Ownership of Cultural Goods

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Abstract

We examine the return of cultural goods to their home country. The cultural good can be unified or separated into two countries. We show that nonintegration and separation of the cultural good is initially optimal when the host invests in the restoration of the cultural good and his unique restoration skill makes him an indispensable trading partner. The return of the cultural good to its home country and shift of ownership becomes optimal when the restoration stage is over and the host's investment changes to human capital, which reduces the spillover from his investment, and technological changes make him a relatively dispensable trading partner. Alternatively, the cultural good can be returned due to changes in the valuation of the cultural good. The return can be triggered when unification is efficient but it is possible that the return is triggered even when separation is efficient.

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1 Introduction

The return of cultural goods to their country of origin has always been a contentious issue. One needs to look no further than the cases of the Icelandic manuscripts and of the Parthenon marbles to get an idea of how controversial such restitutions are. The Icelandic manuscripts, the largest restitution of cultural goods to day, were returned to Iceland from Denmark in their entirety in 1997, eighty years after the initial request. In the case of the Parthenon marbles, the initial request for their return was made more than a century ago and the issue has yet to be resolved.[1]

The issue of restitution of a cultural good is, in essence, a question of ownership. Who should be the owner of the good, the country of origin or the host country? The debate over ownership of such goods has traditionally been based on legal, historical and moral arguments. More recently, the focus of the debate has shifted towards technological considerations and more specifically on the issue of complementarities among cultural goods. For example, in the case of the Parthenon marbles, proponents of restitution argue that the marbles should be returned and reunited to enable the original collection to be presented in its entirety. Opponents argue against reunification on the basis that it would damage the idea of the 'encyclopaedic' museum; " a great cornucopia of different civilizations, an encyclopaedic storehouse of universal knowledge, displaying the great cultures side by side, with equal veneration, to enlighten the world" (Macintyre, 2008).[2]

We address this open question in the debate. We model cultural goods as public goods and take the property rights approach in determining the optimal structure for such goods. Besley and Ghatak (2001) apply the property rights theory (Grossman and Hart 1986; Hart and Moore 1990) to analyze

[1] For more details and further examples see Greenfield (2007).

[2] Such arguments are by no means unique in the literature. Complementarites were also an issue in the case of the Icelandic manuscripts and of Australia's 'birth certificate' - the original vellum Australia Constitution Act (1901) which had ended its status as a British colony - which Australia received in 1990.

who should own public goods. They show that ownership should be allocated to the party that values the public good most. Our contribution is to introduce the possibility that the cultural good can be separated into two parts and located in different countries.

We analyze a setup where agents 1 and 2 make specific investments in the cultural good. The investments can take the form of restoration, protection, study or display of the cultural good. The cultural good can be unified or separated into two parts. The location of part 1 is fixed to country 1. Part 2 can be located in country 2 (separated cultural good) or in country 1 (unified cultural good). Agent 1 values the cultural good more than agent 2 and the valuations further depend on the location of part 2. Both agents prefer location in their own country.

Given our interest in the return of cultural goods, we examine when the initial position of nonintegration and separation of the cultural good can be optimal and what changes in parameter values can trigger the return of cultural good back to the home country so that in addition to location also the ownership changes hands, that is agent 1 ownership and unification is optimal.

We firstly show that nonintegration and separation is optimal when the spillover from agent 2's investment is large and agent 2 is an indispensable trading partner. This is the case when agent 2's investment is in restoration and his unique restoration skill which makes him indispensable. Nonintegration and separation then maximizes agent 2's investment incentives. When the restoration stage is over and agent 2's investment changes to human capital, the spillover from his investment is reduced. Furthermore, technological changes make agent 2 a relatively dispensable trading partner. Then agent 1 ownership and unification provide the best investment incentives, that is, the return of the cultural good becomes optimal. We furthermore show that the return can be either efficient or inefficient – where inefficient means that for given investments separation of the cultural good maximizes its value but inefficient unification provides the best investment incentives.

The return of the cultural good can also be triggered by changes in the valuation of the cultural good. If the value of the separated cultural good is reduced, for example because in the modern world there are other opportunities than museums to encounter other cultures, it can become optimal to return the cultural good. Alternatively, an increase the value of the unified cultural good, for example because of rise of nationalism, can trigger the return of the cultural good. Again, the return can be triggered when unification is efficient but it is possible that the return is triggered even when separation is efficient.

Our contribution is to introduce to Besley and Ghatak (2001) the possibility of separation of the public good to two location. Their work has previously been extended to impure public goods (Francesconi and Muthoo, 2011), indispensable agents (Halonen-Akatwijuka, 2012), generalized Nash bargaining solution (Schmitz, 2013), location of public good (Halonen-Akatwijuka and Pafilis, 2014).

2 The model

Our model builds on Besley and Ghatak (2001). There are two agents $i = 1, 2$. Each agent makes a specific investment in the cultural good, denoted by y_i. The investment can take the form of restoration, protection, study or display of the cultural good. Investment costs are given by $c(y_i)$ with $c(0) = 0$, $c'(y_i) > 0$, $c''(y_i) > 0$ and Inada endpoint conditions. For some results we employ $c(y_i) = \frac{1}{2}(y_i)^2$. The investments are observable but not verifiable to the third parties.

The cultural good can be unified or separated into two parts. The location of part 1 of the cultural good is fixed to country 1. Part 2 can be located in country 2 (separated cultural good) or in country 1 (unified cultural good). The cultural good is a public good and its value to each agent depends on its location. The value of the separated cultural good to agent $i = 1, 2$ is $\theta_i (y_1 + y_2)$ and the value of the unified good is $\Theta_i (y_1 + y_2)$. We assume that each agent prefers location in their own country, $\Theta_1 > \theta_1$ and $\Theta_2 < \theta_2$. Furthermore, we assume that agent 1 is the high-valuation agent, i.e. $\Theta_1 > \Theta_2$ and $\theta_1 > \theta_2$. Combining these inequalities gives Assumption 1.

Assumption 1. $\Theta_1 > \theta_1 > \theta_2 > \Theta_2$.

Unification of the cultural good is efficient if and only if $\Theta_1 + \Theta_2 > \theta_1 + \theta_2$. The efficiency of unification can arise e.g. from the esthetic beauty of a unified building or sculpture or the value of a complete collection of manuscripts. The first best investments for a unified cultural good are

$$\Theta_1 + \Theta_2 = c' (y_i^*) \text{ for } i = 1, 2. \tag{1}$$

Separation of the cultural good is efficient if and only if $\theta_1 + \theta_2 > \Theta_1 + \Theta_2$. Separation is efficient e.g. when the benefit of an encyclopaedic museum is large and separation allows displaying part 2 in the museum while part 1 remains in its original location. The first best investments for a separated cultural good are given by

$$\theta_1 + \theta_2 = c' (y_i^*) \text{ for } i = 1, 2.$$

In the main model we assume that unification is efficient and explore efficient separation in an extension in Section 6.

We assume that contracts are incomplete so that ex ante contracts can only be written on the ownership and location of the cultural good. We analyze (i) nonintegration and separation of the cultural good and (ii) ownership by agent 1 or 2 with either separated or unified cultural good.

The timing of the model is as follows:

1. The agents contract on ownership and location.
2. The agents make specific investments.

3. The agents bargain and complete the project.

The default payoffs are important in determining the outcome of ex post bargaining. Under nonintegration the default payoff for agent i is $\theta_i \kappa (y_1 + y_2)$ where $0 \leq \kappa \leq 1$. Parameter κ is the degree of complementarity between the two parts of the cultural good. If $\kappa = 0$, the parts are strictly complementary and the public good has no value unless the parts are in the same project. If $\kappa = 1$, the two parts of the cultural good are independent and have the same value whether they are in the same project or not.

When agent i owns both parts of the cultural good, she can exclude agent j from participating in the cultural good project but cannot exclude him from consuming it since it is a public good. The default payoffs under agent i ownership are $\Theta_k \left(\lambda_j y_i + \mu_j y_j\right)$ for a unified cultural good or $\theta_k \left(\lambda_j y_i + \mu_j y_j\right)$ for a separated cultural good where $k = 1, 2$. Parameter λ_j is the degree of indispensability of agent j where $\kappa \leq \lambda_j \leq 1$. If agent j is indispensable ($\lambda_j = \kappa$), then the return to agent i's investment is not increased by ownership of the second part if agent j is not present. If agent j is dispensable ($\lambda_j = 1$), his absence does not affect the value of agent i's investment. In the context of cultural goods, an agent can be indispensable if he has considerable expertise that is very important to the project or due to limited availability of ex-post alternative trading partners. Parameter μ_i is the degree of spillover from agent i's investment where $0 \leq \mu_i \leq 1$. $\mu_i = 1$ when the investment remains in the asset, e.g. restoration investment, while $\mu_i = 0$ when the investment increases agent i's specific human capital with no spillover to the cultural good

Assumption 2. $\mu_i \leq \lambda_j$.

Also Besley and Ghatak (2001) make a similar assumption to our Assumption 2. It implies that in the absence of agent j the return to agent i's investment is weakly higher when he owns both parts of the cultural rather than none.

3 Optimal ownership for a given location

3.1 Separated cultural good

We will first analyze optimal ownership of a separated cultural good. Under nonintegration Nash bargaining leads to the following payoffs for the agents.

$$\begin{aligned} u_i^{NI:S} &= \theta_i \kappa \left(y_1 + y_2\right) + \frac{1}{2}\left(\theta_1 + \theta_2\right)\left(1 - \kappa\right)\left(y_1 + y_2\right) - c\left(y_i\right) \\ &= \frac{1}{2}\left(\theta_1 + \theta_2\right)\left(y_1 + y_2\right) + \frac{1}{2}\left(\theta_i - \theta_j\right)\kappa\left(y_1 + y_2\right) - c\left(y_i\right) \end{aligned}$$

Superscript NI:S denotes nonintegration and separation. The investment incentives are

$$\frac{1}{2}\left(\theta_1 + \theta_2\right) + \frac{1}{2}\left(\theta_i - \theta_j\right)\kappa = c'\left(y_i^{NI:S}\right) \quad \text{for } i = 1, 2. \tag{2}$$

The first term in (2) arises from the holdup problem. The second term is positive for agent 1 and negative for agent 2. This is because the investment increases the value of both agents' default payoffs since they are investing in a public good. The default payoff increases more for the high-valuation agent 1 and therefore strengthens agent 1's bargaining position and, conversely, weakens the low-valuation agent 2's bargaining position. This effect depends on how complementary the parts are. If the parts are strictly complementary $(\kappa = 0)$, the investment has no effect on the default payoffs. The more independent the parts are (the higher is κ), the larger is the positive bargaining position effect for agent 1 and the negative effect for agent 2.

Under ownership by agent i, the agents' payoffs are

$$u_i^{iO:S} = \theta_i \left(\lambda_j y_i + \mu_j y_j\right) + \frac{1}{2}\left(\theta_1 + \theta_2\right)\left[\left(y_1 + y_2\right) - \left(\lambda_j y_i + \mu_j y_j\right)\right] - c\left(y_i\right)$$

$$= \frac{1}{2}\left(\theta_1 + \theta_2\right)\left(y_1 + y_2\right) + \frac{1}{2}\left(\theta_i - \theta_j\right)\left(\lambda_j y_i + \mu_j y_j\right) - c\left(y_i\right), \tag{3}$$

$$u_j^{iO:S} = \frac{1}{2}(\theta_1 + \theta_2)(y_1 + y_2) + \frac{1}{2}(\theta_j - \theta_i)\left(\lambda_j y_i + \mu_j y_j\right) - c(y_j) \qquad (4)$$

where superscript iO:S denotes ownership by agent i and separation. The optimal investments are given by

$$\frac{1}{2}(\theta_1 + \theta_2) + \frac{1}{2}(\theta_i - \theta_j)\lambda_j = c'\left(y_i^{iO:S}\right), \qquad (5)$$

$$\frac{1}{2}(\theta_1 + \theta_2) + \frac{1}{2}(\theta_j - \theta_i)\mu_j = c'\left(y_j^{iO:S}\right). \qquad (6)$$

Now the bargaining position effect for the owner depends on how indispensable the other agent is as a trading partner , λ_j, while for the non-owner it depends on how much of his investment spills over to the cultural good, μ_j. Note that given Assumption 2, agent 1 ownership dominates agent 2 ownership since agent 1 ownership maximizes the positive effect for agent 1 (since $\lambda_2 \geq \mu_1$) and minimizes the negative effect for agent 2 (since $\mu_2 \leq \lambda_1$).

Equations (2) , (5) and (6) show that nonintegration dominates ownership by agent 1 if $\lambda_2 = \kappa < \mu_2$. Agent 2 has higher investment under nonintegration since his investment weakens his bargaining position less under nonintegration when $\kappa < \mu_2$. Agent 1's investment is the same under both ownership structures since $\lambda_2 = \kappa$. While agent 1 ownership is optimal if $\mu_2 \leq \kappa \leq \lambda_2$ as both agents have (weakly) higher incentives when agent 1 owns both parts of the cultural good. The positive bargaining position effect is increased for agent 1 ($\lambda_2 \geq \kappa$) and the negative effect for agent 2 is reduced ($\mu_2 \leq \kappa$). We summarize this analysis in Proposition 1.

Proposition 1 *When the cultural good is separated,*
(i) nonintegration is optimal if $\lambda_2 = \kappa < \mu_2$,
(ii) ownership by agent 1 is optimal if $\mu_2 \leq \kappa \leq \lambda_2$.

Note that combining the condition in Proposition 1(i) with Assumption 2 implies that $\mu_1 \leq \lambda_2 = \kappa < \mu_2 \leq \lambda_1$. Therefore nonintegration is optimal when the agents have different roles. Agent 2 is indispensable and there is a large spillover from his investment while agent 1 is relatively dispensable and there is a low spillover from her investment. This can be the case when agent 2 invests in restoration of the cultural good. Therefore his investment remains in the cultural good. Furthermore, agent 2's unique restoration skill makes him indispensable. While agent 1's investment is in her specific human capital and she is relatively dispensable.

Similarly, it follows from Proposition 1(ii) and Assumption 2 that $\mu_2 \leq \kappa \leq \lambda_2$, $\mu_2 \leq \lambda_1$ and $\mu_1 \leq \lambda_2$. This implies that the agents have similar roles when agent 1 ownership is optimal. Both agents are relatively dispensable and there is a low spillover from their investments.

3.2 Unified cultural good

Finally, suppose the cultural good is unified and agent i is the owner. The investment incentives are given by

$$\frac{1}{2}\left(\Theta_1 + \Theta_2\right) + \frac{1}{2}\left(\Theta_i - \Theta_j\right)\lambda_j = c'\left(y_i^{iO:U}\right) \tag{7}$$

$$\frac{1}{2}\left(\Theta_1 + \Theta_2\right) + \frac{1}{2}\left(\Theta_j - \Theta_i\right)\mu_j = c'\left(y_j^{iO:U}\right) \tag{8}$$

where iO:U denotes ownership by agent i and unification. Proposition 2 replicates the main result of Besley and Ghatak (2001).

Proposition 2 *It is optimal for the high-valuation agent 1 to own the unified cultural good.*

Given Assumption 2, agent 1 ownership maximizes the positive bargaining position effect for agent 1 and minimizes the negative effect for agent 2.

4 Unification decision

Under agent 1 ownership the cultural good can be unified or separated. In this Section we analyze the unification decision. Since location of the cultural good is contractible, it is determined in the date 1 contract and chosen to maximize joint surplus. We assume that unification is efficient, $\Theta_1 + \Theta_2 > \theta_1 + \theta_2$. (Efficient separation is explored in Section 6.) Agent 1's investment is higher under unification if and only if

$$\frac{1}{2}(\Theta_1 + \Theta_2) + \frac{1}{2}(\Theta_1 - \Theta_2)\lambda_2 > \frac{1}{2}(\theta_1 + \theta_2) + \frac{1}{2}(\theta_1 - \theta_2)\lambda_2 \tag{9}$$

Assumption 1 implies that unification increases the valuation difference, $\Theta_1 - \Theta_2 > \theta_1 - \theta_2$. Therefore the positive bargaining position effect is increased by unification. Furthermore, since unification is efficient also the first term is higher in the left-hand-side of (9). Consequently, agent 1's investment is higher under unification.

For agent 2 there is a tradeoff since unification increases the negative bargaining position effect. Agent 2 has higher incentives under unification if and only if

$$\frac{1}{2}(\Theta_1 + \Theta_2) + \frac{1}{2}(\Theta_2 - \Theta_1)\mu_2 \geq \frac{1}{2}(\theta_1 + \theta_2) + \frac{1}{2}(\theta_2 - \theta_1)\mu_2 \tag{10}$$

which is equivalent to

$$\mu_2 \leq \frac{(\Theta_1 + \Theta_2) - (\theta_1 + \theta_2)}{(\Theta_1 - \Theta_2) - (\theta_1 - \theta_2)} \equiv \widehat{\theta}$$

where $0 < \widehat{\theta} < 1$. If μ_2 is small enough, the negative bargaining position effect is small and agent 2 has higher incentives under unification due to the higher first term in the left-hand-side of (10). This gives Proposition 3.

Proposition 3 *Under agent 1 ownership, the cultural good will be efficiently unified if $\mu_2 \leq \widehat{\theta}$ where $0 < \widehat{\theta} < 1$.*

If $\mu_2 \leq \widehat{\theta}$, both agents have higher investments under unification and therefore unification is optimal under agent 1 ownership. Inefficient separation improves agent 2's incentives if $\mu_2 > \widehat{\theta}$ and therefore it can be optimal to inefficiently separate the cultural good if the improved incentives for agent 2 outweigh agent 1's lower investment.

5 Return of cultural goods

Our interest is in the return of cultural goods. Therefore, we examine a situation where initially part 2 of the cultural good is located in country 2 and owned by agent 2 (NI:S). Then a change in the parameter values triggers the return of part 2 to country 1 and also the ownership is shifted to agent 1 (1O:U).

Although unification of the cultural good is efficient, $(\Theta_1 + \Theta_2) > (\theta_1 + \theta_2)$, initially the cultural good is separated and part 2 is owned by agent 2, i.e. NI:S is optimal. According to Proposition 1 nonintegration is optimal for a separated cultural good if $\lambda_2 = \kappa < \mu_2$. This is the case when agent 2's investment is in restoring the cultural good, so that the spillover from his investment is high (μ_2 is high) and his restoration skill is unique so that he is an indispensable trading partner, $(\lambda_2 = \kappa)$.

We furthermore need to check that NI:S generates a higher joint surplus than 1O:U. Agent 2 has higher investment under NI:S than under 1O:U if and only if

$$\frac{1}{2}(\theta_1 + \theta_2) + \frac{1}{2}(\theta_2 - \theta_1)\kappa > \frac{1}{2}(\Theta_1 + \Theta_2) + \frac{1}{2}(\Theta_2 - \Theta_1)\mu_2. \qquad (11)$$

The first term is greater in the right-hand-side of (11) and the second term is greater in the left-hand-side taking into account that $\kappa < \mu_2$ and that separation reduces the valuation difference. (11) is equivalent to

$$\mu_2 > \frac{[(\Theta_1 + \Theta_2) - (\theta_1 + \theta_2)] + (\theta_1 - \theta_2)\kappa}{(\Theta_1 - \Theta_2)} \equiv \overline{\theta}. \qquad (12)$$

If μ_2 is large enough, the negative bargaining position effect under 1O:U is so large that agent 2's investment is higher under NI:S. Agent 1, on the other hand, has always higher incentives under 1O:U as verified by the following equation.

$$\frac{1}{2}(\theta_1+\theta_2)+\frac{1}{2}(\theta_1-\theta_2)\kappa<\frac{1}{2}(\Theta_1+\Theta_2)+\frac{1}{2}(\Theta_1-\Theta_2)\lambda_2. \qquad (13)$$

Both the first and the second terms are higher in the right-hand-side of (13) taking into account that $\lambda_2=\kappa$. Therefore optimality of NI:S has to be driven by agent 2's higher investment, which occurs when $\mu_2>\overline{\theta}$. It is further required that the value of given investments is not too low under inefficient separation as compared to unification, that is $(\Theta_1+\Theta_2)-(\theta_1+\theta_2)$ is small. Note also that $\partial\overline{\theta}/\partial\kappa>0$ and therefore smaller κ relaxes (12) and favours nonintegration as the negative bargaining power effect is reduced under nonintegration. This is opposite to the private goods case (Hart and Moore 1990) where nonintegration is dominated when the assets are strictly complementary ($\kappa=0$).

Then consider a change in the parameter values that triggers the return of the cultural good. That is, 1O:U becomes optimal. By Proposition 1 it is optimal to shift from NI:S to 1O:S if $\mu_2\leq\kappa\leq\lambda_2$. This can happen when the restoration stage is over and the nature of agent 2's investment changes to human capital which has a low spillover (μ_2 decreases) and due to technological changes agent 2's skill is no longer unique so that he becomes a relatively dispensable trading partner (λ_2 increases). The final step is to verify that efficient unification is optimal under agent 1 ownership. According to Proposition 3 this is the case if $\mu_2\leq\widehat{\theta}$ as then even agent 2 has higher investment under unification.

We summarize this analysis in Proposition 4.

Proposition 4 *(i) Nonintegration and inefficient separation is optimal if* $\mu_2>\lambda_2=\kappa$ *and* $(\Theta_1+\Theta_2)-(\theta_1+\theta_2)$ *is small.*

(ii) Agent 1 ownership and efficient unification is optimal if $\mu_2\leq\kappa\leq\lambda_2$ *and* $\mu_2\leq\widehat{\theta}$.

Proof is in the Appendix.

Initially, agent 2's restoration investment remains in the cultural good and weakens his bargaining position maximally if agent 1 owns the cultural good. Nonintegration reduces the effect of his restoration investment on his default payoff as the two parts of the cultural good are complementary. Therefore agent 2's incentives are higher under nonintegration. For agent 1, nonintegration does not change the effect of her investment on her default payoff from agent 1 ownership since agent 2 is indispensable. Therefore agent 1's investment is the same under both ownership structures. However, due to agent 2's higher investment, nonintegration and separation is optimal. Since separation is inefficient, the efficiency difference, $(\Theta_1 + \Theta_2) - (\theta_1 + \theta_2)$, has to remain small for NI:S to be optimal.

When the restoration stage is completed, agent 2's investment changes to human capital and μ_2 is reduced. This improves agent 2's incentives under 1O as the negative bargaining effect is at least partially eliminated. Furthermore, agent 2 is no longer an indispensable trading partner and λ_2 increases improving also agent 1's incentives under 1O. New technologies have replaced previously unique restoration skills increasing the value of λ_2. For example, software can solve the puzzle of combining broken pieces of pottery, which was previously a unique skill. That is why 1O becomes optimal and, furthermore, efficient unification occurs since according to Proposition 3, even agent 2 has higher investment under unification when $\mu_2 \leq \widehat{\theta}$.

Above we have considered technological changes triggering the return of the cultural good. Return can also be driven by changes in the valuation of the cultural good. One possibility is that the value of an encyclopaedic museum has decreased, in particular, θ_2 is lower. For example, Picasso's encounter of an African mask at the Etnographic Museum inspired his African period. In modern times the possibilities for encountering other cultures have radically increased reducing θ_2. Alternatively, the value of the unified cultural good may have increased e.g. due to the rise of nationalism, Θ_1 is higher. We examine such valuation changes in the following Proposition and show that they can indeed trigger the return of the cultural good.

Proposition 5 *Suppose that initially* $\mu_2 > \max\left\{\lambda_2 = \kappa, \overline{\theta}\right\}$ *and* $(\Theta_1 + \Theta_2) - (\theta_1 + \theta_2)$ *is small so that nonintegration and separation is optimal. Lower* θ_1, θ_2 *or higher* Θ_1, Θ_2 *can trigger efficient return of the cultural good.*

First, it is clear that when θ_1 or θ_2 decrease, both the value of given investments and the investments themselves decrease under NI:S and this can trigger a shift to 1O:U. Second – and less obviously – lower θ_1 or θ_2 increase $\overline{\theta}$ and if the increase in large enough, $\mu_2 > \overline{\theta}$ is no longer satisfied. Then NI:S cannot be optimal since even agent 2 has higher investment under 1O:U.

Similarly, higher Θ_1 or Θ_2 increase the investments and their value under 1O:U and ease the constraint of $\mu_2 > \overline{\theta}$ favouring 1O:U over NI:S.

6 Inefficient return

Return of cultural good may also be inefficient. Suppose $(\theta_1 + \theta_2) > (\Theta_1 + \Theta_2)$ and originally NI:S is optimal, implying that $\lambda_2 = \kappa < \mu_2$ as per Proposition $1(i)$. Furthermore, we need to compare NI:S and 1O:U when separation is efficient. First, agent 1 has higher investment under NI:S than under 1O:U if and only if

$$\frac{1}{2}(\theta_1 + \theta_2) + \frac{1}{2}(\theta_1 - \theta_2)\kappa > \frac{1}{2}(\Theta_1 + \Theta_2) + \frac{1}{2}(\Theta_1 - \Theta_2)\lambda_2. \qquad (14)$$

The first term is higher in the left-hand-side and the the second term is higher in the right-hand-side taking into account that $\lambda_2 = \kappa$. Therefore agent 1's investment is higher under NI:S if and only if

$$\lambda_2 = \kappa < \frac{(\theta_1 + \theta_2) - (\Theta_1 + \Theta_2)}{(\Theta_1 - \Theta_2) - (\theta_1 - \theta_2)} = \widetilde{\theta}. \qquad (15)$$

The positive bargaining position effect is small when $\lambda_2 = \kappa$ is low and the larger investment is driven by the greater first term in the left-hand-side of (14). Agent 2 has higher investment under NI:S since

$$\frac{1}{2}(\theta_1 + \theta_2) + \frac{1}{2}(\theta_2 - \theta_1)\kappa > \frac{1}{2}(\Theta_1 + \Theta_2) + \frac{1}{2}(\Theta_2 - \Theta_1)\mu_2. \qquad (16)$$

Taking into account that $\kappa < \mu_2$, both the first and the second terms are larger in the left-hand-side of (16). Therefore NI:S is optimal if $\lambda_2 = \kappa < \min\left\{\mu_2, \widetilde{\theta}\right\}$.

Then suppose the restoration stage is over and the parameter values change so that $\mu_2 < \kappa < \lambda_2$. By Proposition 1, 1O:S strictly increases both investments for separated cultural good if $\mu_2 < \kappa < \lambda_2$. Proposition 6 furthermore shows that it is optimal to unify the cultural good inefficiently if $[(\theta_1 + \theta_2) - (\Theta_1 + \Theta_2)]$ is small.

Proposition 6 *(i) Nonintegration and efficient separation is optimal if* $\lambda_2 = \kappa < \min\left\{\mu_2, \widetilde{\theta}\right\}$ *where* $0 < \widetilde{\theta} < 1$.

(ii) Agent 1 ownership and inefficient unification is optimal if $\mu_2 < \kappa < \lambda_2$ *and* $(\theta_1 + \theta_2) - (\Theta_1 + \Theta_2)$ *is small.*

As in Proposition 4, return of the cultural good is triggered by the end of restoration stage (lower μ_2) and technological developments (higher λ_2). Here it is additionally required for NI:S that $\lambda_2 = \kappa < \widetilde{\theta}$ while in Proposition 4 the additional condition is related to μ_2. This is because with efficient separation agent 2 has always higher investment under NI:S and even agent 1's investment is higher if the positive bargaining position effect is not large, $\lambda_2 = \kappa < \widetilde{\theta}$.

As with efficient return, also inefficient return can be triggered by changes in the valuations.

Proposition 7 *Suppose initially* $\lambda_2 = \kappa < \min\left\{\mu_2, \widetilde{\theta}\right\}$ *so that nonintegration and separation is optimal. Lower* θ_1, θ_2 *or higher* Θ_1, Θ_2 *can trigger inefficient return of the cultural good.*

A Appendix

Proof of Proposition 4.

(i) By Proposition1 NI:S dominates 1O:S if $\lambda_2 = \kappa < \mu_2$. To verify that NI:S generates higher joint surplus that 1O:U assume that $c(y_i) = \frac{1}{2}(y_i)^2$. Denote joint surplus under NI:S by $S^{NI:S}$.

$$S^{NI:S} = (\theta_1 + \theta_2)\left(y_1^{NI:S} + y_2^{NI:S}\right) - \frac{1}{2}\left(y_1^{NI:S}\right)^2 - \frac{1}{2}\left(y_2^{NI:S}\right)^2$$

$$\begin{aligned} = \; & (\theta_1+\theta_2)\left[\left(\frac{1}{2}(\theta_1+\theta_2)+\frac{1}{2}(\theta_1-\theta_2)\kappa\right)+\left(\frac{1}{2}(\theta_1+\theta_2)+\frac{1}{2}(\theta_2-\theta_1)\kappa\right)\right] \\ & -\frac{1}{2}\left[\frac{1}{2}(\theta_1+\theta_2)+\frac{1}{2}(\theta_1-\theta_2)\kappa\right]^2-\frac{1}{2}\left[\frac{1}{2}(\theta_1+\theta_2)+\frac{1}{2}(\theta_2-\theta_1)\kappa\right]^2 \end{aligned}$$

Joint surplus under 1O:U equals

$$\begin{aligned} S^{1O:U} \; = \; & (\Theta_1+\Theta_2)\left[\left(\frac{1}{2}(\Theta_1+\Theta_2)+\frac{1}{2}(\Theta_1-\Theta_2)\lambda_2\right)+\left(\frac{1}{2}(\Theta_1+\Theta_2)+\frac{1}{2}(\Theta_2-\Theta_1)\mu_2\right)\right] \\ & -\frac{1}{2}\left[\frac{1}{2}(\Theta_1+\Theta_2)+\frac{1}{2}(\Theta_1-\Theta_2)\lambda_2\right]^2-\frac{1}{2}\left[\frac{1}{2}(\Theta_1+\Theta_2)+\frac{1}{2}(\Theta_2-\Theta_1)\mu_2\right]^2 \end{aligned}$$

$S^{NI:S} > S^{1O:U}$ is equivalent to

$$\frac{3}{4}(\theta_1+\theta_2)^2 - \frac{1}{4}(\theta_1-\theta_2)^2\kappa^2$$

$$> \frac{3}{4}(\Theta_1+\Theta_2)^2 - \frac{1}{4}(\Theta_1-\Theta_2)^2\lambda_2^2 - \frac{1}{4}(\Theta_1-\Theta_2)\left((\Theta_1+\Theta_2)(\mu_2-\lambda_2)+\frac{1}{2}(\Theta_1-\Theta_2)\left(\mu_2^2-\lambda_2^2\right)\right)$$

$$\underline{\Theta} \equiv 3(\theta_1+\theta_2)^2 - 3(\Theta_1+\Theta_2)^2 - (\theta_1-\theta_2)^2\kappa^2 + (\Theta_1-\Theta_2)^2\lambda_2^2$$

$$+\left(\Theta_1-\Theta_2\right)\left(\left(\Theta_1+\Theta_2\right)\left(\mu_2-\lambda_2\right)+\frac{1}{2}\left(\Theta_1-\Theta_2\right)\left(\mu_2^2-\lambda_2^2\right)\right)>0 \quad (17)$$

Therefore $S^{NI:S}>S^{1O:U}$ if and only if $\underline{\Theta}>0$.

Suppose $(\theta_1+\theta_2)=(\Theta_1+\Theta_2)$, $(\theta_1-\theta_2)<(\Theta_1-\Theta_2)$ and $\mu_2>\lambda_2=\kappa$. Then $\underline{\Theta}$ simplifies to

$$\left[\left(\Theta_1-\Theta_2\right)^2-\left(\theta_1-\theta_2\right)^2\right]\lambda_2^2$$
$$+\left(\Theta_1-\Theta_2\right)\left[\left(\Theta_1+\Theta_2\right)\left(\mu_2-\lambda_2\right)+\frac{1}{2}\left(\Theta_1-\Theta_2\right)\left(\mu_2-\lambda_2\right)\left(\mu_2+\lambda_2\right)\right]>0 \quad (18)$$

Then lower θ_1 so that $(\theta_1+\theta_2)<(\Theta_1+\Theta_2)$. Since $\frac{\partial\underline{\Theta}}{\partial\theta_1}=2\left(3\left(\theta_1+\theta_2\right)-\kappa^2\left(\theta_1-\theta_2\right)\right)>0$, $\underline{\Theta}$ decreases but remains positive as long as $(\Theta_1+\Theta_2)-(\theta_1+\theta_2)$ is small.

Q.E.D.

Proof of Proposition 5 and 7.

By standard calculations, $\frac{\partial S^{NI:S}}{\partial\theta_i}>0$ and $\frac{\partial S^{1O:U}}{\partial\Theta_2}>0$ proving the propositions.

Proof of Proposition 6.

From (17) $S^{NI:S}<S^{1O:U}$ if and only if $\underline{\Theta}<0$.

Suppose that $\theta_1=\Theta_1>\theta_2=\Theta_2$. Then (17) simplifies to

$$\underline{\Theta}\equiv\left(\Theta_1-\Theta_2\right)\left[\left(\Theta_1+\Theta_2\right)\left(\mu_2-\lambda_2\right)-\left(\Theta_1-\Theta_2\right)\kappa^2+\frac{1}{2}\left(\Theta_1-\Theta_2\right)\left(\mu_2^2+\lambda_2^2\right)\right]. \quad (19)$$

Assume $\kappa=\lambda_2$ and substitute in (19).

$$\underline{\Theta}\equiv\left(\Theta_1-\Theta_2\right)\left[\left(\Theta_1+\Theta_2\right)\left(\mu_2-\kappa\right)+\frac{1}{2}\left(\Theta_1-\Theta_2\right)\left(\mu_2-\kappa\right)\left(\mu_2+\kappa\right)\right] \quad (20)$$

$\underline{\Theta}<0$ for $\theta_1=\Theta_1>\theta_2=\Theta_2$ and $\mu_2<\kappa=\lambda_2$.

Differentiate (20) with respect to λ_2.

$$-(\Theta_1 - \Theta_2)\left[\Theta_1 + \Theta_2 - (\Theta_1 - \Theta_2)\lambda_2\right] < 0$$

Since $\underline{\Theta} < 0$ for $\theta_1 = \Theta_1 > \theta_2 = \Theta_2$ and $\mu_2 < \kappa = \lambda_2$ and decreasing in λ_2, it follows that $\underline{\Theta} < 0$ for $\theta_1 = \Theta_1 > \theta_2 = \Theta_2$ and $\mu_2 < \kappa \leq \lambda_2$.

Finally, increase Θ_1 and decrease Θ_2 so that $\Theta_1 > \theta_1 > \theta_2 > \Theta_2$ but $(\theta_1 + \theta_2) > (\Theta_1 + \Theta_2)$. The effect of these changes is

$$-6(\Theta_1 + \Theta_2) + 2\Theta_1(\mu_2 - \lambda_2) + (\Theta_1 - \Theta_2)\left(\lambda_2^2 + \mu_2^2\right) + 6(\Theta_1 + \Theta_2)$$

$$+2\Theta_2(\mu_2 - \lambda_2) + (\Theta_1 - \Theta_2)\left(\lambda_2^2 + \mu_2^2\right)$$

$$2(\Theta_1 + \Theta_2)(\mu_2 - \lambda_2) + 2(\Theta_1 - \Theta_2)\left(\lambda_2^2 + \mu_2^2\right)$$

The first term is negative and the second positive. For $\lambda_2 = 1$ and $\mu_2 = 0$, the above equation is negative. If it is positive, $\underline{\Theta}$ remains negative as long as $(\theta_1 + \theta_2) - (\Theta_1 + \Theta_2)$ is small.

Q.E.D.

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