

Economic Analysis of Law Review

An Agency Cost Approach to Child Support

Uma abordagem de custo de agência para pensão alimentícia

Jaime Orrillo¹

Universidade Católica de Brasília

RESUMO

Este artigo trata do problema de investimento que uma mãe separada ou solteira enfrenta em relação a como financiar a formação integral de sua prole. Nós interpretamos a formação integral como incluindo alimentação, educação, vestuário, etc. Nós mostramos que a mãe é indiferente em relação à fonte de financiamento, seja ele pago em dinheiro emprestado de instituições de crédito ou dinheiro obtido através dos pagamentos de pensão alimentícia. Este resultado de irrelevância é obtido dado que a mãe não usa os pagamentos de pensão alimentícia para seu próprio benefício. Caso contrário, ela vai ter que suportar um custo de agência por causa da incapacidade de compromisso que ela tem em relação ao montante investido. Ficamos com este último resultado usando um jogo dinâmico jogado apenas pelos pais. Finalmente, discutimos a possibilidade de a criança tomar parte no jogo, transmitindo algum sinal de desconforto ou formar uma coligação com o seu pai / sua mãe em benefício de ambos.

Palavras-chave: Pensão alimentícia, teoria dos jogos, jogos dinâmicos, custo de agência.

JEL: K0, D82, G3

ABSTRACT

This paper deals with the investment problem that a separated or never-married mother faces regarding how to finance the integral formation of her offspring. We interpret integral formation as meaning food, education, clothing, etc. We show that the mother is indifferent in regard to the financing source, be it borrowed money from credit institutions or money obtained via the child support payments. This irrelevance result is obtained provided the mother does not use the child support payments for her own benefit. Otherwise, she will have to bear an agency cost because of the inability of commitment that she has in relation to an invested amount. We get this latter result by using a dynamic game played only by parents. Finally we discuss the possibility of the child taking part in the game by transmitting some discomfort signal or forming some coalition with his/her mother in benefit of both.

Keywords: Child support; full control; agency cost; dynamic games.

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1. Introdução

Among all the rights that a child has, rights to an education and food are fundamental. However, the child can be affected and not enjoy his rights because of a separation of his parents or the fact that his parents never united in a marriage relationship. All these facts bring disadvantages to minors. In case the child does not live in a well-established family structure the mother or the guardian of the minor can avoid such disadvantages claiming that by right he or she is entitled to an amount of money which is stipulated by the law and depends on the father's income.

The law which guarantees that the guardian receive such an amount to supply the minor's needs is called the child support law. This law stipulates the arrest of the person, typically a noncustodial divorced parent or simply a never-married parent, who fails to provide the child support payments. Notice that child support consists of court-ordered payments to support an individual's minor child or children. However, we will use this term (child support) even when the money transferred to the guardian is not established by law. This will be the case in which parents love their offspring and reach an agreement about the amount transferred by the father to the mother.

Much has been written about child support from both economic and law perspectives. Concerning the former, Del Boca and Ribero (1998) assert that "one of the major causes of poverty in single parent families is the inadequate amount of child support." As for the latter, which is not our concern, there exists an abundant literature dealing with this important theme. See for instance Comanor² (2004) which concerns itself mainly with the problem of the failure of child support payments. Now, for a mixed literature of law and economics, see Weiss and Wills (1993), Del Boca and Flinn (1995), and Roff (2008).

The child support law does not say anything about the guardian who receives the child support. That is, the law does not penalize the guardian who could possibly spend a part or the total child support payments on herself. This fact, besides causing economic inefficiency because of the non-allocation of court-ordered payments, leads to the need of seeking a legal figure in order to consider it as an offense. Even though, as said above, our analysis of child support is not from a legal perspective, we suggest that the appropriation of the money that the mother does for her own benefit can be considered an economic crime of embezzlement. The argument is as follows: once the law has established the amount of money that the mother will receive, the link between the receiver/mother and the provide/father, is lost, since it is now the legal authority that determines or establishes the mechanism of transference of resources, now public, to the mother.

Depending on the legal system of the country, the mechanism used can be of at least two types: 1) the father deposits the child support amount established by law in a judiciary account from which the money will be transferred to the guardian. 2) the judge decides that the child support amount be deducted from the father's salary when the father is an employee of some private or public firm. In either of these cases, the mother becomes a kind of depositary of funds which will be used for the child's or children's needs who, according to Weiss and Willis (1985), are public goods within the family. Hence, the mother as guardian would be incurring in speculation by extension.

This paper has three goals. The first one is to analyze the child support problem from an economic perspective. This paper does not consider the role of the child authorities in the problem. Instead, we approach the situation as an investment problem which the mother faces, similar to that of the entrepreneur in the model of Jensen and Meckling (1976). This implies that the mother will

² This volume is of considerable interest to policymakers, lawyers and parent advocacy groups.

have to raise money from external sources whenever she is unable to finance with her own resources (equity). I earnestly hope that this approach in some way helps the judicial system deliver the sentence, once this activity is considered as a offense. The other two objectives are more technical and concern the welfare of the mother when embezzling (or not) the child support. These aims will be stated later.

In order to reach our first goal, first of all, the child support problem can be included in the moral hazard³ with hidden actions literature because the father or the child support authorities are unable to observe the mother's actions regarding the allocation of the support received. Moral hazard situations have natural applications in insurance, finance and labor contracts, to name only a few. However, to be more precise the mother and the father are linked via an agency relationship. Among the papers on this matter, Spence and Zeckhauser (1971) and Ross' (1973) pioneering works stand out. For an assessment and review on this theory see Eisenhardt (1989). This literature approaches this kind of interaction in general terms. However, for the specific subject of child support we refer to Roff (2008) who models the interaction between parents as an interaction à la Stackelberg.

If the mother has enough money the investment made in favor of her offspring is not a problem. However, when the mother's income is too low in relation to the money needed to invest in the integral⁴ formation of the child, there will be problems. The external sources can be institutions which provide educational credits or the child's father. The first source will only require the repayment of the initial investment plus the interest in the final period when the child attains his or her integral formation, and where the child is able to generate the returns to pay the debt incurred by the mother in the initial period.

When the financing source is the father, the mother has two possibilities. She can request maintenance via the legal system or she can simply make an agreement with the father so that he supplies the necessary financing for the integral formation of the child. The dialogue between the mother and father, without the intervention of the law, can be defended because of the uncertainty concerning the maintenance stipulated by the judicial system, which could be lower than the necessary investment for the integral formation of the child. Notice that the child support payments stipulated by the judge depend on the income declared by the father. The father, if a lemon, then, will have an incentive to hide the real amount of his wealth. The mother, aware of this uncertainty, has a great incentive to reach an agreement with the father, offering him a part of all the returns his offspring will have in the future or allowing the father to have access to his child while the child is under the care of the mother. This can be done because the mother is assumed to retain the full control of her child. This assumption (H6 in the model) is crucial for our results. The consequences, negative or positive, of this full control could be many. For instance, the mother could plant ideas in the mind of the child that trigger feelings of appreciation or hatred towards his father.

We assume that the integral investment is an attractive investment, and both parents know this. That is, the present net value of such an investment is strictly positive. If this is not the case, the mother will not dialogue with the father and will be content with whatever the justice department stipulates, although it be too little to invest in the integral formation of the child.

The second goal of this paper is to show that when the mother promises to faithfully invest in the integral formation of her child it is the same as debt financing. That is, our finding is similar to one obtained by Modigliani and Miller (1958). Our third goal is to demonstrate that if the mother is

³ Since there exists asymmetric information which causes this economic inefficiency.

⁴ Here integral means food and education, be it technical, scientific, artistic, etc.

unable to commit to investing a particular amount, then we show that the mother invests a lower amount. This leads to an agency cost which will be borne by the mother. In order to reach this objective, the child support authorities are put aside by simplicity because the child support transfers are made via an agreement between parents.

A strong hypothesis is that the child, at the end of the period, must share his returns with his parents according to what the mother agreed upon at the beginning of period. This hypothesis is quite restrictive because there is proof that children may share only a part of their returns with their parents, or even abandon their parents, financially, at the end of the contract period, when the child becomes financially independent. In other words, the child may break the contract which was drawn up by the mother and father at the beginning of the period when the child had no decision-making powers. We must state that we have made this assumption because we wished to construct the simplest possible model, focusing upon the mother's behavior in response to the child support received. In a sequel, we hope to explore the important interactions between mother and child which can be modelled by another relationship agency.

The paper is organized the following way: Section 2 presents a benchmark model where the mother finances the whole investment using her own resources (equity). In it we also show the irrelevance of financing via debt or child support payments with the commitment of the mother. In any case, the mother's payoff remains the same. Section 3 analyzes the case in which the financing is carried out via child support payments but the mother is unable of commitment to invest a particular amount. In it we show that due to the incapability of the mother to invest all the child support payments in her child, this creates an agency cost which the mother will bear. Finally, Section 4 is dedicated to the conclusions.

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2. The model

Consider a separated or never-married mother who has an income of r monetary units. From now on, we will refer to her simply as mother.

If she invests i monetary units in her child's integral formation at the beginning of the period, the return on this investment is $f(i)$. The following assumptions about f are technical.

H1: The function f assumed to be strictly increasing and strictly concave so that $f''(i) < 0 < f'(i)$.

H2: The Inada conditions are satisfied: $f(0) = 0$, $f'(0) = \infty$ and $f'(\infty) = 0$. The mother consumes the rest of the money, $r - i$, which was not invested in the child's integral formation. Thus, the mother's utility is assumed to be $U(i) = f(i) + (r - i)$

2.1. Financing with own resources

The mother's problem is maximizing $U(i)$ subject to $i \leq r$.

The constraint reflects the idea that the mother cannot invest more than she has. From H1 and H2 imposed on the function f we see that the solution of first order condition is

$$f'(i) = 1 \quad (1)$$

This is also the solution of the mother's problem, provided that r be large enough. Denote by I this solution. Then I must satisfy (1).

Hence the mother's value function:

$$U(I) = f(I) + (r - I)$$

Suppose that $I > r$. In absence of external financing, the mother will invest all her own income and will have no income for personal consumption. That is, $I = r$ and the value function is $U(r) = r$.

More formally, one has that exists an unique $I > 0$ such that $f'(I) = 1$.

Therefore the solution of the problem is I if I is less than r , and r if I is greater or equal than r .

Obviously, in the case in which $I > r$, the mother has an incentive to raise external funds to invest in her child.

2.2. Educational debt financing

Suppose that the amount $I - r$ arose by issuing debt, that is, by borrowing from financial institutions, say banks. Under this credit, the mother will promise the financial institution a repayment D at the end of the period.

What should D be when the bank loans the mother $I - r$ at the 0 period? To answer this question, note that after rising $I - r$ in period 0, but before choosing i , the separated mother's utility is:

$$U = (f(i) - D) + [r + (I - r)] - i = f(i) - i - D + I.$$

The first term is the monetary return of the integral investment in the child minus the debt payment, the second one the amount of money that the mother has after the loan has been obtained and the last term is the cost of such investment.

Since D and I are independent of i it follows that U attains its maximum value at I . The following assumptions about capital markets are assumed.

H3: The capital markets are competitive.

H4: There is no intertemporal discount.

Under H3 and H4 the mother will invest in the education of her child only if $f(I) > I$. (that is, if the investment has positive net present value). Therefore using H3 and H4 again one has $D = I - r$. Thus, the separated mother's utility is

$$U(I) = (f(I) - D) + r + (I - r) - I = f(I) + r - I.$$

which is exactly as if she had enough money to begin with.

2.3. Child support financing with commitment

Now suppose that the father is the one who finances the child's integral formation but only under the condition that the money $I - r$ given to the mother be actually invested in its genuine proposal. Since the mother promises to invest I , then under H3 and H4, the child support payments is

$$P = (1 - a)f(I)$$

Hence to raise the $I - r$ we must have

$$I - r = (1 - a)f(I)$$

which implies

$$a = 1 - \frac{I - r}{f(I)}$$

Since the mother takes advantage of a of the integral return that her child obtains, her utility is

$$U = af(I) + P + r - I = f(I) + r - I.$$

This expression is the same as in the case in which the mother had enough money to invest in her child's integral formation. Hence, if the mother can either finance herself with debt or with the child support payments and can promise the father that she will take an efficient investment decision, then the mixture of debt and child support payments is irrelevant. From all these arguments we can then state the following proposition:

Proposition 1. Suppose that the mother is committed to invest $I > r$. Then under H1-H4 the financing of the child's integral formation is irrelevant in relation to the mixture of debt and child support payments.

3. The agency cost of child support financing

The problem now concerns the investment encountered by the mother who does not commit to invest a particular amount. We will then assume the following:

H5: The mother has full discretion of how much to invest.

H6: The mother retains full control of her child.

The previous assumptions will be crucial for this part of the paper.

Suppose that the mother has no money to finance the child's integral formation ($I > r$). That is, the amount $I - r$ must be raised via child support. Let p be the child support provided by the father.

3.1. The game

We propose a dynamic game with complete information for solving the investment faced by the mother. The timing of the game is as follows:

1. The mother offers an equity stake $(1 - a)$, where $a \in [0, 1]$.
2. The father observes (and accepts) $(1 - a)$, and then chooses the child support payment, $p(a)$.
3. The mother observes the child support level, $p(a)$ and then she chooses the investment, i .
4. The payoffs are $U(a) = af(i) + (r + p - i)$ and $p(a) = (1 - a)f(i)$.

3.2. Solution of the game

We solve this game by using the backwards-induction method. First, we characterize the mother's best response in stage (3) $\tilde{i}(a)$ to an arbitrary child support payment offered by the father in stage (2), $p(a)$.

Given $p(a)$ the mother chooses $\tilde{i}(a)$ to maximize $af(i) + (r + p - i)$ subject to $i \leq r + p$.

The mother's payoff represents the utility provided by the fraction a of the child's returns plus the amount left by personal consumption $r + p - i$. The total amount that the mother has to finance the investment i in her child is now $r + p$.

The first order condition is

$$af'(i) = 1$$

By using H2 and by assuming r large enough so that constraint is not binding⁵, there exists a unique optimal amount investment $i^*(a)$ which satisfies

$$af'(i^*(a)) = 1 \quad (2)$$

The mother's best response more generally as $i^*(a)$ if $i^*(a) < r + p$ and $r + p$ if $i^*(a) \geq r + p$.

Since the father can solve the mother's third stage problem as well as the mother can, the father should anticipate that the mother's reaction to the child support $p(a)$ will be to choose

⁵ That is $i^*(a) < r + p$.

the investment level $\tilde{i}(a)$. Thus, the father's child support payments that will be given to the mother in stage (2) is⁶

$$\tilde{p}(a) = (1 - a)f(\tilde{i}(a))$$

Then, the mother in stage (1) anticipates this child support payment and computes her payoff using $\tilde{p}(a)$ so that

$$U^*(a) = a f(\tilde{i}(a)) + (r + \tilde{p}(a) - \tilde{i}(a)) = f(\tilde{i}(a)) + r - \tilde{i}(a).$$

3.2.1. Distortion

Differentiating with respect to a on both sides of (2), and after solving for $\frac{di^*(a)}{da}$ we have that $\frac{di^*(a)}{da}$ is equal to $-\frac{1}{a} \frac{f'(i^*(a))}{f''(i^*(a))}$. This last term is strictly positive because f is strictly increasing and strictly concave. This implies that the bigger a is the greater the right the mother has to take advantage of the fruit her child will produce. As $a = 1$, one has $i^*(a) = I$. Therefore, when $a < 1$ we will have

$$i^*(a) < I \quad (3)$$

since $i^*(a)$ is strictly increasing.

Thus, under child support payments financing the mother will underinvest. This is because the mother will have to share the net profits offered by the child in adulthood with the father. More formally, when $a < 1$ from (3) it follows that

$$f'(i^*(a)) > f'(I) \quad (4)$$

which means that under underinvestment the marginal benefit from investment $i^*(a)$ is more than the marginal benefit from investment I , while the marginal benefit from personal consumption remains the same as 1. Consequently, child support payments distort the mother's investment decision.

This distortion represents an agency cost since the mother acts as the agent for the father.

3.2.2. Measuring the agency cost

The question now is who bears the agency cost of child support? To see the agency cost more clearly, remember that since the father anticipated $i^*(a)$, the mother's payoff at stage (1) is

$$U^*(a) = f(i^*(a)) + r - i^*(a) \quad (5)$$

⁶ Notice that that we are assuming that there be no intertemporal discounts
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Knowing that f is strictly increasing and using (4), one has

$$f(I) > f(i^*(a)) \text{ and } r - I < r - i^*(a) \quad (5)$$

This means that while the mother is using the child support payment, she will take less advantage of her child because the returns he will have shall be less than the returns that she would have if she had been using her own money. At the same time however, she will have more money for personal consumption.

The following reasoning implies that while using the child support, the mother will be worse-off than if she were using debt.

We know that the function $f(i) + r - i$ attains its maximum value at I . When r is large enough, the mother can choose $i^*(a)$ since $i^*(a) < r + p$.

However, she chooses I . Thus, from the revealed preference one has

$$f(I) - I > f(i^*(a)) - i^*(a)$$

which implies that the agency cost of child support payments is

$$U(I) - U^*(a) > 0.$$

3.2.3. Computing the optimal value of a

We begin by computing the derivative of value function $U^*(a)$ defined by (5) regarding a :

$$(U^*)'(a) = (f'(i^*(a)) - 1)(i^*)'(a)$$

From the (2) and from the fact that $a < 1$, it follows that the term $(f'(i^*(a)) - 1)$ is strictly positive, implying that $(U^*)'(a)$ for $(i^*)'(a)$ is strictly positive by (3).

Therefore since $U^*(a)$ is strictly increasing, the mother would be tempted to increase a by the highest number possible. However this cannot be done because if $a = 1$ then the father would not take advantage of the future returns of his child. Thus, the mother would not be able to obtain the child support money since $p^* = (1 - a)f(i^*(a))$ and with $a = 1$ one would have $p^* = 0$.

How will $a \in [0, 1[$ be determined?

The mother would want to increase a subject to restriction

$$i^*(a) \leq r + p^*$$

where $p^* = (1 - a)f(i^*(a))$.

To put it more formally, we define the following set

$$A = \{a \in [0, 1[: i^*(a) \leq r + p^*(a)\}$$

In other words, the mother will have to choose the maximum of the set $\mathbf{A}$.

To find the max $\mathbf{A}$, first we observe that $p(0) = 0$ and $p(1) = 0$. Therefore for $a \in]0, 1[$, the function $p(a) + r > r$ is an inverse U-shaped function.

Second, the function $i^*(a)$ is strictly increasing and $i^*(1) = I > r$. We can then conclude that there is a unique $\bar{a} < 1$ such that $i^*(\bar{a})$ computed at $\bar{a}$ is equal to $r + (1 - \bar{a})f(i^*(\bar{a}))$. It is easy to check that $\bar{a}$ is the max of $\mathbf{A}$.

Therefore by definition of $\tilde{i}(a)$ the $\bar{a}$ is determined implicitly by the previous equation by substituting $i^*(\bar{a})$ by $\tilde{i}(\bar{a})$.

We can summarize all that was said so far in the following proposition.

Proposition 2: Under H1-H6 we have the following result: If the mother is not committed to invest $I > r$, then she will underinvest $\tilde{i}^*(a) < I$. In addition, one has $\tilde{i}(\bar{a}) = r + (1 - \bar{a})f(\tilde{i}(\bar{a}))$ where $\bar{a}$ is the maximum of the set $\mathbf{A}$.

4. Concluding remarks

The results of this paper are: first, the irrelevance in the way the child's integral formation is financed. This integral investment can be undertaken either by debt or child support payments. This result depends on the mother's commitment capacity regarding the amount of child support payments used to invest in the child. The second result refers to the fact that if the mother does not stipulate, in the contract, the amount to be spent in favor of her child, she will make an underinvestment. This leads her to bear an agency cost caused by that inability of commitment in relation to how much she should be investing

A weakness of the paper is to assume that the child will not break⁷ the contract made between his parents when he is a minor. This contract stipulated the full division of the child's future returns between his parents. It is evident that this may not happen since the child could decide to only share a fraction of his earnings with his parents or even decide to abandon them. Future research will be done incorporating decisions of the child who will have the possibility of breaking the contracts.

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⁷ That is, the child is a passive agent who doesn't decide the amount to be invested in himself. EALR, V. 5, n° 2, p. 244-254, Jul-Dez, 2014

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