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# Global Sourcing if Contracts are Reference Points\*

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*Job Market Paper*

## Abstract

This paper presents econometric evidence for a link between a country's level of egalitarianism and its inward foreign direct investment. In order to provide a theoretical rationale for this relationship, I embed Hart and Moore's (2008) novel contractual foundation into a simple model of global sourcing with culturally dissimilar countries. Entrepreneurs can cooperate with foreign suppliers under two contractual modes: rigid and flexible. If suppliers consider original contracts as reference points and future is uncertain, a fundamental tradeoff arises between these two modes. By stipulating a range of possible outcomes, a flexible contract allows for future adaptation but is associated with ex post haggling cost. By specifying a single outcome, a rigid contract eliminates future disagreement but precludes beneficial adjustments to the occurring shocks. The key message of this paper is twofold: Due to lower haggling cost, the degree of contractual flexibility is higher in egalitarian countries. If future is uncertain, these countries are more attractive for international investors than less egalitarian ones.

*Keywords:* Foreign direct investment, cross-country cultural differences, egalitarianism, risk, contracts as reference points, haggling, contractual rigidity vs. flexibility

*JEL-Classifications:* D03, D23, D63, F23, L23

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# 1 Introduction

“It is in justice that the ordering of society is centered.” Aristotle

Egalitarianism, defined by the Merriam-Webster online dictionary as “a belief in human equality especially with respect to social, political, and economic affairs”, constitutes one of the cornerstones of democratic societies. Recent sociological contributions find, however, considerable differences with regard to the appreciation of this (cultural) value across countries. One of the renowned proxies for egalitarianism stems from the Schwartz Value Survey, cf. Schwartz (2004, 2006) for an overview. In this survey, urban teachers in 55 countries were asked during 1988-2004 to rate the importance of values like ‘social justice’, ‘equality’, ‘accept my portion in life’ as ‘guiding principles in [their] lives’. The esteems of these items were aggregated to a single per country egalitarianism score, cf. Siegel et al. (2011). These scores are depicted on the horizontal axis of Figure 1. The vertical axis represents the log of a country’s mean inward foreign direct investment (FDI) stock from 1988-2004, as documented by the United Nations Conference on Trade and Development (UNCTAD). A simple linear regression shows that egalitarian countries tend to be more attractive from the viewpoint of international investors than less egalitarian ones. A one-standard-deviation increase in a country’s egalitarianism score is associated with a 0.7 percent increase in its FDI stock.<sup>1</sup>

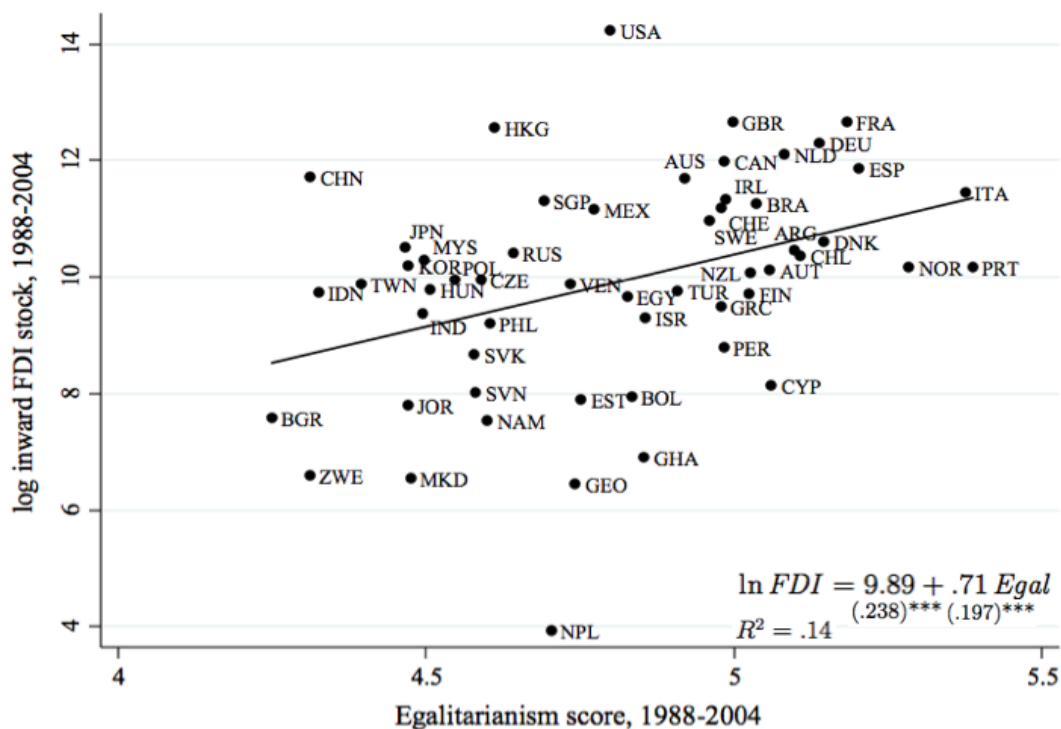


Figure 1: *Egalitarianism score and log of inward FDI stock, 1988-2004.*

Note: OLS regression with robust standard errors in parenthesis. Coefficient is statistically different from 0 at the \*\*\*1% level.

<sup>1</sup> Clearly, this simple correlation is not sufficient to claim a causal impact of egalitarianism on FDI. Section 6 will present empirical evidence which accounts for the issue of endogeneity.

This leads us to a simple research question: What is a rationale behind the link between egalitarianism and inward FDI? The contribution of this paper extends well beyond the response to this key question. I develop a pioneering model of global sourcing with culturally dissimilar countries. Since considerations like egalitarianism or fairness are hard to reconcile with the conventional assumption of perfectly rational decision makers, this model attributes to its key players some realistic behavioral features. As will become clear further below, this novel behavioral foundation proves useful for the analysis of the fundamental tradeoff between contractual rigidity vs. flexibility, which arises during the foreign market entry. The model predicts that, if future is risky, the degree of contractual flexibility in egalitarian countries is higher compared to the less egalitarian ones. Since flexible contracts outperform the rigid ones in terms of adaptability to future contingencies, egalitarian countries will attract relatively more foreign direct investment than less fairness oriented ones.

The framework developed in this paper is an analytically tractable partial equilibrium model of global sourcing. This paper’s demand and supply side resemble the canonical model by Antràs and Helpman (2004), hereafter AH.<sup>2</sup> Yet, the underlying contractual foundations fundamentally differ. While AH build their model on the Property Rights Theory by Grossman and Hart (1986) and Hart and Moore (1990), hereafter PRT, I rely on the novel idea of ‘contracts as reference points’ by Hart and Moore (2008), hereafter HM. In the heart of the PRT lies the idea that, if cooperation parties conduct relationship-specific activities in the presence of imperfect verifiability, each party will *ex ante* underinvest into these activities. Albeit being one of the most influential theories of the firm (cf. Gibbons 2005), the PRT has been criticized in the literature on three major grounds. First, by assuming costless (Coasian) bargaining between contracting parties, the PRT completely eliminates the realistic feature of *ex post* ‘haggling cost’ (cf., e.g., Williamson 2000). The second criticism is related to the first one and stems from the creators of the PRT themselves (cf. Hart and Moore 2008). Given that cooperation parties always bargain *ex post* to the efficient outcome, it is hard to see why the design of the *ex ante* contract (e.g. the degree of flexibility) or any other organizational arrangement (e.g. authority, hierarchy, and delegation) should matter. Third, Maskin and Tirole (1999) show that fully rational decision makers can circumvent inefficiencies associated with unverifiable information via artful revelation mechanisms.

The contracts-as-reference-points approach accounts for this criticism by turning the PRT ‘on its head’: instead of modeling *ex post* efficiency and *ex ante* underinvestment, HM present a theory which exhibits *ex ante* efficiency and *ex post* ‘haggling cost’.<sup>3</sup> The latter

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<sup>2</sup> See Antràs (2012), Antràs and Rossi-Hansberg (2009), Helpman (2006) for the overviews of AH and the discussion of this paper’s impact on the subsequent theoretical and empirical research.

<sup>3</sup> See Hart (2008), Hart and Moore (2007) and Walker (2012) for nice overviews of this idea.

inefficiency results from attributing the following behavioral feature to the model’s decision makers: A party is happy to provide the perfect performance if she is getting *ex post* what she feels entitled to. However, she is ‘aggrieved’ and stints on her performance, the action called by HM as ‘shading’, if she feels being unfairly treated. HM hypothesize that a party’s *ex post* feeling of entitlement is determined by the *ex ante* stipulated contract.<sup>4</sup> In this sense, original contracts act as reference points.<sup>5</sup>

To the best of my knowledge, the current paper is the first one to embed the idea of contracts as reference points into a model of global sourcing. Apart from this novel contractual foundation, my model differs from AH in five major aspects. First, it explicitly introduces decision makers into the model. As in AH, production of final goods requires the cooperation of two units, headquarters and manufacturing suppliers. Yet, each unit now comprises not only employees, but also a principal. Throughout the paper, I will refer to the headquarters’ principal as an entrepreneur and to the supplier unit’s decision maker as a manager. Second, I account for recent empirical findings that find a causal effect of managerial effort on the firm productivity.<sup>6</sup> In contrast to AH, who impose firm productivity as an exogenous ‘black-box’ parameter, I link firm productivity to the endogenous managerial effort. Following HM, this effort is assumed to be completely non-verifiable by the courts.<sup>7</sup> Third, in addition to AH-like ‘*silent*’ contracts, an entrepreneur may now enter with a manager two further types of contractual agreements: a *flexible* and a *rigid* one. A silent contract is a vague agreement which prescribes *no price* for the future trade. An *ex ante* flexible contract stipulates a *price range* for supplier’s activities and entitles the entrepreneur to choose *ex post* a single price from this interval. Under a rigid contract, the entrepreneur commits to compensate supplier’s activities with the *fixed price*. Fourth, I allow for the uncertainty with respect to future supplier’s cost.<sup>8</sup> I proceed with a simplest case of two potential states of the world: a high-cost and a low-cost one. Fifth, by assuming cross-country differences with respect to egalitarianism, this paper opens a theoretical debate about the effect of cultural values and social norms on a country’s comparative advantage.

I obtain the following *theoretical* predictions. First, I show that silent contracts are always dominated by the flexible ones. The intuition behind this result draws on HM’s idea of contracts as reference points: Under a silent contract, the entire surplus is subject

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<sup>4</sup> Fehr et al. (2009, 2011a,b) provide persuasive experimental evidence for this hypothesis. Cf. Bartling and Schmidt (2012), Erlei and Reinhold (2011) and Hoppe and Schmitz (2011) for further support.

<sup>5</sup> In order to detach *ex post* shading from the well-known source of inefficiencies due to *ex ante* underinvestment, the authors assume that a cooperation between two parties involves *no ex ante* activities. As will be clear further below, the current paper achieves the same goal by assuming that *ex ante* activities are not relationship-specific and perfectly contractible.

<sup>6</sup> Cf. Bloom and Van Reenen (2010), Gibbons and Henderson (2012), Syverson (2011) for recent surveys.

<sup>7</sup> However, this model can be easily extended to the case of a partial verifiability of the managerial effort.

<sup>8</sup> The case of demand uncertainty can be equally analyzed in this framework and yields similar results.

to ex post negotiation and the manager can potentially claim the whole net surplus as a compensation of her effort. If the entrepreneur does not meet this claim, the manager feels shortchanged and provides perfunctory performance. Yet, under a flexible contract, the supplier’s reference point is bounded by the upper limit of the ex ante stipulated price range. As a result, a manager’s shading is smaller and entrepreneurial profits are larger for any given compensation of the managerial effort. Second, if future is certain, flexible contracts are strictly dominated by the rigid ones. This results from the fact that rigid contracts provide no room for disagreement and, thereby, eliminate managerial shading. The tradeoff between flexible and rigid contracts, however, becomes relevant if the realization of the future state of the world is risky. In the third result, I show that rigid contracts are no longer first-best optimal under future uncertainty, since they preclude profitable adjustments to the occurring shocks. In this case, flexible contracts may do a better job. I show, fourthly, that a flexible contract is more likely to dominate a rigid one the lower a supplier’s inclination to aggrievement and the higher the intensity of supplier’s inputs in production. These two results are intuitive, since lower aggrievement implies less shading under a flexible contract and higher supplier’s intensity increases the necessity of the ex post adjustment to the cost volatility. Fifth, since haggling cost are lower in countries whose contractors feel entitled to a fair share of net profits, flexible contracts will be relatively more prevalent in egalitarian countries. Given that flexible contracts enable profitable adjustments to future contingencies, egalitarian countries are most attractive from the viewpoint of international investors.

The *empirical* part of this paper scrutinizes more thoroughly the link between a country’s egalitarianism score and its inward FDI stock, outlined in Figure 1. I proceed in two steps. First, I run OLS regressions with a standard set of controls in order to ensure that the suggested pattern is not driven by omitted factors. In the second step, I account for the issue of reverse causality by employing the instrumental variables (IV) approach. Following Siegel et al. (2011), I use proxies for a country’s societal fractionalization, religious adherence and war history as instruments for its egalitarianism level. Both OLS and IV regressions confirm a significant impact of a country’s egalitarianism score on its inward FDI stock.

This paper relates to several research strands. First, notice that the terms ‘egalitarian’ and ‘fair’ have been used interchangeably above. This perception relies on a particular notion of the (distributive) justice that dates back at least to Aristotle’s (1925) *Nicomachean Ethics*. He argued that “[...] awards should be ‘according to merit’; for all men agree that what is just in distribution must be according to merit in some sense. [...] The just, then, is a species of the proportionate [...]” (cf. Book V, Chapter 3).<sup>9</sup> In this spirit, I call a manager ‘fair’ if

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<sup>9</sup> Interestingly, Aristotle argued in this context that dissatisfaction with the bargaining outcomes is “the origin of quarrels and complaints”. This is well-aligned with this model’s notion of aggrievement cost.

her ex post feeling of entitlement is proportionate to her contribution to relationship.<sup>10</sup>

Second, this paper provides a theoretical rationale for the recent empirical studies that claim a causal effect of culture on trade (see, e.g., Felbermayr and Toubal (2010) and the references therein). The findings by Siegel et al. (2011, 2012) are of particular importance for the current paper. Using the above mentioned Schwartz’s (2004) measure for egalitarianism and a range of instrumental variables, the authors find that greater egalitarianism *distance* between countries has a negative causal impact on cross-national flows of bond and equity issuances, syndicated loans, and mergers and acquisitions (cf. 2011 paper) and foreign direct investment flows (cf. 2012 paper).<sup>11</sup> The authors explain their finding by arguing that “as the distance on egalitarianism increases, assets may become more difficult to price, corporate governance practices may be less acceptable, firm stakeholders [...] more difficult to deal with, subsidiaries’ managements more difficult to control, and negotiations more likely to fail”, see Siegel et al. (2012: 622). The drawback of this explanation, however, is that it is not specific to egalitarianism.<sup>12</sup> In contrast, this paper’s rationale emphasizes a particular role of egalitarianism in explaining cross-country difference in FDI stocks.<sup>13</sup>

Third, this paper builds on a substantive sociological literature studying the link between national-level values and managerial actions. Sagiv et al. (2010) provide an extensive overview of this literature and conclude that living in a society whose culture emphasizes egalitarian values promotes managerial concern and care for organizational members. Similarly, Brett and Okumura (1998) argue that country-specific negotiation patterns can be traced back to national-level cultural values (see also Brett 2000 and Brett and Crotty 2008 for overviews). Negotiators from egalitarian cultures are more likely to focus on the issues under negotiation instead of exerting power claims. The current paper adopts these findings by assuming that managers in egalitarian countries claim ex post a share of net surplus which is closely related to their (firm’s) contribution to relationship, whereas managers in less egalitarian countries feel entitled to disproportionately high surplus shares.

The remainder of the paper is structured as follows. Section 2 lays out the basic set up. Section 3 discusses the contractual choices in a world without future uncertainty. Section 4 analyzes the tradeoff between flexibility and rigidity in a risky environment. Section 5 considers cultural differences in the global sourcing model. Section 6 presents econometric evidence supporting this paper’s main prediction. Section 7 concludes.

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<sup>10</sup> See also Konow (2003) for an review of the literature on the ‘equity principle’ and the related concepts.

<sup>11</sup> This cultural distance is defined as a difference between countries’ egalitarianism scores.

<sup>12</sup> In fact, the same reasoning can be equally applied to any other cultural dimension (‘mastery’, ‘harmony’, ‘embeddedness’, ‘intellectual and affective autonomy’) from the Schwartz Value Survey.

<sup>13</sup> Notice also that the two papers test different econometric models. While Siegel et al. analyze the impact of egalitarianism *distance* on bilateral FDI *flows*, this paper complements their findings by investigating the impact of a country’s egalitarianism *score* on its inward FDI *stock*. In a robustness check (available upon request), I also show that egalitarianism *score* is positively associated with FDI *inflows*.

## 2 The model

**General setup.** In order to make the exposition of the novel foundation by HM as simple as possible, I will take throughout a partial equilibrium perspective. Consider first a closed economy which is populated by skilled and unskilled workers. Each unskilled worker supplies inelastically one labor unit. Each skilled worker not only possesses a labor unit, but is also capable of receiving innovative ideas (blueprints for differentiated final goods) that arrive at a random rate. A skilled worker with a blueprint (hereafter *entrepreneur*) establishes a headquarter unit  $H$  and hires unskilled workers as employees. A skilled worker without a blueprint can be either employed at a given wage rate  $\omega$  in the outside sector, or become a *manager* by establishing a manufacturing unit  $M$ . This unit consists of unskilled workers and specializes on the provision of intermediate components, which are needed for  $H$ 's blueprint. I follow AH by assuming that both units are indispensable for production of final goods and a cooperation between  $H$  and  $M$  will be referred to throughout as a firm.<sup>14</sup> I further assume that the mass of  $H$  is strictly lower than the mass of  $M$ . Since blueprints is a scarce production factor, an entrepreneur becomes a residual claimant of a firm's pure profits.

**Demand and production.** Consider a firm which produces a single variety of a differentiated product in the monopolistically competitive industry. Assuming that workers' preferences for differentiated goods are CES, this firm faces the following isoelastic demand:<sup>15</sup>

$$x = \rho^{-1/(1-\alpha)} A, \quad 0 < \alpha < 1,$$

where  $x$  denotes quantity,  $\rho$  represents the price of the final good,  $\alpha \in (0, 1)$  is a parameter (inversely) related to the elasticity of substitution between any two varieties and  $A$  measures the aggregate demand level (cf. Antràs and Helpman 2008). This demand system immediately yields the revenue:

$$R = x^\alpha A^{1-\alpha}. \quad (1)$$

As mentioned above, production of final goods requires a cooperation of a headquarter and a supplier, whereby  $H$  specializes in provision of headquarter services  $h$  and  $M$  produces manufacturing components  $m$ . Each input is produced by a respective unit's employees. Without loss of generality, I normalize  $H$ 's cost per unit of  $h$  to one.  $M$ 's per unit cost will be denoted by  $c$ . Given that each unit's decision maker acts as a fix production factor, there is no need to assume additional fixed production cost.<sup>16</sup> Two inputs are combined to final

<sup>14</sup> For the sake of simplicity, this paper does not model  $H$ 's make-or-buy decision (i.e., whether to integrate a supplier or cooperate with  $M$  at arm's length). I take up, however, this issue in the conclusion.

<sup>15</sup> To save on notation, the firm-specific index is omitted from the outset.

<sup>16</sup> However, these fixed cost can be easily incorporated into the model along the lines of AH.



goods according to the Cobb-Douglas production function:

$$x = \theta \left( \frac{h}{\eta_h} \right)^{\eta_h} \left( \frac{m}{\eta_m} \right)^{\eta_m}, \quad 0 < \eta_h < 1, \quad \eta_m = 1 - \eta_h, \quad \theta \in [0, 1], \quad (2)$$

where  $\eta_h$  is a firm-specific parameter that represents the headquarter intensity in production.<sup>17</sup> Conversely,  $\eta_m$  denotes the supplier intensity. Variable  $\theta$  represents firm productivity. In contrast to AH, this variable is no longer assumed to be exogenous. In view of the evidence presented in the introduction, I assume that  $\theta$  represents a manager's organizational effort that facilitates the assembly of  $h$  and  $m$ .<sup>18</sup> Notice that, if a manager provides no effort (i.e.  $\theta = 0$ ), the quantity of final goods is zero, independent of the amount of employed inputs. Without loss of generality, I normalize the upper bound of the managerial performance to unity. A manager's willingness to provide consummate performance is determined by the behavioral rule specified in the following.

**Behavioral assumption.** As mentioned in the introduction, I follow HM by assuming that an ex ante contract is the reference point for a manager's feeling of entitlement. To formalize this idea, I impose the following behavioral rule for the managerial effort:<sup>19</sup>

$$\theta = \left( \frac{w}{W} \right)^a, \quad a \in [0, 1], \quad \theta'(a) \leq 0 \quad \forall \quad w \leq W, \quad (3)$$

where  $w$  is the ex post compensation of the managerial effort and  $W$  is the compensation which a manager feels entitled to. For the sake of simplicity, I first follow HM by assuming that a manager feels entitled to the highest possible reward which is permitted by the ex ante contract. The fairness considerations will be introduced into the model in section 5. As long as managerial compensation is lower than the best possible outcome from her viewpoint, i.e.  $w < W$ , she is aggrieved and stints on the (organizational) effort. The amount of shading for any given  $w$  is determined by the aggrievement factor  $a$ . Without loss of generality, the domain of  $a$  is normalized to a unity interval, whereby  $a = 1$  ( $a = 0$ ) represents highest (no) shading. Notice also that higher  $a$  implies a lower  $\theta$  for all  $w < W$ .

I further follow HM (p. 6) by assuming that a manager's effort is associated with no cost: "We suppose that consummate performance does not cost significantly more than perfunctory performance: either it costs slightly more or it costs slightly less, that is, a party

<sup>17</sup> This contrasts the assumption of industry-specific  $\eta_h$  in the multi-sector AH model. Since the current model exhibits only one monopolistically competitive sector, I proceed with an alternative assumption of within-sector firm differences regarding headquarter intensities.

<sup>18</sup> An entrepreneur's effort can be potentially linked to firm productivity as well. However, since entrepreneurs are residual claimants of firm profits, they always provide consummate performance in this model. I return to this issue in the conclusion.

<sup>19</sup> Although this rule is conceptually identical to HM, it is formalized in a slightly different way for the sake of mathematical simplicity. I am grateful to Oliver Hart for helpful suggestions in this regard.

may actually enjoy providing consummate performance.” In what follows, I assume that a manager is indifferent between providing consummate and perfunctory performance if she feels being fairly treated.

**Contractual environment.** Compared to AH, this paper proceeds with two diametrically opposed assumptions. First, courts can perfectly verify and enforce the quantity of inputs  $h$  and  $m$ . Second, both inputs are *not* relationship-specific, i.e., each party can fully recover her production cost by selling (parts of) her inputs to the outside sector. These alternative assumptions are met along the lines of HM to eliminate the well-known channel of inefficiencies due to *ex ante* underinvestment (cf. discussion in the introduction). In doing so, this paper highlights the novel source of inefficiencies stemming from *ex post* shading.<sup>20</sup> The shading is only possible if managerial performance is not fully verifiable, which is assumed in the following.<sup>21</sup> More specifically, the courts cannot distinguish a consummate performance ( $\theta = 1$ ) from a perfunctory one ( $\theta < 1$ ). As a result, fully enforceable contracts that condition a manager’s *ex post* compensation on her effort are not feasible in this model.<sup>22</sup>

Given that the only source of inefficiencies in this model is managerial *ex post* shading due to aggrivement, headquarters might consider to search after the realization of the state for a different supplier (if cooperation between  $H$  and  $M$  is at arms-length), or hire a new manager (if  $M$  is  $H$ ’s subsidiary). I exclude both cases by relying on HM’s line of reasoning: managerial decisions must be made soon after the state is revealed and it might be hard to find alternative partners in the final stage of a production process. Furthermore, the current manager might have acquired some critical know-how needed for the assembly of final goods. These arguments resemble Williamson’s (1985) discussion of ‘temporal specificity’ as a potential source of the ‘fundamental transformation’ between parties. Notice, however, that the fundamental transformation between  $H$  and  $M$  in this model is of a particular type: while  $H$  is reliant on a particular manager regarding the final good production, both parties’ inputs can be sold on the outside market if the current cooperation breaks down.

**Risk.** This paper allows for uncertainty regarding future contingencies. As mentioned in the introduction, I exemplarily analyze the risk related to the supplier’s *cost*. To keep the model as simple as possible, I assume that these cost can take one of two possible future values:  $c_G$  (a *Good* low-cost state), or  $c_B$  (a *Bad* high-cost state), whereby  $c_B > c_G$ . The probability of a good state is known *ex ante* by the two parties and will be denoted by  $g$ .

**Timing.** The timing of the events is as follows (cf. Figure 2):

<sup>20</sup> As argued in the conclusion, combining both sources of inefficiencies is a promising research agenda.

<sup>21</sup> One can think of managerial effort as a value added which enhances the workers’ effort in a subtle or immaterial way (for instance, by making an instruction manual for final goods user-friendlier etc.).

<sup>22</sup> In contrast to PRT, which *ad hoc* assumes that initially non-contractible activities become all at once contractible in the future, a court’s ability to verify a party’s performance does *not* vary across time in the current model.

$t_0$ :  $H$  and  $M$  randomly match and stipulate in the ex ante contract the characteristics of  $M$ 's contractible activities  $m$  and the corresponding compensation. The reward of  $M$ 's activities can be stipulated in two different ways:

$r$ : The parties stipulate *ex ante* a single price. This *rigid* agreement will be designated throughout with a superscript  $r$ .

$f$ : The parties stipulate *ex ante* a price range, from which  $H$  is allowed to choose *ex post* a single price. I denote this *flexible* agreement with a superscript  $f$ .

Besides, the parties stipulate the date  $t_1$  for the future trade. The length of the interval  $t_0 - t_1$  is chosen precisely so as to enable both parties' consummate performance. Immediately after contract signing, both parties start the input production.

$t_S$ : The State of the world,  $st \in \{G, B\}$ , is realized.

$t_R$ : If ex ante contract is *flexible*, the headquarter  $R$  refines the contract by choosing a single price for  $M$ 's inputs from the ex ante stipulated price range.<sup>23</sup>

$t_A$ :  $M$  Assembles both inputs to final goods according to the technology described by (2).

$t_1$ : The output is sold and the revenue is shared between  $H$  and  $M$ .

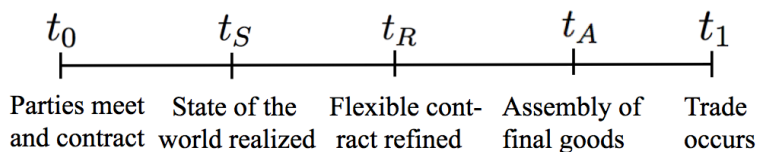


Figure 2: *Timing*.

Three specific issues that are (implicitly) embedded in this timing deserve further attention. First, notice that the ex ante ( $t_0$ ) contract always contains a compensation component (either  $r$  or  $f$ ). As shown in the following section, this claim turns out to be one of this model's key results. More specifically, I prove that a contract which contains no or vague sharing rule is always dominated by a flexible one. The former contract will be referred to throughout as 'silent' and is distinguished from the other two contractual modes with a superscript  $s$ . Second, in contrast to the PRT, the model does not require that all activities are sunk before  $t_R$ . Instead, both parties can undertake or withdraw some activities at any point between  $t_0$  and  $t_1$ . Third, it rules out ex ante lump-sum transfers between parties.<sup>24</sup>

<sup>23</sup> I follow HM by assuming that a rigid contract cannot be renegotiated ex post (see discussion therein).

<sup>24</sup> If lump-sum transfers are feasible, potential suppliers overbid each other with respect to participation fee up to the point where the entire pure surplus is accumulated by headquarters. This assumption, albeit helpful from the viewpoint of theoretical simplicity, has been criticized for being hard to map to anything in the real world, especially in the international context (cf., e.g., Antràs and Staiger 2011).

This game is solved in the following. To make the exposition of the fundamental tradeoff between silent, rigid and flexible contracts as clear as possible, I first refrain from modeling uncertainty concerning date  $t_S$ . This uncertainty will be (re)introduced in section 4.

### 3 Contractual choice without uncertainty

#### 3.1 First-best contract

To begin with, consider a *hypothetical* benchmark case in which all actions can be verified by the courts. In this case,  $H$  can condition managerial ex post reward  $\omega$  upon the provision of consummate performance  $\theta = 1$ .<sup>25</sup> Besides,  $H$  and  $M$  ex ante stipulate the first-best (hereafter  $FB$ ) levels of investments into headquarter services,  $h^{FB}$ , and manufacturing components,  $m^{FB}$ . Bearing in mind that  $H$ 's marginal cost are normalized to unity and  $M$ 's marginal cost are given by  $c$ , these investments maximize  $H$ 's pure profits  $\pi(h, m) = R(h, m) - h - cm - \omega$ . Using (1) and (2), standard profit maximization yields both parties' investment, revenue, and joint operating profits in the first-best case:

$$h^{FB} = \alpha \eta_h R^{FB}, \quad m^{FB} = \alpha \left( \frac{\eta_m}{c} \right) R^{FB}, \quad R^{FB} = \alpha^{\frac{\alpha}{1-\alpha}} c^{-\frac{\alpha \eta_m}{1-\alpha}} A, \quad \Pi^{FB} = (1 - \alpha) R^{FB}. \quad (4)$$

In accordance with the ex ante contract, an entrepreneur compensates managerial effort with  $\omega$ , i.e.  $\pi_M^{FB} = \omega$  and retains the remaining first-best operating profits, i.e.  $\pi_H^{FB} = \Pi^{FB} - \omega$ . In the following, I relax the assumption of perfect verifiability of managerial effort  $\theta$ .

#### 3.2 Silent contract

The parties sign in  $t_0$  a vague contract, due to which  $H$  is allowed to demand from  $M$  up to  $m^{FB}$  manufacturing inputs. However, parties refrain from specifying a price for these inputs.  $M$  is only willing to enter this silent contract under a voluntary trade condition. That is,  $H$  cannot legally force  $M$  to trade if the latter does not want to (cf. HM for the discussion).

Recall that, in this model, all inputs are potentially deployable on the outside market at their production cost. Hence, neither party has an incentive to ex ante underinvest in the respective inputs. In  $t_R$ , parties get together to refine the silent contract.  $M$  is willing to participate in the current relationship if its manufacturing inputs are remunerated at their production cost. In addition,  $M$ 's manager claims a compensation for her organizational effort. Since the manager considers the ex ante contract as a reference point and this contract

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<sup>25</sup> I assume throughout that a manager is willing to cooperate with a  $H$  if her ex post reward is *weakly* larger than her outside option,  $\omega$ .

is silent with regard to her future reward, she demands from  $H$  the highest possible reward,  $\Pi^{FB}$ , as a compensation of her performance. Given that this claim is not enforceable by the courts, the entrepreneur is free to choose any  $w^s \in [\omega, \Pi^{FB}]$  to reward the manager. However, the headquarter anticipates that, if the manager's claim is not fully satisfied, she will hereafter stint on her performance,  $\theta$ . Using (1) and (2), it follows immediately from simple profit maximization that this underperformance negatively affects all equilibrium outcomes:

$$h = \alpha \eta_h R, \quad m = \alpha \left( \frac{\eta_m}{c} \right) R, \quad R = \theta^{\frac{\alpha}{1-\alpha}} R^{FB}, \quad \Pi = \theta^{\frac{\alpha}{1-\alpha}} \Pi^{FB}. \quad (5)$$

Assuming that the entrepreneur is fully aware of the manager's behavioral rule from (3),  $H$  stipulates in  $t_R$  the reward which maximizes her pure profits:

$$\max_w \pi_H^s = \left( \frac{w}{\Pi^{FB}} \right)^\lambda \Pi^{FB} - w, \quad (6)$$

where  $\lambda \equiv \frac{\alpha a}{1-\alpha}$  is defined for notational simplicity. Since  $\lambda$  is a positive monotone function of  $a$ , it can be interpreted as an alternative measure of aggrievement. For  $\alpha \in (0, 1)$  and  $a \in [0, 1]$ , the domain of  $\lambda$  is  $[0, \infty)$ . However, as will be clear further below, the headquarters' profits under a silent contract are positive if and only if  $\lambda < 1$  (i.e., a manager's aggrievement is sufficiently low). I exclude at the outset the trivial case of negative profits by imposing **ASSUMPTION 1.**  $\lambda < 1$ .

Simple maximization of (6) yields the optimal managerial reward in a silent contract:<sup>26</sup>

$$w^s = \Lambda \Pi^{FB}, \quad (7)$$

where  $\Lambda \equiv \lambda^{\frac{1}{1-\lambda}}$  denotes the fraction of operating profits that is paid to  $M$  as a reward for her effort  $\theta$ . Notice that the domain of  $\Lambda$  under Assumption 1 is  $\Lambda \in [0, 1)$ . Since the supplier obtains solely a fraction of the reward she feels entitled to, she is aggrieved (if  $a \neq 0$ ) and stints on her performance. Using (3), the manager's effort under a silent contract reads:

$$\theta^s = \Lambda^a. \quad (8)$$

The following Lemma proves two intuitive results:

**LEMMA 1.** (i)  $w^{s'}(a) > 0$ ; (ii)  $\theta^{s'}(a) < 0$  for all  $\lambda \in [0, 1)$ .

*Proof.* See Appendix A.

<sup>26</sup> I am assuming throughout that  $M$ 's participation constraint is always satisfied, i.e.  $w \geq \omega$ . This is the case if  $\omega$  is sufficiently low or  $\Pi^{FB}$  sufficiently high.

In words, the fraction of operating profits that is transferred to  $M$  as a reward for managerial effort is an increasing function of a manager's inclination to aggrivement,  $a$ . For any given reward, the manager's effort is lower the higher is her aggrivement.

Since  $H$  anticipates  $M$ 's underperformance with regard to non-contractible activities, it is no longer profitable for  $H$  to stipulate in  $t_R$  the first-best level of costly inputs. Instead, substituting  $\theta^s$  for  $\theta$  in the "reaction functions" from (5), yields the optimal amount of both parties' contractible activities and the associated ex post revenue under a silent contract:<sup>27</sup>

$$h^s = \alpha\eta_h R^s, \quad m^s = \alpha \left( \frac{\eta_m}{c} \right) R^s, \quad R^s = \Lambda^\lambda R^{FB}. \quad (9)$$

To sum up, the total price which is stipulated in  $t_R$  can be decomposed in two components: compensation of  $M$ 's contractible activities,  $m^s$  at their variable cost  $c$ , and the reward  $w^s$  to promote managerial non-contractible effort. Using (7) and (9), this overall price reads:

$$p^s = \alpha\eta_m \Lambda^\lambda R^{FB} + \Lambda \Pi^{FB}.$$

Utilizing this price together with (9) in  $\pi_H^s = R^s - p^s - h^s$  and  $\pi_M^s = p^s - cm^s$ ,  $H$ 's and  $M$ 's pure profits under a silent contract read:

$$\pi_H^s = (\Lambda^\lambda - \Lambda) \Pi^{FB}, \quad \pi_M^s = \Lambda \Pi^{FB}, \quad (10)$$

where  $\Pi^{FB}$  is given by (4). Notice that  $H$ 's pure profits are strictly positive if and only if  $\Lambda < 1$ , which holds true under Assumption 1. Furthermore, I show in Appendix B that  $H$ 's profits under a silent contract are decreasing in  $M$ 's inclination to aggrivement:

**LEMMA 2.**  $\pi_H^s(a) < 0$ .

*Proof.* See Appendix B.

### 3.3 Flexible contract

Assume as before that a supplier commits in  $t_0$  to employ up to  $m^{FB}$  contractible inputs in the production of final goods. The parties, however, now agree on the following compensation scheme.  $H$  commits to compensate each manufacturing input at  $M$ 's production cost,  $c$ . In addition,  $H$  obligates to reward the manager with  $w^f \in [\omega, \delta \Pi^{FB}]$ , where  $\delta \in (0, 1)$  is a fraction of the first-best operating profits. Notice also that the voluntary trade condition is *not* stipulated, since this enforceable contract guarantees  $M$  at least her outside option.

<sup>27</sup> Since  $M$  can deploy all residual inputs on the outside market at their production cost,  $M$  is not aggrived if  $H$  stipulates in  $t_R$  the amount of manufacturing inputs below the highest possible amount,  $m^{FB}$ .

When parties get together in  $t_R$  to refine this flexible contract,  $M$ 's willingness to conduct non-contractible activities is still determined by (3). However, since a flexible contract defines an upper bound for the permissible ex post price,  $M$ 's reference point under this agreement is now given by  $\delta\Pi^{FB}$ .  $H$  takes this into account and maximizes through a choice of  $w$  her pure profits,  $\pi_H^f = \left(\frac{w}{\delta\Pi^{FB}}\right)^\lambda \Pi^{FB} - w$ . This yields the following managerial reward:

$$w^f = \left(\frac{\lambda}{\delta}\right)^{\frac{1}{1-\lambda}} \delta\Pi^{FB}. \quad (11)$$

Notice that this equilibrium compensation encompasses two cases:

$$w^f = \begin{cases} \delta\Pi^{FB} & \text{if } \lambda \geq \delta & (\text{Case 1}) \\ \left(\frac{\lambda}{\delta}\right)^{\frac{1}{1-\lambda}} \delta\Pi^{FB} & \text{if } \lambda < \delta & (\text{Case 2}) \end{cases} \quad (12)$$

In words, if a manager's aggrivement is sufficiently high (i.e.  $\lambda \geq \delta$ ), the headquarter compensates the manager with the highest possible reward permitted by the ex ante contract.<sup>28</sup> In contrast, if a manager's aggrivement is sufficiently low (i.e.  $\lambda < \delta$ ),  $H$  compensates  $M$ 's manager with a reward below the upper bound of the ex ante stipulated compensation range. These two cases will be analyzed more thoroughly in the following.<sup>29</sup>

*Case 1.* Given that the manager is compensated with the highest possible reward that is allowed by the ex ante contract, she does not shade (i.e.  $\theta^f = 1$ ). Joint operating profits in this case are at the first-best level, cf. (4). Since  $H$  transfers a share  $\delta$  of these profits to  $M$ , an entrepreneur's and a manager's pure profits read:

$$\pi_H^f = (1 - \delta)\Pi^{FB} \quad , \quad \pi_M^f = \delta\Pi^{FB}. \quad (13)$$

Notice that entrepreneurial profits are decreasing in the upper bound,  $\delta$  of the ex ante stipulated compensation range. The following Lemma proves that, in *Case 1*, entrepreneurial profits under a flexible contract are higher than under a silent agreement:

**LEMMA 3.** *In Case 1,  $\pi_H^f \geq \pi_H^s$ .*

*Proof.* See Appendix C.

*Case 2.* Given that a manager's reward is below the best possible compensation permitted by the ex ante contract, her effort

$$\theta^f = \left(\frac{\lambda}{\delta}\right)^{\frac{\alpha}{1-\lambda}} \quad (14)$$

<sup>28</sup> Notice from (11) that  $\lambda \geq \delta$  implies  $w^f \geq \delta\Pi^{FB}$ . However, the headquarter is not willing to compensate the manager with more than  $\delta\Pi^{FB}$ , since this is the highest possible reward which  $M$  feels entitled to.

<sup>29</sup> Once again, I implicitly assume in either case that  $M$ 's participation constraint,  $w^f \geq \omega$  is fulfilled.

is strictly smaller than the first-best effort ( $\theta = 1$ ). Yet, since  $\lambda < \delta < 1$ , the manager's effort under a flexible contract is larger than under a silent agreement, cf. (8). As in section 3.2,  $H$  anticipates that  $M$  will shade on the non-verifiable performance and stipulates in  $t_R$ :

$$h^f = \alpha\eta_h R^f, \quad m^f = \alpha \left( \frac{\eta_m}{c} \right) R^f, \quad R^f = \delta^{\frac{\lambda}{\lambda-1}} \Lambda^\lambda R^{FB}. \quad (15)$$

It can be easily verified that  $\delta^{\frac{\lambda}{\lambda-1}} > 1$  for all  $\lambda < \delta < 1$ . Hence, the comparison of (15) and (9) immediately implies a larger revenue under a flexible contract compared to a silent one. This result is intuitive, since shading is lower under a flexible contract. The overall price stipulated in  $t_R$  comprises, once again, the compensation of inputs and of managerial effort:

$$p^f = \alpha\eta_m \delta^{\frac{\lambda}{\lambda-1}} \Lambda^\lambda R^{FB} + \left( \frac{\lambda}{\delta} \right)^{\frac{1}{1-\lambda}} \delta \Pi^{FB}.$$

Using this price together with (15) in  $\pi_H^f = R^f - p^f - h^f$  and  $\pi_M^f = p^f - cm^f$ ,  $H$ 's and  $M$ 's pure profits read

$$\pi_H^f = \delta^{\frac{\lambda}{\lambda-1}} (\Lambda^\lambda - \Lambda) \Pi^{FB}, \quad \pi_M^f = \delta^{\frac{\lambda}{\lambda-1}} \Lambda \Pi^{FB}, \quad (16)$$

where  $\Pi^{FB}$  is given by (4). As in *Case 1*, entrepreneurial profits are decreasing in  $\delta$  for all  $\lambda \in [0, 1)$ . Furthermore, the following Lemma states that pure entrepreneurial profits under  $f$  are higher than under  $s$  and that former profits are decreasing in managerial aggrievement:

**LEMMA 4.** *In Case 2,  $\pi_H^f > \pi_H^s$  and  $\pi_H^{f'}(a) < 0$ .*

*Proof.* Follows immediately from  $\delta^{\frac{\lambda}{\lambda-1}} > 1$  and  $\pi_H^{f'}(\lambda) = -\frac{\delta^{\frac{\lambda}{\lambda-1}} \Lambda \ln(\frac{\delta}{\lambda})}{\lambda(1-\lambda)} < 0$  for all  $\lambda < \delta < 1$ .

It follows immediately from Lemmas 3 and 4 that silent contracts are dominated by the flexible ones. However, as long as  $a \neq 0$ , entrepreneurial profits under a flexible contract are lower than in the first-best case. This results from the fact that joint operating profits under a flexible agreement are not higher than in the first-best case ( $\Pi^f \leq \Pi^{FB}$ ) and a manager's compensation under  $f$  is weakly larger than under  $FB$  ( $w^f \geq \omega$ , cf. (12)). I thus maintain:

**PROPOSITION 1.** *If ex ante contracts are perceived as reference points, silent contracts are inferior to the flexible ones. Due to shading, entrepreneurial profits under a flexible contract are lower than in the first-best case and are decreasing in managerial aggrievement.*

*Proof.* Follows directly from Lemmas 3 and 4 and the discussion above.

Although this finding resembles the key result by HM, this Proposition can be considered as complementary since it was derived in a richer framework featuring firm's organization and production decisions.



### 3.4 Rigid contract

In contrast to a flexible contract,  $M$  commits in  $t_0$  to provide a fix amount of contractible activities  $m^{FB}$ , as specified in (4). In return,  $H$  commits to compensate these activities at their production cost  $c$ , and to reward managerial effort with her outside option,  $\omega$ .<sup>30</sup> Hence, the overall price stipulated in a rigid contract reads  $p^r = \alpha\eta_m R^{FB} + \omega$ . Since a rigid contract does not provide room for adjustment, the contract is not refined in  $t_R$ . While  $M$ 's provision of non-contractible activities is still governed by the behavioral rule from (3), she provides consummate performance since her effort is being compensated with a highest possible amount permitted by the initial contract. Hence, a firm achieves the first-best revenue  $R^{FB}$ .  $H$ 's and  $M$ 's pure profits,  $\pi_H^r = R^{FB} - p^r - h^{FB}$  and  $\pi_M^r = p^r - cm^{FB}$ , read:

$$\pi_H^r = \pi_H^{FB} = \pi^{FB} - \omega \quad , \quad \pi_M^r = \omega. \quad (17)$$

Given that a rigid contract eliminates  $M$ 's ex post aggrievement,  $H$  obtains first-best profits despite contractual incompleteness. Bearing in mind that  $H$ 's profits under a flexible contract are lower than in the first-best case, implies

**PROPOSITION 2.** *Without uncertainty, rigid contracts are superior to the flexible ones.*

*Proof.* Follows directly from the discussion above.

This Proposition raises an immediate follow-up question: Why do not we observe exclusively rigid contracts in reality? The next section argues that, by allowing for beneficial ex post adjustments to the occurring shocks, flexible contracts may outperform the rigid ones in spite of accompanying shading.

## 4 Contractual choice under uncertainty

### 4.1 First best (state-contingent) contract

As in section 3, I begin with a hypothetical benchmark case of perfect verifiability. Consider the game laid down in Figure 2. If courts could verify the state of the world ( $c_G$  vs.  $c_B$ ), cooperating parties would always achieve the first-best outcome by writing state-contingent contracts (i.e., by conditioning  $M$ 's future compensation on the realization of the state). These contracts could be concluded on the following terms. In  $t_0$ , the manager commits to conduct the first-best effort ( $\theta = 1$ ) in return for a fix reward,  $\omega$ . In addition, the parties

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<sup>30</sup> The courts can verify and enforce the payment of  $\omega$ , albeit the managerial effort itself is non-verifiable.

stipulate ex ante a state-specific price  $p_u^{st} = c_{st}$  per unit of  $M$ 's input. As before, the first-best contract maximizes  $H$ 's pure profits  $\pi_H^{st}(h, m) = R(h, m) - h - p_u^{st}m - \omega$  by specifying both inputs' optimal quantities. In this case, however, the input levels are state-dependent:

$$h^{st} = \alpha\eta_h R^{st}, \quad m^{st} = \alpha \left( \frac{\eta_m}{p_u^{st}} \right) R^{st}, \quad R^{st} = \alpha^{\frac{\alpha}{1-\alpha}} (p_u^{st})^{-\frac{\alpha\eta_m}{1-\alpha}} A. \quad (18)$$

That is,  $M$  commits to provide  $m^{st}$  inputs in state  $st \in \{G, B\}$  of the world and  $H$  commits to compensate these inputs with  $p_u^{st} = c_{st}$ . Consequently,  $H$ 's ex ante expected profits under a state-contingent contract are given by:

$$E(\pi_H^{FB}) = g\pi_{HG}^{FB} + (1-g)\pi_{HB}^{FB} = (1-\alpha)\alpha^{\frac{\alpha}{1-\alpha}} A \left[ gc_G^{-\frac{\alpha\eta_m}{1-\alpha}} + (1-g)c_B^{-\frac{\alpha\eta_m}{1-\alpha}} \right] - \omega. \quad (19)$$

The assumption of state verifiability is dropped in the following. Since the proof of superiority of a flexible contract compared to a silent agreement can be conducted by analogy to section 3, the following analysis concentrates on the two relevant contractual forms: rigid and flexible.

## 4.2 Rigid contract

For a risk-neutral manager to be willing to enter a rigid agreement, this contract has to include two components. First, the managerial effort has to be compensated with her outside option,  $\omega$ . Second, each unit of the manufacturing input has to be compensated with the following per unit price:

$$p_u^r = gc_G + (1-g)c_B. \quad (20)$$

This price represents  $M$ 's expected production cost per unit of  $m$  and it equals the expected per unit price under a state-contingent contract. Under a rigid contract, however, parties exclude future adjustments by stipulating ex ante a *fix* amount of both inputs:

$$h^r = \alpha\eta_h R^r, \quad m^r = \alpha \left( \frac{\eta_m}{p_u^r} \right) R^r, \quad R^r = (\theta^r)^{\frac{\alpha}{1-\alpha}} \alpha^{\frac{\alpha}{1-\alpha}} (p_u^r)^{-\frac{\alpha\eta_m}{1-\alpha}} A. \quad (21)$$

Under a rigid contract,  $H$  has no other possibility than to pay ex post the fixed price which has been stipulated ex ante. Since this price is also  $M$ 's reference point (i.e., the manager gets exactly what she feels entitled to),  $M$  provides consummate performance, i.e.  $\theta^r = 1$ . To sum up,  $H$ 's profits under a rigid contract are independent of the realization of the state and are given by:

$$E(\pi_H^r) = (1-\alpha)\alpha^{\frac{\alpha}{1-\alpha}} A [gc_G + (1-g)c_B]^{-\frac{\alpha\eta_m}{1-\alpha}} - \omega. \quad (22)$$

A comparison of these profits with the first-best profits from (19) results in

**PROPOSITION 3.** *Under uncertainty, the expected value of a rigid contract is lower than the expected value of a state-contingent agreement.*

*Proof.* See Appendix D.

The rationale behind this result stems from the simple fact that the revenue function is concave in both inputs, cf. (1) and (2). Recall that a state-contingent contract allows the headquarters to react appropriately to the state of the world by choosing ex post a lower (higher) quantity of inputs in the bad (good) state of the world. In contrast, a rigid contract prescribes a fix amount of supplier's inputs, which corresponds to the weighted average of this input's first-best levels in two states of the world, cf. (18) and (21). This loss in flexibility matters if and only if a revenue function is concave in output, which is reasonable to assume.

Before turning to the analysis of a flexible contract, it is instructive for further purposes to detect factors that affect  $H$ 's profits under  $r$ . It follows immediately from the comparison of (19) and (22) that the relative disadvantage of a rigid contract as compared to a state-contingent one is increasing in the following ratio:

$$\Psi \equiv \frac{gc_G^{-\gamma\eta_m} + (1-g)c_B^{-\gamma\eta_m}}{[gc_G + (1-g)c_B]^{-\gamma\eta_m}}, \quad (23)$$

where  $\gamma \equiv \frac{\alpha}{1-\alpha}$ . The reaction of  $\Psi$  with respect to the exogenous factors is established in

**LEMMA 5.** *(i)  $\Psi'(\eta_m) > 0$ ; (ii)  $\Psi'(c_B) > 0$ ; (iii)  $\Psi'(c_G) < 0$ ; (iv)  $\Psi(g) = 1$  if  $g = 0$  or  $g = 1$ . Furthermore,  $\Psi'(g) \gtrless 0$  for  $g \lesseqgtr g^*$ , where  $g^* = \frac{c_G^{-\gamma\eta_m}c_B - c_B^{-\gamma\eta_m}(c_B(1+\gamma\eta_m) - c_G\gamma\eta_m)}{(c_G^{-\gamma\eta_m} - c_B^{-\gamma\eta_m})(c_B - c_G)(1+\gamma\eta_m)}$ .*

*Proof.* See Appendix E.

The intuition behind this Lemma results from the fact that a flexible contract allows  $H$  to stipulate ex post a higher (lower) amount of manufacturing inputs as a response to a lower (higher) price of these inputs. The gain from this flexibility increases in the importance of manufacturing inputs in the production process,  $\eta_m$ . Greater price volatility due to higher  $c_B$  or lower  $c_G$  amplifies the advantage of a flexible contract. If either state is highly unlikely (i.e.  $g$  approaches zero or one), the relative advantage of a state-contingent contract disappears. Conversely, the relative advantage of the flexibility is highest for the 'intermediate' values of  $g$ . In general, the relative advantage of a state-contingent contract reacts in an inverted U pattern on the increase in  $g$ : this benefit increases first up to  $g^*$  and decreases afterwards.

### 4.3 Flexible contract

As in the rigid contract, a headquarter commits to compensate a manager's non-verifiable effort with a fix payment  $\omega$ . A flexible contract, however, differs from a rigid one in terms

of the ex ante stipulated compensation of contractible activities. More specifically, it allows headquarters to demand in  $t_R$  up to  $m^{FB}$  manufacturing inputs in exchange for a per-unit price  $p_u^f$ . This price can be chosen by  $H$  from the range  $[c_G, c_B]$ .<sup>31</sup> A manufacturing supplier is only willing to enter this contract if it precludes the headquarter from demanding manufacturing inputs in a bad state at low cost, i.e.  $p_u^f < c_B$ . Consequently, the following voluntary trade condition is included in the flexible contract: If  $M$  rejects the take-it-or-leave-it price  $p_u^f$  in  $t_R$ , the ex ante contract is void and no trade occurs.

After the state of the world is realized, parties get together in  $t_R$  to negotiate about the sharing of surplus. As before, a firm's revenue and the optimal quantities of both parties' inputs are functions of the managerial effort,  $\theta^f$ :

$$h^f = \alpha \eta_h R^f, \quad m^f = \alpha \left( \frac{\eta_m}{p_u^f} \right) R^f, \quad R^f = (\theta^f)^{\frac{\alpha}{1-\alpha}} \alpha^{\frac{\alpha}{1-\alpha}} (p_u^f)^{-\frac{\alpha \eta_m}{1-\alpha}} A. \quad (24)$$

This effort depends on the manager's satisfaction with the bargaining outcome. Recall that the ex ante stipulated payment  $\omega$  is fixed and cannot be renegotiated. However, given that courts cannot verify the state of the world, an ex ante stipulated price range  $[c_G, c_B]$  leaves room for interpretation. In principle, a headquarter can offer any price from this interval for a unit of a manufacturing input. Since a manager is a residual claimant of  $M$ 's profits, any price that exceeds  $M$ 's per unit production cost constitutes this manager's pure profits. As before, I assume that in  $t_R$  a manager feels entitled to the best possible outcome permitted by the ex ante contract. Her most desirable per unit price is thus given by the upper bound of the price interval. Since parties now negotiate about *per unit* price (instead of overall compensation), the behavioral rule from (3) should be adjusted as follows:

$$\theta^f = \left( \frac{p_u^f}{c_B} \right)^a. \quad (25)$$

As long as the ex post stipulated per unit price is lower than  $M$ 's feeling of entitlement,  $c_B$ , the manager provides a perfunctory performance,  $\theta^f < 1$ . The headquarter anticipates this and, depending on the prevailing state, chooses the price  $p_u^f$  as follows.

If a *bad* state of the world occurs,  $M$ 's cost are given by  $c_B$ . If trade is voluntary,  $M$  is willing to cooperate with  $H$  only if the latter stipulates the price  $p_u^f = c_B$ . Given that this price is the highest possible compensation of the supplier's activities which is permitted by the ex ante contract,  $M$  provides consummate performance,  $\theta^f = 1$ .  $H$  anticipates this outcome and stipulates in  $t_R$  the first-best amount of contractible inputs  $(h^{FB}, m^{FB})$ . In this case, the entrepreneur realizes the first-best pure profits:

<sup>31</sup> All results equally hold if the flexible contract defines just two possible prices,  $p_u^f \in \{c_G, c_B\}$ .

$$\pi_{HB}^f = (1 - \alpha)\alpha^{\frac{\alpha}{1-\alpha}} A c_B^{-\frac{\alpha\eta m}{1-\alpha}} - \omega. \quad (26)$$

In a *good* state of the world,  $H$  can stipulate any price from the range  $[c_G, c_B]$  and still satisfy  $M$ 's participation constraint. Choosing a price below  $c_B$  has two counteracting effects. On the one hand, lower compensation of  $M$ 's inputs increases  $H$ 's pure profits. On the other hand, lower  $p_u^f$  increases managerial shading from (25). An equilibrium  $p_u^f$  internalizes these two effects. Utilizing  $\theta^f$  from (25) in (24), immediately implies that the former effect dominates (is dominated by) the latter if  $a$  is lower (higher) than  $\eta_m$ . In other words, if a manager's aggrivement is lower than  $M$ 's contribution to the relationship,  $H$  has no incentive to stimulate  $M$ 's non-verifiable effort by stipulating higher per-unit price for manufacturing components. Depending on the relationship  $a \gtrless \eta_m$ , the headquarter's course of action in this simple model reduces to the following two 'corner solutions'.

*Case I:  $a \geq \eta_m$ .* Even though  $M$ 's production cost,  $c_G$ , are low, the headquarter stipulates in  $t_R$  the highest possible price allowed by the ex ante contract,  $p_u^f = c_B$ . This price completely prevents the managerial shading, i.e.  $\theta^f = 1$ . However, given a high price,  $H$ 's pure profits correspond to the bad-state scenario of a state-contingent contract:

$$\pi_{HG}^f = (1 - \alpha)\alpha^{\frac{\alpha}{1-\alpha}} A c_B^{-\frac{\alpha\eta m}{1-\alpha}} - \omega.$$

Using these profits together with (26) in  $g\pi_{HG}^f + (1-g)\pi_{HB}^f$  yields  $H$ 's expected pure profits:

$$E(\pi_H^f) = (1 - \alpha)\alpha^{\frac{\alpha}{1-\alpha}} A c_B^{-\frac{\alpha\eta m}{1-\alpha}} - \omega. \quad (27)$$

It immediately follows from the comparison of (27) and (22) that these profits are lower than under a rigid contract. This results from the fact that per unit price under  $r$  is a weighted average of high and low cost, whereas per unit price in *Case I* always equals the high cost.

*Case II:  $a < \eta_m$ .*  $H$  stipulates the lowest possible price permitted by the ex ante contract,  $p_u^f = c_G$ . The headquarter anticipates managerial shading associated with this price, cf. (25), and stipulates the amount of contractible inputs according to (24). In this case, the headquarter obtains following pure profits in the good state of the world:

$$\pi_{HG}^f = (1 - \alpha)\alpha^{\frac{\alpha}{1-\alpha}} A \left( \frac{c_G}{c_B} \right)^{\frac{\alpha a}{1-\alpha}} c_G^{-\frac{\alpha\eta m}{1-\alpha}} - \omega. \quad (28)$$

Combining these profits with (26), yields  $H$ 's expected profits under a flexible contract:

$$E(\pi_H^f) = (1 - \alpha)\alpha^{\frac{\alpha}{1-\alpha}} A \left[ g c_G^{\frac{\alpha(a-\eta_m)}{1-\alpha}} c_B^{-\frac{\alpha a}{1-\alpha}} + (1-g)c_B^{-\frac{\alpha\eta m}{1-\alpha}} \right] - \omega. \quad (29)$$

Similarly to (23), the relative attractiveness of a flexible contract compared to a rigid one can be described by the following ratio:

$$\Phi \equiv \frac{g c_G^{\gamma(a-\eta_m)} c_B^{-\gamma a} + (1-g) c_B^{-\gamma \eta_m}}{[g c_G + (1-g) c_B]^{-\gamma \eta_m}}. \quad (30)$$

The reaction of this ratio with respect to exogenous parameters is derived in

**LEMMA 6.** (i)  $\Phi'(a) < 0$ ; (ii)  $\Phi'(\eta_m) > 0$ ; (iii) the sign of  $\Phi'(c_B)$  is ambiguous and is more likely to be positive the lower is  $a$ ; (iv) the sign of  $\Phi'(c_G)$  is ambiguous and is more likely to be negative the lower is  $a$ ; (v)  $\Phi(g) = 1$  if  $g = 0$  and  $\Phi(g) < 1$  if  $g = 1$ . The reaction of  $\Phi(g)$  with respect to  $g$  is ambiguous and depends on the level of  $a$ : If  $a$  is sufficiently low, starting from  $g = 0$ ,  $\Phi(g)$  first increases and after a certain threshold decreases in  $g$ . For sufficiently high  $a$ ,  $\Phi(g)$  decreases in  $g$  at  $g = 0$  and  $\Phi(g) < 1$  holds for all  $g \in (0, 1]$ , cf. Figure 3.

*Proof.* See Appendix F.

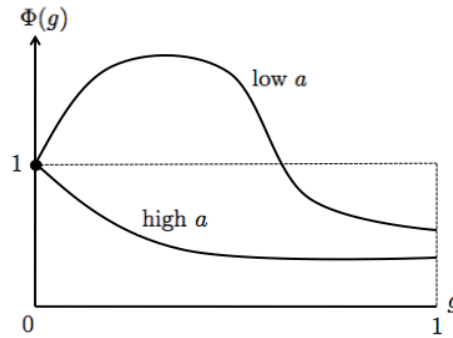


Figure 3: Profiles of  $\Phi(g)$  for low and high  $a$ .

These results are summarized in

**PROPOSITION 4.** Compared to a rigid contract, the relative advantage of a flexible contract is decreasing in supplier's aggrivement,  $a$ , and increasing in supplier's production intensity,  $\eta_m$ . The attractiveness of a flexible contract is more likely to increase in  $c_B$  and decrease in  $c_G$  the lower is supplier's aggrivement. If a good state is highly unlikely (i.e.  $g$  converges to zero), the headquarter is indifferent between a flexible and a rigid contract. If a bad state is highly unlikely (i.e.  $g$  converges to one), a flexible contract is strictly dominated by a rigid one. In general, if supplier's aggrivement is sufficiently low, the relative attractiveness of a flexible contract first increases and after a certain threshold decreases in the probability of the good state,  $g$ . For a sufficiently high level of aggrivement a flexible contract is (weakly) dominated by a rigid one for any  $g$ .

*Proof.* Follows immediately from Lemma 6.

Since aggrivement is present only under a flexible contract, the relative attractiveness of flexibility decreases in  $a$ . Bearing in mind that a flexible agreement converges to the state-

contingent (first-best) one for low aggrivement levels, the intuition behind further results of Proposition 4 resembles the logic of Lemma 5. As before, the gain from the ability to react appropriately to the cost volatility increases in the importance of manufacturing inputs in the production process,  $\eta_m$ . In contrast to Lemma 5, however, the relative advantage of the flexibility is now ambiguously reacting on the increase in  $c_B$ . This ambiguity results from the interplay of two effects. As before, an increase of cost volatility due to a higher  $c_B$  amplifies the advantage of the possibility to choose a lower price and lower amount of manufacturing inputs in a bad state. On the other hand, however, higher  $c_B$  increases the upper bound of the ex ante negotiated price interval and, thereby, raises a manager's ex post feeling of entitlement. This counteracting effect implies, ceteris paribus, higher shading and lower headquarter's profits, cf. (28). Hence, a headquarter is more likely to enter a flexible contract at a high level of  $c_B$  only if  $a$  is sufficiently low. Similarly, the effect of  $c_G$  on the relative advantage of a flexible contract is ambiguous and depends on the interplay of two effects. On the one hand, higher  $c_G$  decreases ceteris paribus the cost volatility across states and makes a flexible contract less attractive. Yet, a higher  $c_G$  has an opposing effect that does not exist under a state-contingent contract: managerial shading decreases due to a lower gap between the realized outcome ( $p_u^f = c_G$ ) and her feeling of entitlement, cf. (28). The latter effect is stronger the higher managerial aggrivement,  $a$ . If  $a$  is sufficiently low, the headquarter is less likely to enter a flexible contract at a high level of  $c_G$ .

Lastly, consider the behavior of  $\Phi(g)$ . Recall that shading under a flexible contract occurs only in the good state of the world. Hence, if this state is highly unlikely (i.e.  $g = 0$ ),  $H$  obtains the same profits under either contractual form. If the incidence of the good state is almost sure (i.e.  $g$  converges to one), the headquarter is better off under a rigid contract. For intermediate values of  $g$ , the reaction of  $\Phi(g)$  depends on the aggrivement level. For low levels of  $a$ , the relative attractiveness of a flexible contract resembles the inverted-U pattern from Lemma 5: the relative attractiveness of a flexible contract first increases and, after a certain threshold, decreases in  $g$ . Yet, if a supplier's aggrivement is sufficiently high, a flexible contract is dominated by a rigid one for any probability of the good state,  $g$ .

## 5 Global Sourcing

Suppose now that a large pool of entrepreneurs from a third country considers to source manufacturing inputs from one of the two countries:  $E$  and  $S$ . Recall from section 2 that entrepreneurial blueprints differ with regard to the supplier intensity,  $\eta_m$ . Since the assumption of the distribution of  $\eta_m$  is irrelevant for the results derived below, I proceed with a

simplest case of a uniform distribution. The two sourcing countries are identical to the one described in section 2, except that managers in  $E$  have a different fairness perception compared to those in  $S$ . While all suppliers in  $S$  still feel entitled to the best outcome permitted by the flexible contract, cf. (25), suppliers' shading in  $E$  is determined by the following behavioral rule:<sup>32</sup>

$$\theta^E = \left( \frac{p_u^f}{\mathcal{I}} \right)^a, \quad \text{where } \mathcal{I} \equiv \begin{cases} c_B & \text{if } st = B \\ F(\eta_m) \in [c_G, c_B) & \text{if } st = G \end{cases}, \quad F'(\eta_m) \geq 0. \quad (31)$$

The intuition behind the indicator function  $\mathcal{I}$  is straightforward: If a bad state of the world prevails,  $M$  feels entitled to the highest possible per unit price in order to cover her production cost,  $c_B$ . In this case, behavioral rule from (31) coincides with (25) and  $H$  obtains the same profits in both countries. However, if a good state of the world prevails, a manager in  $E$  claims a lower per unit price in  $t_R$  as compared to a manager in  $S$ . The feeling of entitlement of an  $E$ -manager is described by a general (Fairness) function  $F(\eta_m)$ . The upper bound of this function lies strictly below the best possible price allowed by the ex ante contract,  $c_B$ . Bearing in mind the concept of fairness discussed in the introduction, I assume that a manager's feeling of entitlement is a function of  $M$ 's contribution to relationship,  $\eta_m$ , and that this function is non-decreasing, i.e.  $F'(\eta_m) \geq 0$ .<sup>33</sup> Given that suppliers in  $E$  claim a share of surplus which is related to their contribution to relationship, this country will be referred to throughout as *Egalitarian*. Conversely, since suppliers in  $S$  demand the best possible reward independent of their contribution, they will be referred to as *Selfish*.

Consider first the relative attractiveness of a flexible contract compared to a rigid one in  $S$ . Since suppliers' behavior in this country is identical to the one described in the previous section, the ratio from (30) can be used to describe this relative advantage:

$$\Phi^S \equiv \frac{g c_G^{\gamma(a-\eta_m)} c_B^{-\gamma a} + (1-g) c_B^{-\gamma \eta_m}}{[g c_G + (1-g) c_B]^{-\gamma \eta_m}}. \quad (32)$$

It can be immediately seen that  $\Phi^S|_{\eta_m=0} = g \left[ \left( \frac{c_G}{c_B} \right)^{\gamma a} - 1 \right] + 1 < 1$  for all  $c_B > c_G$ . That is, if the supplier intensity is very low, flexible contracts are strictly dominated by the rigid ones. Recall from Lemma 6 that the relative advantage of flexible vs. rigid contracts increases in  $\eta_m$ . However, without further parameter restrictions, a flexible contract does not necessarily dominate a rigid one at the high levels of supplier intensity since the relationship  $\Phi^S|_{\eta_m=1} \geq 1$

<sup>32</sup> As before, a rigid contract eliminates ex post aggrievement in either country.

<sup>33</sup> Notice that  $F(\eta_m)$  in  $S$  is implicitly set to  $c_B$  for all  $\eta_m$ . The analysis can be easily extended to a more general case in which suppliers' feeling of entitlement in  $S$  is represented by a positive monotone function,  $F_S(\eta_m)$ , where  $F_E(\eta_m) < F_S(\eta_m) \forall \eta_m$ . All results remain qualitatively unchanged.



cannot be assigned without ambiguity. In order to make the trade-off between a flexible and a rigid contract relevant, I impose the following parameter restriction:<sup>34</sup>

**ASSUMPTION 2.**  $a < \bar{a}$ , where  $\bar{a} \equiv \frac{\ln g - \ln[(gc_G + (1-g)c_B)^\gamma - (1-g)c_B^{-\gamma} - \gamma \ln c_G]}{\gamma \ln(\frac{c_B}{c_G})}$ .

It can be easily verified that  $\Phi^{S'}(a)|_{\eta_m=1} < 0$  for all parameter values. This implies  $\Phi^S|_{\eta_m=1} > 1$  for all  $a < \bar{a}$ . In words, Assumption 2 ensures that flexible contracts are superior to rigid ones for highest levels of  $\eta_m$ . To sum up, given that a rigid contract is superior (inferior) to a flexible one for low (high) supplier intensities and, bearing in mind that the relative advantage of a flexible contract is a positive monotone function of  $\eta_m$ , there exists a unique cutoff  $\eta_m^S$ , for which a headquarter is indifferent between two contractual forms. This cutoff is implicitly defined by  $\Phi^S(\eta_m^S) = 1$ . All blueprints with supplier intensities below (above) this threshold will be carried out in  $S$  under a rigid (flexible) contract.

Consider next the tradeoff between contractual flexibility vs. rigidity in  $E$ . Under behavioral rule from (31), the relative advantage of a flexible vs. rigid contract is given by:

$$\Phi^E \equiv \frac{gc_G^{\gamma(a-\eta_m)} F(\eta_m)^{-\gamma a} + (1-g)c_B^{-\gamma\eta_m}}{[gc_G + (1-g)c_B]^{-\gamma\eta_m}}. \quad (33)$$

Bearing in mind that  $F(\eta_m)^{-\gamma a} > c_B^{-\gamma a}$  for all  $F(\eta_m) < c_B$ , the comparison of (32) and (33) implies  $\Phi^E > \Phi^S$  for all parameter values. Given that rigid contracts are equally profitable in both countries, this implies a greater attractiveness of a flexible agreement in  $E$  than in  $S$  for any  $\eta_m$ . Two corollaries follow immediately from this finding: the degree of contractual flexibility is relatively higher in egalitarian countries and these countries are more successful in attracting foreign direct investment than the less egalitarian ones. To verify these corollaries, consider first the blueprints with supplier intensities  $\eta_m \in (\eta_m^S, 1)$ . Recall that, in  $S$ , flexible contracts strictly dominate rigid contracts within this range. This holds a fortiori for  $E$  since rigid contracts are equally profitable in both countries and flexible contracts in  $E$  are more profitable than in  $S$ . The relative advantage of  $E$  as compared to  $S$  in this range is *intra*-marginal, since a flexible contract is a dominant contractual form in both countries. Second, consider the blueprints with supplier intensities  $\eta_m \in [0, \eta_m^S]$ . Recall that, in  $S$ , entrepreneurs are indifferent between the two contractual forms for  $\eta_m = \eta_m^S$ . Bearing in mind that flexible contracts are more profitable in  $E$  than in  $S$  for any  $\eta_m$ , a flexible contract in  $E$  is a strictly dominant and most profitable contractual form for  $\eta_m^S$ . Since  $\Phi^E(\eta_m)$  is continuous, the  $E$ 's cutoff  $\eta_m^E$ , above which flexible contracts dominate the rigid ones, lies strictly below the  $S$ 's cutoff,  $\eta_m^S$ . Hence, while flexible contracts are strictly

<sup>34</sup> Expression for  $\bar{a}$  results from solving  $\Phi^S|_{\eta_m=1} = 1$  for  $a$ . Tedious but straightforward analysis shows that  $\bar{a} \in (0, 1)$ .

dominated in  $S$  for  $\eta_m \in (\eta_m^E, \eta_m^S]$ , they constitute a superior contractual form in  $E$ . In this range, the relative advantage of  $E$  as compared to  $S$  is *infra*-marginal, since a *flexible* contract in  $E$  outperforms the  $S$ 's most profitable *rigid* contract. The behavior of  $\Phi^E$  within the range  $\eta_m \in [0, \eta_m^E]$  is ambiguous (cf. Appendix G for discussion). Yet, independently of this function's behavior,  $\Phi^E > \Phi^S$  implies that entrepreneurial profits in the egalitarian country are (weakly) greater than in the selfish one. These results are summarized in

**PROPOSITION 5.** *Countries whose managers are perceived to be more fairness-oriented will ceteris paribus attract more foreign direct investment. The degree of flexibility of the underlying contracts is relatively higher in egalitarian countries compared to less egalitarian ones.*

*Proof.* Follows immediately from the comparison of (32) and (33) and the discussion above.

Notice that the fairness function  $F(\eta_m)$  not only impacts the attractiveness of a country as an offshoring destination but, via its impact on firm-specific shading (cf. (31)), may also have an effect on a country's total factor productivity. However, since the analysis of the interaction between distributions of  $\eta_m$  and  $\theta$  would go beyond the scope of this paper, I leave this question open for future research.

## 6 Econometric Evidence

**Specification and data.** In this section, I test the following simple econometric model:

$$Y_i = \alpha_0 + \alpha_1 \text{Egal}_i + \alpha_2 \mathbf{X}_i + u_i, \quad (34)$$

where  $Y_i$  represents the log of a country's inward FDI stock,  $\alpha_0$  is the intercept,  $\text{Egal}_i$  is country  $i$ 's egalitarianism score,  $\mathbf{X}_i$  a vector of controls, and  $u_i$  the residual.

I use two different data sources in order to construct alternative proxies for the left-hand-side variable. As mentioned in the introduction, the first measure for the mean inward FDI stock in 1988-2004, denoted as  $FDI$ , was gathered from the UNCTAD data. In order to ensure that my results are not driven by cross-country variations in definitions and reporting requirements, I use the data from the Bureau of Economic Analysis (BEA) on the US Foreign Direct Investment position abroad as a second left-hand-side-variable. This variable will be denoted as  $USFDI$  and it was calculated as the mean of the period 1988-2004.

The main regressor,  $\text{Egal}$ , denotes a country's egalitarianism score from the Schwartz Value Survey 1988-2004, cf. Siegel et al. (2011). This variable has been rescaled to have a mean of zero and standard deviation of one. The first three control variables are constructed

using the World Bank’s World Development Indicators. *GDP* denotes the log of a country’s mean real gross domestic product 1988-2004 at purchasing power parity. *Trade* represents a country’s openness (measured as a percentage of trade to GDP), likewise calculated as a mean of the period 1988-2004. *Legal* is the ‘strength of legal rights index’, available only for 2004.<sup>35</sup> I further use the log of absolute latitude, *Latitude*, from Mayer and Zignago (2011) as an exogenous proxy for institutional quality, cf. Hall and Jones (1999). Two further variables are gathered from Mayer and Zignago’s dataset: *Distance* denotes the log of a country’s distance to the US (weighted by the geographic distribution of population inside each nation) and *English* is a dummy variable set equal to 1 if English is an official language.

Lastly, several exogenous factors will be used as instruments in the IV regressions. Siegel et al. (2011) identify three major antecedents of a country’s egalitarianism level: societal fractionalization, religious adherence and a country’s war experience during the 19th century. More specifically, the egalitarianism score is higher the lower a country’s ethnic and religious fractionalization, the higher the prevalence of Protestants and Catholics, and the larger a country’s war experience during the 19th century.<sup>36</sup> Given that these correlations were discussed at length by Siegel et al., this paper refrains from replicating their results. At the same time, since all three antecedents of egalitarianism are not affected by a country’s inward FDI stock (neither directly, nor through omitted variables), they fulfill the exclusion restriction of the IV approach. These instruments will be denoted as follows. *Efrac* and *Rfrac* are estimates of ethnic and religious fractionalization, as reported by Alesina et al. (2003). *Protestant* and *Catholic* denote the fractions of Protestants and Catholics in 2000 from Barro’s (2003) dataset. *Wars* is the number of wars in which a country was involved during the 19th century, calculated using the Correlates of War database (cf. Sarkees, 2000).

**Results.** Table 1 presents the results of the OLS regression, as specified by (34). Column (1) of the *FDI*-regression includes no controls and corresponds to Figure 1 in the introduction. Similarly, column (1) of the *USFDI*-regression reports the effect of *Egal* on the US investment position abroad, without inclusion of controls. A one-standard-deviation increase in a country’s egalitarianism score is associated with a 0.7 and 1 percent increase of the overall and US FDI stock, respectively. The coefficients slightly decline but remain highly significant after the inclusion of *GDP* and *Trade* (columns (2)), the above-mentioned exogenous controls (columns (3)) and the institutional measure (columns (4)) as control variables.

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<sup>35</sup> I conducted robustness checks using a great range of alternative proxies for institutional quality (both considered jointly and as separate regressors). Since the coefficient on *Egal* remains fairly similar, I refrain from reporting these tests and provide them upon request.

<sup>36</sup> Siegel et al. (2011: 5) explain the latter finding arguing that “wars, especially those fought during the period of state formation in the 19th century, required actions and expansions of rights that promoted national solidarity.”

	<i>FDI</i>				<i>USFDI</i>			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
<i>Egal</i>	.717*** (.197)	.588*** (.098)	.504*** (.096)	.506*** (.102)	1.021*** (.309)	.840*** (.176)	.741*** (.172)	.765*** (.158)
<i>GDP</i>		1.047*** (.095)	.985*** (.064)	.982*** (.072)		1.554*** (.132)	1.364*** (.103)	1.323*** (.113)
<i>Trade</i>		.013*** (.002)	.012*** (.002)	.011*** (.002)		.013*** (.001)	.008*** (.002)	.004 (.003)
<i>Latitude</i>			.248** (.110)	.186 (.122)			-.335* (.171)	-.577*** (.216)
<i>Distance</i>			-.302 (.227)	-.319 (.219)			-.625** (.266)	-.760** (.284)
<i>English</i>			.389 (.277)	.265 (.268)			1.054** (.407)	.600 (.423)
<i>Legal</i>				.054 (.044)				.211*** (.068)
Observ.	55	53	50	49	54	52	49	48
$R^2$	.143	.849	.893	.894	.139	.809	.826	.846

Note: OLS regressions with robust standard errors in parenthesis. Coefficient is statistically different from 0 at the \*\*\*1%, \*\*5% and \*10% level.

Table 1: *Correlation between egalitarianism and inward foreign direct investment.*

Table 2 reports the results of the IV regressions of *FDI* and *USFDI* on *Egal*, whereby the latter was instrumented with *Efrac*, *Rfrac*, *Protestant*, *Catholic*, and *Wars*. The positive effect of egalitarianism remains highly significant, albeit the magnitude of this effect slightly increases. In principle, it could be an indication of weak instruments. Yet, this hypothesis can be rejected using the F-test on the coefficients of the instruments in the first-stage regression.<sup>37</sup> Instead, higher estimates suggest that the IV regression corrects for the attenuation bias of the OLS. To sum up, the evidence presented in Tables 1 and 2 supports this paper's main hypothesis: egalitarian countries attract *ceteris paribus* more FDI.

	<i>FDI</i>				<i>USFDI</i>			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
<i>Egal</i>	1.453*** (.405)	.964*** (.178)	.738*** (.138)	.757*** (.123)	1.810*** (.530)	.993*** (.261)	1.076*** (.220)	1.043*** (.182)
<i>GDP</i>		1.016*** (.099)	.972*** (.068)	.953*** (.077)		1.540*** (.131)	1.347*** (.102)	1.283*** (.108)
<i>Trade</i>		.013*** (.003)	.012*** (.002)	.010*** (.002)		.014*** (.002)	.008*** (.003)	.002 (.003)
<i>Latitude</i>			.164 (.119)	.069 (.137)			-.424** (.191)	-.702*** (.213)
<i>Distance</i>			-.213 (.208)	-.235 (.199)			-.397* (.225)	-.559** (.252)
<i>English</i>			.319 (.244)	.133 (.227)			.994*** (.359)	.424 (.398)
<i>Legal</i>				.074 (.048)				.229*** (.069)
Observ.	54	52	49	48	53	51	48	47
1 <sup>st</sup> -stage $R^2$	.440	.423	.444	.490	.449	.431	.464	.505

Note: IV regressions with robust standard errors in parenthesis. Coefficient is statistically different from 0 at the \*\*\*1%, \*\*5% and \*10% level.

Table 2: *Causal impact of egalitarianism on the inward FDI stock.*

<sup>37</sup>  $F = 11.09$  in column (1) of the *FDI*-regression and  $F = 10$  in column (1) of the *USFDI*-regression.

## 7 Concluding Comments

This paper develops a pioneering theoretical framework that can be used for studying global sourcing decisions in a world with culturally dissimilar countries. In this model, headquarters choose a destination location for their foreign direct investment by taking into account cross-country differences in fairness. A host country's unit is guided by a manager, whose (organizational) effort is crucial for a firm's productivity and profitability. This effort is endogenously determined according to the following behavioral rule: A manager is happy to provide consummate performance if her future compensation corresponds to her feeling of entitlement and stints on the non-verifiable effort if she feels shortchanged. Along the lines of Hart and Moore (2008), an ex ante contract acts as a reference point for a manager's ex post feeling of entitlement. If future is uncertain, a fundamental tradeoff arises between a cooperation under a rigid vs. flexible contract. By stipulating a single outcome, a rigid contract eliminates a manager's aggrievement but precludes beneficial adjustments to future contingencies. By stipulating a range of possible outcomes, a flexible contract allows for future adaptation but simultaneously opens the door for potential disagreement and haggling cost. These inefficiencies are lowest in those countries in which a manager's feeling of entitlement is proportionate to her contribution to the relationship. As a result, the degree of contractual flexibility is highest in egalitarian countries. If future is uncertain, these countries are *ceteris paribus* more attractive for international investors than less egalitarian ones. This paper provides supportive empirical evidence for the latter hypothesis.

Although the theoretical results have been derived in a partial equilibrium setting, the model can be easily embodied in a general equilibrium framework. Given that a price (range) stipulated in a rigid (flexible) contract crucially depends on the workers' wage rate, an endogenous derivation of a country's income levels might provide further insights for the tradeoff between the two contractual forms. The current model also leaves some open questions for future theoretical and empirical research.

From a theoretical perspective this model can be extended in at least three aspects. First, recall that, in order to concentrate on the novel source of inefficiencies due to ex post shading, this paper completely eliminates ex ante underinvestment. These two potential sources of inefficiencies, however, can be integrated in a unified framework in order to understand their interaction and the relative magnitude. A first step towards this unified framework would be to relax a strong assumption of perfect verifiability of both parties' inputs. Assumption of partial contractibility of ex ante investment along the lines of Antràs and Helpman (2008) might be an appealing first step in this regard. Second, the analyzed shading on the part of suppliers can be applied to headquarters as well. By embedding this paper into a repeated

(e.g. two-stage) environment, one could assume that headquarters destroy the supplier's reputation if its manager stints on the performance in the first-period. Furthermore, the domestic headquarter and foreign suppliers may differ with regard to their perception of fairness. This richer model of double-sided shading may enhance our understanding of the link between cultural proximity and foreign direct investment. Among other things, it might be helpful in explaining the effect of the egalitarianism *distance* on bilateral *flows* of foreign direct investment (cf. discussion in the introduction). Third, the headquarter's choice of integration vs. outsourcing of manufacturing production can be readily scrutinized within the current framework in order to analyze the impact of cross-country cultural differences on the international make-or-buy decision. An interesting research agenda in this context would be to incorporate into the current model the findings by Hart and Holmstrom (2010), who develop a novel Theory of the Firm using the idea of 'contracts as reference points'.

The empirical evidence presented in this paper can be also expanded in at least three respects. First, alternative regressors can be used to corroborate the impact of 'fairness' or 'reciprocity' on foreign direct investment. Experimental evidence from the ultimatum games (cf., e.g., Oosterbeek et al. (2004) for a meta-study) can serve as a starting point of this analysis. Second, it remains open whether the degree of contractual flexibility impacts the established link between egalitarianism and FDI, as predicted by the theory. Third, this model's second cultural dimension – an inclination to aggrievement – can be readily approximated using available proxies from the sociological literature (e.g., a country's 'harmony' score from the Schwartz Value Survey). Future empirical work is required to analyze the interplay of distinct cultural dimensions on the comparative advantage of countries.

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# Appendices

## A Proof of Lemma 1

The first order derivative of  $w^s$  from (7) with respect to  $\lambda$

$$w^{s'}(\lambda) = \frac{\lambda^{\frac{\lambda}{1-\lambda}} [1 - \lambda(1 - \ln \lambda)]}{(1 - \lambda)^2}$$

is positive since  $[1 - \lambda(1 - \ln \lambda)] > 0 \forall \lambda \in [0, 1)$ .  $\lambda'(a) > 0$  immediately implies  $w^{s'}(a) > 0$ .

(ii) Differentiating  $\theta^s$  from (8) with respect to  $a$  yields after simplification

$$\theta^{s'}(a) = -\frac{\lambda^{\frac{\lambda}{1-\lambda}} [\lambda - 1 - \ln \lambda]}{(1 - \lambda)^2},$$

which is always negative given that  $[\lambda - 1 - \ln \lambda] > 0$  for all  $\lambda \in [0, 1)$ .

## B Proof of Lemma 2

Using the definition of  $\Lambda \equiv \lambda^{\frac{1}{1-\lambda}}$ ,  $(\Lambda^\lambda - \Lambda)$  can be rearranged to  $T(\lambda) \equiv \lambda^{\frac{1}{1-\lambda}} (\lambda^{-1} - 1)$ .

Differentiating  $T(\lambda)$  with respect to  $\lambda$  yields after simplification:

$$T'(\lambda) = \frac{\Lambda \ln \lambda}{\lambda(1 - \lambda)} < 0 \quad \forall \lambda \in [0, 1).$$

Since  $\lambda'(a) > 0$ , this immediately implies  $\pi_H^{s'}(a) < 0$ .

## C Proof of Lemma 3

Using (10) and (13), the condition for  $\pi_H^f \geq \pi_H^s$  reads

$$T_1(\delta) \equiv 1 - \delta - \lambda^{\frac{1}{1-\lambda}} (\lambda^{-1} - 1) \geq 0.$$

Notice that this condition is decreasing in  $\delta$ . That is, if  $T(\bar{\delta}) \geq 0$  for the highest possible  $\delta = \bar{\delta}$ ,  $T(\delta) \geq 0$  holds a fortiori for all  $\delta < \bar{\delta}$ . Recall that, under the parameter restriction of *Case 1*,  $\bar{\delta} = \lambda$ . Substituting  $\delta = \lambda$  in  $T_1(\delta)$  yields the sufficient condition for  $\pi_H^f \geq \pi_H^s$ :

$$T_2(\lambda) \equiv 1 - \lambda - \lambda^{\frac{1}{1-\lambda}} (\lambda^{-1} - 1) \geq 0.$$

The first order derivative of  $T_2(\lambda)$  with respect to  $\lambda$ ,  $T_2'(\lambda) = -1 - \frac{\Lambda \ln \lambda}{\lambda(1-\lambda)}$  is ambiguous. The second order derivative, however, is unambiguously negative:

$$T_2''(\lambda) = \frac{\ln(\lambda)\Lambda[\lambda - 1 - \ln \lambda]}{\lambda(1-\lambda)^3} < 0, \quad \forall \lambda \in [0, 1].$$

This implies that  $T_2(\lambda) \geq \min\{T_2(0), T_2(1)\}$ . Taking limits of  $T_2(\lambda)$  yields  $\lim_{\lambda \rightarrow 0} T_2(\lambda) = \lim_{\lambda \rightarrow 1} T_2(\lambda) = 0$ . Hence,  $T_2(\lambda) \geq 0$  and, therefore,  $\pi_H^f \geq \pi_H^s$  for all  $\lambda \in [0, 1)$ .

## D Proof of Proposition 3

Using a definition  $\Gamma \equiv \gamma\eta_m$  in (19) and (22), the relative advantage of a state-contingent contract as compared to a rigid one is given by the following ratio:

$$\Psi(c_B) \equiv \frac{gc_G^{-\Gamma} + (1-g)c_B^{-\Gamma}}{[gc_G + (1-g)c_B]^{-\Gamma}}.$$

Notice first that  $\Psi(c_B = c_G) = 1$ . That, is the relative advantage of a state-contingent contract disappears if supplier's cost are identical in both states of the world. Furthermore, differentiating this expression with respect to  $c_B$  yields after simplification:

$$\Psi'(c_B) = \frac{\Gamma g(1-g)c_G[c_G^{-\Gamma-1} - c_B^{-\Gamma-1}]}{[gc_G + (1-g)c_B]^{1-\Gamma}} > 0,$$

which is always positive given that  $[c_G^{-\Gamma-1} - c_B^{-\Gamma-1}] > 0$  for all  $c_B > c_G$ . That is, as long as supplier's cost in the bad state of the world are higher than in the good state, a state-contingent contract strictly dominates a rigid one.

## E Proof of Lemma 5

The definition  $\Gamma \equiv \gamma\eta_m$  is used throughout for notational simplicity.

(i) Differentiation of (23) with respect to  $\eta_m$  yields after simplification:

$$\Psi'(\eta_m) = \frac{\gamma T_1(c_G)}{[gc_G + (1-g)c_B]^{-\Gamma}},$$

where

$$T_1(c_G) \equiv c_G^{-\Gamma} g(\ln(gc_G + (1-g)c_B) - \ln c_G) + c_B^{-\Gamma} (1-g)(\ln(gc_G + (1-g)c_B) - \ln c_B).$$

Simple differentiation of  $T_1(c_G)$  with respect to  $c_G$  yields after simplification:

$$T_1'(c_G) = -\Gamma c_G^{-\Gamma-1} g [\ln(g c_G + (1-g)c_B) - \ln c_G] - \frac{g(1-g)c_B [c_G^{-\Gamma-1} - c_B^{-\Gamma-1}]}{g c_G + (1-g)c_B}.$$

Given that  $[c_G^{-\Gamma-1} - c_B^{-\Gamma-1}] > 0$  for all  $c_B > c_G$ , the sufficient condition for  $T_1'(c_G) < 0$  is  $T_2(c_B) \equiv \ln(g c_G + (1-g)c_B) - \ln c_G > 0$ . It can be immediately seen that  $T_2'(c_B) > 0$  for all parameter values. That is, if  $T_2(\underline{c}_B) \geq 0$  for the lowest  $c_B = \underline{c}_B$ ,  $T_2(c_B) > 0$  holds a fortiori for all  $c_B > \underline{c}_B$ . Bearing in mind that the lower bound of  $c_B$  is  $c_G$ , yields  $T_2(c_B = c_G) = 0$ . This immediately implies  $T_2(c_B) > 0$  and, thus,  $T_1'(c_G) < 0$  for all parameter values. Since  $T_1(c_G)$  is decreasing in  $c_G$ , the sufficient condition for  $T_1(c_G) > 0$  is  $T_1(\bar{c}_G) \geq 0$ , where  $\bar{c}_G$  is the upper bound of  $c_G$ . Bearing in mind that  $\bar{c}_G = c_B$  yields  $T_1(c_G = c_B) = 0$ . Hence,  $T_1(c_G) > 0$  for all  $c_G < c_B$ . This immediately implies  $\Psi'(\eta_m) > 0$ .

(ii) The sign  $\Psi'(c_B) > 0$  has been established in Appendix D.

(iii) Differentiation of (23) with respect to  $c_G$  yields after simplification:

$$\Psi'(c_G) = -\frac{\Gamma g(1-g)c_B [c_G^{-\Gamma-1} - c_B^{-\Gamma-1}]}{[g c_G + (1-g)c_B]^{1-\Gamma}},$$

which is always negative given that  $[c_G^{-\Gamma-1} - c_B^{-\Gamma-1}] > 0$ .

(iv) Differentiation of (23) with respect to  $g$  yields after simplification:

$$\Psi'(g) = \frac{T_3(g)}{[g c_G + (1-g)c_B]^{1-\Gamma}},$$

where  $T_3(g) \equiv (g c_G + (1-g)c_B)(c_G^{-\Gamma} - c_B^{-\Gamma}) - \Gamma(g c_G^{-\Gamma} + (1-g)c_B^{-\Gamma})(c_B - c_G)$ .

Consider first the corner solutions of  $T_3(g)$ :

If  $g = 0$ ,  $T_3(c_G) = c_B(c_G^{-\Gamma} - c_B^{-\Gamma}) - \Gamma c_B^{-\Gamma}(c_B - c_G)$ . It can be easily verified that  $T_3'(c_G) < 0$ . Hence, if  $T_3(\bar{c}_G) \geq 0$  for the highest  $c_G = \bar{c}_G$ ,  $T_3(c_G) > 0$  holds a fortiori for all  $c_G < \bar{c}_G$ . Using  $c_G = c_B$ , yields  $T_3(c_G = c_B) = 0$ . Thus,  $T_3(c_G) > 0$  for all  $c_G < c_B$  and, therefore,  $\Psi'(g) > 0$  for  $g = 0$ .

If  $g = 1$ ,  $T_3(c_B) = c_G(c_G^{-\Gamma} - c_B^{-\Gamma}) - \Gamma c_G^{-\Gamma}(c_B - c_G)$ . Again, it is readily verified that  $T_3'(c_B) < 0$ . Hence, if  $T_3(\underline{c}_B) \leq 0$  for the lowest  $c_B = \underline{c}_B$ ,  $T_3(c_B) < 0$  holds a fortiori for all  $c_B > \underline{c}_B$ . Utilizing  $c_B = c_G$  yields  $T_3(c_B = c_G) = 0$ . Hence,  $T_3(c_B) < 0$  for all  $c_B > c_G$  and, thus,  $\Psi'(g) < 0$  for  $g = 1$ .

Solving  $T_3(g)$  for  $g$  yields a unique extremum:  $g^* = \frac{c_G^{-\Gamma} c_B - c_B^{-\Gamma} (c_B(1+\Gamma) - c_G \Gamma)}{(c_G^{-\Gamma} - c_B^{-\Gamma})(c_B - c_G)(1+\Gamma)}$ . Since the denominator of this expression is strictly positive, the sign of  $g^*$  is determined by the sign of  $T_4(c_G) \equiv c_G^{-\Gamma} c_B - c_B^{-\Gamma} (c_B(1+\Gamma) - c_G \Gamma)$ . It can be easily verified that  $T_4'(c_G) < 0$ . That is, a sufficient condition for  $T_4(c_G) > 0$  is  $T_4(c_G = c_B) \geq 0$ , which is in fact fulfilled. Hence,

$g^* > 0$  for all  $c_B > c_G$ . Similarly, it can be shown that  $g^* < 1$  for all parameter values.

In order to verify that  $g^*$  is indeed a maximum, evaluate the second order derivative of (23) with respect to  $g$  at  $g = g^*$ . After simplification of this derivative I obtain:

$$\Psi''(g)|_{g=g^*} = \left( -\frac{\Gamma(c_G^{-\Gamma}c_B - c_B^{-\Gamma}c_G)}{(1+\Gamma)(c_B^{-\Gamma} - c_G^{-\Gamma})} \right)^\Gamma \left( -\frac{(1+\Gamma)^2(c_B^{-\Gamma} - c_G^{-\Gamma})^2(c_B - c_G)}{\Gamma(c_G^{-\Gamma}c_B - c_B^{-\Gamma}c_G)} \right) < 0.$$

This derivative is negative given that  $(c_G^{-\Gamma}c_B - c_B^{-\Gamma}c_G) > 0$  and  $(c_B^{-\Gamma} - c_G^{-\Gamma}) < 0$  for all  $c_B > c_G$ . To sum up,  $\Psi(g)$  is increasing in  $g$  up to  $g^*$  and decreasing in  $g$  thereafter.

## F Proof of Lemma 6

Once again, I am using throughout the definition  $\Gamma \equiv \gamma\eta_m$  for notational simplicity.

(i) Simple differentiation of (30) with respect to  $a$  yields after simplification:

$$\Phi'(a) = -\frac{\gamma g c_G^{\gamma(a-\eta_m)} c_B^{-\gamma a} \ln\left(\frac{c_B}{c_G}\right)}{[g c_G + (1-g)c_B]^{-\Gamma}},$$

which is always negative given that  $c_B > c_G$ .

(ii) Differentiation of (30) with respect to  $\eta_m$  yields:

$$\Phi'(\eta_m) = \frac{\gamma T_1(c_G)}{[g c_G + (1-g)c_B]^{-\Gamma}}, \quad (35)$$

where

$$T_1(c_G) \equiv c_G^{\gamma(a-\eta_m)} c_B^{-\gamma a} g(\ln(g c_G + (1-g)c_B) - \ln c_G) + c_B^{-\Gamma}(1-g)(\ln(g c_G + (1-g)c_B) - \ln c_B)$$

Notice that the level of  $T_1(c_G)$  depends among other things on the level of  $a$ . Taking the first order derivative of  $T_1(c_G)$  with respect to  $a$  yields after simplification:

$$\frac{\partial T_1(c_G)}{\partial a} = \gamma c_G^{\gamma(a-\eta_m)} c_B^{-\gamma a} \ln\left(\frac{c_G}{c_B}\right) g[\ln(g c_G + (1-g)c_B) - \ln c_G] < 0.$$

The negative sign results from the fact that  $\ln(c_G/c_B) < 0$  and  $[\ln(g c_G + (1-g)c_B) - \ln c_G] > 0$  for all  $c_G < c_B$  (see part (i) in Appendix E for the proof of the latter relationship). Hence, if  $T_1(c_G) \geq 0$  for the highest  $a = \eta_m$ ,  $T_1(c_G) > 0$  holds a fortiori for all  $a < \eta_m$ .<sup>38</sup> Evaluating

<sup>38</sup> Recall that parameter restriction  $a < \eta_m$  is required for the feasibility of a flexible contract.

$T_1(c_G)$  at  $a = \eta_m$  yields:

$$T_1(c_G)|_{a=\eta_m} = c_B^{-\Gamma} [g(\ln(gc_G + (1-g)c_B) - \ln c_G) + (1-g)(\ln(gc_G + (1-g)c_B) - \ln c_B)]$$

To determine the sign of this expression, differentiate it with respect to  $c_G$ . This yields after simplification:

$$T_1'(c_G)|_{a=\eta_m} = -c_B^{-\Gamma} g(1-g) \frac{(c_B - c_G)}{(gc_G + (1-g)c_B)c_G} < 0.$$

Hence, if  $T_1(c_{mG})|_{a=\eta_m} \geq 0$  for the highest  $c_G = \bar{c}_{mG}$ , i.e.  $c_{mG} = c_B$ ,  $T_1(c_{mG})|_{a=\eta_m} > 0$  holds a fortiori for all  $c_{mG} < \bar{c}_{mG}$ . It can be immediately seen that  $T_1(c_G = c_B)|_{a=\eta_m} = 0$ . Hence  $T_1(c_G)|_{a=\eta_m} > 0$  and, therefore,  $T_1(c_G) > 0$  for all  $c_{mG} < c_B$  and  $a < \eta_m$ . This implies  $\Phi'(\eta_m) > 0$ .

(iii) Differentiation of (30) with respect to  $c_B$  yields after simplification:

$$\Phi'(c_B) = \frac{T_2(a)}{c_B [gc_G + (1-g)c_B]^{1-\Gamma}},$$

where

$$T_2(a) = \Gamma g(1-g) [c_G^{\gamma(a-\eta_m)} c_B^{-\gamma a} c_B - c_B^{-\Gamma} c_G] - a\gamma g(gc_G + (1-g)c_B) c_G^{\gamma(a-\eta_m)} c_B^{-\gamma a}. \quad (36)$$

Notice first that, if  $a = 0$ , a flexible contract is identical to a state-contingent contract and, thus,  $\Phi'(c_B) = \Psi'(c_B) > 0$ . For the other corner solution,  $a = \eta_m$ ,  $\Phi'(c_B)$  takes the opposite sign, since  $T_2(a)|_{a=\eta_m} < 0$ . Hence, the sign of  $\Phi'(c_B)$  is ambiguous and depends on the level of  $a$ . While the signs of  $T_2'(a)$  and  $T_2''(a)$  cannot be assigned without ambiguity for all parameter values, the sign of  $T_2'(a)$  is unambiguously negative if evaluated at  $a = 0$ :

$$T_2'(a)|_{a=0} = \Gamma g(1-g) c_G^{-\gamma \eta_m} \gamma c_B \ln \left( \frac{c_G}{c_B} \right) - \gamma g c_G^{-\Gamma} (gc_G + (1-g)c_B) < 0.$$

Furthermore, it can be verified that  $T_2'(a)$  is a polynomial of a degree one. That is,  $\Phi'(c_B)$  can have at most one extreme value. Combining this result together with the previous findings with respect to corner solutions of  $\Phi'(c_B)$  implies that  $\Phi'(c_B)$  can change the sign (from positive to negative) only once, cf. Figure 4. To sum up, I have just shown that  $\Phi'(c_B)$  is more likely to be positive the lower is  $a$ .

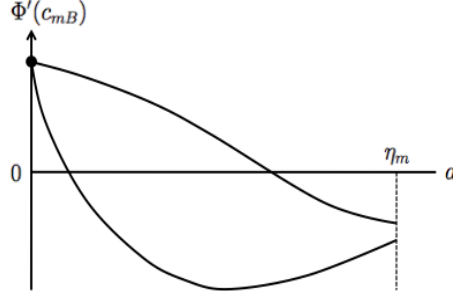


Figure 4: Possible profiles of  $\Phi'(c_B)$ .

(iv) Similarly, differentiation of (30) with respect to  $c_G$  yields after simplification:

$$\Phi'(c_G) = \frac{T_3(a)}{c_G [gc_G + (1-g)c_B]^{1-\Gamma}},$$

where  $T_3(a) \equiv -\text{sgn}\{T_2(a)\} T_2(a)$  and  $T_2(a)$  is given by (36).

As before, it can be shown that, if  $a = 0$ , a flexible contract is identical to a state-contingent contract and  $\Phi'(c_G) = \Psi'(c_G) < 0$ . At the other extreme,  $a = \eta_m$  the reaction of  $\Phi(c_G)$  with respect to  $c_G$  takes the opposite sign. Given  $T_3(a) \equiv -\text{sgn}\{T_2(a)\} T_2(a)$  and  $T_2(a)|_{a=0} < 0$  immediately implies  $T_3(a)|_{a=0} > 0$ . Furthermore, bearing in mind that  $T_2(a)$  is a polynomial of a degree one,  $\Phi'(c_G)$  can have at most one extreme value and, thus, can change the sign (from negative to positive) only once. This completes the proof that  $\Phi'(c_G)$  is more likely to be negative the lower  $a$ .

(v) It follows immediately from substitution of  $g = 0$  and  $g = 1$  in (30) that  $\Phi(0) = 1$  and  $\Phi(1) = \left(\frac{c_G}{c_B}\right)^{\gamma a} < 1$ . Furthermore, a simple differentiation of (30) with respect to  $g$  yields after simplification:

$$\Phi'(g) = \frac{T_4(a)}{(gc_G + (1-g)c_B)^{1-\Gamma}},$$

where  $T_4(a) \equiv (gc_G + (1-g)c_B)[c_G^{\gamma(a-\eta_m)} c_B^{-\gamma a} - c_B^{-\Gamma}] - \Gamma(gc_G^{-\Gamma} + (1-g)c_B^{-\Gamma})(c_B - c_G)$ . Since the expression in the squared brackets is strictly positive for all  $c_B > c_G$ , the sign of  $T_4(a)$  is ambiguous and depends on the level of  $a$ .

Consider first the behavior of  $T_4(a)$  if evaluated at  $g = 0$ ,  $T_4(a)|_{g=0} = c_B[c_G^{\gamma(a-\eta_m)} c_B^{-\gamma a} - c_B^{-\Gamma}] - \Gamma c_B^{-\Gamma}(c_B - c_G)$ . The sign of this expression is ambiguous and it depends on the level of  $a$ . This can be most easily seen by examining the corner solutions of  $a$ . If  $a = \eta_m$ ,  $T_4(a)|_{g=0, a=\eta_m} < 0$  and the relative advantage of a flexible contract decreases in  $g$ . In contrast, if  $a = 0$ ,  $T_4(a)|_{g=0, a=0} > 0$  and the relative advantage of a flexible contract increases in  $g$ .<sup>39</sup> In general, the higher  $a$ , the lower the advantage of flexibility at low values of  $g$ ,

<sup>39</sup> To prove this, notice that the derivative of  $T_4(a)|_{g=0, a=0}$  with respect to  $c_B$  is negative,  $\frac{\partial T_4(a)|_{g=0, a=0}}{\partial c_B} = -\frac{\Gamma}{c_G}[c_G^{-\Gamma} c_B - c_B^{-\Gamma} c_G] < 0$ . Hence, if  $T_4(a)|_{g=0, a=0} \geq 0$  for a highest possible  $c_G = c_B$ ,  $T_4(a)|_{g=0, a=0} > 0$



$$T_4'(a)|_{g=0} = \gamma c_G^{\gamma(a-\eta_m)} c_B^{-\gamma a} c_B \ln\left(\frac{c_G}{c_B}\right) < 0.$$

Consider next the first order derivative of  $T_4(a)$  with respect to  $a$ . It can be easily seen that  $T_4'(a)$  is a polynomial of a degree one. That is,  $\Phi(g)$  can have at most one extreme value. Bearing in mind previous findings regarding corner solutions of  $\Phi'(g)$ , this implies for the case  $\Phi'(g)|_{g=0} > 0$  that a flexible contract dominates a rigid one for low  $g$  and is dominated by a rigid agreement for sufficiently high  $g$ . In a high-aggrievement case, i.e.,  $\Phi'(g)|_{g=0} < 0$ , a flexible contract is dominated by a rigid one for any  $g > 0$  (cf. Figure 3).

## G Discussion of the behavior of $\Phi^E(\eta_m)$

Consider first the corner solution of  $\Phi^E(\eta_m)$  from (33) for  $\eta_m = 0$ . Since  $\Phi^E(0) < 1$  for all  $F(\eta_m) \in (c_G, c_B)$ , flexible contracts are dominated by the rigid ones for the lowest  $\eta_m$ .

Consider next the slope of  $\Phi^E(\eta_m)$ . In contrast to  $\Phi^S(\eta_m)$ , this function is no longer unambiguously increasing in  $\eta_m$ . To see this, differentiate (33) with respect to  $\eta_m$  and simplify the resulting expression to obtain:

$$\Phi^{E'}(\eta_m) = \frac{\gamma T(\eta_m)}{[g c_G + (1-g)c_B]^{-\Gamma}},$$

where

$$T(\eta_m) \equiv F(\eta_m)^{-\gamma a} c_G^{\gamma(a-\eta_m)} g(\ln(g c_G + (1-g)c_B) - \ln c_G) + c_B^{-\Gamma} (1-g)(\ln(g c_G + (1-g)c_B) - \ln c_B) - \gamma a F(\eta_m)^{-\gamma a - 1} F'(\eta_m) g c_G^{\gamma(a-\eta_m)}$$

Consider first the sign of  $\Phi^{E'}(\eta_m)$  without the last expression in  $T(\eta_m)$ . Given that  $F(\eta_m)^{-\gamma a} > c_B^{-\gamma a}$ , comparison with (35) immediately implies  $\Phi^{E'}(\eta_m) > \Phi'(\eta_m) > 0$ . This would imply that the relative advantage of flexible contracts, as before, increases in the supplier intensity,  $\eta_m$ . However, the last term in  $T(\eta_m)$  affects  $\Phi^{E'}(\eta_m)$  in the opposite direction, making thereby the sign of  $\Phi^{E'}(\eta_m)$  ambiguous. The intuition behind this new opposing effect results from the fact that higher  $\eta_m$  in country  $E$  raises a supplier's feeling of entitlement, which ceteris paribus increases the manager's shading. Similarly, the second order derivative of  $\Phi^E(\eta_m)$  with respect to  $\eta_m$  depends on the functional form of  $F(\eta_m)$ . Hence, without specifying  $F(\eta_m)$ , the behavior of  $\Phi^E(\eta_m)$  for  $\eta_m \in [0, \eta_m^E)$  cannot be described without ambiguity. In other words, the function  $\Phi^E(\eta_m) = 1$  may have several roots within this range. Yet, independently of its behavior, the finding  $\Phi^E(\eta_m) > \Phi^S(\eta_m) \forall \eta_m$  suffices to claim that  $E$  is weakly more attractive than  $S$  within this range.

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holds a fortiori for all  $c_G < c_B$ . Indeed,  $T_4(a)|_{g=a=0} = 0$  holds for  $c_G = c_B$ .