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Cross-Cultural Trade and Internal Institutional Stability

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Cross-Cultural Trade and Internal Institutional Stability

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July 2005

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JEL Classification: D23, F15, J41, O17, P51

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This paper has been conceived and completed during my visit at the Department of Economics, University of California at Berkeley, whose hospitality I acknowledge with gratefulness. I am indebted to Gérard Roland for his generous and helpful advice at several stages of this work. I have also benefited from comments and suggestions by Sam Bowles, Francesco Drago, Dora Kadar, Ugo Pagano, Guillermo Rein and, especially, Pietro Vertova. Finally I would like to thank the Bank of Italy for financial support. Usual disclaimers apply.
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Traditional trade theory obtains that international integration always yields large potential welfare benefits, even in a static constant returns competitive economy. Such a result however can only be maintained in a world bereft of its institutional and cultural dimensions. In this paper we show that once institutional factors are introduced into the discussion, integration may be detrimental to welfare in the long-run. Exploiting a game theoretical approach, we consider the integration between two societies that only differ in their institutional structures. Two important results are derived. First we illustrate that intercommunity integration may entail the disruption of the pre-existent internal arrangements in at least one of the two societies. This is crucial especially because in our model institutional diversity is the only reason that makes intercommunity integration profitable. Second, in the presence of large gains from internal cooperation, the collapse of the domestic institutional equilibrium leads to a loss of welfare for the community as a whole.

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"Trade and exchange across cultural lines have played a crucial role in human history, being perhaps the most important external stimuli to change, leaving aside the unmeasurable and less benign influence of military conquest" (Curtin, 1984: 1)

1 Introduction

The standard approach to international trade points to the potential beneficial effects of integration, either in terms of the efficiency-enhancing role of free trade in a static framework or in terms of growth, efficiency and welfare in an intertemporal context. From both static and dynamic points of view, opening up to cross-border exchange creates, for the countries involved, the opportunity to obtain a larger economic pie, at the only possible cost of some redistribution of income. But the gains are *potential*. It will be then the nature of the institutions in each economy to determine whether or not they will be realized and to what extent (e.g. Srinivasan and Bhagwati, 2001).

Yet, until now, the lack of an appropriate theoretical framework capable to include the cultural and institutional dimensions of the issue has induced international economists to emphasize the benefits of free movements of goods, people and ideas, overlooking the consequent social tensions and the effects on the stability of the domestic arrangements. This paper argues that we cannot fully understand the true consequences of economic integration until we take domestic norms and social institutions that embody them seriously.

Beliefs and cultural models are shaped into societal and economic structures by means of institutions. To the extent that cultural and historical experiences differ across countries, diverse institutional and belief systems are produced. As a consequence, at each point in time, countries also differ in their ability to realize the potential gains from trade. The matter is complicated enough in a closed economy, where individuals share the same national traditions, culture, and historical legacies. It turns out to be even more complicated as societies evolve, interact and become interdependent. More complex institutions will be required to seize the gains from trade and define the rules to share the larger economic pie resulting from the integration. As a consequence, a more refined economic approach is required to represent and interpret the underlying process.

Institutions model the incentive structure of a society. In the measure that they are essentially immobile across borders, institutional arrangements may be treated as a determinant

of comparative advantage and a source of gains from integration, just like factor endowments. However, unlike factor endowments, institutions are humanly forged constraints, "*the external (to the mind) mechanisms individuals create to structure and order the environment*" (North, 1994: 363). Hence, they cannot be considered given once and for all. By contrast, the institutional structure is shaped and continuously altered by the ongoing and incremental process of economic integration. This implies that: (*a*) whether or not opening up is profitable *ex-ante* for a certain country depends on the nature and the state of development of the current institutions; (*b*) even if positive gains from trade are predicted *ex-ante*, the concrete possibility for the economy to enjoy them *ex-post* is determined by the way the institutions will, in turn, respond to the removal of the cross-border barriers. Using a repeated-game theoretical model, this paper shows that the economic integration of a previously segregated community with the rest of the world may involve the *dis*integration of the internal institutional stability. In such a case, the community as a whole may not only be unable to realize the *potential* gains from trade, but also experience *ex-post* welfare losses.

Some studies have recently started to gauge the role of institutional and cultural diversity in international trade. The main contribution of this literature is to illustrate the various aspects of the institutional framework that may support economic exchange. Social networks and group ties engaged in repeated interactions may be seen to enhance cooperation and trust (Bowles and Gintis, 2004; Gosh and Ray, 1996; Kandori, 1992), overcome informational cross-border barriers (Casella and Rauch, 2002; Rauch and Casella; 2003), and deter opportunism (Rauch and Trindade, 2002)[1]. Self-enforcing relational contracting incurs increasing marginal costs as the traders' community enlarges (Li, 2003). Thus, there exists a turning point where anonymous market transactions result to be more cost-effective and the transition from personal to impersonal exchange becomes possible (Dixit, 2003; Kranton, 1996).

Further research has explored the emergence and evolution of formal and informal institutions from a historical point of view. These studies emphasize the diffused reliance on interpersonal relations at early stages of market development and the role of former institutions in facilitating trade expansion: the merchant guilds in the late medieval period (Greif, Milgrom, and Weingast, 1994), the law of merchant in the Champagne fairs (Milgrom, North and Weingast, 1990), the Maghribi trading coalition (Greif, 1993, 1994a), and the Genoa patron system (Greif, 1994b)

[1] For a collection of papers on networks and group ties see also the special issue of the Journal of International Economics, 48 (1999), and Rauch and Casella (2001).

during the commercial revolution.

This paper is mainly grounded on Avner Greif's contribution, who combines modeling and case study. In the 11th century, Maghribi merchants managed to mitigate the commitment problem stemming from overseas agency relations by means of a multilateral punishment system (*collectivist society*). Such a coordination mechanism implies collective punishment of dishonest agents by all the merchants who rely on perfect information on past cheaters. This practice is contrasted with the bilateral punishment system employed by Genoese merchants, which only requires each merchant to punish the agent she has caught cheating (*individualist society*). The interesting feature of this story is that the two strategies resemble the cultural and institutional characteristics of more recent communities. For instance Clay (1997), adopting the same game model, studies the case of the merchants' coalition in Mexican California during the 1830s and 1840s. In a more general context, as we discuss in the next paragraph, the individualist organization resembles the societal traits of the contemporary Western world, while the collectivist system resembles those of some developing countries.

In his papers, Greif illustrates how two identical societies grown in isolation can develop alternative institutional strategies to handle the same problems of imperfect contract enforcement. In his model, the consequent institutional and cultural diversity turns out to be a reason for at least one of the two economies to find cross-community integration profitable. However, what has not been explored until now is how intercommunity integration impacts the pre-existing institutional stability. Will the former social arrangements persist in the two economies, one of them prevail or a combination emerge? Which are the *ex-post* effects of integration on welfare? Will the two communities be able to realize the potential benefits from trade after the possible reshuffle of the internal institutional structure? The aim of this work is to shed some light on these issues, starting from the point where Greif stopped. Greif clarifies the conditions under which integration can take place, but does not illuminate on what happens later. In particular he does not consider the case where the internal equilibrium collapses. In our paper the two originally segregated communities are allowed to interact, so that cross-border contracts may be stipulated. Then, to gauge the consequences of such a change in the external rules on the internal stability, we treat institutions as endogenous and show how the collectivist equilibrium may disintegrate after collectivist agents get in touch with the individualist world. In this case, the entire collectivist community quits relying on the pre-existent agreements and gives up the

gains from cooperation that it was enjoying before. This leads to ex-post loss in welfare.

The remainder of the paper is organized as follows. In the next paragraph we illustrate some recent empirical studies that provide examples for the above story. Then, in Section 3 we plunge the issue into a game theoretical approach, and describe more rigorously the functioning of the coalition-based enforcement system. In Section 4, the institutional equilibrium conditions are evaluated and discussed in segregation, while in Section 5 we study why and how internal cooperation may become unsustainable after intercommunity integration. In Section 6 we carry out the welfare analysis and, finally, Section 7 draws the conclusions.

2 Stylized Facts

Our starting point is that, in small communities, closed to cross-border exchange and characterized by ineffective legal systems, trade relies on long-term, partner-specific relations, whereas formal courts for the dispute resolution become the exception. These patters are consistent with Alexander Gerschenkron's classic proposition assessing that developing countries create institutional substitutes for arrangements that are prevailing in developed countries (Gerschenkron, 1962). Relation-based institutions emerge endogenously and are self-enforcing. Moreover, they are context-specific in the sense that are sustainable as long as the conditions that have supported their development are not altered. In what follows we give some examples.

Bigsten, Collier et al. (2000) study the contractual practices of African manufacturing firms using survey data collected in Burundi, Cameroon, Côte d'Ivoire, Kenya, Zambia, and Zimbabwe. The authors discuss the significant difference in modes of contracting between these countries, where flexibility and long-term relationships are widespread, and Western economies, where market exchange is the dominant trade form. Fafchamps (1996) further investigates the enforcement system of commercial contracts in Ghana through local interviews. He finds that compliance with contractual provisions is in general owed to the desire to preserve partner-specific trade relationships based on mutual trust. As business interactions mix up with social ones, we can say with Granovetter (1985) that economic behavior is embedded in networks of interpersonal relations. But the survival of these arrangements is conditional to the maintenance of the prerequisites that have supported their emergence.

Shmitz (1999) illustrates how in the Sinos Valley cluster in Brazil the boom resulting from the export incentive policy in 1969/70 lessened the socio-cultural ties that sustained exchange

and cooperation within the local community in segregation. The increasing economic integration spurred competition amongst local producers. Monitoring for the product development and quality inspection became more severe, and an auction system was established for the export orders' assignment. This led to the dismissal of the former trust-based arrangements as local manufacturers were pitched one against the other, and the conditions for the mutual trust were eroded. A similar story is documented by Ensminger (1992) for the case of the Orma tribe of Kenya. The author describes the organizational features of this local community: in the pre-colonial period, when the tribe was closed to any interaction with the outside, economic and social relations among the members were based on what Ensminger (1992: 2) calls a "*moral economy*". Yet, the decline in the transaction costs, the consequent interaction with other communities and the increased diversity among traders made the tribe's arrangements unsustainable and provoked the failure of the internal cooperation and the collective action.

A final case that is particularly suited for the scope of this paper is provided by Woodruff (1998). A survey-data analysis describes the functioning of the coalition-based enforcement system between manufacturers and retailers in the Mexican footwear's industry. Until the trade liberalization reform took place (at the end of the '80s), manufacturers and retailers relied on informal agreements based on personal reputation. The production, the delivery of the good and the payment were separated in time: first, the manufacturers showed some product samples to the retailers; then the latter signed an order; after months the products were delivered, and generally the payment was due by a further month. The three-gap separation between the *quid* and the *quo* over time (the order, the delivery and the payment) opens room for two types of commitment problems: (*i*) After having placed a product-specific order, the retailer can cancel the order and leave the manufacturer with the unsold good. (*ii*) After the delivery of the product, the retailer can seize the good without paying, or pay late. The informal enforcement mechanism built to face these problems was based on a system of commercial references. Accordingly, before concluding an order, each manufacturer could gather information about the retailer's behavior in the previous transactions with any other manufacturer within the coalition: the timing of the payment, possible orders' cancellations or products' returns. The reputation mechanism made it possible to punish "ill-behaved" retailers on a multilateral basis.

The Mexican survey testifies that the coalition-based coordination arrangement was bounded to succeed only in closed economy. Trade liberalization expanded the available outside options

domestic retailers could rely on to import merchandise rather than to purchase it from the domestic coalition. Therefore, they faced slack incentives to remain loyal to local manufacturers since the new opportunities of cross-border trade reduced the cost of a bad reputation within the coalition. Since until that moment the coalition had been working without recourse to external enforcement or control, when integration took place it was not prepared to monitor retailers' behavior. Then, contract compliance became more difficult to be sustained and the former economic relations tended to breach. In the next paragraph we model the above story in a game form.

3 Theoretical Framework

The theoretical framework adopted is an infinitely repeated game. According to this approach, an institution is defined as a system of two interrelated factors, *cultural beliefs* and *organizations,* that together generate a regularity of (social) behavior (Greif, 1994a, 2005). The *cultural beliefs* represent the individual's expectations on how the population of other players act in the current period, whereas the *organizations* reflect the rules of the game that define the set of admissible actions. The theoretical model restricts the analysis to those behaviors and expected behaviors that are consistent with the equilibrium concept adopted. The subgame perfect equilibrium requires that, given the information available, the expectations on other agents' behavior and the specified rules of the game, agents define and follow the best strategy such that they cannot gain from deviations at each stage.

We distinguish between three sets of parameters: exogenous, endogenous and quasi- parameters (Greif, 2005). The first are those that are taken as given and are only altered by a change in the external context, such as an increase (decrease) in the uncertainty of the relevant environment where agents make their decisions, the magnitude of some individual payoffs, and the preferences (that we consider given for the sake of simplicity). Endogenous parameters are determined by the equilibrium of the game, for instance the wage that has to be paid to the employees to keep them honest. Quasi-parameters, finally, reflect regularities of behavior and beliefs shared by the majority of players. They must be considered as exogenous in the short-run but endogenous in the long-run. Their marginal change cannot instantaneously alter the relevant equilibrium institution but the cumulative change in the shared expectations may be crucial to determine the institutions' evolution. Variations in the rules of the game can therefore

be able to trigger destabilizing processes such that the individual perceives her current behavior to be a disequilibrium strategy (since she is unable to instantaneously update) but still relies on the previous expectations and takes the previous institutional arrangements as given.

While an institution is associated to an equilibrium outcome that implies a certain regularity of behavior in a given situation, institutional change is a variation in such regularity of behavior generated by either internal or external factors. The institution is *self-reinforcing* if the range of values of the parameters such that the institution is stable widens over time along the evolution path determined by the structure of the institution itself, whereas the institution is *self-undermining* if its development entails situations for which the institution results to be destabilized after an external stimulus that would have not damaged it in a previous time period (Greif, 2005). Armed with this general conceptual framework, we can now proceed with the following formalization based on Greif (1993, 1994a).

Consider two societies that are characterized by similar technological levels, the same production possibilities, and identical preferences (equal discount factor, $\beta \in (0,1)$). Assume that the two communities of players have the same total size, and are divided into M merchants (manufacturers) that are engaged in long distance trade, and A ($> M$) agents (retailers). Merchants produce a certain good and sell it overseas. They can deliver the good by themselves or hire an agent and pay a wage w (each merchant can only hire one agent, and each agent can only be employed by one merchant). If the merchant operates by herself, she gets a payoff equal to k, while if she hires an agent two possibilities are available. The agent is honest: in this case the merchant obtains $\gamma - w$ and the agent w. The agent cheats: in this case the agent earns α (where $\gamma > \alpha > w$) and the merchant gets zero payoff. There are efficiency gains from cooperation so that $\gamma - w > k$ by hypothesis. The merchant can set the level of the wage to pay and can choose to hire agents only within a subset of players on the basis of their past behavior. Given the offered wage, the agent can decide to be honest or not. A merchant prefers not to employ an agent if the wage she has to pay to keep the agent honest is larger than α ($k > \gamma - \alpha$). After a merchant has employed an agent, at the end of each period the former can choose to terminate the agency relation or not. If an agent has cheated, she is always fired. After an agent becomes unemployed she has a probability $h_h \in [0,1]$ to be rehired if she was honest during the last period, and $h_c \in [0,1]$ if, on the contrary, she cheated. Furthermore, there is an exogenous probability that the agency relation ends for reasons independent of the decisions of the two

partners. In order to discern the effects of the societal organization of the two communities from other forms of diversity, we assume that the exogenous probability of relation termination (that reflects the general degree of insecurity of the contractual environment) is the same for the two economies. Nevertheless, to make it possible to recognize the independent effects of changes in the respective institutional contexts, we denote them in different ways. Then, $\sigma \in [0,1]$ is the exogenous probability of relation termination in the collectivist society, while $\tau \in [0,1]$ is the analogous probability in the individualist one, where $\sigma = \tau$ by assumption.

The two communities of merchants are governed by two alternative strategies. In the individualist society a *bilateral punishment system* (*BPS*, hereafter denoted by b superscript) works such that the merchants always fire a dishonest agent, but do not punish an agent that cheated someone else (in an analogous way as in Shapiro and Stiglitz, 1984). Therefore, honest and dishonest agents, if unmatched, have the same probability to be rehired ($h_h^b = h_c^b = h^b$). In the collectivist society, on the contrary, a *multilateral punishment system* (*MPS*, hereafter denoted by m superscript) prevails, so that all the merchants participate in a sharing information system through which they are able to know if an agent was honest or not in the past when employed by any other member of the coalition. Dishonest agents are labelled as such and are never hired again by any merchant ($h_c^m = 0$). We define such an institution as the *merchants' coalition with MPS*.

Given the described structure of the game, each merchant wants to find the minimum wage such that the employed agent is honest. In other words, she has to offer to the agent a payoff for which the life time expected utility of a honest matched agent is equal to the life time expected utility of a cheater. We define this wage the *honesty wage*. Consistently with Greif (1993, 1994a), the equilibrium concept adopted in this framework is the one of subgame perfect equilibrium (*SGPE*). In other words, in equilibrium each individual's strategy must be optimal for all the members of the coalition given the actions of all the non-members in response to the coalitional strategy. Moreover, there cannot be any sub-coalition of players that has an incentive to deviate. Then in the collectivist society each merchant finds it optimal to adopt the multilateral punishment system and pay the honesty wage; under these conditions agents' best strategy (conditional to the expectations about other players' behavior) is to be honest. We only focus on the behaviors that, given the rules of the game and the cultural beliefs, are admissible to be an equilibrium. The situation where the coalition strategy is sustainable as

SGPE as above illustrated is defined *coalition-equilibrium.*

4 Segregation

In this section we define the coalition-equilibrium in segregation.

Definition 1 *An economy is segregated if exogenous (or endogenous) barriers exist such that merchants from each economy can only (or strictly prefer to) hire agents from their own economy.*

In equilibrium merchants pay to the agents the honesty wage and agents are always honest. We recall that h_h^i (h_c^i), with $i = b,\ m$, is the probability that an unemployed honest agent (cheater) finds a new partner, σ (τ) is the exogenous probability that a relation terminates in the collectivist (individualist) society, β is the discount factor, and α is the instantaneous payoff of a cheater.

Definition 2 *The (segregation) honesty wage w_i^* (with $i = b,\ m$) is the minimum wage such that agents are always honest in the intraeconomy agency relations. It is monotonically increasing with h_c^i, σ (τ), and α, and monotonically decreasing with β and h_h^i* (Greif, 1994a).

Define, in segregation, VS_h^i $(= w_i^* + \beta(1-\sigma)VS_h^i + \sigma US_h^i)$ the life time expected utility of an employed honest agent, US_h^i $(= \beta h_h^i VS_h^i + \beta\left(1-h_h^i\right)US_h^i)$ the life time expected utility of an unemployed honest agent, US_c^i $(= \beta h_c^i VS_c^i + \beta\left(1-h_c^i\right)US_c^i)$ the life time expected utility of an unemployed cheater, and, finally, VS_c^i $(= \alpha + US_c^i)$ the utility of an employed agent who cheats. The (segregation) honesty wage is the minimum wage such that the following condition holds:

Condition 1 (*Honesty condition in segregation*)

$$VS_h^i \geq VS_c^i$$

Given the initial conditions, we can find the segregation honesty wages respectively in the collectivist (w_b^*) and in the individualist society (w_m^*):

$$w_m^*\left(h_h^m > 0,\ h_c^m = 0\right) = \frac{(1-\beta)\,\Sigma_h^m}{H_h^m}\alpha \tag{1}$$

$$w_b^*\left(h_h^b = h_c^b = h^b > 0\right) = T^b\alpha \tag{2}$$

where $\Sigma_h^m = [1-\beta(1-h_h^m)(1-\sigma)]$, $T^b = \left[1-\beta\left(1-h^b\right)(1-\tau)\right]$ and $H_h^m = [1-\beta(1-h_h^m)]$. As it can be easily proved, $\forall\ h_h^m,\ h^b \geq 0$, $w_m^* < w_b^*$ is always true.

The two enforcement strategies are sustainable as long as they represent a *SGPE*, providing that: (*i*) Collectivist (individualist) merchants find it optimal to employ the *MPS* (*BPS*) and not to deviate. (*ii*) Agents find it optimal to be honest if they are paid the honesty wage w_i^* ($i = b, m$).

Since, by hypothesis, gains from cooperation exist, $\gamma - w > k$, and $k > \gamma - \alpha$, in order strategy i to be sustainable the following condition must hold:

Condition 2 (*Sustainable honesty wage*)

$$w_i^* < \alpha.$$

Otherwise, the merchants would prefer operating by themselves rather than hiring an agent. We can prove the following proposition:

Proposition 1 *In segregation the collectivist (individualist) enforcement strategy is always stable.*

Proof. See the mathematical appendix. ■

In the specific case of the collectivist coalition, we derive that the coalition is a *SGPE*, providing that: (*i*) Merchants find it optimal to be members of the coalition; (*ii*) Merchants always prefer to hire a honest agent and never hire a cheater[2]; (*iii*) Agents never cheat if paid w_m^*.

Before turning to the intercommunity integration case, a final result is worth pointing out. As a consequence of the different enforcement strategies, in equilibrium the two economies tend to organize themselves according to two distinct social structures. Let us introduce the possibility for merchants to employ other merchants as agents.

In the individualist economy a merchant will never find it profitable to hire another merchant as her agent. Indeed, the ownership of a capital to invest increases the reservation utility of a merchant with respect to the one of an agent without capital. As a consequence, Greif (1994a) finds that the wage that keeps the former honest when she works as an agent tends to be higher than the one required by the latter. We refer to this community as a society with a vertical social structure where merchants only employ agents without capital.

On the contrary, in the collectivist economy, a merchant that is employed as an agent and is caught cheating cannot benefit from the multilateral retaliation strategy when she is, in turn,

[2] We emphasise that the mechanism works without second-order punishment, *i.e.* a merchant that hires a dishonest agent is not punished by the other merchants.

cheated by an agent. Therefore, for the given honesty wage w_m^*, in equilibrium an agent tends to cheat a merchant that has cheated when working as agent for another merchant (since no *MPS* is at work the agent demands to be paid at least $w_b^* > w_m^*$ to be honest). Collectivist merchants have, thus, an additional incentive to be honest when they work as agents. Again following Greif (1994a), we obtain that merchants can randomly match either an agent with capital (another merchant working as an agent) or an agent without capital, and, in equilibrium, they will be indifferently honest for the honesty wage w_m^* [3]. We refer to this community as horizontal social structure.

We can now derive the probability distributions for agents to be hired in the two communities as function of the different enforcement strategies. As it is immediate to verify, in the collectivist economy, due to the horizontal structure, the probability for a honest agent to be hired is $h_h^m = \dfrac{\sigma M}{A-(1-\sigma)M+M} = \dfrac{\sigma M}{A+\sigma M}$. By contrast, in the individualist one, since vertical integration prevails, the probability that either a honest agent or a cheater is rehired when unemployed is $h^b = \dfrac{\tau M}{A-(1-\tau)M} > h_h^m$.

All the results derived in this section are taken as a starting point for the analysis of the cross-cultural integration that is the subject of the remaining part of the paper.

5 Integration

So far we have assumed the two communities to be segregated due to exogenous entry barriers that prevent the merchants from each community from hiring foreign agents. Suppose now that the exogenous barriers fall down and merchants have the opportunity to hire agents from either community (*joint economy*).

Definition 3 *A joint economy is integrated if, given the initial conditions, merchants from at least one economy are indifferent from the original economy of their agents (Greif, 1994a: 993). Integration is called asymmetric if only merchants from one community are willing to hire foreign agents.*

To analyze the effects of the economic integration on the stability of the coalition we take the initial conditions as given leaving the equilibrium value of w_m as *endogenous parameter*. We retain unchanged (*exogenous parameters*): the individuals' preferences (discount factor, β), the exogenous conditions (contractual insecurity, $\sigma = \tau$), the equilibrium wage of the other

[3] We refer to Greif (1994) for a more detailed discussion of this point.

community (w_b^*), the dimension and the composition of the two economies (M and A). On the contrary the probability distributions for an unemployed agent to be rehired represent *quasi-parameters* that reflect agents' expectations on the majority of other individuals' behavior. According to what we said in Section 2, we assume that individuals are unable to immediately update their expectations when the external conditions change. Therefore, we assume that the quasi-parameters are exogenous in the short-run. Even after intercommunity integration occurs, we assume that individuals employed in agency relations within a certain community retain unchanged their expectations and believe that the previous institutional equilibrium (the coalition) survives. This assumption of incapability of instantaneous update is a form of bounded rationality that reveals when the exogenous conditions change suddenly for the agents. As a consequence, in the first period when agents after integration have to make their decisions, they evaluate their expected life time utilities taking for granted the *pre-change cultural beliefs*, h_h^m and h^b (Greif, 1994a).

Suppose now that technology efficiency gains from trade do not exist, and the intercommunity barriers fall down. Given the pre-change cultural beliefs, we have $w_b^* > w_m^*$. As a consequence, individualist merchants find it optimal to hire collectivist agents. Indeed assume that an individualist merchant meets a collectivist agent (either honest or dishonest is irrelevant here) and the merchant is uncertain about how fast the agent update her social behavior once emigrated in the individualist community. We observe that even in the extreme case of instantaneous update (that we have excluded by hypothesis) the collectivist agent, which is used to be in equilibrium for $w_m^* < w_b^*$, will never demand a wage higher than w_b^* to be honest. The same argument does not hold in the case a collectivist merchant meets an individualist agent. Now, unless instantaneous update were possible, the individualist agent, given her cultural beliefs and the equilibrium wage $w_b^* > w_m^*$, will never be honest for w_m^*. Therefore, the collectivist merchant will never hire an individualist agent. *Asymmetric* integration takes place.

In what follows we take the pre-change cultural beliefs, h_h^m and h^b, unchanged in the short-run. However, as we have just proved, even if they were updated (but not instantaneously) by the agents the reasoning would not be altered in any significant way. Accordingly, define w_m^{**} the wage that a collectivist merchant has to pay to a collectivist agent to keep her honest after intereconomy agency relations become possible. To find w_m^{**} we proceed as follows.

Let us suppose that, during their overseas trips, employed collectivist agents have the oppor-

tunity to get in touch with individualist merchants with probability $p \in (0,1)$ (where $p \lesseqgtr h^b$) and to be hired by them. After integration, the employed collectivist agent has the following opportunities:

(i) To remain honest to her domestic partner and earn a wage equal to w_m^{**} (her life time expected utility is $VI_h^m = w_m^{**} + \beta(1-\sigma) VI_h^m + \sigma UI_h^m$). A honest agent, once become unmatched for exogenous reasons (with probability σ), joins the pool of unmatched collectivist agents (her life time expected utility is $UI_h^m = \beta h_h^m VI_h^m + \beta(1-h_h^m) UI_h^m$).

(ii) To cheat her domestic partner, earn α today, and establish an agency relation with an individualist merchant the subsequent period with expected probability $p > 0$ (the agent has life time expected utility equal to $VI_c^m = \alpha + \beta p VI_h^g$). If an intereconomy agency relation terminates for exogenous reasons (with probability τ), the agent (that has already cheated a collectivist merchant in the past and will never be hired again by one of them) joins the pool of unmatched individualist agents internalizing their cultural beliefs (her life time expected utility becomes $UI^b = \beta h^b VI_h^b + \beta\left(1-h^b\right) UI^b$).

According to the changed rules of the game (new outside options for the collectivist agents) but unchanged cultural beliefs (expectations on probability distributions), collectivist merchants must consider now that collectivist agents have a positive probability to be hired by individualist merchants. Indeed, this is sufficient for the collectivist agents to cheat the current partners if they are still paid w_m^*. As a consequence, to maintain the equilibrium, collectivist merchants have now to find the minimum wage such that:

Condition 4 (*Honesty condition in integration*)

$$VI_h^m \geq VI_c^m$$

thereby the following proposition:

Proposition 2 *In (asymmetric) integration, the honesty wage w_m^{**} is the minimum wage such that collectivist agents are always honest in the intraeconomy agency relations. Given the initial conditions, the (integration) honesty wage is:*

$$w_m^{**} = \frac{\Sigma_h^m \left[1 - \beta\left(1 - pH^b\right)\right]}{H_h^m} \alpha \tag{3}$$

where $\Sigma_h^m = [1 - \beta(1-h_h^m)(1-\sigma)]$, $H_h^m = [1 - \beta(1-h_h^m)]$, and $H^b = \left[1 - \beta\left(1-h^b\right)\right]$. w_m^{**} is monotonically increasing in α, h^b, p and σ, and decreasing in h_h^m.

Proof. See the mathematical appendix. ■

Therefore the condition for coalition stability in integration is that collectivist merchants pay all collectivist agents a wage equal to w_m^{**}. According to Condition 2, in order for the coalition to remain stable, w_m^{**} must be lower than α. However, studying equation (3), we notice that after cross-border barriers fall down this is no longer necessarily the case. In particular intracommunity cooperation ceases to be sustainable for: (i) large σ; (ii) large h^b; (iii) large p; and (iv) small h_h^m. Therefore the wage that has to be offered to the collectivist agents to induce them to be honest after the intereconomy agency relations become possible is higher: (i) the more risky the domestic contractual environment; (ii) the more developed the market in the individualist society; (iii) the higher the degree of integration; and (iv) the less developed the market in the collectivist society. We notice that w_m^{**} is independent of τ. This result is due to the fact that the honesty wage in the individualist society (w_b^*) has been considered exogenous and determined by the equilibrium conditions of this economy as in equation (2). This implies that the level of w_b^*, which has been substituted in VI_h^b to derive w_m^{**}, already reflects the degree of contractual risk of the individualist economy (τ) that, as a consequence, does not explicitly enter w_m^{**}.

If w_m^{**} goes above α, the collectivist merchants will find it optimal not to hire agents but to deliver the goods by themselves. As a consequence, the demise of the *MPS* further entails that merchants that are employed as agents by other merchants have no longer the incentive to be honest for the given wage (in the same way we have seen for the individualist society in Section 4), then merchants will not hire other merchants as agents as well.

Expressing the sustainable wage condition, $w_m^{**} < \alpha$, with respect to p we obtain:

Proposition 3 *In integration, the coalition with MPS is stable iff:*

$$p < \widetilde{p} = \frac{1}{H^b}\left(\frac{H_h^m}{\beta \Sigma_h^m} - B\right) \tag{4}$$

where $\Sigma_h^m = [1 - \beta(1 - h_h^m)(1 - \sigma)]$, $H_h^m = [1 - \beta(1 - h_h^m)]$, $H^b = \left[1 - \beta\left(1 - h^b\right)\right]$, *and* $B = (1 - \beta)/\beta$. $\widetilde{p}$ *is monotonically increasing in* h_h^m, *and decreasing in* h^b *and* σ.

Proof. See the mathematical appendix. ■

Proposition 3 represents a crucial result that is worth some comments. The equilibrium value of p is, *ceteris paribus*, a monotonic function of h_h^m. Define the degree of market thickness as

the probability that any given individual in the trade space is able to find, in a given length of time, another individual to match (McLaren, 2003). An increase in the market thickness, in turn, derives from a rise in the number of (effective) market participants and in their versatility, and from improvements in the search efficiency (communication, agents' mobility and so on). Accordingly, p may be interpreted as the degree of international market thickness (level of intercommunity integration), while h_h^m is the domestic market thickness (level of domestic market development). Expressing $\widetilde{p}$ as a function of h_h^m, thus, gives, *ceteris paribus*, the maximum degree of intercommunity integration compatible with coalition stability for the given level of development of the domestic market at the moment the cross-border barriers fall down. Hereafter we denote this function with $\widetilde{p}\,(h_h^m, \sigma)$. The behavior of $\widetilde{p}\,(h_h^m, \sigma)$ can be illustrated as in Figure 1 for two different levels of the domestic institutional risk (σ).

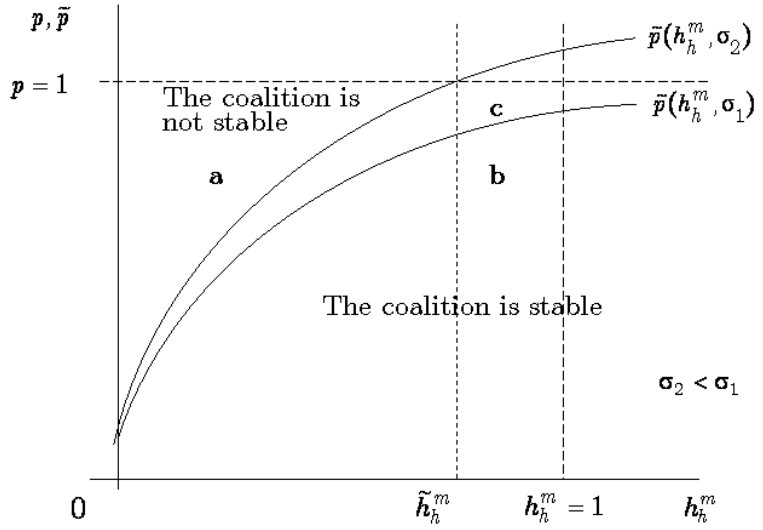

Figure 1

As we can prove, $\widetilde{p}\,(h_h^m, \sigma)$ is a monotonic function increasing in h_h^m. This means that the more developed the domestic market is, the higher the degree of cross-community integration that does not undermine the domestic institutional stability. Consider for instance $\sigma = \sigma_1$ (lowest curve); we can distinguish two cases that are commented below.

First (*case 1*), look at the region above the curve: here the value of the relevant parameters are such that, for given h_h^m, it turns out that $p \geq \widetilde{p}\,(h_h^m, \sigma_1)$, or, what is the same, $w_m^{**} \geq \alpha$. Imagine for instance that we are in point a. This can be described as the case of a small econ-

omy initially closed to international trade inhabited by manufacturers (merchants) and retailers (agents), similar to the one described about the Mexico footwear's industry in Section 2. Assume that manufacturers are organized in a coalition that relies on an information-sharing system of cross-references coupled with *MPS*, and that such a coalition is sustainable in segregation. By hypothesis this country is characterized by labor abundance, that is, resident agents have a lower probability to find a domestic match than agents in the rest of the world have to find a foreign match ($h_h^m < h^b$). Suppose that, at a certain moment, trade liberalization takes place so that domestic retailers can also match foreign manufacturers[4]. Since the level of international market thickness is high with respect to the one of the domestic trade context, agents (retailers) deem international opportunities considerably more appealing than the ones offered by the domestic manufacturers' coalition.

A remark here is due: the matching probabilities are *perceived* magnitudes, not real ones. Indeed we can emphasize that: (*i*) the agents know the probability distributions to find a domestic partner in segregation and *expect* them to remain the same after integration (h_h^m); (*ii*) they have some information about the probability distributions for foreign agents to find a foreign partner before the integration and *assume* them unchanged after the liberalization (h^b); (*iii*) and, finally, they know nothing about their possibilities to match a foreign manufacturer (p). However, given that $h_h^m < h^b$ (labor abundance hypothesis), they may (correctly or not) *anticipate* that $h_h^m < p$[5]. But these expectations do not need to be fulfilled. Beliefs about profitable outside options are enough for them to breach the current contracts and seek their fortune abroad, unless the payoff offered by domestic manufacturers increases to an unsustainable level $w_m^{**} \geq \alpha$.

If, on the contrary (*case 2*), the intereconomy integration is to occur in presence of a more developed domestic market, we find ourselves in the region below the curve. Imagine, for example, we are in point b, that is, for the same level of p, h_h^m is now considerably higher than before. The international outside opportunity is still a valuable option and the fact that it is available entails that agents are willing to be honest only for $w_m^{**} \geq w_m^*$. However it results that $w_m^{**} < \alpha$,

[4] We can justify the hypothesis that domestic unmatched retailers cannot meet foreign manufacturers arguing that, to enter the international market, it is necessary to preliminary have a solid reputation on the domestic one. An agent that has not even matched any domestic partner cannot be deemed as such and so cannot hope to find a foreign manufacturer that wants to trade with her.

[5] Notice that $h_h^m < p$ is neither necessary nor sufficient condition for the coalition's demise (as it clearly emerge from Figure 1). Here we are only illustrating an example where this is the case. We might maintain the framework as general as possible without the implications change. For instance, given $\sigma = \sigma_1$, if we considered instead point c (where $h_h^m \geq p$), everything would follow in an analogous way as in a.

and, as a consequence, internal cooperation is sustainable.

Suppose now that the degree of contractual risk of the domestic environment decreases as a consequence of an exogenous improvement in the domestic institutional environment. Accordingly $\widetilde{p}\left(h_h^m, \sigma\right)$ shifts upwards as illustrated for the case $\sigma = \sigma_2 \left(< \sigma_1\right)$. As one can notice the range of the parameters such that the coalition remains stable after intercommunity integration widens (*i.e.* the integration honesty wage is sustainable even for smaller degrees of domestic market thickness than before). If σ tends to decrease over time, we can say that the domestic institution is self-reinforcing. Finally, we can single out a range of values for $h_h^m \in \left[\widetilde{h}_h^m, 1\right]$ such that the coalition is always stable after integration. We can say in this case that the domestic markets, on the one side, and the domestic institutions, on the other, are *together* so developed that, while the cross-border integration leads to an increase in the wage in the labor abundant country, the domestic institutional arrangements always remain stable.

We conclude that it is the interplay between the level of domestic market thickness (h_h^m) and the degree of institutional development (σ) that makes the domestic coalition robust enough to survive the intercommunity integration shock.

6 Welfare Analysis

In this section we gauge the effects of the cross-cultural integration in terms of welfare, focusing on the collectivist economy. The analysis that we conduct is *ex-post*, in the sense that we evaluate the probability distributions taking into account the *ex-post* effects of the cross-border mobility. For the sake of simplicity, we use an utilitarian measure of total welfare that is given by the sum of the individual utilities for the entire population (agents plus merchants).

Accordingly, we compute and compare total welfare for the collectivist community respectively in segregation and integration. We replicate this exercise in the two cases, both when the coalition remains stable after cross-border barriers fall down, and when it disintegrates.

Let us start with the case in which the honesty wage increases as a consequence of the new outside option but does not exceed the sustainable level. In segregation and coalition-equilibrium every period M merchants are matched with M agents (each period $M \times \sigma$ relations terminate but they are substituted with other $M \times \sigma$ ones) and $A + M - M$ honest agents (agents plus merchants functioning as agents) are unemployed. In integration, collectivist merchants can pay a wage $w_m^{**} < \alpha$ such that agents are honest and do not wish to establish intereconomy agency

relations. Since $w_m^{**} \geq w_m^*$, merchants are worse off and agents are better off, and the only effects of the integration are in terms of redistribution. Recall that VS_h^m (US_h^m) is the ex-post life time utility of a honest collectivist agent matched with a collectivist merchant (unmatched) in segregation, and VI_h^m (UI_h^m) the corresponding life time payoff in integration. We obtain the following proposition:

Proposition 4 *If the coalition remains stable after intercommunity integration, the net gains are zero. We have:*

$$\underbrace{M\frac{\gamma - w_m^*}{1-\beta} + M \times VS_h^m + (A+M\text{-}M)\, US_h^m}_{\text{Segregation}} = \underbrace{M\frac{\gamma - w_m^{**}}{1-\beta} + M \times VI_h^m + (A+M\text{-}M)\, UI_h^m}_{\text{Integration}}$$

Proof. See the mathematical appendix. ■

Suppose now that the condition $w_m^{**} < \alpha$ is not satisfied. As a consequence, in integration, collectivist merchants do not hire collectivist agents and prefer operating by themselves. Therefore, the collectivist population is characterized as follows: (i) $p\,(1-\sigma)\,M$ agents could manage to cheat their domestic partners and match a foreign one at the moment the intercommunity integration occurred; they are employed in agency relations with individualist merchants; (ii) the remaining $[1-p\,(1-\sigma)]\,M$ agents are domestically unemployed and get zero payoff; and (iii) all the merchants work only as agents of themselves (without exploiting the gains from cooperation). To compute the life-time ex-post utilities, we need now to take into account that the $p\,(1-\sigma)\,M$ collectivist agents that have emigrated to the individualist society increase the labor supply of that economy. As a consequence, the ex-post probability for either a collectivist or an individualist agent to be hired in the individualist community becomes: $h_{\text{ep}}^b = \dfrac{\sigma M}{A + (p-1)\,(1-\sigma)\,M}$. We have:

Proposition 5 *If the coalition disintegrates after intercommunity integration, the total welfare can either increase or decrease, depending on:*

$$\underbrace{M\frac{\gamma - w_m^*}{1-\beta} + M \times VS_h^m + (A+M-M)\, US_h^m}_{\text{Segregation}} \underset{>}{\overset{<}{=}} \underbrace{M\frac{k}{1-\beta} + p \times (1-\sigma) \times M \times VI_h^b}_{\text{Integration}}$$

Proof. See the mathematical appendix. ■

As one can notice, merchants are disfavored by the intercommunity integration since $\gamma - w_m^* > k$. The overall effect on the agents, on the contrary, is ambiguous. We can express Proposition 5 as follows.

Proposition 6 *If the coalition disintegrates after intercommunity integration, the total welfare decreases if the pre-change gains from cooperation are sufficiently large. In particular total welfare decreases iff:*

$$\frac{COOP}{(1-\beta)} \geq \left[\frac{p\,(1-\sigma)\,H_{ep}^{b}}{(1-\beta)} - \frac{H_h^m + x\beta h_h^m}{H_h^m} \right] \alpha$$

where $A/M = x$; $COOP = (\gamma - k - w_m^*)$; $H_h^m = [1 - \beta\,(1 - h_h^m)]$, *and* $H_{ep}^{b} = \left[1 - \beta\left(1 - h_{ep}^{b}\right)\right]$.

Proof. See the mathematical appendix. ■

Proposition 6 establishes that if gains from cooperation, on which the collectivist institutional arrangements are founded, are high enough in segregation, then the failure of the domestic coalition and the transition to the individualist culture leads to a loss of welfare for the community as a whole. Table 1 shows some calibration results for such a case. The exogenous parameters are β, x, α, σ, γ, k and p. All the others are endogenously derived as explained in the text. The population is normalized to equal one ($A + M = 1$). For given σ, p is chosen such that, considering the interplay with $h^b(\sigma)$ and $h_h^m(\sigma)$, w_m^{**} turns out to be larger than α (Condition 2 is violated or, *i.e.*, $p \geq \widetilde{p}$). The gains from cooperation are $\text{COOP} = (\gamma - k - w_m^*)$. It results that, even for small gains from cooperation (with respect to α), the percentage net welfare change ($\Delta W\%$) is significantly negative.

Table 1: Calibrations ($\beta = 0.99$; $x = 1.2$; $\alpha = 1$)

$p \geq \widetilde{p}$	σ	COOP	h_h^m	h^b	h_{ep}^b	w_m^*	w_b^*	w_m^{**}	$\Delta W\%$
0.7	0.4	0.2	0.25	0.70	0.40	0.0213	0.818	1.051	-4.872%
0.7	0.5	0.2	0.30	0.74	0.50	0.0214	0.871	1.120	-4.763%
0.8	0.4	0.2	0.25	0.70	0.38	0.0213	0.818	1.200	-3.538%
0.8	0.5	0.2	0.30	0.74	0.46	0.0214	0.871	1.277	-3.229%
0.7	0.4	0.3	0.25	0.70	0.40	0.0213	0.818	1.051	-13.355%
0.7	0.5	0.3	0.30	0.74	0.49	0.0214	0.871	1.120	-13.256%
0.8	0.4	0.3	0.25	0.70	0.38	0.0213	0.818	1.198	-12.141%
0.8	0.5	0.3	0.30	0.74	0.46	0.0214	0.871	1.277	-11.859%

As a consequence, if we assume that the gains from cooperation are such that this is the case, intercommunity integration should be implemented in a way compatible with domestic institutional stability. Clearly, the above result has to be combined with an evaluation of the dynamic effects. For instance, the collectivist society may be able to expand over time by creating transnational networks. In the presence of cross-border ties, the coalition is likely to be stable for a larger set of parameters (self-reinforcing effect), exploit opportunities from local knowledge, information gathering, trust, and foster, as a last result, a trade creation effect.

What about the other community? In this section we have explicitly left aside the evaluation of the welfare effects of the integration on the individualist economy in order to keep the focus on the collectivistic one. As it is clear from the above discussion, however, we can infer that, if nothing else changes, individualist merchants have nothing to lose from the integration (the only consequence for them is the opportunity to choose their agents within a larger set of individuals and eventually pay them a lower wage). Again the ambiguous effects are on the agents' welfare. Yet, due to the aim of this paper, we have chosen to treat the individualist wage as a given parameter in order to significantly simplify the analysis. Then here we do not intend to face such an issue that will be addressed in a future work. Some interesting considerations on the general effects of the integration in terms of international insecurity are provided for instance by Scheve and Slaughter (2004), and Rodrik (1997).

Finally, we notice that our results are driven by three main assumptions: (*i*) Agents are affected by some kind of bounded rationality so that they cannot foresee that once many people from the collectivist economy start trying to get the same chance of working for a foreign employer, the ex-post probability to find a match abroad will go down and so will do their life time utilities. (*ii*) Second, the coalition is confined to work in segregation. If collectivist merchants were able to establish a cross-border multilateral punishment system, cooperation might turn out to be sustainable in integration as well, even for a high level of intercommunity integration. (*iii*) Technology efficiency gains from trade have been explicitly neglected. If they were to be introduced in the discussion, the collectivist employers might find it advantageous to hire individualist employees as well, and the all story would be different. These questions are left open for further research.

7 Conclusions

Recent contributions in historical comparative institutional analysis seek to unravel the role of nonmarket institutions in explaining economic growth and development. According to this view, the nature of nonmarket institutions affects the cost and the feasibility of trade and, crucially influences the process of market integration (Greif, 1993). However, up to now, how institutions respond to the integration has not been explored. This paper takes some steps in this direction and attains two main results. First, we find that as the incentive structure of a society is altered by the change in the external rules of the game, the survival of the pre-existent internal arrangements is determined by the interplay between the initial level of market development, on the one side, and institutional evolution, on the other. Second, as a consequence of the previous result, the response of the domestic institutional structure to the process of economic integration influences the capability of the given community to realize *ex-post* the potential gains from trade. In particular, if the internal institutional equilibrium collapses after integration, and the initial gains from cooperation are large enough, the community as a whole is likely to experience a net welfare loss.

These findings are borne out by empirical cases illustrated in Section 2. They testify an underlying tension between social groups and markets, economic integration and institutional *dis*integration. There is evidence that while within-group organizational arrangements can facilitate trade expansion, trade expansion, in turn, unleashes forces that undermine the stability of social norms embodied in institutional practices. We have studied the case of a collectivist economy that gets in touch with the individualistic world and allows cross-cultural exchange contracts. Consider, for instance, the Orma tribe of Kenya. Ensminger (1992) shows that when the tribe opened up its borders and started interacting with the outside, the former societal structure was disintegrated in the wake of increasing market relations. In the light of our model, we give this story the following interpretation. In a collectivist economy, coordination is sustained by repeated interactions upon which agents formulate their expectations (Ensminger and Knight, 1997). Expectations, in turn, are the basis for compliance to social norms. Once the rules of the game are exogenously altered, the consequent change in the individual expectations, coupled with some form of bounded rationality, is able to create an institutional vacuum that precedes (and can even hamper) the transition to the anonymous market. This analysis empha-

sizes the dynamic nature of the process of institutional evolution passing through exogenous and endogenous factors that yield conditions conducive to change (Lesorogol, 2003). As standard results of the economic literature are challenged, the evaluation of these effects breeds a number of issues of considerable analytical and policy interest. In particular, not only the collapse of the internal arrangements is likely to generate a welfare loss for the community as a whole, but, in our model, once the internal collectivist equilibrium is disintegrated, the very reason for integration is called into question. On the contrary, when the domestic institutions survive after integration, the welfare effects are likely to be positive (efficiency gains from trade coupled with income redistribution). Hence the crux of the investigation is not to question whether to open or not, but rather to evaluate how and at which degree to implement the trade reform in order not to endanger the pre-existent internal equilibrium. Once the crucial relationship among market integration, institutional stability and welfare has been revealed, further research is required to make these intuitions more precise and richer.

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A Mathematical Appendix[1]

A.1 Segregation

Honesty wage in segregation. In what follows we maintain $\sigma = \tau$ (as assumed in the paper). In segregation, the life time expected utilities of respectively a honest (cheater) employed and a honest (cheater) unemployed agent are:

$$VS_h^i = \frac{w_i^* + \sigma US_h^i}{1 - \beta(1-\sigma)}; \tag{1}$$

$$VS_c^i = \alpha + US_c^i; \tag{2}$$

$$US_h^i = \frac{\beta h_h^i VS_h^i}{1 - \beta\left(1 - h_h^i\right)}; \tag{3}$$

$$US_c^i = \frac{\beta h_c^i VS_c^i}{1 - \beta(1 - h_c^i)} \text{ with } i = m, b. \tag{4}$$

Substituting (3) in (1) we get:

$$\left[1 - \beta(1-\sigma)\right] VS_h^i = w_i^* + \sigma \frac{\beta h_h^i VS_h^i}{1 - \beta\left(1 - h_h^i\right)}$$

$$\left[1 - \beta(1-\sigma)\right]\left[1 - \beta\left(1 - h_h^i\right)\right] VS_h^i = \left[1 - \beta\left(1 - h_h^i\right)\right] w_i^* + \sigma\beta h_h^i VS_h^i$$

$$\left\{\left[1 - \beta(1-\sigma)\right]\left[1 - \beta\left(1 - h_h^i\right)\right] - \sigma\beta h_h^i\right\} VS_h^i = \left[1 - \beta\left(1 - h_h^i\right)\right] w_i^*$$

$$VS_h^i = \frac{\left[1 - \beta\left(1 - h_h^i\right)\right] w_i^*}{(1-\beta)\left[1 - \beta\left(1 - h_h^i\right)(1-\sigma)\right]} \tag{5}$$

In segregation, the honesty condition is:

$$VS_h^i \geq VS_c^i$$

whereby, using (2) and (5), it follows:

$$VS_h^i \geq \alpha + \frac{\beta h_c^i VS_h^i}{1 - \beta(1 - h_c^i)}$$

$$VS_h^i \geq \frac{\left[1 - \beta\left(1 - h_c^i\right)\right]\alpha}{(1-\beta)}$$

$$\frac{\left[1 - \beta\left(1 - h_h^i\right)\right] w_i^*}{(1-\beta)\left[1 - \beta\left(1 - h_h^i\right)(1-\sigma)\right]} \geq \frac{\left[1 - \beta\left(1 - h_c^i\right)\right]\alpha}{(1-\beta)}$$

$$w_i \geq w_i^* = \frac{\left[1 - \beta\left(1 - h_h^i\right)(1-\sigma)\right]\left[1 - \beta\left(1 - h_c^i\right)\right]\alpha}{\left[1 - \beta\left(1 - h_h^i\right)\right]} \tag{6}$$

Considering the individualist society (BPS), we can set $h_h^b = h_c^b = h$, and substitute τ for σ. We obtain that the individualist honesty wage is:

$$w_b^* = \left[1 - \beta\left(1 - h^b\right)(1-\sigma)\right]\alpha \tag{7}$$

While in the case of the collectivist community (MPS), we have $h_h^m > h_c^m = 0$, whereby:

$$w_m^* = \frac{\left[1 - \beta\left(1 - h_h^m\right)(1-\sigma)\right](1-\beta)\alpha}{\left[1 - \beta\left(1 - h_h^m\right)\right]} \tag{8}$$

[1] Last revision: May 5, 2005. More detailed proofs are available upon request.

We can prove that $w_m^* < w_b^*$ always. Using (7) and (8):

$$\frac{(1-\beta)\left[1-\beta\left(1-h_h^m\right)(1-\sigma)\right]}{\left[1-\beta\left(1-h_h^m\right)\right]}\alpha - \left[1-\beta\left(1-h^b\right)(1-\sigma)\right]\alpha < 0$$

$$(1-\beta)\left[1-\beta\left(1-h_h^m\right)(1-\sigma)\right] - \left[1-\beta\left(1-h^b\right)(1-\sigma)\right]\left[1-\beta\left(1-h_h^m\right)\right] < 0$$

$$-\beta h^b + \beta^2 h^b - \beta h_h^m \sigma + \beta h^b \sigma - \beta^2 h^b \sigma + \beta^2 h^b \sigma h_h^m - \beta^2 h^b h_h^m < 0$$

$$-\left[\beta h^b(1-\beta) - \beta h^b \sigma(1-\beta)\right] - \beta h_h^m \sigma - \beta^2 h^b h_h^m(1-\sigma) < 0$$

$$-\beta h^b(1-\beta)(1-\sigma) - \beta h_h^m \sigma - \beta^2 h^b h_h^m(1-\sigma) < 0 \text{ QED}$$

Proof of proposition 1. In segregation $w_b^* < \alpha$ always. Indeed, using (7) and observing that $\left[1-\beta\left(1-h^b\right)(1-\sigma)\right] < 1$, we have:

$$w_b^* < \alpha$$

$$\left[1-\beta\left(1-h^b\right)(1-\sigma)\right]\alpha < \alpha \text{ QED}$$

since $w_m^* < w_b^*$, we have also proved that $w_m^* < \alpha$.

A.2 Integration

Proof of proposition 2. Define VI_h^m (UI_h^m), VI_h^b (UI^b) and VI_c^m the life time expected utilities of respectively an employed (unemployed) collectivist agent, an employed (unemployed) individualist agent and a collectivist cheater. Consider w_m^{**} as endogenous and w_b^* as exogenous. We have:

$$VI_h^m = \frac{\left[1-\beta\left(1-h_h^m\right)\right]w_m^{**}}{(1-\beta)\left[1-\beta\left(1-h_h^m\right)(1-\sigma)\right]}; \tag{9}$$

$$UI_h^m = \frac{\beta h_h^m VI_h^m}{1-\beta\left(1-h_h^m\right)}; \tag{10}$$

$$VI_h^b = \frac{\left[1-\beta\left(1-h^b\right)\right]w_b^*}{(1-\beta)\left[1-\beta\left(1-h^b\right)(1-\sigma)\right]} = \frac{\left[1-\beta\left(1-h^b\right)\right]\alpha}{(1-\beta)}; \tag{11}$$

$$UI^b = \frac{\beta h^b VI_h^b}{1-\beta\left(1-h^b\right)}; \tag{12}$$

$$VI_c^m = \alpha + \beta p VI_h^b. \tag{13}$$

In integration, the honesty condition is:

$$VI_h^m \geq VI_c^m$$

whereby, using (9), (11) and (13),

$$\frac{\left[1-\beta\left(1-h_h^m\right)\right]w_m^{**}}{(1-\beta)\left[1-\beta\left(1-h_h^m\right)(1-\sigma)\right]} \geq \alpha + \beta p\frac{\left[1-\beta\left(1-h^b\right)\right]\alpha}{(1-\beta)}$$

and the honesty wage is:

$$w_m \geq w_m^{**} = \frac{\left[1-\beta\left(1-h_h^m\right)(1-\sigma)\right]\left\{(1-\beta)+p\beta\left[1-\beta\left(1-h^b\right)\right]\right\}}{\left[1-\beta\left(1-h_h^m\right)\right]}\alpha \tag{14}$$

that, using $\Sigma_h^m = [1-\beta(1-h_h^m)(1-\sigma)]$, $H_h^m = [1-\beta(1-h_h^m)]$ and $H^b = \left[1-\beta\left(1-h^b\right)\right]$, becomes:

$$w_m^{**} = \frac{\Sigma_h^m\left[1-\beta\left(1-pH^b\right)\right]}{H_h^m}\alpha \tag{15}$$

Using (8) and (14), we show that $w_m^{**} > w_m^*$:

$$\frac{[1-\beta(1-h_h^m)(1-\sigma)]\left\{(1-\beta)+p\beta\left[1-\beta\left(1-h^b\right)\right]\right\}}{[1-\beta(1-h_h^m)]}\alpha > \frac{[1-\beta(1-h_h^m)(1-\sigma)](1-\beta)}{[1-\beta(1-h_h^m)]}\alpha$$

$$(1-\beta)+p\beta\left[1-\beta\left(1-h^b\right)\right] > (1-\beta)$$

$$p\beta\left[1-\beta\left(1-h^b\right)\right] > 0 \text{ QED}$$

Proof of proposition 3. Using (14), the condition for a sustainable honesty wage (Condition 2 in the paper) can be written as:

$$\frac{[1-\beta(1-h_h^m)(1-\sigma)]\left\{(1-\beta)+p\beta\left[1-\beta\left(1-h^b\right)\right]\right\}}{[1-\beta(1-h_h^m)]}\alpha < \alpha$$

$$p < \widetilde{p} = \frac{[1-\beta(1-h_h^m)]}{\beta[1-\beta(1-h_h^m)(1-\sigma)][1-\beta(1-h^b)]} - \frac{(1-\beta)}{\beta[1-\beta(1-h^b)]}$$

$$p < \widetilde{p} = \frac{H_h^m}{\beta\Sigma_h^m H^b} - \frac{B}{H^b} = \frac{1}{H^b}\left(\frac{H_h^m}{\beta\Sigma_h^m} - B\right)$$

where we have used $B = (1-\beta)/\beta$.

Finally we find h_h^m such that the coalition is always stable, *ceteris paribus*:

$$\frac{[1-\beta(1-h_h^m)]}{\beta[1-\beta(1-h_h^m)(1-\sigma)][1-\beta(1-h^b)]} - \frac{(1-\beta)}{\beta[1-\beta(1-h^b)]} > 1$$

$$\frac{[1-\beta(1-h_h^m)]}{[1-\beta(1-h_h^m)(1-\sigma)]} - (1-\beta) > \beta\left[1-\beta\left(1-h^b\right)\right]$$

$$\frac{[1-\beta(1-h_h^m)]}{[1-\beta(1-h_h^m)(1-\sigma)]} > 1-\beta^2\left(1-h^b\right)$$

$$[1-\beta(1-h_h^m)] > \left[1-\beta^2\left(1-h^b\right)\right][1-\beta(1-h_h^m)(1-\sigma)]$$

$$[1-\beta(1-h_h^m)] - \beta h_h^m(1-\sigma)\left[1-\beta^2\left(1-h^b\right)\right] > \left[1-\beta^2\left(1-h^b\right)\right][1-\beta(1-\sigma)]$$

$$\beta\left\{1-(1-\sigma)\left[1-\beta^2\left(1-h^b\right)\right]\right\}h_h^m > \left[1-\beta^2\left(1-h^b\right)\right][1-\beta(1-\sigma)] - (1-\beta)$$

$$h_h^m > \widetilde{h}_h^m = \frac{(1-\beta)\left[\sigma(1+\beta)-\beta\left(1-h^b\right)\right]+\beta^2 h^b\sigma}{\sigma+\beta^2(1-h^b)(1-\sigma)}$$

A.3 Welfare

Proof of proposition 4. Comparing the total welfare under segregation and integration (as explained in the text for this case), we have:

$$\underbrace{M\frac{\gamma-w_m^*}{1-\beta}+M\times VS_h^m+(A+M-M)\,US_h^m}_{\text{Segregation}} = \underbrace{M\frac{\gamma-w_m^{**}}{1-\beta}+M\times VI_h^m+(A+M-M)\,UI_h^m}_{\text{Integration}}$$

$$M\frac{\gamma-w_m^*}{1-\beta}+VS_h^m\left[M+A\frac{\beta h_h^m}{1-\beta\left(1-h_h^m\right)}\right]=M\frac{\gamma-w_m^{**}}{1-\beta}+VI_h^m\left[M+A\frac{\beta h_h^m}{1-\beta\left(1-h_h^m\right)}\right]$$

$$M\frac{w_m^{**}-w_m^*}{1-\beta}+\frac{\left[1-\beta\left(1-h_h^m\right)\right]\left(w_m^*-w_m^{**}\right)}{(1-\beta)\left[1-\beta\left(1-h_h^m\right)(1-\sigma)\right]}\left[M+A\frac{\beta h_h^m}{1-\beta\left(1-h_h^m\right)}\right]=0$$

$$M-\frac{\left[1-\beta\left(1-h_h^m\right)\right]}{\left[1-\beta\left(1-h_h^m\right)(1-\sigma)\right]}\left[M+A\frac{\beta h_h^m}{1-\beta\left(1-h_h^m\right)}\right]=0$$

Indeed, using the fact that:

$$h_h^m=\frac{\sigma M}{A+\sigma M}$$

we have:

$$M\left[1-\beta\left(1-h_h^m\right)(1-\sigma)\right]-M\left[1-\beta\left(1-h_h^m\right)\right]-A\beta h_h^m=0$$

$$\beta\sigma M-\beta\frac{\sigma^2M^2}{A+\sigma M}-\beta\frac{\sigma MA}{A+\sigma M}=0 \text{ QED}$$

Proof of propositions 5 and 6. Expressing total welfare, respectively, in segregation and in integration, as it is explained in the text for this case, we have:

$$\underbrace{M\frac{\gamma-w_m^*}{1-\beta}+M\times VS_h^m+(A+M-M)\,US_h^m}_{\text{Segregation}} \gtreqless \underbrace{M\frac{k}{1-\beta}+p\,(1-\sigma)\,M\times VI_h^b}_{\text{Integration}}$$

$$M\frac{\gamma-w_m^*}{1-\beta}-M\frac{k}{1-\beta}>-M\alpha-A\frac{\beta h_h^m}{1-\beta\left(1-h_h^m\right)}\alpha+p\,(1-\sigma)\,M\frac{\left[1-\beta\left(1-h_{\text{ep}}^b\right)\right]\alpha}{(1-\beta)}$$

$$\frac{M}{1-\beta}\left(\gamma-w_m^*-k\right)>M\left[p\,(1-\sigma)\,\frac{\left[1-\beta\left(1-h_{\text{ep}}^b\right)\right]}{(1-\beta)}-1\right]\alpha-A\frac{\beta h_h^m}{1-\beta\left(1-h_h^m\right)}\alpha$$

Defining COOPERATION $=\left(\gamma-w_m^*-k\right)$ and $A/M=x$, we can rewrite as follows:

$$\frac{M}{1-\beta}\times\text{COOPERATION}>M\left[\frac{p\,(1-\sigma)\,H_{\text{ep}}^b}{(1-\beta)}-1\right]\alpha-A\frac{\beta h_h^m}{H_h^m}\alpha$$

$$\frac{\text{COOPERATION}}{(1-\beta)}>\left[\frac{p\,(1-\sigma)\,H_{\text{ep}}^b}{1-\beta}-\frac{H_h^m+x\beta h_h^m}{H_h^m}\right]\alpha \text{ QED} \tag{16}$$

where $H_{\text{ep}}^b=\left[1-\beta\left(1-h_{\text{ep}}^b\right)\right]$.