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Cultural Identity, Mobility, and Decentralization

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Abstract

Regional cultural identity increases trust and facilitates interaction between native citizens ("social capital"). At the same time, it also affects non-native's migration decisions and their utility as it excludes non-native mobile workers from economic interaction within the region. Policies to increase regional cultural identity thus exert an externality that is negative for a basic model where future local productivity is exogenous and random, leading to the result of oversupply of regional culture under decentralization. If migration affects productivity, the basic result of oversupply may be reversed, depending on production technology and the government's objective function. Some positive and normative conclusions for cultural policy are derived.

JEL Classification: H72, H73, J61, Z13

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1 Introduction

Cultural differences, i.e. differences in norms and values between nations and between regions within nations, are still sizeable. Differences in culture extend to customs, beliefs, languages, and dialects. There are observable tendencies of cultural differences decreasing over time, commonly attributed to increasing interregional and international economic exchange. At the same time, regional and national governments undertake efforts to define and reinforce traditional regional cultural norms and values. For example, Catalonian cultural policy of recent decades seems to have reversed the falling trend in the use of Catalan vs. Castilian (Rendon (2007)).[1] Crawford (2006) analyzes contemporary Japanese history textbook censorship and sees its main intention in "legitimising a particular set of values" which "seek to unite [people] in the face of a fracturing social cohesion." Recent efforts in Danish cultural policy seem to stress a reinforcement of explicitly danish cultural norms and values: "The Danish Cultural Canon is intended to: [...] provide reference points and awareness of what is special about Danes and Denmark in an ever more globalised world [and] [...] strengthen the sense of community by showing key parts of our common historical possessions"(Council of Europe (2009)).

A common culture and common language, as Lazear (1999) points out, allows individuals to trade with one another without intermediaries and allows the traders to have "common expectations and customs, which enhances trust".[2]

The starting assumption of this article is therefore, that cultural policy aimed at strengthening a specific regional cultural identity, possibly with the effect of increasing regional social cohesion, or "regional social capital", will, as a side effect, impede factor mobility of both native citizens and individuals from other regions.[3] We consequently refer

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[1]Keating (2001) regards the catalan language and catalonian cultural identity to be strongly linked.

[2]Falck et al. (2010) show that cultural similarity of german regions, measured by historical similarity of dialects, explains a considerable share of cross-regional migration flows in Germany. Guiso et al. (2004) show, among other things, that european's trust for fellow countrymen is generally larger than for other countries' citizens, that cultural similarity and bilateral trust are related, and that the amount of bilateral trust positively affects economic exchange between the respective countries.

[3]We recognize that the degree to which an increased regional cultural specificity may ultimately result in exclusion effects could qualitatively differ between regional cultures. This possibility is not reflected in our model. However, in section 3.1 we explicitly analyze the possibility of unilateral efforts to decrease

to such regional social capital as "exclusive social capital".[4]

In the context of a federation with heterogeneous regional cultures, it may thus at first sight seem justified to ask whether the best cultural policy in such a setting would simply be to undertake efforts to "standardize" regional cultures to some universal culture. However, equalizing cultural differences is likely to be costly.[5] If such costs of culture equalization are sizeable, it will not be feasible to just discard regional cultures and replace them with an alternative universal culture that does not involve mobility impediments. We therefore assume that any efficient cultural policy will necessarily have to (at least partly) rely on regionally specific culture.

We thus assume a (presumably negative) interregional externality in the provision of culture, rendering decentralized public provision of regional culture inherently inefficient. If wages and rents are also directly or indirectly affected by cultural policy, it may not be a priori clear whether this externality is negative, or whether there are compensating countervailing effects.[6] Ultimately, regarding the federal institutional structure, the task is to determine the sign of the presumed externality, to narrow down the specific conditions that have to be fulfilled for this argument to provide a case for centralizing or coordinating cultural policy, and, finally, to derive political economy conclusions for cultural policy in a federal state.[7]

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cultural differences.

[4]This term resembles a close conceptual analogy to the term "bonding social capital" (see, for instance Geys and Murdoch (2008)).

[5]For instance, such costs may comprise (non-permanent) intergenerational frictions and (permanent) opportunity costs of foregone beneficial effects of cultural diversity between regions. For instance, cultural differences between regions may breed specialization gains and comparative advantage: Belloc and Bowles (2009) employ this premise in their attempt to explain persistence of cultural differences in the presence of cultural equalization effects of international trade. Also, cultural uniqueness and historic cultural authenticity may be an essential cause for the value of a region's cultural assets ("cultural capital"), which may be monetizable for instance through tourism or export of cultural goods (Throsby (1999)).

[6]The overall effect may depend, for instance, on our assumptions about the distribution of landrents and on our assumptions about which individuals to include in the regional welfare function (see the discussion in section 3.3).

[7]Our notion of a federal state comprises federations of regions such as Germany as well as federations of different nations such as the E.U. When applying our model to federations of nations, the term "regional" may readily be replaced by the term "national".

The empirical literature on social capital has found growth effects of social capital on a regional as well as on a national level (most notably, Zak and Knack (2001) and Knack and Keefer (1997)).[8] A small empirical literature on decentralization and social capital has found some evidence of a positive relation between social capital and decentralization.[9]

The literature on fiscal federalism has analyzed efficiency of the provision of (homogeneous) local public goods in a federal state. Zodrow and Mieszkowski (1986) have essentially argued that decentralization of local public good supply should lead to underprovision of these goods, because from the regional viewpoint, the marginal costs of public funds to finance these goods only include the adverse effect of taxation on the region's own tax base, but not the positive external effect on the other region's tax bases. Myers (1990) however has shown that this result critically hinges on restrictive assumptions regarding the regional non-availability of lump-sum personal and property taxes and immobility of citizens: If lump-sum personal and property taxes are available and citizens are freely mobile, decentralized local public good provision will indeed be efficient. The literature has further qualified this result (see Wellisch (1993), Wellisch (1994)), however, it has so far only considered "culturally neutral" public goods, i.e. public goods that benefit native and non-native citizens equally.

While cultural public goods have not yet been analyzed explicitly by prior research on regional competition, analyzing public investments in norms and values is not entirely new to the literature. In the presence of public investments in human capital, Poutvaara (2006) analyzes incentives of tax revenue maximizing regional governments to bias human capital provision away from internationally applicable (i.e. "culturally neutral") education types (such as engineering and medicine) and towards country-specific education types (such as law), making their tax base less mobile, however at the price of causing a welfare loss

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[8]While it is not critical for our results whether regional cultural identity affects utility directly, or whether these effects occur indirectly though increased productivity, as we show in Appendix A, these studies find, among other things, a strong positive relationship between ethnic homogeneity, social capital, and growth, which is in principle accordance with our results.

[9]Most notably, Bjørnskov and Svendsen (2002) and de Mello (2000). While the causal interpretation for this correlation of both of these works is different than the interpretation that our model offers, this correlation does not conflict with central results of our paper.

to their own citizens.[10] Konrad (2008) analyzes the case of revenue maximizing regional governments that engage in tax-competition by making public investments in "patriotism" or "taxpayer loyalty", thus effectively "ear-marking" their tax base, i.e. making taxpayers less mobile.[11] Our approach differs from these studies, in that it a) constitutes a (foremost) normative approach and b) it assumes non-distortive taxation, i.e. per capita lump-sum financing of the public good.

Aim and results   In the following theoretical analysis, we investigate the efficiency properties of a federation under different federal institutional settings with regard to mobility and the provision of regional culture or "social capital".[12]

We start with the assumption that it is possible to increase the adherence of natives to a given set of cultural norms and values, i.e. to "strengthen" cultural norms and values, by policy efforts, and that it is not feasible to discard the traditional regional culture.[13] We also assume that native residents incur lower transaction costs in economic interaction within their native region, the more this region invests in regional culture. We further assume that non-native residents bear higher transaction costs in economic interaction within their resident region, the more this region invests in regional culture.[14] We thus effectively argue that regional culture constitutes a publicly provided good, that, in the form of an informal institution, provides access to economic exchange for natives and thus increases natives' utility within the region ("home attachment effect"), while constituting a "publicly provided bad" for non-natives, thus decreasing non-natives' utility within the

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[10]Poutvaara (2006) shows that graduate taxes complementing the income tax will increase efficiency in such a setting.

[11]Konrad (2008) shows that such deliberately generated home attachment reduces the intensity of tax competition, but generates a strategic disadvantage for the country that invests more in home attachment. He also shows that harmonization of taxes may intensify such investments in home attachment.

[12]In what follows, we do not distinguish between the terms "culture" and "social capital", although we suppose that actually the term "culture" may refer more to the causes, while the term "social capital" may refer more to the corresponding utility effects in the given context.

[13]In an extension of the model, we alternatively assume that it is possible to undertake costly efforts to interregionally equalize sets of norms and values.

[14]We alternatively assume that non-native residents bear higher transaction costs within their resident region, the less both regions invest in reducing cultural differences.

region ("exclusion effect").

In a symmetric setting with wage uncertainty, i.e. for regions that are identical except for their different types of culture and that are subject to random productivity shocks, we then compare the case of immobile workers with the case of free mobility under decentralized and under centralized provision of regional culture.[15] In our analysis, we throughout disregard the possibility of different sets of norms and values being differently effective in creating utility and productivity effects. We find that investments in regional culture are always higher in the case where workers are immobile than in the case of free mobility. We also find that regional culture is suboptimally high under decentralization.

We then extend our model in allowing regions to undertake (costly) efforts to decrease cultural differences and, somewhat analogously, we find that such efforts will be suboptimally low.

Partly motivated by the empirical literature on social capital and regional growth,[16] we investigate in another extension the case where culture does not have a direct effect on utility but an indirect effect through wages (see Appendix A, "productive social capital").

We then analyze the marginal culture investment effect of giving one region a slight ex ante productivity advantage and find that, for this asymmetric setting, the richer region will invest relatively more in regional culture than the poorer region.

We further extend our model by assuming decreasing marginal productivity of labor so that the wage is endogenously determined by migration. As long as the regional governments' objective function is to maximize natives income and the region's immobile factor is owned by natives, this extension does not change our basic result of overprovision.

However, if we assume instead that the immobile factor's income is owned by individuals from outside the federation ("absentee landowners"), then, depending on production technology, culture may either be overprovided or underprovided under decentralization.

Finally, we draw some positive and normative conclusions from our analysis.

The paper is organized as follows. Section 2 develops and solves the basic model of

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[15]We find it adequate to model wages as uncertain, assuming that investments in culture yield a return over decades or even life-times and as local productivity seems very likely to be more volatile during the same time-span.

[16]Most notably, Bjørnskov and Svendsen (2002) and de Mello (2000).

regional culture in fiscal competition. Section 3 extends the model in various directions: First, productive effects of regional culture are considered. Then, we look at the possibility of costly unilateral efforts to reduce cultural differences. Third, we look at regions of different productivities. Finally, effects of migration on wages and the immobile factor's income are taken into account. Section 4 concludes.

2   Basic model

We consider a federation that consists of two regions, D and F. Each region has a native population $\overline{N}$. Utility depends on net income and regional cultural identity, or "social capital", S_i, $i = D, F$.[17] We assume that local governments directly provide cultural identity.[18] This can be seen as a proxy for local cultural and educational policy. The costs of providing culture are reimbursed via head taxes that fall on natives.[19] Per native citizen costs are denoted by $C(S)$, with $C' > 0$ and $C'' > 0$. Regional culture benefits native residents as "regional social capital" S_i, but, due to an exclusion effect, harms non-native residents. Denoting per-capita income in region i by θ_i, utility of natives of region i that live and work in the region of birth is

$$U_{ii} = \theta_i + S_i - C(S_i), \quad i = D, F. \tag{1}$$

Utility of an immigrant from region j is

$$U_{ji} = \theta_i - S_i - C(S_j), \quad i = D, F, j \neq i. \tag{2}$$

Note that S_i captures all net benefits of regional culture bar costs of provision. This includes the benefits of reduced transaction costs for natives (and increased cultural transaction

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[17]S_i can either be generally interpreted as "utility from regional identity" or, more specifically, as "efficiency gains attributed to interpersonal trust from regional identity".

[18]In what follows, we may refer to "cultural identity" simply as "culture".

[19]This means that natives bear the costs of provision, regardless of whether they migrate at a later stage. This assumption can be justified by the dispropotionately large share of social capital investment that occurs early in life during education (i.e., before migration) in conjunction with the long term nature of cultural attitudes and social capital investments. Also, note that strong cultural affiliation of migrants with their home region could be expected to be linked with strong economic ties with the home region such as, for instance, financial remittances to family members.

costs for non-natives, respectively), as well as any diversity effects of regionally specific culture (i.e. all net benefits of regional cultural diversity).[20] Also note that regional culture does not affect native non-residents' welfare. This assumption thus effectively excludes the possibility of emigrants forming exclaves enabling them to enjoy the benefits of their culture within the foreign region.[21] Note also, that regional culture does not affect non-native non-residents' welfare in our model. This effectively excludes welfare effects of cultural (population) diversity within regions, i.e. culture of non-native immigrants affecting native resident's welfare (positively or negatively).[22] Per-capita income is subject to region specific i.i.d. shocks, where the shocks θ_i are described by the p.d.f. $f(\theta_i)$ with support $[\underline{\theta}, \overline{\theta}]$. Uncertainty is resolved prior to migration.

We assume the following timing: First, regions decide autonomously and simultaneously on regional culture. Second, shocks occur and income is revealed. Third, workers decide whether to emigrate or not. By the choice of residence workers maximize utility. Fourth, consumption takes place. We assume that local governments maximize utility of natives. Since migration takes place later, this could be justified either by welfare economic considerations or by any public choice model.

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[20]Note that, for the sake of simplicity, S_i enters the utility function linearly. This implies that net benefits (bar costs of provision) of regional culture, including any diversity effects, are assumed to be positive and non-convex. Also note that S_i benefits natives as much (in absolute terms) as it hurts non-natives. Introducing a parameter $\delta > 0$ before S_i in equation 2 would not change any of our results.

[21]Qualitatively, this does not present a problem as long as utility effects of culture are (mostly) immobile, i.e. the benefits of culture are at least partly conditional on (immobile) cultural institutions of the region of origin, or forming enclaves is costly, for instance due to institutional constraints by the host country.

[22]It seems justified not to regard welfare effects of within-region cultural diversity, as the literature on the effects of diversity on welfare and growth so far seems rather inconclusive: in a recent literature overview, Alesina and Ferrara (2005) find strong evidence for public good provision being lower in more fragmented societies, while they conclude that the effect of ethnic diversity on productivity is ambiguous empirically and is also far from being understood theoretically. For U.S. States, Ratna et al. (2009) find negative effects of racial diversity and positive effects of linguistic diversity on growth, for U.S. Cities, Ottaviano and Peri (2006) find positive effects of cultural diversity on growth. In the theoretical literature, Lazear (1999) stresses negative diversity effects of cultural-linguistic heterogeneity, while Durkin (1998) analyzes countervailing effects of ethnic diversity on human capital and human capital spillovers, and finds both instances where further immigration either increases or decreases welfare.

The game is solved backwards. When cultural investments are completed and income is revealed, natives have a stronger preference for the respective region than potential immigrants. Natives of D compare wages and beneficial social capital of their home region $\theta_D + S_D$ with foreign wages and harmful social capital of the foreign region $\theta_F - S_F$. Natives of F choose between $\theta_D - S_D$ and $\theta_F + S_F$, accordingly.[23] Hence,

- all workers live in region D if $\theta_D - \theta_F > S_D + S_F$,

- only natives of region D live there if $S_D + S_F > \theta_D - \theta_F > -(S_D + S_F)$,

- all workers live in region F if $\theta_D - \theta_F < -(S_D + S_F)$.

Assuming that regional culture is not too large compared to the maximum interregional income differential, i.e., $S_D + S_F < \overline{\theta} - \underline{\theta}$, exclusive regional culture then acts as a cost of migration and reduces migration flows. At the policy stage of the game, where uncertainty is yet not resolved, the government of region D maximizes expected utility of a representative native:

$$
\begin{aligned}
EU_D \;=\; & \int_{\underline{\theta}}^{\overline{\theta}} \left[\int_{\underline{\theta}}^{\theta_F - S_D - S_F} (\theta_F - S_F) f(\theta_D) d\theta_D \right] f(\theta_F) d\theta_F \\
& + \int_{\underline{\theta}}^{\overline{\theta}} \left[\int_{\theta_F - S_D - S_F}^{\overline{\theta}} (\theta_D + S_D) f(\theta_D) d\theta_D \right] f(\theta_F) d\theta_F \\
& - C(S_D).
\end{aligned}
\tag{3}
$$

The first line of equation (3) sums up utility when income shocks are such that all workers choose to live in region F, which happens when income in region D, θ_D, is comparatively low.[24] The second line sums up utility for all combinations of θ_D and θ_F where natives of D choose to stay in their home region. Finally, the third line covers costs per capita of providing culture in the home region.

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[23] Note that costs of providing social capital are irrelevant for the migration decision by assumption.

[24] This implicitly assumes that the regional government should care about emigrants and thus include them in the regional welfare function. Individuals are thus effectively included in the welfare function based on their cultural identity, i.e., in the context of this model: based on their place of residence at the time when the social capital investment takes place.

The first-order condition reads

$$\frac{dEU_D}{dS_D} = -\int_{\underline{\theta}}^{\overline{\theta}} \left[\int_{\underline{\theta}}^{\theta_F - S_D - S_F} f(\theta_D) d\theta_D \right] f(\theta_F) d\theta_F \qquad (4)$$
$$+ 1 - C'(S_D) = 0.$$

Since the first line is negative, it is easy to compare the outcome of regional competition in regional culture with the provision of regional culture in a closed region. In the absence of any migration, the expected utility in region D would be

$$EU_{imob} = \int_{\underline{\theta}}^{\overline{\theta}} (\theta_D + S_D) f(\theta) d\theta - C(S_D), \qquad (5)$$

leading to the first-order condition

$$\frac{dEU_{imob}}{dS_D} = 1 - C'(S_D) = 0. \qquad (6)$$

The marginal utility of regional culture, 1, should be equal to marginal costs, $C'(S_D)$. By comparison it follows, that $C'(S_D)$ is smaller with mobility than without mobility. Taken convexity into account, this implies that mobility reduces the amount of exclusive regional culture. The intuition is that in an open economy domestic culture is not used after a severe negative local shock causing complete emigration.

Since regional culture hurts immigrants, there is a negative externality which should imply inefficient regional culture provision under decentralization. To show this, we calculate the total expected welfare per capita by summing up expected utilities for representative agents in both regions. The respective first-order condition of total welfare maximization is

$$\frac{d(EU_D + EU_F)}{dS_D} = \frac{dEU_D}{dS_D} - \int_{\underline{\theta}}^{\overline{\theta}} \left[\int_{\underline{\theta}}^{\theta_D - S_F - S_D} f(\theta_F) d\theta_F \right] f(\theta_D) d\theta_D \qquad (7)$$
$$= 0.$$

For any amounts of regional culture in both regions, marginal-expected-per-capita welfare is unambiguously smaller than marginal expected utility of a native citizen in the region under consideration. dEU_D/dS_D should be larger under centralization than under decentralization. Assuming that second-order conditions hold, this implies for a symmetric setting, where $S_D = S_F$, that $C'(S_D)$ and, hence, S_D is smaller under centralization than under decentralization. Hence:

Proposition 1 *If wages are uncertain, and culture has an adverse effect on non-natives' utility within the region, and regional wages are not affected by migration, then the symmetric Nash equilibrium of fiscal competition with regional culture is inefficient. Regional culture is over-provided.*

Regions should invest less in exclusive regional culture, because it excludes foreigners. It is worth to compare our results with those on local public good supply. Decentralized local public consumption good supply will be efficient if lump-sum and property taxes are available, as in our model, and if there is perfect mobility (Myers (1990)). This holds even if there are public good spillovers (see Wellisch (1993)). If, however, there is attachment to home and thus imperfect mobility, the public good supply in at least one region is inefficient (Wellisch (1994)). In our model, immobility is not exogenously given, but the publicly provided good, that is regional culture, creates mobility costs (i.e. opportunity costs for natives and a disutility / exclusion effect for non-natives). In the end, there is imperfect mobility. Natives of both regions have different interests. As a consequence, negative spillovers of excluding regional culture cause inefficiency.

So far we have assumed that regional culture is not too large compared to the maximum interregional income differential, i.e., $S_D + S_F < \overline{\theta} - \underline{\theta}$. If, however, $S_D + S_F > \overline{\theta} - \underline{\theta}$, individuals would always stay in their home region, and expected utility and the corresponding first order condition would be similar to the immobility case (equations 5 and 6).

Also, dropping wage uncertainty would change this result: if wages were certain, there would ex ante be no expected gain from migrating in stage two and thus investments in culture would yield a certain return. Without uncertainty, investments in culture would therefore be independent of the institutional setting with regard to mobility and the level of government that provides culture.[25]

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[25]This is true for the symmetric setting of the basic model. In the assymetric setting, wage uncertainty is not necessary for this inefficiency result (see section 3.2).

3 Extensions

In the remaining part of the paper, we will extend our basic model by allowing productivity effects of culture, policies of cultural unification and integration (i.e. public efforts to reduce cultural differences), asymmetric regions (i.e. productivity being relatively higher in one region), and wages that are not constant but endogeneously determined by migration. So far we have assumed that culture directly affects utility, but has no effect on productivity. However, various theoretical and empirical works have attributed growth effects to interpersonal trust or "social capital" (most notably, Zak and Knack (2001) and Knack and Keefer (1997), see Durlauf and Fafchamps (2005) for an overview). It may therefore be interesting to see if the results of our basic model change, when instead of viewing culture as purely comsumptive, we incorporate productivity effects of culture, leaving all other assumptions unchanged. We come to the conclusion that Proposition 1 still holds under these assumptions. The analysis is very straightforward and analogous to the basic model described above and can be found in the appendix of this paper.

3.1 Policies of cultural unification and integration

So far we have assumed that regional culture decreases a non-native's utility as much as regional culture increases a native's utlity. Implicit to this was the assumption that cultures of both regions were perfectly different from each other and thus incompatible. However, sets of cultural norms and values of both regions may actually overlap. Governments may be able to change the degree to which cultures differ, for example by deciding which norms and values to teach in school or which cultural goods to subsidize.[26] Such equalization efforts, however, may be costly. As mentioned earlier, changing traditional culture may lead to intergenerational conflicts and, moreover, cultural differences between regions may

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[26]For example, governments may undertake efforts to increase literacy in interregionally / internationally used languages. Also, regional governments may try to build a common cultural identity with other regions: for example, from its very beginning, the history of the european union can be seen as an attempt not only to create common institutions but also to overcome cultural differences and to create a common cultural identity.

to some degree be beneficial.[27]

In light of these considerations, we now assume that D and F can each independently, to a degree γ_i choose to partially convert their regional culture towards a "neutral" culture, at a cost $K(\gamma_i)$, with $K' > 0$, $K'' > 0$, $\lim_{\gamma \to 1} K'' = \infty$ and $0 \leq \gamma_i \leq 1$, thus defining the degree of bilateral cultural difference as $\alpha(\gamma_D, \gamma_F) = 1 - \gamma_D - \gamma_F$.[28] Immigrants from region j would achieve utility $\theta_i - \alpha S_i$ in region i, where $\alpha = 1$ stands for perfectly different cultures, where both regions spend nothing to change their cultures and $\alpha = -1$ stands for perfectly similar cultures, where both regions change their culture so that both cultures are perfectly identical. Natives of j would only emigrate if $\theta_j - \theta_i < -(S_j + \alpha_i S_i)$.

The government of region D maximizes expected utility of a representative native:

$$
\begin{aligned}
EU_D = {} & \int_{\underline{\theta}}^{\overline{\theta}} \left[\int_{\underline{\theta}}^{\theta_F - S_D - S_F(1 - \gamma_D - \gamma_F)} (\theta_F - S_F(1 - \gamma_D - \gamma_F)) f(\theta_D) d\theta_D \right] f(\theta_F) d\theta_F \quad (8) \\
& + \int_{\underline{\theta}}^{\overline{\theta}} \left[\int_{\theta_F - S_D - S_F(1 - \gamma_D - \gamma_F)}^{\overline{\theta}} (\theta_D + S_D) f(\theta_D) d\theta_D \right] f(\theta_F) d\theta_F \\
& - C(S_D) - K(\gamma_D).
\end{aligned}
$$

The first-order condition of region D w.r.t. γ_D then reads

$$
\begin{aligned}
\frac{dEU_D}{d\gamma_D} = {} & \int_{\underline{\theta}}^{\overline{\theta}} \left[\int_{\underline{\theta}}^{\theta_F - S_D - S_F(1 - \gamma_D - \gamma_F)} S_F f(\theta_D) d\theta_D \right] f(\theta_F) d\theta_F \quad (9) \\
& - K'(\gamma_D) = 0.
\end{aligned}
$$

Since the first line is positive and because of $K' > 0$, $K'' > 0$, efforts to reduce cultural differences should be positive in an open region (Note that in a closed region they should be zero because then there is no migration anyway). Since cultural differences hurt not only natives who want to emigrate but also immigrants, there is a positive externality that should lead to suboptimally low efforts to reduce cultural differences. To show this, we take a look at the respective first-order condition of total welfare maximization:

$$
\begin{aligned}
\frac{d(EU_D + EU_F)}{d\gamma_D} = {} & \frac{dEU_D}{d\gamma_D} + \int_{\underline{\theta}}^{\overline{\theta}} \left[\int_{\underline{\theta}}^{\theta_D - S_F - S_D(1 - \gamma_D - \gamma_F)} S_D f(\theta_F) d\theta_F \right] f(\theta_D) d\theta_D \quad (10) \\
= {} & 0.
\end{aligned}
$$

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[27]See the brief discussion in the introduction of this paper.

[28]Compare Lazear (1999).

For any effort to reduce cultural differences, total marginal-expected-per-capita welfare will always be higher than marginal expected utility of a native citizen from the viewpoint of the region, i.e. $dEU_D/d\gamma_D$ should be smaller under centralization. For a symmetric setting where $\gamma_D = \gamma_F$, and assuming that second-order conditions hold, this implies that $K'(\gamma_D)$ and therefore also γ_D should be larger under centralization. Hence:

Proposition 2 *The symmetric Nash equilibrium of fiscal competition with efforts to reduce cultural differences is inefficient. When acting uncooperatively, regions undertake too little effort to reduce cultural differences.*

Regions should invest more in reducing cultural differences, because such efforts not only increase utility of natives that emigrate to the other region, but also increases utility of potential non-native immigrants.

3.2   Asymmetric regions

We now return to our basic model and extend this model by allowing one region to be richer than the other by adding an asymmetry parameter Δ to income in region D and subtracting it from income in region F (asymmetric productivity), all other assumptions of the basic model remaining unchanged. Expected utility of a representative native in D then becomes:

$$
\begin{aligned}
EU_D \;=\; & \int_{\underline{\theta}+\Delta+S_D+S_F}^{\overline{\theta}-\Delta} \left[\int_{\underline{\theta}+\Delta}^{\theta_F-S_D-S_F} (\theta_F - S_F)f(\theta_D - \Delta)d\theta_D \right] f(\theta_F + \Delta)d\theta_F \quad (11) \\
& + \int_{\underline{\theta}-\Delta}^{\underline{\theta}+\Delta+S_D+S_F} \left[\int_{\theta_F-S_D-S_F}^{\overline{\theta}} (\theta_D + S_D)f(\theta_D - \Delta)d\theta_D \right] f(\theta_F + \Delta)d\theta_F \\
& - C(S_D).
\end{aligned}
$$

The first-order condition reads

$$
\begin{aligned}
\frac{dEU_D}{dS_D} \;=\; & -\int_{\underline{\theta}+\Delta+S_D+S_F}^{\overline{\theta}-\Delta} \left[\int_{\underline{\theta}+\Delta}^{\theta_F-S_D-S_F} f(\theta_D - \Delta)d\theta_D \right] f(\theta_F + \Delta)d\theta_F \quad (12) \\
& + 1 - C'(S_D) = 0.
\end{aligned}
$$

which, as the first line is negative and due to equation (6) implies that also in the non-symmetric case there will always be less regional culture with mobility than without mobility. The first-order condition of total welfare maximization is

$$
\frac{d(EU_D + EU_F)}{dS_D} = \frac{dEU_D}{dS_D}
$$
$$
- \int_{\underline{\theta}-\Delta+S_D+S_F}^{\overline{\theta}+\Delta} \left[\int_{\underline{\theta}-\Delta}^{\theta_D-S_D-S_F} f(\theta_F + \Delta)d\theta_F \right] f(\theta_D - \Delta)d\theta_D
$$
$$
+ 1 - C'(S_D) = 0. \tag{13}
$$

Thus for any amount of regional culture, marginal-expected-per-capita welfare is still unambiguously smaller than marginal expected utility of a native citizen as seen from the respective region. Hence:

Proposition 3 *The asymmetric Nash equilibrium of fiscal competition with regional culture is inefficient.*

As before, this result only holds if we have assume that regional culture is not too large compared to the maximum interregional income differential, i.e., $S_D + S_F < \overline{\theta} - \underline{\theta} - 2\Delta$, because otherwise even individuals from the poorer region F would never migrate anyway. Hence we find that generally, asymmetry does not change the result of overprovision under decentralization.

For an asymmetric setting, it is interesting to compare regional culture investments in both regions. To do this, we look at how regional culture investment in the richer region changes when we increase Δ marginally, starting at the symmetric Nash equilibrium. As the partial derivatives $\frac{\partial EU_D}{\partial S_D}$ and $\frac{\partial EU_F}{\partial S_F}$ are both functions of S_D, S_F, and Δ, and should both equal zero in equilibrium, the partial derivative of S_D w.r.t. Δ in equilibrium is implicitly determined by the system of equations

$$
\frac{\partial^2 EU_D}{\partial S_D \partial \Delta} + \frac{\partial^2 EU_D}{\partial S_D^2} \cdot \frac{\partial S_D}{\partial \Delta} + \frac{\partial^2 EU_D}{\partial S_D \partial S_F} \cdot \frac{\partial S_F}{\partial \Delta} = 0 \tag{14}
$$

$$
\frac{\partial^2 EU_F}{\partial S_F \partial \Delta} + \frac{\partial^2 EU_F}{\partial S_F \partial S_D} \cdot \frac{\partial S_D}{\partial \Delta} + \frac{\partial^2 EU_F}{\partial S_F^2} \cdot \frac{\partial S_F}{\partial \Delta} = 0 \tag{15}
$$

Cramers rule yields:

$$
\frac{dS_D}{d\Delta} = \frac{-\left(\frac{\partial^2 EU_D}{\partial S_D \partial \Delta} \cdot \frac{\partial^2 EU_F}{\partial S_F^2} - \frac{\partial^2 EU_F}{\partial S_F \partial \Delta} \cdot \frac{\partial^2 EU_D}{\partial S_D \partial S_F} \right)}{\frac{\partial^2 EU_D}{\partial S_D^2} \cdot \frac{\partial^2 EU_F}{\partial S_F^2} - \frac{\partial^2 EU_F}{\partial S_F \partial S_D} \cdot \frac{\partial^2 EU_D}{\partial S_D \partial S_F}} \tag{16}
$$

Because of the symmetry of the starting point ($\Delta = 0$ and $S_D = S_F = S$) and assuming that second-order conditions hold, and assuming that the Nash equilibrium is stable (i.e. that the denominator of equation 16 is positive), then $\frac{dS_D}{d\Delta}$ is positive iff $\frac{\partial^2 EU_D}{\partial S_D \partial \Delta} > 0$, i.e.

$$
\begin{aligned}
\frac{\partial^2 EU_D}{\partial S_D \partial \Delta} = {} & f(\theta) \int_{\underline{\theta}}^{\overline{\theta} - 2S} f(\theta_D) d\theta_D \\
& - \int_{\underline{\theta} + 2S_D}^{\overline{\theta}} F(\theta_F - 2S) f'(\theta_F) d\theta_F \\
& + \int_{\underline{\theta} + 2S}^{\overline{\theta}} f(\theta_F) f(\theta_F - 2S) d\theta_F > 0.
\end{aligned}
\tag{17}
$$

Since the first and the third line are always positive, this condition is always satisfied if the second line is positive, which should be true at least for all probability distributions $f(\theta)$ that are symmetric or have a right, i.e. positive skew, and that do not have strict inner minima.[29] For example, the uniform distribution or the normal distribution both satisfy these conditions.

Proposition 4 *If one region is given a marginal exogenous advantage in productivity, then the resulting Nash equilibrium will be asymmetric, i.e. the richer region will invest relatively more in regional culture, at least as long as the probability distribution of the income shock is symmetric or has a positive skew, and has no strict inner minima, i.e. it satisfies* $v(X) = \frac{E((X - E(X))^3)}{Var(X)^{3/2}} \geq 0$ *and* $f'(\theta) = 0 \Rightarrow f''(\theta) \leq 0 \forall \theta$, *where* v *denotes skewness of the distribution* $f(\theta)$.

The intuition for this result is that from the viewpoint of the richer region, the likelihood of emigration is now relatively smaller compared to the symmetry case, making it ex-ante, when culture investments take place, comparatively unlikely that culture investments are devalued ex-post by a severe negative shock.[30] The reverse is true for the poorer region.

It it interesting to compare this result to the global optimum and to see if the global optimum, like the Nash equilibrium, is also asymmetric, i.e. whether it is actually desirable from the viewpoint of the central planner to have the richer region invest more in its culture than the poor region.

---

[29]In equation 17, F denotes the cumulative distribution function for f.

[30]Note that the higher culture investment of the richer region is not caused by an increased tax base.

Proposition 5 *If, starting from the symmetric global optimum where both regions have identical productivities, one region is given a marginal exogenous advantage in productivity, then the resulting global optimum will still be symmetric, i.e. it is still globally optimal to have both regions invest equally in their culture.*

To see this, we take a look at how the first-order condition of total welfare maximization changes, when we increase Δ marginally, starting at the symmetric optimum:

$$
\begin{aligned}
\frac{d^2(EU_D + EU_F)}{dS_D d\Delta} &= f(\bar{\theta}) \left[\int_{\underline{\theta}}^{\theta_D - 2S} f(\theta_D) d\theta_D - \int_{\underline{\theta}}^{\theta_D - 2S} f(\theta_F) d\theta_F \right] \qquad (18) \\
&+ \int_{\underline{\theta}+2S}^{\bar{\theta}} \left[\left[\int_{\underline{\theta}}^{\theta_D - 2S} f(\theta_F) d\theta_F \right] f'(\theta_D) + f(\theta_D)f(\theta_D - 2S) \right] d\theta_D \\
&- \int_{\underline{\theta}+2S}^{\bar{\theta}} \left[\left[\int_{\underline{\theta}}^{\theta_D - 2S} f(\theta_D) d\theta_D \right] f'(\theta_F) + f(\theta_F)f(\theta_F - 2S) \right] d\theta_F
\end{aligned}
$$

As the first line is zero and the second and third line add up to zero, the whole term is zero, i.e. the global optimum stays symmetric even when we allow one region to become richer than the other region.

The intuition for this result is as follows: total costs of social capital provision are minimized when $C'(S_F) = C'(S_D)$, i.e. by setting $S_D = S_F$, while at the same time, from the federal viewpoint, there is nothing to gain from trading S_D against S_F, as such a trade would have no effect on migration decisions (only the sum of S_D and S_F is relevant for migration decisions) and would thus never yield any efficiency gain. While in the asymmetric Nash equilibrium, marginal regional benefits of social capital provision from the viewpoint of the regions differ, and thus marginal regional costs of culture provision differ, it would in contrast globally be optimal to equalize marginal costs across regions (which would require equal regional culture investments).

Another result of our analysis of the asymmetry case is that with asymmetry, other than in the symmetric setting of our basic model, we end up with inefficient regional culture investments under decentralization even when wages are certain (provided Δ is large enough).[31]

---

[31]Under asymmetry, as long as Δ is large enough, there must always be some migration and thus there will always be an externality from regional culture investments in the rich region on workers from the poor region.

3.3 Endogenous wages and rents

In this subsection we consider second round income effects of migration. To this end, production is explicitly modeled. The neoclassical production function is linearly homogenous: $G(N_i, L) = Lg(n_i)$, where $n_i = N_i/L$ and $i = D, F$. It fulfills the Inada conditions which will exclude corner solutions. We assume that one unit of labor is supplied inelastically at the place of residence with N_i thus describing both the working population and total labor supply in region i. L is an immobile factor ("land"). The shock now affects regional output: $\theta_i G(N_i, L)$, where the i.i.d. shock θ_i is still described by the p.d.f. $f(\theta_i)$ with support $[\underline{\theta}, \overline{\theta}]$. Profit maximization determines regional wages $w_i = \theta_i G_N(N_i, L) = \theta_i g'(n_i)$ and land rents $r_i = \theta_i[g(n_i) - g'(n_i)n_i]$. Migration changes the working population, $N_D = \overline{N} + M$ and $N_F = \overline{N} - M$, and thus local wages and rents.[32] For the reference case of autarky, we define $G_N^A = G_N(\overline{N}, L)$, making $\theta_i G_N^A$ the regional wage under autarky.

Migration will narrow the differences between local wages, since it reduces the marginal product of labor in the destination region and increases it in the source region. More explicitly, the following migration equilbrium conditions arise:

- if under autarky $\theta_D G_N^A - \theta_F G_N^A > S_D + S_F$, workers migrate into region D until $\theta_D G_N(\overline{N} + M, L) - \theta_F G_N(\overline{N} - M, L) = S_D + S_F$, implicitly defining the equilibrium migration level $M_1 > 0$ as a function $M_1(S_D, S_F, \theta_D, \theta_F)$, with $\frac{dM_1}{dS_D} < 0$

- if under autarky $-(S_D + S_F) \leq \theta_D G_N^A - \theta_F G_N^A \leq S_D + S_F$, there is no migration at all ($M = 0$),

- if under autarky $\theta_D G_N^A - \theta_F G_N^A < -(S_D + S_F)$, workers migrate into region F until $\theta_D G_N(\overline{N} + M, L) - \theta_F G_N(\overline{N} - M, L) = -(S_D + S_F)$, implicitly defining the equilibrium migration level $M_2 < 0$ as a function $M_2(S_D, S_F, \theta_D, \theta_F)$, with $\frac{dM_2}{dS_D} > 0$.

In the first migration equilibrium, natives of region F are indifferent between both regions, in the second equilibrium, natives of region D are indifferent. If regional culture investment is rather small compared to wage differences, there is a band of inaction where nobody migrates. Otherwise, migration takes place and equalizes wage differences and

---

[32]Note that $M < 0$ if migration goes from region D to F.

total regional culture investment. Denoting I_{ii} as the income of the representative native individual from region i who stays in i and I_{ij} as her income when she migrates to the other region, expected utility for region F can be written as:

$$
\begin{aligned}
EU_F \;=\;& \int_{\underline{\theta}}^{\overline{\theta}-\frac{S_D+S_F}{G_N^A}} \left[\int_{\theta_F+\frac{S_D+S_F}{G_N^A}}^{\overline{\theta}} (I_{FD}(\theta_D, M_1) - S_D) f(\theta_D) d\theta_D \right] f(\theta_F) d\theta_F \qquad (19) \\
&+ \int_{\underline{\theta}-\frac{S_D+S_F}{G_N^A}}^{\underline{\theta}+\frac{S_D+S_F}{G_N^A}} \left[\int_{\theta_F-\frac{S_D+S_F}{G_N^A}}^{\theta_F+\frac{S_D+S_F}{G_N^A}} (I_{FF}(\theta_F, 0) + S_F) f(\theta_D) d\theta_D \right] f(\theta_F) d\theta_F \\
&+ \int_{\underline{\theta}+\frac{S_D+S_F}{G_N^A}}^{\overline{\theta}} \left[\int_{\underline{\theta}}^{\theta_F-\frac{S_D+S_F}{G_N^A}} (I_{FF}(\theta_F, M_2) + S_F) f(\theta_D) d\theta_D \right] f(\theta_F) d\theta_F \\
&- C(S_F)
\end{aligned}
$$

Line 1 sums up utility when there are migration flows from region F to region D, line 2 describes utility when there is no migration ("band of inaction"), line 3 describes utility when there is migration into region F, line 4 describes costs of providing regional culture.[33]

The first derivative w.r.t. S_D reads:

$$
\begin{aligned}
\frac{dEU_F}{dS_D} \;=\;& \int_{\underline{\theta}}^{\overline{\theta}-\frac{S_D+S_F}{G_N^A}} \left[\int_{\theta_F+\frac{S_D+S_F}{G_N^A}}^{\overline{\theta}} \frac{dI_{FF}(\theta_F, M_1)}{dM_1} \frac{dM_1}{dS_D} f(\theta_D) d\theta_D \right] f(\theta_F) d\theta_F \qquad (20) \\
&+ \int_{\underline{\theta}+\frac{S_D+S_F}{G_N^A}}^{\overline{\theta}} \left[\int_{\underline{\theta}}^{\theta_F-\frac{S_D+S_F}{G_N^A}} \frac{dI_{FF}(\theta_F, M_2)}{dM_2} \frac{dM_2}{dS_D} f(\theta_D) d\theta_D \right] f(\theta_F) d\theta_F
\end{aligned}
$$

To examine the externality of culture investments in D, we take a look at how S_D affects expected utility of the representative native individual from F whose welfare is to be maximized by the regional government of F. We distinguish three cases

- Land is owned by native workers. Native worker's welfare is maximized (maximizing total income).

---

[33]Note that, since natives either live in their home region or are indifferent between both regions, we only need the income of natives working at home to calculate the expected utility of natives: when there is migration from region F to region D (as in line 1 of equation 19), it must be true that $I_{FD} - S_D = I_{FF} + S_F$, so that equation 19 can be simplified by replacing $I_{FD} - S_D$ and factoring out S_F.

- Land is owned by absentee landowners whose welfare is not reflected in the regional objective functions. Native worker's welfare is maximized (maximizing regional wages).

- Land is owned by a third group, "native landowners". Worker's welfare is not reflected in the regional objective functions. Native landowners' welfare is maximized (maximizing land rent).

We throughout assume that $S_D + S_F < (\overline{\theta} - \underline{\theta})G_N^A$, i.e. that culture investments are not too large.

3.3.1 Maximizing native's total income

In this setting, we assume that land is owned by natives. So land rents will not have any direct effect on migration decisions. Income of the representative native individuals from region i is described as:

$$I_{ii} = w_i + \frac{r_i L}{N} \tag{21}$$

when they stay at home and

$$I_{ij} = w_j + \frac{r_i L}{N} \tag{22}$$

when they migrate to the other region. In order to determine whether there will be overprovision or underprovision, we need to determine the sign of $\frac{dEU_F}{dS_D}$ (equation 20). For this we need to determine $\frac{dI_{FF}(\theta_F, M)}{dM}$. Using the properties of the production function, we get:

$$\frac{dI_{FF}(\theta_F, M)}{dM} = -\theta_F g'' \left(\frac{\overline{N} - M}{L} \right) \frac{M}{NL} \tag{23}$$

Since $g'' < 0$, it is clear that $dI_{FF}/dM > 0$ for $M > 0$, i.e. when there is migration from F to D, further migration to D increases p.c. income of F's remaining residents. Thus line 1 of equation 20 is negative, because $M_1 > 0$ and $\frac{dM_1}{dS_D} < 0$. As $dI_{FF}/dM < 0$ for $M < 0$, i.e. when there is migration from D to F, less migration to F decreases p.c. income of F's native residents. Thus line 2 of equation 20 is negative, because $M_2 < 0$ and $\frac{dM_2}{dS_D} > 0$, making the externality described by equation 20 negative: culture investments of one region still have an adverse effect on expected income of non-natives even when wages are endogenously determined.

Proposition 6 *The symmetric Nash equilibrium of fiscal competition with wages being endogenously determined by migration flows is inefficient, assuming decreasing marginal product of labor. Culture is overprovided.*

As opposed to regional competition with exogenous wages, now investment in regional culture also changes wages and rents, via the negative effect that culture has on migration. If region D is hit by a positive shock, culture, via its negative effect on immigration, decreases income of natives in the source region F, as both wages in F and absentee native landowners' total contribution to labor enumeration in F decrease, overcompensating for increased landrent in F. Analogously, if region D is hit by a negative shock, regional culture reduces emigration and thus decreases income of natives of the destination region F, as landrent in F decreases, overcompensating for increased wages in F. Both mechanisms harm natives of the respective other region, hence the unambiguously negative externality.

Decentralization thus still leads to oversupply of regional culture. Wage effects do not reverse this remarkable effect of decentralization.

3.3.2 Maximizing wage income

In this setting, we assume that land is owned by absentee landowners from outside the federation, therefore the governments' objective is to maximize wage income of native citizens.[34] Native worker's welfare is to be maximized, so land rents will (obviously) not have any effect on migration decisions. Income of the representative native individual from region i is

$$I_{ii} = w_i \tag{24}$$

when they stay at home and

$$I_{ij} = w_j \tag{25}$$

when they migrate to the other region. Using the properties of the production function, we get:

$$\frac{dI_{FF}(\theta_F, M)}{dM} = -\theta_F g'' \left(\frac{\overline{N} - M}{L} \right) \frac{1}{\overline{L}} \tag{26}$$

---

[34]Alternatively, maximizing wage income instead of total income could be motivated by a political economy setting in which the owners of the immobile factor have a sufficiently small weight in setting the policy agenda.

Since $g'' < 0$, it is clear that $dI_{FF}/dM > 0$, i.e. further emigration from F (if F turns out to be the poor region) or less immigration into F (if F turns out to be the rich region) always increases p.c. income opportunities of F's native residents. Thus line 1 of equation 20 is negative, because $\frac{dM_1}{dS_D} < 0$. This means that if F does poorly, S_D will decrease income opportunities of natives from F, because the exclusion effect of social capital in D leads to a larger labor supply and lower wages in F. However, line 2 of equation 20 is positive, because $\frac{dM_2}{dS_D} > 0$. This means that if region F does well, S_D will increase income opportunities of natives from F, because the home attachment effect of social capital in D leads to a smaller labor supply and higher wages in F, which constitutes a sort of "foreign labor market protection effect". Thus we have two (potentially countervailing) effects. Note that when examining the overall effect, we will have to consider both the probability distribution of the regional income shock and production technology, both of which could change the relative size of the two effects in a way that could potentially influence the sign of the overall effect.

Proposition 7 *If native workers' welfare is to be maximized and land is owned by absentee landowners, assuming decreasing marginal product of labor, and a symmetric shock distribution $f(\theta)$, the symmetric Nash equilibrium of fiscal competition with culture is efficient if and only if*

$$\int_{\underline{\theta}}^{\overline{\theta} - \frac{S_D + S_F}{G_N^A}} \left[\int_{\theta_F + \frac{S_D + S_F}{G_N^A}}^{\overline{\theta}} \left[-\theta_F g'' \left(\frac{\overline{N} - M_1}{L} \right) \frac{dM_1}{dS_D} \right. \right.$$
$$\left. \left. + \theta_D g'' \left(\frac{\overline{N} + M_1}{L} \right) \frac{dM_1}{dS_F} \right] f(\theta_D) \, d\theta_D \right] f(\theta_F) \, d\theta_F = 0, \tag{27}$$

and there will be underprovision of culture if the above term is larger than 0 and an overprovision if the above term is smaller than 0.

To see this, note that, if we assume a symmetric shock distribution $f(\theta)$, we can rewrite the expression for $\frac{dEU_F}{dS_D}$ in equation 20 accordingly. The condition of proposition 7 is a general one,[35] insofar as it does not make specific assumptions about production technology or on the exact form of $f(\theta)$. Note that the sign of the third derivative of the production function

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[35]Except for the assumption that $f(\theta)$ is symmetric.

and the exact form of the distribution $f(\theta)$ will together determine whether we have over- or underprovision.

Corollary 1 *For production technologies that exhibit $g''' \leq 0$, including a quadratic production technology, culture is underprovided.*

To see this, note that if $g''' \leq 0$, the term in proposition 7 will always be larger than zero, i.e. in response to less immigration, marginal productivity will always increase relatively faster in the rich region, making the foreign labor market protection effect unambiguously larger than the exclusion effect, hence we will then always end up with underprovision. If the production technology is instead characterized by $g''' > 0$, then $|g''\left(\frac{\overline{N}-M_1}{L}\right)| > |g''\left(\frac{\overline{N}+M_1}{L}\right)|$, i.e. marginal productivity will increase faster in the poor region, which will have a detrimental effect on the size of the foreign labor market protection effect relative to the exclusion effect. Determining specific conditions for the sign of the externality for production technologies that exhibit $g''' > 0$, such as for Cobb-Douglas technology, would require solving the condition in proposition 7 explicitly for such production functions. However, this is not possible, as M_1 is an implicit function of θ_D and θ_F that cannot be solved algebraically.[36]

We thus conclude that culture investments of one region generally have a non-zero effect on expected income of non-natives, only with the exception of a border case described by the condition in proposition 7. The externality of culture investments is unambiguously positive for production technologies that exhibit a negative third derivative or a third derivative identical to zero, leading to the result of underprovision of culture under decentralization. The externality is presumably also positive for a range of specifications with production functions that exhibit $g''' > 0$, for which the overall detrimental effect of the positive third derivative on the relative size of the foreign labor market protection effect with respect to the exclusion effect is too small to make the externality negative overall. In this setting of wage-maximizing regional governments, a positive externality, i.e. underprovision of culture, could thus be interpreted such that the exclusion effect of culture investments is in absolute terms actually smaller than the foreign labor market

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[36]Our numerical simulations for Cobb-Douglas technology suggest that for $g''' > 0$, we have underprovision if production elasticity is rather large and overprovision if it is rather small.

protection effect of culture investments. From a federal viewpoint, regions should in this setting therefore spend more on culture, as this increases total federal wage income.

3.3.3 Maximizing land rent

In this setting, we assume that the regional government only cares about maximizing the rent that accrues to the immobile factor located in the region.[37] We assume that natives each own an equal share of their region's land. As land ownership and provision of the mobile factor is thus seperated by assumption, land rents will obviously not have any effect on migration decisions in this setting either. Income of the native landowner from region i is

$$I_{ii} = \frac{r_i L}{\overline{N}} \tag{28}$$

Using the properties of the production function, we get:

$$\frac{dI_{FF}(\theta_F, M)}{dM} = \theta_F g'' \left(\frac{\overline{N} - M}{L} \right) \frac{1}{L} \left(\frac{\overline{N} - M}{L} \right) \tag{29}$$

Since $g'' < 0$, it is clear that $dI_{FF}/dM < 0$, i.e. further emigration from F and less immigration into F always decreases p.c. income of F's native landowners. Thus line 1 of equation 20 is positive, because $\frac{dM_1}{dS_D} < 0$ but line 2 of equation 20 is negative, because $\frac{dM_2}{dS_D} > 0$. That means if region F does poorly, S_D would seem to tend to increase income opportunities of native landowners from F, because higher S_D will decrease the amount of the mobile factor that will move from region F to region D, which we shall call "poor regions' land rent protection effect". However, if region F does well, S_D would seem to tend to decrease land rents in F, by keeping more of the mobile factor in region D, which constitutes a limiting or detrimental effect of S_D on the prosperous region's land rent. The overall effect again depends on both the distribution $f(\theta)$ and on the production function.

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[37]For instance, this could be motivated either by the assumption that the mobile factor is provided by workers from outside the federation, or by a political economy setting in which the owners of the immobile factor set the policy agenda. Land rent maximization is typically assumed in models of regional competition with perfect household mobility, because in such a setting, due to the perfectly mobile household's equal utility constraint, maximizing land rent is equivalent to welfare maximization (see Wellisch (2000)).

Proposition 8 *If land rent is maximized assuming decreasing marginal product of labor, and a symmetric shock distribution $f(\theta)$, the symmetric Nash equilibrium of fiscal competition with culture is efficient if and only if*

$$\int_{\underline{\theta}}^{\overline{\theta}-\frac{S_D+S_F}{G_N^A}} \left[\int_{\theta_F+\frac{S_D+S_F}{G_N^A}}^{\overline{\theta}} \left[\theta_F g'' \left(\frac{\overline{N}-M_1}{L} \right) \left(\frac{\overline{N}-M_1}{L} \right) \frac{dM_1}{dS_D} \right. \right. \tag{30}$$
$$\left. \left. -\theta_D g'' \left(\frac{\overline{N}+M_1}{L} \right) \left(\frac{\overline{N}+M_1}{L} \right) \frac{dM_1}{dS_F} \right] f(\theta_D) \, d\theta_D \right] f(\theta_F) \, d\theta_F = 0,$$

and there will be underprovision of culture if the above term is larger than 0 and overprovision if the above term is smaller than 0.

The condition is derived analogously to the condition in proposition 7. Again, the sign of the third derivative of the production function and the exact form of the distribution $f(\theta)$ will together determine whether we have over- or underprovision.

Corollary 2 *For production technologies that exhibit $g''' \leq 0$, including a quadratic production technology, culture is overprovided.*

To see this, note that if $g''' \leq 0$, the term in proposition 8 will always be smaller than zero, the explanation being analogous to that in the previous section. If the production technology is instead characterized by $g''' > 0$, as with Cobb-Douglas technology, then, also analogously to the previous section, equation 30 shows two countervailing effects. On the one hand, $\frac{\overline{N}-M_1}{L}$ is always smaller than $\frac{\overline{N}+M_1}{L}$ and for all combinations of θ_D and θ_F that satisfy $\theta_D > \theta_F + \frac{S_D+S_F}{G_N^A}$, θ_F is always smaller than θ_D, but on the other hand, $|g'' \left(\frac{\overline{N}-M_1}{L} \right)| > |g'' \left(\frac{\overline{N}+M_1}{L} \right)|$, i.e. marginal productivity will decline faster in the poor region. As before, M_1 is itself a function of θ_D and θ_F, so calculating the overall effect would require solving the condition in proposition 8 explicitly.

We conclude that culture investments of one region, when only regional land rents enter the regional government's objective function, generally have a non-zero effect on expected income of non-natives, with the exception of a border case described by equation 30. The externality of culture investments is unambiguously negative for production technologies that exhibit a negative third derivative, such as quadratic production technologies, or a third derivative identical to zero, leading to the result of overprovision of culture.

However, the externality is likely negative also for a range of specifications with production functions that exhibit $g''' > 0$, for which the overall detrimental effect of the positive third derivative on the relative size of the adverse effect of S_D on the prosperous region's land rent compared to the "poor region's land rent protection effect" is too small to make the externality positive overall.

In this setting of land rent maximizing regional governments, a negative externality, i.e. overprovision of culture, could therefore be interpreted in the following way: the potential detrimental effect of long-term culture investments on the other region's land rent, that occurs when the other region turns out to be the more prosperous region in the future, is larger than the potential positive effects of such investments on the other region's land rent, that occurs when the other region turns out to be the less prosperous region.

Seen from a federal viewpoint, regions should then spend less on culture, as spending less on culture would increase total expected federal land rent.

Our result of inefficient decentralized local public good supply contravenes the usual result that land-rent maximization leads to efficient decentralized public good supply. It is therefore interesting to compare this inefficiency result with the literature on local public good supply. Decentralized local public good supply in a federation will be efficient if households are perfectly mobile and regions are not restricted in their sets of tax intruments (Myers (1990)). In such a setting, maximizing land rent will be equivalent to maximizing welfare due to the equal utility constraint of perfectly mobile households. In our model, the publicly provided good (i.e., social capital) creates imperfect mobility, because it asymmetrically affects utility of natives and non-natives: if the native region turns out to be prosperous, households are "trapped" in their native region, as it will never be optimal for them to migrate. This means that, even in a setting with small regions, the equal utility constraint will not apply for this group of individuals. As a consequence, expected land rent maximization will not be equivalent to expected welfare maximization as it will disregard the effect of social capital investments on natives' wages in case the native region is the more prosperous region. This is true irrespective of whether we look at small regions or large regions.[38] It is also interesting to compare this result of inefficient

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[38]The exclusion effect that seems to drive our inefficiency result, however, additionally necessitates the assumption of large regions: if we assumed small regions instead, the exclusion effect of a single region's

good supply to another setting in the literature: Wellisch (1994) shows that exogenous attachment to home and interregional spillover effects of public goods together lead to inefficiency, while in our model, without assuming exogenous mobility constraints, the local public good "social capital", due to its specific characteristics, endogenously generates both imperfect mobility and externalities,[39] with the result of public good provision being inefficient.

4 Concluding remarks

Our paper adresses a general trade-off in regional policy, i.e. the balance between cultural openness and its effects on factor mobility on the one hand, and regional social cohesion built on regional cultural identity, or "regional social capital", on the other hand. With regard to cultural policy in a federal state, we have shown that generally, due to interregional externalities of cultural policy, regional investments in regional cultural identity should be expected to be suboptimally high under decentralization. This is because regional governments do not take into account the negative externality of regional cultural identity on the utility of foreign workers in their jurisdiction, while the central government would.

Neither productivity effects of social capital, nor assuming regions with ex-ante asymmetric productivity,[40] nor endogenous effects of migration flows on factor enumeration (at least if we assume the regional government to care about the sum of regional income, i.e. wages and rents), change this basic result of overprovision of regional culture.

Moreover, in this asymmetric setting we also find that the richer region will invest more in social capital relative to the other region,[41] while for total welfare, it would be

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culture should be expected to be too small to have an impact on the utility of workers from less prosperous regions. It is the combination of assuming a) asymmetric utility effects of social capital on natives and non-natives and b) large regions instead of small regions, that in the end causes the result of inefficient decentralized public good supply.

[39]Note that these externalities are of a different nature than those discussed in Wellisch (1994).

[40]At least as long as the probability distribution of the regional income shock is symmetric or positively skewed, and has no strict inner minima.

[41]Note that this result is not driven by an increased tax base but by asymmetric migration incentives.

better to equalize spending on culture across both regions. For practical policy, this result may provide a theoretical justification of either coordination of regional cultural policies between rich and poor regions or interregional transfers for financing cultural policy from rich to poor regions.

When investments in regional culture, via the negative effect that culture has on migration, also changes wages and rents, and the regional government cares about total regional income, then culture investments always have a detrimental effect on the other region's welfare objectives, irrespective of the direction of the income shock, so that in such a setting decentralization always leads to oversupply of regional culture.

In the setting of wage-maximizing regional policy and relatively small wage effects of migration in the rich region, the exclusion effect of culture investments is in absolute terms smaller than the foreign labor market protection effect of culture investments. Thus regions will undersupply culture. If both regions were to cooperatively increase culture provision, they could increase expected wage income.

When we look at land rent maximizing regional governments and relatively small land rent effects of migration in the rich region, the potential detrimental effect of culture investments on the foreign individual's land rent income, that occurs when the other region turns out to be the more prosperous region, will be larger than the potential positive effects of such investments on the foreign individual's land rent income, that occurs when the other region turns out to be the less prosperous region.

Therefore, such a setting would positively predict that mobile workers, if they control the policy agenda, will react differently to decentralization of cultural policy as opposed to owners of the immobile factor: mobile workers would likely answer with decreasing culture provision while landowners would answer with increasing culture provision.

In general, in a setting where owners of one factor both control and coordinate regional cultural policy, regional social capital, next to its direct benefits, can thus act as a sort of "rent-extraction instrument", as it enables the respective interest groups to increase their factor income at the expense of total welfare.

We conclude that uncoordinated regional cultural policies will likely result in too much emphasis on regional cultural identity and social capital. In building social capital, regions should invest relatively more in interregionally or internationally universal cultural norms

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and values. As they have insufficient incentives to do so on their own, coordination of cultural policies seems justified. Coordination of cultural policies will likely increase incentives to decrease cultural differences and raise welfare. Corresponding policy measures include a larger share of interregionally and internationally common cultural goods in public culture provision, as well as foreign language programs and cultural exchange programs.

In the context of the European Union, our results thus provide theoretical justification for coordination of national language policies as well as centralized or coordinated efforts to provide cultural goods and to increase cultural exchange between the member states.

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A   Productive Social Capital

For the sake of simplicity, we assume that every additional unit of regional culture leads to one extra unit of income for native workers, and one unit less income for non-native

workers respectively, so that utility of natives of region i that live and work in region i becomes

$$U_{ii} = \theta_i + \theta_i \cdot S_i - C(S_i), \quad i = D, F, \tag{31}$$

and utility of an immigrant from region j who lives and works in i becomes

$$U_{ji} = \theta_i - \theta_i \cdot S_i - C(S_j), \quad i = D, F, j \neq i, \tag{32}$$

interpreting $\theta_i \cdot S_i$ as "social capital". Expected utility of a representative native of region D then becomes (accordingly for EU_F):

$$
\begin{aligned}
EU_D \; = \; & \int_{\underline{\theta}}^{\overline{\theta}} \left[\int_{\underline{\theta}}^{\theta_F \frac{1-S_F}{1+S_D}} \theta_F (1 - S_F) f(\theta_D) d\theta_D \right] f(\theta_F) d\theta_F \\
& + \int_{\underline{\theta}}^{\overline{\theta}} \left[\int_{\theta_F \frac{1-S_F}{1+S_D}}^{\overline{\theta}} \theta_D (1 + S_D) f(\theta_D) d\theta_D \right] f(\theta_F) d\theta_F \\
& - C(S_D).
\end{aligned}
\tag{33}
$$

We assume like before that regional culture is not too large compared to the maximum interregional income differential, i.e., $\frac{1+S_F}{1-S_D} < \frac{\overline{\theta}}{\underline{\theta}}$ and $\frac{1+S_D}{1-S_F} < \frac{\overline{\theta}}{\underline{\theta}}$.

The first-order condition reads

$$
\begin{aligned}
\frac{dEU_D}{dS_D} \; = \; & -\int_{\underline{\theta}}^{\overline{\theta}} \left[\int_{\underline{\theta}}^{\theta_F \frac{1-S_F}{1+S_D}} \theta_D f(\theta_D) d\theta_D \right] f(\theta_F) d\theta_F \\
& + \int_{\underline{\theta}}^{\overline{\theta}} \theta_D f(\theta_D) d\theta_D - C'(S_D) = 0.
\end{aligned}
\tag{34}
$$

Without migration, the first-order condition would be

$$\frac{dEU_{imob}}{dS_D} = \int_{\underline{\theta}}^{\overline{\theta}} \theta_D f(\theta_D) d\theta_D - C'(S_D) = 0. \tag{35}$$

Like before, comparing Equation (34) and (35) shows that $C'(S_D)$ is still unambigously smaller with mobility than without mobility. The first-order condition of total welfare maximization is

$$
\begin{aligned}
\frac{d(EU_D + EU_F)}{dS_D} \; = \; & \frac{dEU_D}{dS_D} - \int_{\underline{\theta}}^{\overline{\theta}} \left[\int_{\underline{\theta}}^{\theta_D \frac{1-S_F}{1+S_D}} \theta_D f(\theta_F) d\theta_F \right] f(\theta_D) d\theta_D \\
& = \; 0.
\end{aligned}
\tag{36}
$$

As before, for any amounts of regional culture in both regions, marginal-expected-per-capita welfare is unambiguously smaller than marginal expected utility of a native citizen in the region under consideration and dEU_D/dS_D should be larger under centralization than under decentralization. Hence, Proposition 1 still holds under these assumptions.