

Gestational Surrogacy Contracts: Altruistic or Commercial?*

Swapnendu Banerjee

Gokhale Institute of Politics and Economics
Pune 411 004, India

Abstract

We in this paper provide an analytical structure to endogenize the optimal gestational surrogacy contract in terms of a simple moral hazard framework. We show that altruistic surrogacy is optimal only if the surrogate has lower outside option and is sufficiently altruistic. Otherwise commercial surrogacy is optimal. We also show that for lower outside option greater social ignominy makes the surrogacy contract relatively more altruistic but the reverse happens when the surrogate has higher outside option. We also explore alternative model specifications and find a case where commercial surrogacy is always optimal irrespective of altruism, outside option and social ignominy.

Keywords: Commercial surrogacy contracts, Altruistic surrogacy contracts, Surrogate, Intended parents, Social ignominy.

JEL Classification: I11, J13, L14, L24.

Introduction

-----*Reproduction, parenthood and family are matters about which most people hold deep convictions - convictions which are often based on a certain theological or moral persuasion. Traditionally, these convictions reflect a socially constructed paradigm of a 'nuclear family' where reproduction takes place within a permanent relationship between one man and one woman to the exclusion of all others. This relationship has traditionally been considered to be mysterious, sacred and personal. Consequently, there is ambivalence about or discomfort with methods of human reproduction, which depart from this traditional and 'natural' process of creating human life. One such method of human reproduction which directly challenges traditional convictions concerning reproduction and the formation of a family is surrogate motherhood.* -----

Stuhmcke (1995)

The above quote from Stuhmcke (1995) brings forth the emotional, ethical, theological, cultural and sociological dilemmas about surrogate motherhood. But what is surrogate motherhood? According to the Merriam-Webster online dictionary, a surrogate is a *substitute*. Therefore, loosely speaking, a surrogate mother is one who carries a baby and gives birth, for another woman who cannot conceive and/or carry a baby successfully. The husband and wife, who need a genetic child, are known as the intended parents or the commissioning couple (ACOG 2004). There are two kinds of surrogacy: (i) straight (natural/ traditional) and (ii) gestational (or host).

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In a straight surrogacy, the sperm of the intended father is used to inseminate the surrogate. Therefore, the surrogate becomes both the genetic and gestational mother. While the intended father is also the genetic father, the intended mother is only a rearing mother (ACOG 2004).¹ In gestational surrogacy, the egg and sperm of intended parents are fertilized externally and the embryo transferred to the uterus of the surrogate. This process is known as In-vitro Fertilization-Embryo Transfer (henceforth IVF-ET). Here, the surrogate is only a gestational carrier and the intended parents are the biological (or genetic) parents.^{2,3} In this paper, without loss of generality, we will focus on gestational surrogacy only.⁴

From a legal perspective surrogate motherhood can be subdivided into two identifiable categories – ‘altruistic’ where no money is paid to the surrogates for her ‘services’ (mainly in excess of necessary medical expenses) and ‘commercial’ where money is paid to the surrogates for her services (in excess of medical expenses).

Policymakers in most countries have banned all payments to surrogates (Ministry of Justice, Canada, 2004, Stuhmcke 1995).⁵ Their objective is to prevent exploitation of needy women, who might not fully realize the risks involved. Since a surrogates’ consent might not be well informed, it might put the unborn child at risk as well. The main objection stems from the realization that surrogacy contracts lead to commodification of the child and the surrogate which has market prices. To be precise, most policymakers want a surrogate to be motivated by altruism – a service out of love and a sense of social responsibility - rather than a profit motive (Brazier *et. al.* 1998).

There are a large number of issues that can be addressed - ethical, legal and economic and it is almost impossible to do justice in one paper. Issues like whether or not such markets should be prohibited outright or regulated, why in practice we see very restrictive policies adopted in most countries, what the ‘sacredness’ of human life means in an economic context, whether this market comes close to be an ‘obnoxious market” (*see* Kanbur 2004 etc.), can be discussed at large. But in this paper we abstract from such issues.

We in this paper try to endogenize the optimal gestational surrogacy contract in terms of a simple moral hazard framework. For this we extend the structure provided by Besley and Ghatak (2005) and make our model context specific.^{6,7} We show that altruistic surrogacy is optimal only if the surrogate has lower outside option and is sufficiently altruistic. Otherwise commercial surrogacy is optimal. We also find implications of social ignominy (related to commercial surrogacy) on the nature of optimal surrogacy contracts. We see that for lower outside option greater social ignominy makes the optimal surrogacy contract relatively more altruistic whereas for higher outside option it makes the optimal surrogacy contract relatively more commercial. We also extend our basic structure and define altruism in terms of ‘cost reduction’ in the sense that the more altruistic a surrogate the lower is her cost of providing one unit of additional effort. We show that in this structure commercial surrogacy is always optimal irrespective of the degree of altruism and social ignominy. Thus our paper makes an attempt to provide an analytical framework to endogenize the optimal form of surrogacy contract, i.e., commercial *vis-à-vis* altruistic, which hitherto has been debated widely but not analysed mathematically. In this respect to our knowledge our paper is a first step in that direction.⁸ Also in line with Besley and Ghatak (2005) our paper incorporates the non-pecuniary aspects of altruism and motivation already addressed by Benabou and Tirole (2003), Dixit (2001), Murdock (2002), Seabright (2003) among others.

I Commercial vs. Altruistic Surrogacy: The Debate

Apart from the previous commodification logic one of the main objections of commercial surrogacy contracts is the possible exploitation of reproductive capacities of financially needy women by upper and middle class couples resulting in a depreciation of their worth as human beings. But the same objections can also hold for altruistic surrogacy where within a family those with less power might be pressurized towards altruism.⁹ Also it has been argued that low payment or no payment makes a contract more oppressive *vis-à-vis* where payment is allowed. Therefore, allowing surrogacy and prohibition of payments might lead to exploitation of women's reproductive capabilities.

In the famous Baby M case the US Supreme Court ruled that surrogacy contracts were "potentially degrading to women" and it opined that surrogacy arrangements would be acceptable if they didn't involve the payment of a fee. But if this meant that the court believed that altruistic surrogacy is acceptable, it "smacks all too familiar a notion that while men get paid for their efforts, skills and services [sperm are among the things for which men get paid] women, being women, should do their women-things out of purity of heart and sentiment" (Shultz 1990, Stuhmcke 1995). Stuhmcke (1995) also believes that "singling out of sexual and reproductive capacities as unacceptable commercial services may reinforce stereotypes that define women primarily by those capacities. This argument demands that surrogacy be evaluated in the wider context of women's political inequality." Radin (1987) has suggested that "whether surrogacy is commercial or altruistic may be an ironic self-deception". That is, surrogates may feel they are fulfilling their womanhood by producing a baby for someone else, although they may be just reinforcing oppressive gender roles (Radin 1987, Stuhmcke 1995). In fact by stereotyping women as a selfless, self sacrificing and 'altruistic' entity altruistic surrogacy only adds to the exploitation of women. If one wants to take benefit of women's reproductive capabilities then one should pay for it.

One major concern for surrogacy agreements is the emotional trauma that the surrogate has to go through while giving up the child to the commissioning parents. It has been seen that a mother develops not only physical but also strong emotional ties to the child that she carries and separation from the child can cause a overwhelming sense of loss and emotional stress for the surrogate. But these problems hold for surrogacy agreements as a whole and are not specific to any form of surrogacy whether commercial or altruistic.

The following statement from Stainsby (1993) can best exemplify emotional exploitation of the surrogate's in altruistic surrogacy within family ties:

The repercussions [of refusing to relinquish a child] would be particularly painful in an altruistic surrogacy situation. It is here that a decision to keep or relinquish the child can cut deep into a surrogate woman's most intimate family ties and support systems. (If the child is disabled in any way neither the surrogate nor the commissioning parents may wish to keep it). In a commercial surrogacy situation a surrogate can still have her family supports. In an altruistic surrogacy one's kith and kin can become one's accusers.

The above statement clearly points out the fallacy of the term 'altruistic surrogacy' where a woman with less power within the family can be physically, financially, or more probably emotionally coerced to assist an infertile relative. The case of Elizabeth Kane, America's first surrogate best documents the hollowness of the term 'altruistic surrogacy'. Elizabeth (who has since identified her own altruism as stemming from "low self esteem") once commented

that Maggie Kirkman (the commissioning mother) was more concerned about her unborn baby than her surrogate sister when the latter began to haemorrhage (Stuhmcke 1995).

Also there is a debate about whether the terms 'altruistic' and 'commercial' are proper. It is also unclear as to when an altruistic surrogacy contract becomes commercial. Is an arrangement that consists of payments for surrogates' medical, travel and other necessary expenses altruistic? Or whether it should be classified as commercial? Generally the common perception is that "altruistic" arrangements stem purely from love and are therefore, somehow more acceptable than an arrangement entered into for commercial reasons. However, as pointed out by Stuhmcke (1995):

The fact that the parties enter into a surrogacy agreement which provides for payment to the surrogate mother does not necessarily mean that the motivation behind the agreement is not altruistic. Similarly, the fact that there is no payment does not necessarily imply that the motivation for surrogacy is altruistic.

It is also very difficult to verify whether monetary transactions are in fact taking place or not. Undercover payments can be made although on paper the agreement can be shown to be 'altruistic'. Lastly, one school of thought is of the opinion that 'altruistic surrogacy' doesn't exist as the women who become surrogate mothers do this as a result of a lack of self-confidence and subordination.

Another important issue is the psychology of the would-be child. The child might be hurt when it comes to know that somebody was paid money for its birth. But this problem is not quite commercial surrogacy specific and can be taken care off by suitable counselling of the child while he/she is growing up. Therefore, it is often somewhat unclear whether the objection about commercial surrogacy is specifically to the monetary character of the transaction, because majority of the objections that can be applied to commercial surrogacy can be applied to altruistic surrogacy as well.

But does this mean that overall surrogacy agreements be banned? Is it fair to let a childless couple suffer because of their misfortune and never be allowed to take the benefits of Assisted Reproductive Technology (ART)? If ART is a technological progress, will it be it fair to deny anybody the benefits of this on ethical, religious, philosophical grounds? The issues that has been and can be raised is hardly exhaustive. For a detailed discussion on these issues one can refer to Stainsby (1993), Stuhmcke (1995), Baker (1996). In the next section we focus on some of the recent trends in surrogate motherhood in India.

I.I Recent Trends in Surrogacy

Outsourcing to India is taking new dimension – in one of its first kind an ethnic Chinese couple's (from Singapore) child was born to a Mumbai-based woman (Times of India, 29.09.2005). Anand, a small town in the western state of Gujarat, India, a place more famous for its milk, has seen as many as 40 commercial in vitro fertilization in the last two years and 50 more are expected this year (The Telegraph 01.01.2008). After becoming a hub of medical tourism, India is emerging as a preferred destination for prospective surrogate mothers. People are pouring from places like Scandinavia, USA, Singapore, Taiwan and England. Why spend 2.6-3.5 million rupees in California when it can be done at less than one million rupees in India? Why spend £ 1000 on an advertisement for a surrogate mother in a British daily, when it costs only £ 100 - £ 300 here? (Times of India 29.9.2005, The Telegraph 22.01.2006)

Many middle-class, lower middle class women are opting to rent their womb to childless Non Resident Indian (NRI) couples with the hope of having a better future for them and their children (Times of India, 11/02/2006).¹⁰ Interestingly enough surrogates find support in their families, mostly because the financial returns are high. Recently India's first surrogate child to a single father was born in Calcutta. Amit Banerjee a divorced 46-year-old chartered accountant became father with the help of two women, one egg donor and another gestational carrier evolving a huge ethical debate in India (Times of India, 3.10.2005). Surrogate motherhood in India is a reality. Fertility clinics all over India are also flooded with enquiries from foreigners wanting Indian Surrogate mother.

India has decent formal guidelines in ART on surrogacy which gives the custody right of the child to the intended parents Indian Council of Medical Research (ICMR) 2004 and above all commercial surrogacy is legal (since 2002 but subject to ICMR guidelines). Because of this, couples from abroad feel comfortable from a legal perspective and are looking towards India to have a prospective surrogate for their would-be child. Cost effectiveness and decent medical facilities are seemed to be the main driving force for this recent surge in demand. In India commercial surrogacy is becoming an outsourcing industry and the reason, technically put, is not difficult to comprehend: a wide labour pool working for relatively low rates.

The rest of the paper is organized as follows. In Section II we describe the model with altruistic surrogates. Section III analyzes the optimal form of surrogacy contract. In Section IV we extend our analysis by considering 'cost-reducing' altruism. Section V provides some concluding remarks.

II The Model

We explore a relationship between a set of risk neutral 'intended parents' and a risk neutral 'surrogate mother' (gestational mother) who will be willing to bear their child through IVF-ET.¹¹ We assume the intended parents to be otherwise medically capable in the sense that the husband has a normal sperm count and wife capable of producing normal ovum on her own. But the wife is incapable of producing a baby on their own due to certain medical problems and can have a biological baby only through the help of a surrogate.¹² After In-Vitro fertilization the embryo is transferred to the uterus of the gestational surrogate and the surrogate starts taking care of the unborn child. Delivery takes place after the biological gestation period is over.¹³ Therefore, in this structure the intended parents provide the genetic material (biological parents) of the baby and the surrogate is only a gestational carrier. According to the contract, we assume that, the surrogate is supposed to hand over the baby to the intended parents and incentive payments (if any for the 'services' of the surrogate) are settled after everything is successfully completed. Alternatively the intended parents can choose to adopt, if they do not want to remain childless. To focus sharply on surrogacy, we make a simplifying assumption that the intended parents prefer a genetic child to an adopted one. This does not affect the qualitative aspect of our paper.

Our goal is to characterize a surrogacy contract between a pair of 'intended parents' and a prospective surrogate who has some altruistic pleasure in helping out a childless couple in terms of a simple moral hazard framework proposed by Besley and Ghatak (2005). The choice of surrogate is not the focus of the paper.¹⁴ After the surrogate is selected the intended parents and the surrogate will enter a contract. For analytical convenience we define the contract in the following way: the contract will consist of all necessary medical expenses to

be borne by the intended parents during the entire period of pregnancy (including some follow-up expenses) and we denote it by ‘m’ and a payment ‘b’ (can be interpreted as bonus or incentive) paid only after the successful termination of the pregnancy leading to the birth of a normal baby.¹⁵ The outcome can be ‘high’ which is nothing but the birth of a normal child and we denote it by $q_H = 1$. The outcome might also be ‘low’ which can be interpreted as failure of the surrogacy process (might lead to a birth of a defective baby or a ‘still’ baby or otherwise) that we denote as $q_L = 0$. Therefore, without loss of generality we focus on a 0-1 outcome. This can be justified on the ground that these days there are a battery of medical tests that can check the health and conditions of a new born baby. Therefore, the ‘outcome’ can indeed be medically verifiable by a third party and therefore, contractible. Therefore, in case of success the surrogate will be paid the necessary medical expenses plus the bonus and in case of failure she will be paid only the medical expenses. The effort supplied by the surrogate during pregnancy is denoted by $e \in [0,1]$ which we also take as the probability of success.^{16,17} We assume e to be non-verifiable and hence non-contractible. Effort is costly

and the cost function is given by $C(e) = \frac{e^2}{2}$. We assume that the surrogate is poor enough so

that she doesn’t have any wealth. This implies that there is a limited liability constraint that operates and the surrogate has to be given the necessary medical costs during this period.²⁰ We also assume that the intended parents do not face any binding wealth constraint and that the intended parents and the surrogate don’t derive any utility if the contract is not signed.

If the process is successful the intended parents get a fixed utility of $V > 0$ and receive zero if the process fails. We assume that a surrogate might care about the fact that she is helping out a childless couple and can receive a non-pecuniary benefit (altruistic pleasure, warm-glow) of αV from successfully helping out the intended parents where $\alpha > 0$. If $\alpha > 1$ then the surrogate is very altruistic and derives more pleasure than the intended parents. Also we assume for simplicity that in case of a failure the surrogate does not receive any altruistic pleasure from her effort.

We now make a technical distinction between altruistic surrogacy and commercial surrogacy in terms of our structure:

Definition 1: A surrogacy contract $\{m, b\}$ is altruistic if $b = 0$. Otherwise it is commercial.²¹

What the above definition imply is that if there is no incentive pay (either pecuniary or non-pecuniary) in case of success mentioned in the initial contract then the surrogacy contract can be termed as altruistic.

We also make a specific assumption here. We assume that the surrogate experiences a feeling of social ignominy from the society in case she has taken money from the intended parents (i.e., she has a commercial motive) after the successful completion of the process. To explain it further we envisage a situation where as if the society expects the surrogate to help a childless couple from a purely altruistic point of view. But the fact that the surrogate has taken money, specifically the incentive bonus (we assume that everybody gets to know that the surrogate has taken money, i.e., it is common knowledge), leads to reduced respect for the surrogate in the society. To capture this loss in a simplified structure we assume that the surrogate cannot enjoy the full ‘b’ that she gets from the intended parents and experiences a loss of λ fraction ($\lambda < 1$) which can be attributed to the feeling of social ignominy that she faces. Put it differently, the surrogate experiences a payment of $(1 - \lambda)b = \beta b$ where $\beta < 1$,

lower β (higher λ) capturing greater feeling of social ignominy. We again clarify that the social ignominy in our model is not associated with the existence of the institution of surrogate motherhood at large but is associated with the professional commercial motive of surrogates. One can also model this social ignominy differently. For an alternative but equivalent modeling approach please see footnote 20.²²

We will also need the following two technical assumptions:

Assumptions:

- (1). $(1 + \alpha)V < 1$.
- (2). $\frac{\beta V^2}{4} - m > 0$.

The first assumption ensures that there is an interior solution in effort from the surrogate. The second assumption will guarantee the existence of optimal contracts under moral hazard.

Keeping everything in mind we now proceed to find out the optimal contract between the intended parents and the surrogate. Our target is to determine the optimal form of surrogacy contract endogenously rather than having it institutionally imposed from outside. Later we will define altruism in terms of cost reduction and re-examine the optimal surrogacy contract.

III Optimal Surrogacy Contracts

First we examine the situation when the effort of the surrogate is contractible. Optimal effort will be chosen to maximize the expected joint surplus of the surrogate and the intended parents. However, the contract offered to the surrogate will have no allocative role in this situation. Therefore, under the first best the optimization problem becomes

$$\max_{e \in [0,1]} S^* = e(V + \alpha V) - \frac{e^2}{2} \quad \dots (1)$$

The optimal first best effort will be $e^{FB} = (1 + \alpha)V$ and the maximum expected joint surplus is $S^* = \frac{(1 + \alpha)^2 V^2}{2}$. Not surprisingly the first best effort and the joint surplus increase with the altruism of the surrogate.

We now turn to the situation when the effort of the surrogate is non-contractible. Under moral hazard the optimal contracting problem of the intended parents will be

$$\max_{\{m,b\}} U^{IP} = (V - b)e - m \quad \dots (2)$$

subject to the following constraints:

- (i) The participation constraint of the surrogate stating that the surrogate be at least given her outside option (reservation utility):

$$U^{SM} = e(\beta b + \alpha V) + m - \frac{e^2}{2} \geq u^0 \quad \dots (3)$$

- (ii) The limited liability constraint requiring that the surrogate will have to be paid at least \underline{m} as medical (and necessary subsistence) expenses:

$$\beta b + m \geq \underline{m}, \quad m \geq \underline{m}. \quad \dots (4)$$

- (iii) The incentive compatibility constraint that says that the effort level maximizes the surrogate's expected private payoff given (b, m) :

$$e = \arg \max_{e \in [0,1]} \left[e(\beta b + \alpha V) + m - \frac{e^2}{2} \right].$$

The above incentive compatibility constraint after simplification becomes

$$e = (\beta b + \alpha V) \quad \dots (5)$$

where $e \in [0,1]$. The assumption of risk neutrality together with limited liability makes the incentive compatibility constraint costly and gives rise to moral hazard incentives for the surrogate. We will focus our attention to the range of reservation payoffs for the surrogate in which the intended parents earn a non-negative payoff. Also note that both the limited liability constraint cannot bind at the same time and therefore, $m \geq \underline{m}$ will be the relevant limited liability constraint and the first one will be a slack constraint. Incorporating the incentive compatibility constraint the optimization exercise becomes

$$\max_{\{m,b\}} U^{IP} = (V - b)(\beta b + \alpha V) - m$$

subject to

$$m \geq \underline{m} \quad \text{(Limited liability)}$$

$$U^{SM} = \frac{(\beta b + \alpha V)^2}{2} + m \geq u^0 \quad \text{(Participation Constraint)}$$

The modified optimization problem involves two choice variables ‘ m ’ and ‘ b ’. Also note that the objective function is concave and the constraints are convex.

Let \bar{u} be the reservation payoff of the surrogate such that the intended parents get zero expected payoff. Also because of the limited liability constraint the participation constraint of the surrogate may not bind if the reservation payoff of the surrogate is very low. Let \underline{u} denote the value of the reservation payoff such that for all $u^0 \geq \underline{u}$ the surrogate’s participation constraint binds. It can be shown that in this structure the limited liability constraint will bind and this is the departure from the first best. To provide a concrete methodical proof we state the following lemmas that might be useful in characterizing the optimal surrogacy contract:

Lemma1: *At least one of the participation and the limited liability constraint must bind under the optimal incentive contract.*

Proof: See the appendix.

Therefore, under the optimal contract at least the limited liability or the participation constraint. The next lemma throws some light on the role of β under the optimal contract. We follow the approach taken by Besley and Ghatak (2005) to show the following lemma:

Lemma 2: *The Limited Liability constraint must bind if β is sufficiently high and e is less than the first best.*

Proof: See the appendix.

Henceforth for tractability of the solution we will assume that the strength of social ignominy is not that high, which implies that λ is sufficiently low and therefore, β is sufficiently high. As already mentioned to focus our attention to the range of reservation payoffs for the surrogate in which the intended parents earn a non-negative payoff we need the following two lemmas:

Lemma 3: Suppose assumption 2 holds. Then $\exists \bar{u} \in (0, S^*)$.

Proof: See the Appendix.

Lemma 4: Suppose assumption 2 holds. Then $\exists \underline{u} \in (0, \bar{u})$.

Proof: See the Appendix.

We can now proceed to state the optimal surrogacy contract under this structure:

Proposition 1:

Given Assumption 1 and 2 an optimal surrogacy contract $\{m^, b^*\}$ between intended parents and a surrogate exists for all $u^0 \in [0, \bar{u}]$ and can be characterized as follows:*

(i) For $u^0 \in [0, \underline{u}]$ and $\alpha > \beta$ the optimal surrogacy contract is altruistic, i.e. $b^ = 0$.*

(ii) If $u^0 \in [0, \underline{u}]$ and $\alpha < \beta$ the optimal surrogacy contract is commercial where $b^ = \frac{(\beta - \alpha)V}{2\beta} > 0$. Also increased social ignominy i.e. lower β , leads to the optimal contract becoming relatively more altruistic.*

(iii) If the outside option of the surrogate is sufficiently high in the sense that $u^0 \in [\underline{u}, \bar{u}]$ then the optimal surrogacy contract is always commercial with $b^ = \frac{1}{\beta} \left[\sqrt{2(u^0 - \underline{m})} - \alpha V \right] > 0$. Interestingly, in this situation, increased social ignominy (reduced β) leads to the optimal surrogacy contract becoming relatively more commercial.*

(iv) The optimal fixed medical expense is given by $m^ = \underline{m}$.*

(v) The optimal effort is found by solving $e^ = b^* + \alpha V$.*

Proof: See the Appendix.

To explain the first two parts of the above findings, we should remember that given our assumption on β , in equilibrium the limited liability constraint always binds and therefore, the intended parents cannot induce the first best effort and b becomes a costly instrument for the intended parents in eliciting effort. By increasing b the intended parents can provide incentives to the surrogate to exert more effort. But if the surrogate is sufficiently altruistic in the sense that $\alpha > \beta$ there is no need to provide any incentives and the optimal surrogacy contract is altruistic. If the surrogate is not so altruistic i.e., $\alpha < \beta$ then explicit financial incentives are needed to elicit costly effort from the surrogate and therefore, the optimal surrogacy contract is commercial. Noteworthy is the fact that in such a situation increased social ignominy leads to lower incentive pay. To explain this, first note that lower β leads to lower optimum effort from the surrogate and that reduces the expected payoff of the intended parents. Therefore, it is optimal for the parents to reduce the incentive pay b and this is possible since the outside option of the surrogate is sufficiently low (i.e., the participation constraint is slack) and therefore the intended parents can optimally reduce b and yet get the surrogate to accept the contract.²¹ Therefore, greater social ignominy makes the surrogacy contract more altruistic when the surrogate has lower outside option. Also worth mentioning is the fact that altruism of the surrogate and b are perfect substitutes in this model and therefore, higher altruism requires lesser incentives to elicit costly effort. Again if the outside option is sufficiently high in the sense that the participation constraint binds then the intended

parents need to provide sufficient incentives irrespective of the altruism of the surrogate to compensate her for the loss of the outside option and therefore, the optimal surrogacy contract is commercial.²² Again interesting to note is that the effect of social ignominy on the incentive payment is diametrically opposite in this case. When the surrogate's outside option is sufficiently high, greater social ignominy leads to greater optimal incentive pay. This is due to the fact that the loss due to social ignominy needs to be compensated through higher incentive pay and given that both the limited liability and the participation constraint binds, increasing b is the only way by which the intended parents can elicit costly effort from the surrogate and at the same time make her accept the contract. Put it differently, greater social ignominy makes the surrogacy contract more commercial when the surrogate has greater outside option. This explains the third part of the proposition. The fourth part of the proposition follows directly from the fact that the surrogate is risk neutral. The surrogate cares about the minimum medical and subsistence expenditure but does not care about the spread between her returns in the two states. Therefore, it is optimal for the intended parents to set the medical (and other subsistence) fixed expenditures as low as possible and therefore, $m^* = m$. The last part of the proposition characterizes optimal effort of the surrogate. In case of altruistic surrogacy surrogate's altruism is sufficient for the intended parents to elicit effort. But when altruism is not so high the intended parents need to provide incentives to elicit effort from the surrogate. In the next section we re-interpret altruism in terms of cost reduction and analyze the optimal form of surrogacy contract.

IV Cost Reducing Altruism

In this section we modify the earlier structure and assume that altruistic surrogates provide effort at a lower cost but they do not receive any non-pecuniary benefit directly from helping out a childless couple. The implication of this is that we assume away the substitutability between altruism and incentives and regard altruism as 'type' denoted by θ , higher θ implying higher altruism given $\theta \in (0,1)$. Different interpretations of type is also available. For example, this can also be interpreted in terms of physical consequences of pregnancy. A younger healthy surrogate will likely experience lesser stress and risk in successfully completing the gestation than an older surrogate. Here, the younger surrogate becomes the 'high' type. But without loss of generality we will focus on the altruistic aspect and we will interpret the cost as in terms of time/opportunity cost of being in gestation. Then, ceteris-paribus, the more altruistic a surrogate is, will likely experience a lower loss of opportunity cost in helping out a childless couple.²³ Given this modified structure the surrogate now receives ' b ' instead of $(b + \alpha V)$ in case of success and zero in case of failure. But the cost of providing effort e is $\frac{(1-\theta)e^2}{2}$, the higher is θ the lower is the marginal and average cost of providing one unit of effort. The intended parents get a fixed utility of $V \in (0,1)$ and receive zero if the process fails. Everything else of the previous structure remains the same. We make the following two assumptions:

Assumptions:

$$(1a) V < 1 - \theta$$

$$(2b) \frac{\beta V^2}{4} - m > 0$$

Assumption-1a ensures that optimal effort is less than 1 (interior solution) and assumption-2a is same as before.

Given this structure under the first best the optimization problem becomes

$$\max_{e \in [0,1]} S^* = eV - \frac{(1-\theta)e^2}{2}. \quad \dots (6)$$

The optimal first best effort is $e^{FB} = \frac{V}{(1-\theta)}$ and the expected joint surplus will be

$S^* = \frac{V^2}{2(1-\theta)}$. Not surprisingly the optimum first best effort and the expected joint surplus increases with the altruism of the surrogate.

When the effort of the surrogate is non-contractible the optimal contracting problem of the intended parents can be given as

$$\max_{\{m,b\}} U^{IP} = (V-b)e - m \quad \dots (7)$$

subject to

(i) The participation constraint:

$$U^{SM} = e\beta b + m - \frac{(1-\theta)e^2}{2} \geq u^0 \quad \dots (8)$$

(ii) The limited liability constraints:

$$\beta b + m \geq \underline{m}, \quad m \geq \underline{m}. \quad \dots (9)$$

(iii) The incentive compatibility constraint:

$$e = \arg \max_{e \in [0,1]} \left[e\beta b + m - \frac{(1-\theta)e^2}{2} \right]$$

which upon simplification becomes

$$e = \frac{\beta b}{(1-\theta)} \quad \dots (10)$$

where $e \in [0,1]$. Incorporating the incentive compatibility constraint the optimization exercise becomes

$$\max_{\{m,b\}} U^{IP} = \frac{(V-b)\beta b}{(1-\theta)} - m$$

subject to

$$m \geq \underline{m} \quad \text{(Limited liability)}$$

$$U^{SM} = \frac{\beta^2 b^2}{2(1-\theta)} + m \geq u^0 \quad \text{(Participation Constraint)}$$

Same as before we can calculate the reservation payoff of the surrogate

$$\underline{\underline{u}} = \frac{\left(\beta V + \sqrt{\beta^2 V^2 - 4\beta m(1-\theta)} \right)^2}{8(1-\theta)} + \underline{m} \quad \text{such that intended parents get zero expected payoff.}$$

Again let $\underline{u} = \frac{\beta^2 V^2}{8(1-\theta)} + \underline{m}$ denote the value of the reservation payoff such that for all $u^0 \geq \underline{u}$ the surrogate's participation constraint binds. It can be shown that the previous four lemmas

hold in this situation also and we can proceed to characterize the optimal surrogacy contract in this situation.²⁴

Proposition 2:

Given assumption 1a and 2a an optimal surrogacy contract $\{m^, b^*\}$ between intended parents and a surrogate exists for all $u^0 \in [0, \bar{u}]$ and has the following features:*

(i) The optimal surrogacy contract is always commercial and the bonus is characterized as

$$b^* = \frac{V}{2} > 0 \quad \forall u^0 \in [0, \underline{u}].$$

$$b^* = \frac{1}{\beta} \left[\sqrt{2(u^0 - \underline{m})(1 - \theta)} \right] > 0 \quad \forall u^0 \in [\underline{u}, \bar{u}].$$

(ii) For lower outside option of the surrogate the surrogacy contract is independent of social ignominy but for higher outside option the surrogacy contract becomes more commercial with an increased social ignominy.

(iii) The optimal fixed medical expense is set at $m^ = \underline{m}$.*

(vi) The optimal effort is found by solving $e^ = \frac{\beta b^*}{(1 - \theta)}$.*

The proof of this proposition will be similar to the earlier proposition and we omit the proof for brevity.²⁵ A crucial feature of this structure is the absence of substitutability between surrogate altruism and incentive ‘ b ’. Because of this the intended parents cannot trade-off financial incentives (or bonus) in lieu of altruism. Given this absence in substitutability a positive b is necessary to induce the surrogate to provide more effort even if she can exert effort at a lower cost. In the first case when the outside option of the surrogate is relatively low i.e., for all $u^0 \in [0, \underline{u}]$ the intended parents will offer half of their gross surplus as bonus in case of success. Note that in this situation the surrogate’s incentive payment is independent of the degree of social ignominy and altruism.²⁶ When the surrogate’s outside option is higher it is optimal for the intended parents to compensate the surrogate for the loss of her outside option and therefore, raise the bonus and the higher is the outside option higher will be the optimal bonus needed to induce the surrogate to exert effort. Also note that greater social ignominy makes the surrogacy contract relatively more commercial. This is similar to the earlier specification where the loss due to social ignominy is needed to the compensated through higher incentive pay and given that both the limited liability and the participation constraint binds, increasing b is the only way by which the intended parents can elicit costly effort from the surrogate. Again since the surrogate is risk neutral, she hardly cares about the spread of income between the two states. She only cares about the minimum medical and subsistence expenses and therefore the optimal m^* will be pinned down to \underline{m} . Lastly the optimal effort will be a function of the bonus paid and the surrogate altruism. The more the bonus and/or altruism the more will be the optimal effort.

V Conclusion

In this paper we make an attempt to endogenize the choice of optimal surrogacy contracts ‘altruistic’ *vis-à-vis* ‘commercial’. Using a simple moral hazard structure we show that altruistic surrogacy is optimal only if the surrogate is sufficiently altruistic and has lower outside option. On the other hand, if the surrogate has higher outside option then commercial surrogacy is always optimal. We have also examined how the degree of social ignominy affects the optimal form of surrogacy contract. We see that for lower outside option greater

social ignominy makes the optimal surrogacy contract relatively more altruistic whereas for higher outside option it makes the optimal surrogacy contract relatively more commercial. We also extend this analysis and define altruism ('type') in terms of 'cost reduction' in the sense that the more altruistic a surrogate the lower is her cost of providing one unit of additional effort. We show that in this structure altruistic surrogacy is *never* achieved as an optimal solution, that is commercial surrogacy is always optimal and this is true irrespective of the degree of social ignominy and surrogates' altruism.

The existing literature on surrogate motherhood has debated a large number of economic, legal and ethical issues concerning the welfare of women and children. Papers by Brazier *et al.* (1998), Hatzis (2003), Posner (1989), Stainsby (1993), Stuhmcke (1995), Williams-Jones (2002) among others discuss the legal and ethical issues related to 'surrogate motherhood' but no analytical framework was provided to address these complex issues. Banerjee and Basu (2008, 2006) has already analyzed the choice of surrogate mothers by intended parents in an incomplete contracting framework and this paper endogenizes the choice of optimal surrogacy contracts in a simple moral hazard framework. There are several issues that remain to be addressed in the future. As already mentioned in the introduction ethical issues like whether or not such markets should be prohibited outright or regulated, why in practice we see very restrictive policies adopted in most countries, what the 'sacredness' of human life means in an economic context and whether this market comes close to be an 'obnoxious market' and how to characterize such a market, can be discussed and analyzed in detail.²⁷ Also we need to address whether surrogacy can pose a competitive threat to the social institution called marriage. Whether it strengthens the bond between husbands and wives, who get a genetically related baby or it weakens their ties in a situation where the wife is not the biological mother. Moreover, given that homosexual marriages are almost legalized in many countries, can gay and lesbian couples become parents by hiring surrogates? Will the number of heterosexual marriages decline in that situation? Another important issue that we didn't explore is the involvement of middlemen or any third party. Although in the present analysis, we restrict our attention to bilateral contracting between surrogates and intended parents, the role of infertility clinics and support groups is very important in motivating women (endogenous motivation) to become surrogates and childless couples to think of surrogacy as an alternative.²⁸ Also one should consider the cost effectiveness of this technological progress so that economically weaker sections can avail such facilities.

Appendix

Proof of Lemma 1: let us examine the situation where both the constraints do not bind in equilibrium. The intended parents will select b by maximizing their payoff unconstrained which yields $b = \max\left\{\frac{(\beta - \alpha)V}{2\beta}, 0\right\}$ and the effort will be $e = \max\left\{\frac{(\beta + \alpha)V}{2}, \alpha V\right\}$. Now since $m > \underline{m}$ and the participation constraint is not binding, the intended parents can reduce m by a small amount while getting the surrogate to accept the contract. This will not affect e and the intended parent's payoffs increase. This is a contradiction since it will be optimal for the intended parents to reduce m until either limited liability or participation constraint binds.

Proof of Lemma 2: Suppose we start with the assumption that $b < V$ implying that 'e' is less than the first best ($e = (\beta b + \alpha V) < (1 + \alpha)V$). We show that the limited liability constraint must bind if β is sufficiently high. Suppose the limited liability constraint doesn't bind. That is we can have an optimal contract (m^0, b^0) such that $b^0 < V$ and $m^0 \geq \underline{m}$. Also from lemma 1 we know that in this case the participation constraint must bind. Now, let us reduce m by a very small amount ε and increase b by an amount in such a way that the surrogate's expected payoff remains constant. Now since the surrogate chooses e to maximize her own expected payoff the envelope theorem suggests that we can ignore the effects of changes in m and b on her payoff via e . Therefore, we get $dU^{SM} = e\beta db + dm = 0$ implying $dm = -e\beta db$. Now the change in the intended parents payoff is given as $dU^{IP} = (V - b)de - (edb + dm)$. Putting $dm = -e\beta db$ by construction, we get $dU^{IP} = (V - b)de - (1 - \beta)edb$. Now if β is sufficiently high, i.e., the social ignominy is sufficiently low, then $dU^{IP} > 0$, which implies that the intended parents are unambiguously better off by slightly increasing b and reducing m in this way and this will continue until the limited liability constraint binds. Thus if $b < V$ and β sufficiently high, an optimal contract defined initially as (m^0, b^0) cannot exist implying that if 'e' is less than the first best then the limited liability constraint must bind. Now we know from the first part that if the limited liability constraint does not bind then e is at the first best, i.e. $e = (1 + \alpha)V$. Therefore, in this situation we get $b = V$. Since $m > \underline{m}$ and $\underline{m} \geq 0$, putting $b = V$ in the intended parents expected payoff we get $U^{IP} = -m < 0$. This shows that for a high β when limited liability constraint doesn't bind the intended parents' expected payoff is negative. Therefore, in equilibrium the limited liability must bind.

Proof of Lemma 3: On the basis of our assumption on β and using lemma 2 we know that the limited liability must bind and that the intended parents expected payoff would then be non-negative. Thus we have $m = \underline{m}$. We should remember that \bar{u} is defined as the reservation payoff of the surrogate such that the intended parents get zero expected payoff. Now to find the value of \bar{u} we need to solve for the only remaining variable from the equation $(V - b)(\beta b + \alpha V) - \underline{m} = 0$ (Intended parents expected payoff is zero). This quadratic equation has two roots of b and since the surrogates expected payoff is increasing in b the

higher root will be the relevant one. Therefore we get $b = \frac{V(\beta - \alpha) + \sqrt{V^2(\beta + \alpha)^2 - 4\beta m}}{2\beta}$.

We substitute this in the surrogate's payoff and we get

$$\bar{u} = \frac{1}{2} \left[\frac{V(\beta + \alpha) + \sqrt{V^2(\beta + \alpha)^2 - 4\beta m}}{2} \right]^2 + \underline{m}. \text{ Given assumption 2 we can see } \bar{u} \text{ is a}$$

strictly positive real number. Also since $\beta < 1$ and $\underline{m} > 0$ we can show that $\bar{u} < S^*$ where

$$S^* = \frac{(1 + \alpha)^2 V^2}{2}. \text{ An easier way to verify this is to put } \beta = 1 \text{ and show that}$$

$$\frac{1}{2} \left[\frac{V(1 + \alpha) + \sqrt{V^2(1 + \alpha)^2 - 4m}}{2} \right]^2 + \underline{m} < S^*. \text{ Now since } \beta < 1 \text{ and } \bar{u} \text{ falls as } \beta \text{ falls then}$$

definitely $\bar{u} < S^*$.

Proof of Lemma 4: We know that \underline{u} denotes the value of the reservation payoff such that for all $u^0 \geq \underline{u}$ the surrogate's participation constraint binds. But suppose the participation constraint does not bind. Then by lemma1 we know that the limited liability constraint should bind and $b = \max\left\{\frac{(\beta - \alpha)V}{2\beta}, 0\right\}$. We consider the following 2 cases:

Case 1: $\alpha < \beta$

In this situation $b = \frac{(\beta - \alpha)V}{2} > 0$ and $U^{SM} = \frac{1}{8}(\beta + \alpha)^2 V^2 + \underline{m}$. Thus from the definition of \underline{u} we get $\underline{u} = \frac{1}{8}(\beta + \alpha)^2 V^2 + \underline{m} > 0$. Now $\underline{u} < \bar{u}$ since given assumption 2 we definitely get $V^2(\beta + \alpha)^2 - 4\beta m > 0$. So in this situation $\exists \underline{u} \in (0, \bar{u})$.

Case 2: $\alpha > \beta$

In this situation $b = 0$ and $U^{SM} = \frac{1}{2}\alpha^2 V^2 + \underline{m}$. Again from the definition of \underline{u} we get that

$\underline{u} = \frac{1}{2}\alpha^2 V^2 + \underline{m}$. Now to show that $\underline{u} < \bar{u}$ we need to show that

$$\frac{1}{2} \left[\frac{V(\beta + \alpha) + \sqrt{V^2(\beta + \alpha)^2 - 4\beta m}}{2} \right]^2 + \underline{m} > \frac{1}{2}\alpha^2 V^2 + \underline{m}. \text{ The condition can be reduced to}$$

$$\left[\frac{V(\beta + \alpha) + \sqrt{V^2(\beta + \alpha)^2 - 4\beta m}}{2} \right]^2 > \alpha^2 V^2. \text{ Now put } \beta = 0 \text{ and the left hand side of the}$$

expression becomes $\alpha^2 V^2$. It can be easily verified that given assumption 2 the left hand side

is increasing in β and therefore, for a positive β we will definitely get $\underline{u} < \bar{u}$. Thus lemma 4 holds.

Proof of Proposition 1: Using lemma 1 and lemma 2 we consider only two relevant cases:

(a) The participation constraint doesn't bind but the limited liability constraint binds.

(b) Both the participation constraint and the limited liability constraint binds.

From the proof of lemma 4 we can split case (a) into two separate cases depending on whether $\alpha > \beta$ and $\alpha < \beta$. Therefore, we will study three relevant cases:

Case 1: In this situation the participation constraint doesn't bind and $\alpha > \beta$. Following lemma 1 we know that that in this case the limited liability constraint must bind and we get the following:

$$b^* = \max\left\{\frac{(\beta - \alpha)V}{2\beta}, 0\right\} = 0 \text{ since } \alpha > \beta.$$

$$m^* = \underline{m}$$

$$e^{**} = \beta b + \alpha V = \alpha V$$

Therefore, following definition 1 in this case the optimum surrogacy contract is altruistic in nature. The surrogate's payoff can be calculated as $U^{SM} = \frac{1}{2}\alpha^2 V^2 + \underline{m}$. The intended parents payoff is $U^{IP} = \alpha V^2 - \underline{m}$ and this is positive given assumption 2 and $\alpha > \beta$. Note that since the participation constraint doesn't bind the following must be true: $\frac{1}{2}\alpha^2 V^2 + \underline{m} > u^0$.

Case 2: Let us deal with the situation where the participation constraint doesn't bind and $\alpha < \beta$. Also since the limited liability constraint binds we get the following:

$$b^* = \max\left\{\frac{(\beta - \alpha)V}{2\beta}, 0\right\} = \frac{(\beta - \alpha)V}{2\beta} > 0 \text{ since } \alpha < \beta.$$

$$m^* = \underline{m}.$$

$$e^{**} = \beta b + \alpha V = \frac{(\beta + \alpha)V}{2}.$$

Note that as β falls i.e., social ignominy λ increases the incentive payment falls. Put it differently in this situation increasing social ignominy makes the optimal surrogacy contract relatively more altruistic in nature (if we interpret falling b as the contract becoming less commercial i.e., more altruistic). The surrogate's payoff, in this situation, will be $U^{SM} = \frac{1}{8}(\beta + \alpha)^2 V^2 + \underline{m}$. The intended parent's payoff will be $U^{IP} = \frac{V^2(\beta + \alpha)^2}{4\beta} - \underline{m}$ which is again positive given assumption 2. Similar to the case 1 note that since the participation constraint doesn't bind the following must be true: $\frac{1}{8}(\beta + \alpha)^2 V^2 + \underline{m} > u^0$.

Case 3: The participation constraint and the limited liability constraint both bind. These two constraints uniquely determine the two choice variables for the intended parents. In particular we get:

$$\begin{aligned}
m^* &= \underline{m}. \\
b^* &= \frac{1}{\beta} \sqrt{2(u^0 - \underline{m})} - \alpha V. \\
e^{**} &= \sqrt{2(u^0 - \underline{m})}.
\end{aligned}$$

Since in this case the participation constraint binds we get $u^0 > \frac{1}{2}\alpha^2 V^2 + \underline{m}$. This implies that $b^* > 0$ which means that the optimum surrogacy contract is commercial. Again note that $e^{**} < e^*$ implies $\sqrt{2(u^0 - \underline{m})} \leq (1 + \alpha)V \Rightarrow (u^0 - \underline{m}) \leq \frac{1}{2}(1 + \alpha)^2 V^2$. The surrogate's payoff in this situation will be $U^{SM} = u^0$ and intended parent's payoff is $U^{IP} = \sqrt{2(u^0 - \underline{m})}[(1 + \alpha)V - \sqrt{2(u^0 - \underline{m})}] - \underline{m}$. Note that $U^{IP} = 0$ if $u^0 = \bar{u}$. Therefore we get $U^{IP} \geq 0 \quad \forall u^0 \in [0, \bar{u}]$.

To check the existence of the optimal contract we proceed as follows. When $u^0 = 0$ and $\alpha > \beta$ the intended parents expected payoff $U^{IP} = \alpha V^2 - \underline{m} > 0$ (by assumption 2) and when $\alpha < \beta$, $U^{IP} = \frac{V^2(\beta + \alpha)^2}{4\beta} - \underline{m} > 0$ (by assumption 2). In both the cases the surrogate receives positive payoff. When $u^0 = 0$ and $\alpha > \beta$, $U^{SM} = \frac{1}{2}\alpha^2 V^2 + \underline{m} > 0$ and when $\alpha < \beta$, $U^{SM} = \frac{V^2(\beta + \alpha)^2}{8} + \underline{m} > 0$. At the other extreme, if the intended parents expected payoff is set to zero, the surrogate's expected payoff under the optimal contract is \bar{u} which is a strictly positive real number by lemma 3. For all $u^0 \geq \underline{u}$, the participation constraint binds and the intended parents' expected payoff is a continuous and decreasing function of u^0 and so the optimal contract exists for all $u^0 \in [0, \bar{u}]$.

Endnote

1. For more details, see ICMR 2004, [www. ivf-infertility. com](http://www.ivf-infertility.com)
2. For more details, see ICMR 2004, [www. ivf-infertility. com](http://www.ivf-infertility.com)
3. We ignore the case where donor sperm is combined with donor or surrogate eggs because the child is not genetically related to intended parents.
4. Other forms of surrogacy can also be analyzed under this structure with slight modification.
5. e.g. Canada, Australia, Singapore has banned surrogacy agreements whereas in USA and India commercial surrogacy is allowed subject to certain guidelines. Interesting to note that in Australia commercial surrogacy is a criminal offence and is a punishable offence but parties to an altruistic surrogacy are not penalized although surrogacy agreements are void and therefore, unenforceable.
6. We abstract from the question about whether surrogacy contracts are desirable or not. Given that surrogacy contracts are a reality we try to endogenize the choice to surrogacy contracts. For detailed discussion on ethical issues see Annas (1998), Hatzis (2003), Posner (1989) and Williams-Jones (2002).

7. For an informal discussion on surrogate motherhood and transaction cost approach *see* Galbraith, McLachlan and Swales (2005).
8. In an earlier work Banerjee and Basu (2008, 2006) examined in an incomplete contracting framework the choice of surrogate mothers.
9. Within a family there is a possibility that those with less power and money are likely to be exploited. Alejandra Munoz, a poor illiterate Mexican woman, was brought illegally to the US on the understanding that when she became pregnant for her infertile cousin the embryo would be flushed out and transferred to her cousin. But later she was told that she was obliged to continue the pregnancy. Alejandra threatened to have an abortion but her relatives kept her under house confinement, threatening to expose her as an illegal alien (Stainsby 1993, Stuhmcke 1995).
10. Niyati Rana, "Wanna rent a womb, come to Anand", Times News Network, 11/02/2006.
11. In this paper we assume away any third party mediation for simplicity. We will address the issue in our future research.
12. Problems like (i) hysterectomy (ii) absence or malformation of uterus, since birth (iii) diabetes, multiple sclerosis, heart and kidney diseases (iv) repeated miscarriages (www.ivf-infertility.com, Stuhmcke 1995). Also *see* section 1 of Banerjee and Basu (2006) for details.
13. There can be various other forms of surrogacy that we have already discussed in the introduction. Those can be easily accommodated in our model slight modifications.
14. Banerjee and Basu (2006) deals with this issue in detail.
15. These can include healthy food (fruits, milk etc.) intake, protein intake, expenditure towards purchasing medicines, medical tests, hospital charges etc.
16. This might entail everything from consuming good food to remaining healthy and cheerful, non-indulgence in stressful work, alcohol and other substance abuse and also abstinence from normal sexual activity (if the surrogate is married). In fact some contracts explicitly mention this last clause. Majority of these are difficult to verify (even medically) by a third party.
17. The probability of success can be given by a function $\pi(e)$ where $\pi' > 0$ in the sense of FOSD. We assume $\pi(e) = e$ for analytical convenience.
18. An alternative equivalent technical assumption would be that the surrogate is infinitely risk averse below \underline{m} (minimum medical expenses) but risk neutral above \underline{m} .
19. Note that 'b' is defined as bonus paid only in case of success.
20. One can also assume that the surrogate's altruism parameter becomes $(\alpha - \lambda b)$ for a positive b and therefore, the surrogate experiences a payoff of $b + (\alpha - \lambda b)V$ in case of a success which after some simple algebra becomes $(1 - \lambda V)b + \alpha V = \gamma b + \alpha V$. One can assume $\gamma < 1$ and we get back our current structure. Thus our current approach and this approach becomes equivalent.
21. Note that lower e leads to lower expected return for the parents but at the same time lower b increases the parents expected payoff.
22. This might also imply that in developed economies where the outside options of surrogates are sufficiently high altruistic surrogacy contracts are not an optimal solution.
23. Can be psychological also.
24. Note that this situation is to some extent similar to the profit-oriented sector considered in Besley and Ghatak (2005).
25. The proof can be obtained from the authors on request.

26. This is due to the specific functional form of the intended parents' objective function.
27. See Kanbur (2004).
28. See Besley and Ghatak (2005).

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