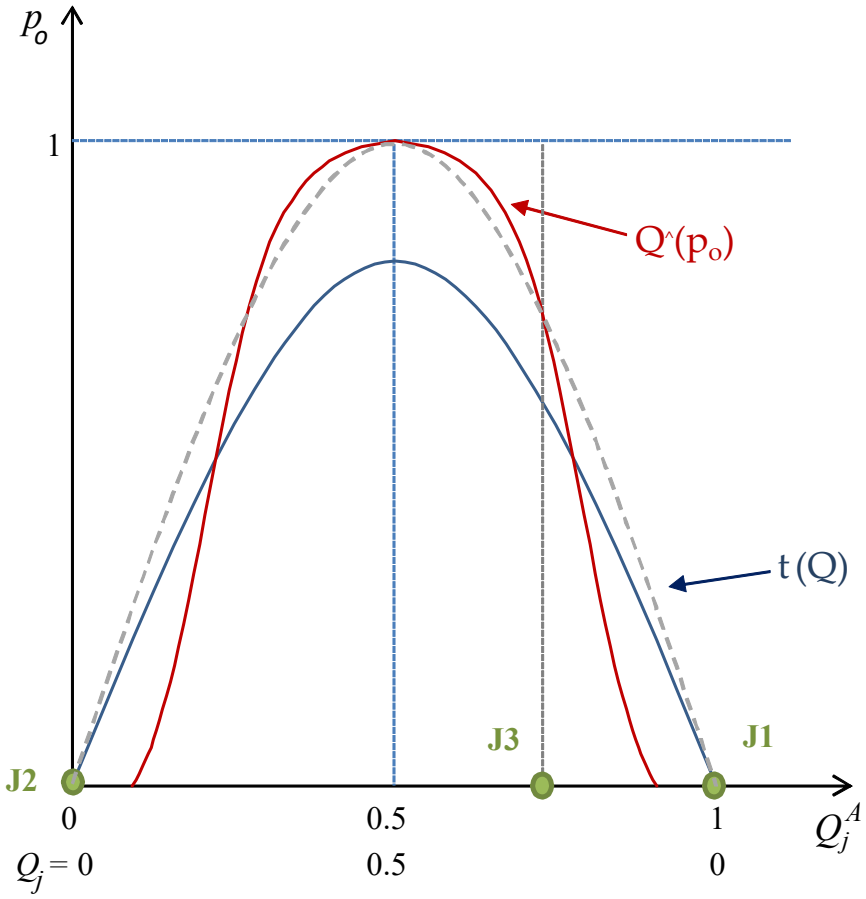

Figure 4:

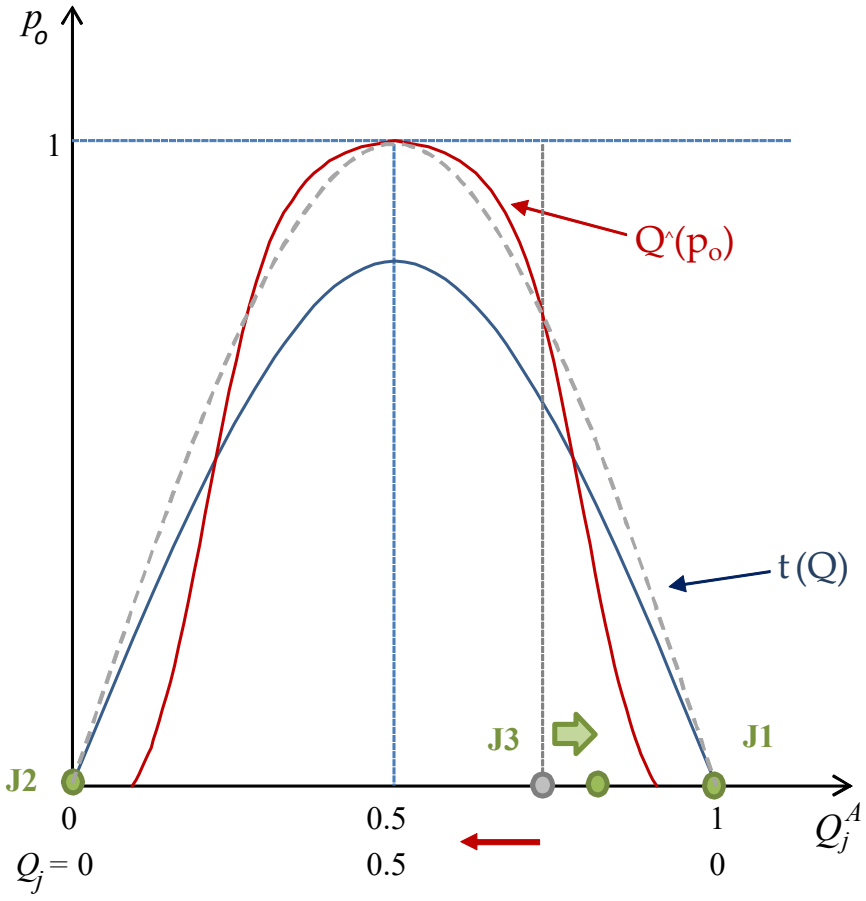

Figure 5: Temporary Shock to Oblique Cultural Transmission

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