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Abstract:

We develop a model of commercial gestational surrogacy in which a childless couple approaches a prospective surrogate, who is willing to gestate for the couple. The surrogate's care is non-contractible. We show that if the surrogate doesn't have any wealth, at the optimum, she is always found to put in sub-optimal effort. Put differently, the surrogate cannot be made a residual claimant and therefore eliciting first best care is never optimal. Therefore the paper, in a hidden action framework, formalizes this 'inefficiency' inherent in the Indian 'rent-a-womb' market.

Keywords: Surrogate, intended-parents, surrogacy agency, monitoring, moral hazard.

JEL Classifications: I11, J13, L14, L24.

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1. Introduction:

"They need their child..... I need the money."

-An Indian Surrogate[1]

Commercial surrogacy, or "wombs for rent," is a growing business in India. Increasing numbers of infertile couples from the U.S, Singapore, Britain, Taiwan, Nordic and other countries are flocking to India in search of prospective surrogates for their would be babies. India provides an English-speaking environment and cheaper services as attractive incentives for those exploring surrogacy as a fertility option. While India is becoming a preferred medical tourism destination in many ways, the issue of wealthy foreigners paying poor Indian surrogates to have babies has raised ethical concerns in many Indian minds about some parts of India becoming "baby factories". While in India commercial surrogacy is not illegal per se, there is yet no legislation that dictates a code of conduct of the mushrooming infertility clinics allover India. India has decent guidelines in ART (ICMR, 2004), but the industry for infertility treatment lacks proper legal structure and legal clarity regarding the transfer of parental rights and entitlement of nationality, among others.[2]

But what is surrogate motherhood? According to the Merriam-Webster online dictionary, a surrogate mother is defined as "a woman who becomes pregnant usually by artificial insemination or surgical implantation of a fertilized egg for the purpose of carrying the foetus to term for another woman, who is medically incapable of doing so." Therefore 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 couple, who hire a surrogate, are known as the

[1] Reported at http://www.sfgate.com/local/bayarea/item/India-surrogacy-Chapter-One-23858.php. Similar reports are cited at CNN, Asia, available at http://edition.cnn.com/2013/11/03/world/asia/india-surrogate-mother-industry/ .
[2] For more, see Smerdon (2008).

intended parents or the commissioning couple (ACOG 2004). There are two kinds of surrogacy: (i) straight (natural/ traditional) and (ii) gestational (or host).

To explain briefly, in straight surrogacy, the sperm of the intended father is used to inseminate the surrogate and 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)[3]. 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 and Embryo Transfer (henceforth IVF-ET). Here, the surrogate is only a gestational carrier and the intended parents are the biological (or genetic) parents[4] [5]. From a legal standpoint surrogacy contracts can be of broad two types – 'altruistic' where no money is paid to the surrogates for her 'services' (mainly in excess of necessary medical expenses) and 'commercial' where money (or incentives) is paid to the surrogates for her 'services' (in excess of medical expenses).

There are a large number of issues regarding the institution of surrogacy that can be addressed: Whether the institution is a 'godsend' for childless couples or a threat to the very fabric of society? Does it allow fertile women to fulfill a social responsibility, or does it lead to commoditization of women? Issues like whether or not such markets should be prohibited outright or regulated[6], should the payment to a surrogate be banned[7] so that the service remains

[3] For more details, see ICMR 2004, www. ivf-infertility.com
[4] For more details, see ICMR 2004, www. ivf-infertility.com
[5] We ignore the case where donor sperm is combined with donor or surrogate eggs because the child is not genetically related to intended parents.
[6] For regulation and ethical guidelines in Australia refer to Government of Australia (2007), Australian Government (2007), Ethical guidelines on the use of assisted reproductive technology in clinical practice and research.
[7] For example in UK payments in excess of medical expenses i.e. incentive payments are strictly prohibited (For legal guidelines on surrogacy practices and legislation in UK, visit http://www.legislation.gov.uk/ukpga/2008/22/pdfs/ukpga_20080022_en.pdf).

altruistic, what the 'sacredness' of human life means in an economic context, can be discussed at large. But in this paper we abstract from such issues.[8]

In this paper, we specifically focus on the optimal organization of surrogacy contracts and the inherent inefficiency using a bilateral contracting structure between a set of Intended Parents and a poor Surrogate. We show that since the surrogate is poor and doesn't have any wealth and given the nature of the output, it is not optimal for the intended parents to offer a contract that makes the surrogate a residual claimant of the surplus. Instead the intended parents should optimally offer a share-type contract and this will optimally lead to sub-optimal investment by the surrogate[9]. Therefore the paper tries to formalize the idea that under-investment will be an inherent feature of the 'rent-a-womb' industry in India where surrogates come from poor and humble background. The structure we use is a hidden action model with limited liability. Note, that in this paper without loss of generality, we focus on commercial gestational surrogacy contracts only[10] where it is assumed that money can be paid to the surrogate for her 'services' either legally (or illegally) and the ethical and/or legal aspect is not the focus of this paper.

Our paper is related to the contract theoretic literature on the 'womb market' (Banerjee (2013), Banerjee and Basu (2009))[11]. Banerjee (2013) addressed the debate on whether a surrogacy institution should be "Commercial or Altruistic'. Using the classic moral hazard framework with limited liability he analyzed conditions under which a surrogacy contract should be commercial or altruistic. Also, Banerjee and Basu (2009) in an incomplete contracting framework showed that if child specific care is non-contractible then surrogates optimally invest less (take less care) than the first-best. Couples are also more likely to choose low-type

[8] For more on ethical discussions on surrogacy markets see Ergas, (2004), Posner (1989).
[9] For a similar kind of idea but in a different context see Banerjee, Gertler and Ghatak,(2002).
[10] Other forms of surrogacy can also be analyzed under this structure with slight modification.
[11] See Hatzis (2003) for a general equilibrium approach on surrogacy.

surrogates, who need less compensation for foregoing cheaper outside options. Hence the popular practice of making surrogacy contracts unenforceable might be counterproductive and puts the unborn child at risk.

Some comparison of this paper with the Banerjee (2013) paper is warranted at this point. In Banerjee (2013) the surrogate suffered from a feeling of social ignominy from commercial motive and that let the surrogate to put in sub-optimal effort irrespective of whether limited liability was binding or not[12]. Therefore social ignominy was sufficient to generate inefficiency in that model. Whereas in this paper we do not have anything like social ignominy, but inefficiency still arises out of the fact that the surrogate doesn't have any wealth. Also in this paper the limited liability constraint always binds at the optimum.

2. The reproductive industry in India-Some issues and trends:

Suboptimal Care:

In India, the temptation of a poor women to become a surrogate can be entirely blamed on the very low level of daily income. The average daily income of the non-agricultural rural population is as low as Rs. 48 (for women) and Rs. 71(for men) a day.[13] A house-hold of minimum four members can scarcely be sustained with this income. Leave aside the need for education, better nutrition or else, a large section of the rural population in India can hardly avail four meals a day. It is this economically marginalized group who sees surrogacy as a brilliant opportunity to improve their livelihood. The widespread notion about surrogates being overwhelmed to offer infertile couples the joy of parenthood is an exaggeration. Strikingly, the reality is women offer their services as surrogates in the anticipation of a better livelihood. Given, an alternative avenue of income they confess "not to prefer working as surrogates."[14]

[12] In fact there was a case where limited liability didn't bind at the optimum.
[13] Consult Indiastat for detailed report, available at http://www.indiastat.com/searchresult.aspx.
[14]

It will be an injustice to blame the surrogates for putting in suboptimal effort in caring for the fetus, or considering surrogacy as a secondary choice. Rather this attitude may be traced back to various other reasons.

Experts feel it is best to separate the surrogates' motherhood emotions from the "job" (of substituting for the genetic mother in bearing the pregnancy) and in the process generates a psychology in the surrogate that subdues the best care she could have given to the child. The rationale is the surrogate would start to feel a motherly connection to the child and may become reluctant to give up the child. These women are poor and less aware, and needs an elaborate psychological as well as physical grooming in order to adjust to the complex emotions that may be attached with such projects. But, the industry provides a very feeble foundation to the 'making of surrogate mothers'. Also, not only she bears the child but also must undergo physical treatments that would alter their biological routines completely. It is an ordeal to make the body realize that it is pregnant through artificial procedures and these efforts of the surrogates go neglected in case of the Indian surrogates. She is paid much less than the foreign surrogate. So, the foreign counterparts are more ready and willing to undergo the effort that is required as she is sufficiently compensated. The Indian surrogates are ignorant and are offered little incentive to give that extra effort. This, as most critics call is 'exploitation of the wombs'.

The Indian surrogates receive lower compensation if an abortion is desired by the Commissioning Couple mid-way into the course of the surrogate's pregnancy. Often cases have been cited where bearing twins would fetch them less than double compensation. No particular settlement is made on the maximum number of IVF cycles to be undergone by each surrogate. Contracts are misleading and contain incomplete information towards the rights of the surrogate. Often surrogates' health is put at risk due to multiple pregnancy or repeated IVF cycles. The surrogates are not covered for these risks. It would have been more appropriate to penalize the Commissioning Couple for frivolously desiring an abortion and compensating the surrogate more for bearing physical uncertainties. So, there are conflicts in the degree of discretion to be given to each party and its consequences upon the welfare distribution among the parties. Rather, this industry applies 'consumer sovereignty' as it applies to all other commercial market

transactions even at the cost of depleting the surrogates' state of health. But, this market exceeds the boundaries of the commonly perceived commodity markets. Hence, the general attitude towards the rights and rewards of the surrogates must be altered in order to fit the special requirements of this industry.

The Indian contracts usually overlook the insurance requirements of the Surrogate. Most contracts have no provision to compensate the death or damage to health caused due to the pregnancy. This is a criticized point in the design of the contracts. Even when the surrogate's risk is covered, there is little chance and capability that she will challenge the non-payment of the insurance in court. Certainly, since India has no implementable legislation hence violation of the recommended contract is hardly a folly under the given circumstances.

The surrogate is made to feel almost like she has been just 'employed' and hence it is justified that she does not feel the level of responsibility towards the fetus like it could have been if she was made a part of the pregnancy. Neither is the surrogate justifiably compensated to allow her to understand that whatever hardships she undergoes it earns her a wage. Hence, if rightly compensated, it could have been possible to extract optimal care from the surrogates. But, most essentially it can be argued that sub-optimal care is obvious given the surrogates must feel a level detachment towards the fetus in order to keep a professional attitude and that she is not adequately compensated.

Moreover, a social stigma operates in the Indian scenario. The society at large cannot see a woman impregnated by any means else than that is ordained by the laws of nature. This depreciates the perception of the surrogates about their own social worth. They cannot feel proud of what they are participating in. They would feel empowered and respectable if only they were perceived as 'valuable', if they were let to know how much gratitude the Commissioning couples feel towards them. This is a missing factor that influences the surrogates' emotion in a fashion that keeps them from optimally participating in these projects. This industry is bound to suffer from a cycle of low investments….flowing back and forth between the Commissioning couple and the surrogates.

Surrogates at risk:

It has been seen that in many cases it is purely the monetary compensation paid to the surrogates that lures poor women into taking all kinds of risks, risks that they know little of. Majority of these women are illiterate enough to understand the exact terms and consequences of the contract they sign. This is clear from reports that claim that surrogates agree to take all efforts to protect the fetus even at the cost of their health, and even willing to be "sustained with life-support equipment" to protect the fetus[15]. Often, the medical community is accused of neglecting the health of the surrogate all together. Their focus and liability being only the delivery of a healthy child to the commissioning couple. "The highly secretive and largely unregulated baby factories (many of which are dressed up as legitimate IVF Clinics) now mushrooming all over India are usually only concerned with the end product: the child"[16]. To give an example we cite the case of Premila Vaghela, a poor 30-year-old surrogate who died during her pregnancy. The foetus, eight-months old and premature, was secured through an emergency caesarian section delivery. Since, the contract had no terms to offer risk coverage in case of the surrogate's death, the surrogacy agency was not liable to offer any compensation owing to her death. The agency paid off the amount owing to the successful birth of the baby, keeping her family from registering any complaints against them.

Thus one can cite umpteen examples where women who offer their wombs for rent may not fully see or internalize the risks involved, but they are somewhat happy to realize their personal expectations. For many this is a source of bulk income required to buy a house, or educate their children, or may be secure medical care for their ill husband. ".....as for the women who bear

[15] Refer to the report available at http://www.theguardian.com/commentisfree/2012/jun/05/india-surrogates-impoverished-die.

[16] For detailed report follow The Guardian, available at http://www.theguardian.com/commentisfree/2012/jun/05/india-surrogates-impoverished-die.

the children of others, they earn for them a hefty fee of about $8,000 — enough to buy a house — while their husbands might toil away for $40 a month."[17]. But the ultimate fallout of the system is a cycle of low child specific investments……the market do not attract educated women, who might have better awareness, and healthier lifestyle habits fit to carry a healthy baby. As a consequence, women's health as well as the new-born child's is sufficiently at jeopardy to doubt the sustainability of this industry in the long run.

With this in mind we proceed with our analysis as follows. In section 3 we describe the baseline model of gestational surrogacy contracts with a pair of intended parents and a poor surrogate. We show that simple economic rationale per se can explain the inherent underinvestment in these sorts of industries. Section 4 discusses an alternative model formulation which is isomorphic to the baseline model. Section 5 concludes our paper.

3. The Baseline Model:

Following Banerjee (2013) we explore an interaction between a set of 'intended parents' and a 'surrogate mother' (gestational carrier) who will be willing to bear their child through In-vitro Fertilization and Embryo Transfer (i.e. IVF-ET). Both the intended parents and the surrogate are assumed to be risk neutral. We assume that the intended parents are otherwise medically capable in the sense that the husband has normal sperm count and the wife capable of producing normal ovum. But because of certain medical problems[18] the wife is incapable of carrying a baby till term and therefore need a surrogate to have a biological baby. After in-vitro fertilization the

[17] Find the detailed report at http://www.forbes.com/sites/kylesmith/2013/10/03/pregnancy-got-you-down-no-problem-outsource-your-babymaking-to-india/

[18] Problems like (i) hysterectomy (ii) absence or malformation of uterus, since birth (iii) diabetes, multiple sclerosis, heart and kidney diseases (iv) repeated miscarriages. See section 1 of Banerjee and Basu (2006) for details. Also see Banerjee (2013)

embryo is transferred to the gestational surrogate the surrogate starts taking care of the unborn child. Delivery takes place after the biological gestation period is over. Therefore similar to Banerjee (2013) the intended parents provide the genetic material (biological parents) of the baby and the surrogate is only a gestational carrier[19]. We assume that the property right of the baby remains with the intended parents and the surrogate is supposed to hand over the baby to the intended parents after everything is successfully completed[20]. 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.

The structure of the game is as follows. The intended parents approach a prospective surrogate and offer a state contingent contract. We assume that the intended parents are supposed to pay $\bar{t}$ if the project succeeds, i.e. the Intended Parents are delivered a healthy baby. If the project fails then the surrogate is paid $\underline{t}$ where $\bar{t} > \underline{t}$. Failure can be interpreted as having an unhealthy baby or a still baby or otherwise. Therefore we specifically assume a generalized incentive structure $\{\bar{t}, \underline{t}\}$ contingent on the outcome of the project. We assume that a limited liability constraint operates which ensures that a surrogate cannot be paid a negative amount, i.e. $\underline{t} \geq 0$. Since, surrogates are endowed with little or no wealth at all, we may expect this limited liability to operate, i.e., she must not be penalized for a bad outcome[21]. After the contract is offered the surrogate starts taking care of the unborn child[22]. The surrogate's care is represented

[19] Therefore without loss of generality we focus on gestational surrogacy and other forms of surrogacy can be easily accommodated in our model with slight modifications.
[20] ICMR guidelines in India Support this assumption.
[21] Also one interpretation can be that she must be covered for all expenses (medical or otherwise) made for her pregnancy and therefore she should at least be paid $\underline{t} > 0$, for simplicity we can normalize the minimum amount payable to 0.
[22] If she accepts the contact and at the equilibrium it can be shown that she will.

by e which is the surrogate's effort in this case. Effort is costly and the cost is given by $\frac{e^2}{2}$. Effort of the surrogate is not observable and hence not contractible. After the gestation period is over outcome of the process is realized. The outcome can be 'high' which is nothing but the birth of a normal child and we denote it by $Y_h = 1$. 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 can be denoted as $Y_l = 0$[23]. The outcome is observable and hence contractible. In case of success the intended parents get a fixed utility $V > 0$ from having a biological baby and gets 0 if the process fails. We assume that that the surrogate is altruistic and receive a non-pecuniary benefit (warm-glow) of λV from successfully helping out the intended parents where $\lambda > 0$. If $\lambda > 1$ 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 get any altruistic pleasure. The surrogate is assumed to have an outside option denoted by $\bar{U} > 0$. We summarize the timeline of the game below:

The Time line:

1. The Intended Parents approach a surrogate, about whom they are well informed regarding the intensity of the surrogate's altruistic feelings for the couple before they offer a contract.
2. The Intended Parents offer an outcome contingent contract $\{\underline{t}, \bar{t}\}$, with $\bar{t}$ being offered only after the successful delivery of a normal baby, $\underline{t}$ is paid in case of failure.
3. The surrogate accepts or rejects the contract. The game ends if she rejects the contract.
4. After both parties agree IVF-ET takes place and the surrogate starts taking care of the unborn child.

[23] Therefore without loss of generality we focus on a 0-1 outcome.

5. After the period of gestation, delivery takes place and payments are settled depending on the according to the terms of the contract.

Given the above structure the Intended Parent's (IP) surplus function is given by

$$\pi_{IP} = e.\left(V - \overline{t}\right) + (1-e).\left(-\underline{t}\right)$$

Or, $$\pi_{IP} = e.\left[V - \left(\overline{t} - \underline{t}\right)\right] - \underline{t} \quad (1)$$

The surrogate's expected pay-off can be written as

$$\pi_S = e.(\lambda V + \overline{t}) + (1-e).\underline{t} - e^2/2$$

Or, $$\pi_S = e.[\lambda.V + \left(\overline{t} - \underline{t}\right)] + \underline{t} - e^2/2 \quad (2)$$

The Optimal Contracting Problem:

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

$$\underset{e\in[0,1]}{max}\, S = e.(1+\lambda)V - \frac{e^2}{2} \quad (3)$$

The optimal first best monitoring effort will be $e^* = (1+\lambda)V$. The maximized first best joint surplus will therefore be $S^* = \frac{(1+\lambda)^2V^2}{2}$. The first best monitoring effort and the optimal first best joint surplus increases with the altruism of the surrogate.

Now we examine the situation where the effort of the surrogate is unobservable and hence non-contractible. Therefore the optimal contracting problem of the intended parents can be represented as the following maximization problem:

$$max_{\{\bar{t},\underline{t}\}}\, \pi_{IP} = e.\left[V - \left(\bar{t} - \underline{t}\right)\right] - \underline{t} \qquad (4)$$

Subject to the following constraints:

(i). The participation constraint of the surrogate stating that she must at least receive her outside option:

$$e.\left(\bar{t} - \underline{t} + \lambda V\right) + \underline{t} - e^2/2 \geqq \bar{U} \qquad \text{(PCS)}$$

(ii). The incentive compatibility constraint of the surrogate stating that she chooses the effort level that maximizes her expected payoff:

$$e = arg\, max_{\hat{e}} \ \left\{\hat{e}.[\lambda.V + \left(\bar{t} - \underline{t}\right)] + \underline{t} - \hat{e}^2/2\right\} \qquad \text{(ICS)}$$

which can be rewritten as

$$e^{SB} = [\lambda.V + \left(\bar{t} - \underline{t}\right)]$$

(iv). The limited liability constraint of the surrogate

$$\underline{t} \geqq 0 \qquad \text{(LLS)}$$

Incorporating the above incentive compatibility constraint the optimal contracting problem can be represented as follows:

$$max_{\{\bar{t},\underline{t}\}}\, \pi_{IP} = (1-\lambda)\left(\bar{t} - \underline{t}\right)V - \left(\bar{t} - \underline{t}\right)^2 + \lambda V^2 - \underline{t}$$

Subject to

$$\frac{\left(\bar{t} - \underline{t} + \lambda.V\right)^2}{2} + \underline{t} \geqq \bar{U}$$

$$\underline{t} \geqq 0$$

First we consider the case where the outside option of the surrogate is very low such that the participation constraint does not bind. In this situation it is optimal for the intended parents to set $\underline{t} = 0$ keeping $\left(\bar{t} - \underline{t}\right)$ unchanged. So fixing $\underline{t} = 0$ the optimum $\left(\bar{t} - \underline{t}\right)$ can be found by simply maximizing the intended parents' expected payoff subject to $\left(\bar{t} - \underline{t}\right)$ and we get

$(\bar{t} - \underline{t}) = \frac{(1-\lambda).V}{2}$. Therefore the optimal contract in this range will be $\left\{\bar{t} = \frac{(1-\lambda)V}{2}, \underline{t} = 0\right\}$ which is, in essence, a share-type contract and the optimal effort in this situation will be $e^{SB} = \frac{(1+\lambda).V}{2}$ which is less than the first best. Plugging in the values of $\bar{t}$ and $\underline{t}$ in the participation constraint we get the restriction $\bar{U} < \frac{(1+\lambda)^2}{8}V^2$. If $\bar{U}$ belongs to this range then the PC of the surrogate doesn't bind and therefore we can ignore the participation constraint.

For intermediate values of $\bar{U}$ such that $\frac{(1+\lambda)^2}{8}V^2 \leq \bar{U} < \frac{(1+\lambda)^2}{2}V^2$, both the participation constraint and the limited liability constraint will bind and the optimal contract is found by solving both the participation and the limited liability constraints, and we get $\bar{t} = \sqrt{2.\bar{U}} - \lambda.V$ and $\underline{t} = 0$ and the optimal effort is given by $e^* = \sqrt{2.\bar{U}}$ and since $\bar{U} < \frac{(1+\lambda)^2}{2}V^2$ the optimal effort is always less than the first best. The intended parents will have non-negative payoff in this situation.

For higher values of $\bar{U}$ such that $\bar{U} \geq \frac{(1+\lambda)^2}{2}V^2$, the participation constraint will bind but the limited liability will not bind. The optimal contract can be found in the following way. Since PCS binds, substitute, $\underline{t}$ from PCS into π_{IP} and we get

$$\pi_{IP} = (\bar{t} - \underline{t})V - \frac{(\bar{t} - \underline{t})^2}{2} + \frac{\lambda V^2(2+\lambda)}{2} - \bar{U}$$

Maximizing this expression with respect to $(\bar{t} - \underline{t})$, we get $(\bar{t} - \underline{t}) = V$, which in essence is nothing but a fixed rent contract that makes the surrogate the residual claimant and the optimal effort will be at the first best level $(1 + \lambda)V$. But what happens to the intended parents' payoff? Plugging $(\bar{t} - \underline{t}) = V$ into the intended parent's payoff we get $\pi_{IP} = -\underline{t} < 0$. Therefore it is not possible for the intended parents to have positive payoff when $\bar{U} > \frac{(1+\lambda)^2}{2}V^2$ and therefore it is

not optimal for the intended parents to offer such a contract and therefore optimal first best effort cannot be achieved. Technically put, this is the situation where one can possibly offer a fixed rent contract but this is not possible since the surrogate cannot compensate the intended parents when the process fails. Therefore making the surrogate residual claimant is not possible as that will hurt the intended parents and they will end up with negative payoff. The above findings can be stated in the following result:

Proposition 1:

(a). If $\overline{U} < \frac{(1+\lambda)^2}{8}V^2$*, then the optimal contract is* $\left\{\bar{t} = \frac{(1-\lambda)V}{2}, \underline{t} = 0\right\}$ *which is in essence a share-type contract. Optimal incentive pay falls with surrogates' altruism. Optimal effort is less than the first best.*

(b). For $\frac{(1+\lambda)^2}{8}V^2 \leq \overline{U} < \frac{(1+\lambda)^2}{2}V^2$*, the optimal contract is* $\left\{\bar{t} = \sqrt{2.\overline{U}} - \lambda.V, \underline{t} = 0\right\}$*. Optimal incentive pay increases with surrogates' outside option but falls with surrogates' altruism. Optimal effort is always less than the first best.*

Proof: Follows from the above discussion. QED

The above result theoretically formalizes the argument that in the Indian market where surrogates come from poor background and doesn't have any wealth; suboptimal care will be an inherent feature. The fact that the property rights of the baby lies with the intended parents and it is not optimal for the intended parents to incentivize the surrogate appropriately to elicit the first best effort. Given that the optimal contract in this situation is a share-type contract, we in the next section construct a model of share-type contract and try to find to optimal shares in such a scenario.

4. Alternative Model Specification: The Share Contract:

In the previous section we have assumed that the Intended Parents offer the surrogate an outcome contingent contract $\{\underline{t}, \overline{t}\}$. It has already been shown that starting from a general incentive structure, the optimal incentive contract resembles a share contract. Given this, in this section, we take a step forward and examine the optimal share contract that the intended parents will offer the surrogate and we show that the two specifications are largely isomorphic.

Therefore we assume that the Intended Parents offer a share contract {F, α}, where F is offered irrespective of the outcome of the project and α denotes a share of utility gain (the money equivalent) enjoyed by the Intended Parents from having the baby. All other notations resemble those used in the previous section. Also, the pay-off structure used in the earlier model is retained.

Thus, the Intended Parent's (I.P) surplus function is given by

$$\pi_{IP} = e.(V - \alpha V) - F \tag{6}$$

And the surrogate's expected payoff will be

$$\pi_S = F + e.(\alpha + \lambda).V - e^2/2 \geqq \overline{U} \tag{7}$$

The Optimal Share-type Contract:

The optimal first best contract will be the same as in the previous case. When the surrogate's effort is non-contractible, the optimal contracting problem of the intended parents can be represented as the following maximization problem:

$$max_{\{F,\alpha\}}\, \pi_{IP} = e.(V - \alpha V) - F \tag{8}$$

Subject to the participation constraint

$$\pi_S = F + e.(\alpha + \lambda).V - e^2/2 \geqq \overline{U} \tag{9}$$

The incentive compatibility constraint:

$$e^{S.B} = arg\,max_{\hat{e}}\ \{\hat{e}.(\alpha + \lambda).V - \hat{e}^2/2\} \quad (10)$$

$$= \ (\alpha + \lambda).V$$

And the limited liability constraint of the surrogate

$$F \ \geqq 0, \quad (11)$$

Internalizing the incentive compatibility constraint the optimal contracting problem reduces to:

$$max_{\{F,\alpha\}}(\alpha + \lambda)(1 - \alpha)V^2 - F$$

Subject to

$$F + \frac{(\alpha+\lambda)^2.V^2}{2} \ \geqq \overline{U}$$

$$F \ \geqq 0$$

The solution is similar to the previous model. This model is found to be isomorphic to the previous model.

Depending on the value of $\overline{U}$ there can be two cases:

(i). $\overline{U}$ is not so high such that participation constraint doesn't bind.

(ii). $\overline{U}$ is sufficiently high such that the participation constraint binds.

A third case is found to exist for very high $\overline{U}$, where a contract with each agent agreeing to participate does not exist. This case seems to restore the first-best outcome, yet either of the agent or the principal is bound to be left with a negative surplus. We simply ignore this case. And similar to the previous model we find that sub-optimality is an inherent feature of this market the way it has been structured here.

We characterize the optimal contracts in both the above cases separately:

Case1: Participation constraint doesn't such that $\overline{U} < \frac{(1+\lambda)^2}{8}V^2$.

For very low $\overline{U}$, the participation constraint doesn't bind. The Intended Parents may offer lower F until at least the Limited Liability binds. Thus, it is optimal for the intended parents to set $F^* = 0$. This does not affect the effort of the surrogate and hence can be justified. The intended parents will optimally choose α so as to $max_\alpha\ (\alpha + \lambda).(1 - \lambda).V^2$ and we get the following result:

Proposition 3: *Suppose $\overline{U} < \frac{(1+\lambda)^2}{8}V^2$ holds.*

A. *The intended parents will offer $\alpha^* = \frac{1-\lambda}{2}$ fraction of their satisfaction (money equivalent) to the surrogate as incentive bonus in case of success. The optimal share decreases with the altruism of the surrogate.*
B. *The optimal fixed fee offered by the intended parents will be $F^* = 0$.*
C. *The optimum effort of the surrogate will be $e^* = \frac{(1+\lambda)}{2}.V$ which less than the first best effort. The optimal effort increases with surrogates' altruism.*

Case2: $\frac{(1+\lambda)^2}{8}V^2 \leq \overline{U} < \frac{(1+\lambda)^2}{2}V^2$:

In this situation $\overline{U}$ is sufficiently high such that the participation constraint binds. Therefore in this case the solution will be determined both by the binding incentive compatibility and the participation constraint of the surrogate. Thus solution to the optimal contract in this situation is as follows:

Proposition 3: *Suppose $\overline{U} \in \left[\frac{1}{2}\left(\frac{1+\lambda}{2}\right)^2.V^2, \frac{(1+\lambda)^2.V^2}{2}\right]$ holds. Then the optimal contract is characterized as follows:*

A. *The intended parents will offer the surrogate* $\alpha^* = \frac{\sqrt{2\overline{U}}}{V} - \lambda$. *The optimal share increases with the surrogate's outside option* $\overline{U}$ *and falls with surrogate's altruism.*

B. *The optimal fixed fee offered to the surrogate is* $F^* = 0$.

C. *The surrogate's optimal effort is* $e^{SB} = \sqrt{2\overline{U}}$ *and it is less than the first best. Optimal effort increases with the surrogate's outside option but is independent of the level of the surrogate's altruism.*

The explanation of the Proposition 2 and 3 is similar to Propositions 1 made in our previous model. The results are exactly identical; as this model is isomorphic to the baseline model. Therefore the upshot of the analysis is that if the surrogate is sufficiently poor and doesn't have any wealth and also given that the property right of the baby lies with the intended parents, the surrogate will always take suboptimal care during gestation and that might be detrimental to the wellbeing of the baby.

5. Conclusion:

In the expanding reproductive tourism industry in India, financially needy women offer themselves as surrogates. They have very little wealth, very little education and therefore little health awareness. Indian surrogates are one of the lowest paid in this market across the globe. There is no legal homogeneous scheme of payments made to the surrogate. [24] Often it has been argued that since the surrogates are mainly motivated by financial incentives, there is an possibility that the surrogates might take suboptimal child specific care during gestation and therefore the unborn child might be at risk. Our paper attempts to give a theoretical explanation

[24] Often the particular nature of the payment is reimbursement of the maintenance costs (paid monthly) plus a lump sum transfer after the parental rights are transfer red to the Commissioning Couple.

to this logic and shows that with the surrogate having no wealth, at the optimum, the surrogate will indeed put in suboptimal effort. Using the classic hidden action framework we show that with limited or no wealth of the surrogate, it is never optimal for the intended parents to make the surrogate a residual claimant and therefore every commercial surrogacy contract will be in essence a share contract where it is optimal for the surrogate to put in suboptimal effort. Therefore eliciting first best effort is ruled out.[25]

In Banerjee (2013) risk neutral agents put in suboptimal effort even in the absence of limited liability and that was due to 'social ignominy' modeled in that paper. Our paper assumes away the role of social ignominy. Yet, even without social ignominy, as shown here, the second-best effort is always lower than the first-best even with risk-neutral agents. There is no way that the first-best effort may be implemented within the given set of feasible contracts. Thus, this paper gives a different rationale for the existence and persistence of suboptimal care in the rent-a-womb' market in India.

An important issue open to further research is to incorporate the moral hazard incentives of the intended Parent in addition to the moral hazard incentive of the surrogate. Thus far, we have only focused our attention on the surrogate's moral hazard and abstracted from the Intended Parent's moral hazard. Therefore one can have a two-way moral hazard model where both the intended Parent and the surrogate's actions are subject to moral hazard. Moreover, in this paper we have assumed away any third party intervention or intermediation (such as infertility clinics) in surrogacy arrangements. In future we plan to examine the role of infertility clinics and optimal contracts in that scenario. Finally, one can also consider the discrete effort case and check whether our results go through in that structure also.

[25] Banerjee , Gertler and Ghatak (2002)

References:

Australian Government (2007), Ethical guidelines on the use of assisted reproductive technology in clinical practice and research, June.

Banerjee, S., (2013), "Gestational surrogacy Contracts: Altruistic or commercial? A Contract Theoretic Approach", The Manchester School, 2013 (June), Vol-81 No. 3 438–460.

Banerjee, S., and Basu, S., (2009), "Rent a Womb: Surrogate selection, Investment Incentives and Contracting", Journal of Economic Behavior and Organization, vol. 69, Pages 260-273. (Also see SSRN Working Paper # 894022 (2006)).

Ergas, Y., (2004) "Babies without Borders: Human Rights, Human Dignity, and the Regulation of International Commercial Surrogacy."

Galbraith, M., McLachlan, H. V., and Swales, J. K., (2005): "Commercial Agencies and Surrogate Motherhood: A Transaction Cost Approach", Health Care Analysis, Vol-13, No.1, March.

Grayson, D.R. (1998), "Mediating Intimacy: Black Surrogate Mothers and the Law", The Chicago University Press, Accessed: 06/09/2013 07: 53.

Hatzis, A.N., (2003): Just the oven: A Law and Economics Approach to Gestational Surrogacy Contracts, in Katharina Boele-Woelki (eds.) Perspective for the Unification or harmonization of Family Law in Europe, Intersentia, Antwerp.

Indian Council of Medical Research (2004): National Guidelines for Accreditation, Supervision and Regulation of ART Clinics in India.

Krawiec, K. D., (2009), "Altruism and Intermediation in the Market for Babies", Washington and Lee Law review, vol. 66, issue 1, article 5.

Posner, R., (1989): The Ethics and Economics of Enforcing Contracts of Surrogate Motherhood, The Journal of Contemporary Health Law and Policy, 5(21), 21-31.

Smerdon. U. R., (2008), "Crossing Bodies, Crossing Borders: International Surrogacy between the United States and India", Cumberland Law Review, vol.39.

Spar, D.L., (2006). "The Baby Business: How Money, Science, and Politics Drive the Commerce of Conception", Harvard Business School Press, Boston, Massachusetts.

The Telegraph: Available at www.telegraphindia.com, various issues

Times of India: Available at www.timesofindia.com, various issues.

The Guardian, UK: Available at http://www.theguardian.com/info.

CNN, Asia: Available at http://edition.cnn.com.

San Francisco Chronicles: Available at http://www.sfgate.com/local/bayarea/item/India-surrogacy-Chapter-One-23858.php.

Indiastat: Available at http://www.indiastat.com/default.aspx.

Refereed web sites:

http://abcnews.go.com/Nightline/story?id=128652&page=1

http://www.dailymail.co.uk

http://edition.cnn.com/2013/03/04/health/surrogacy-kelley-legal-battle

http://www.fertilityindia.com

http://irssh.com/yahoo_site_admin/assets/docs/18_IRSSH-392-V4N1.321102751.pdf

http://www.legislation.gov.uk.

http://www.nihr.ac.uk/infrastructure/Pages/infrastructure_biomedical_research_centres.aspx.

http://www.forbes.com/sites/kylesmith/2013/10/03/pregnancy-got-you-down-no-problem-outsource-your-babymaking-to-india.