Costs and Interventions Regarding Adolescent Pregnancy: A Brief Literature Review

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Abstract In this work, a review of the economic literature was carried out on: (1) pregnancy in adolescence, focusing on its impacts on schooling, the labor market, and social inequalities; and (2) the evaluation of the effectiveness of public policies such as access to contraceptives, sex education, and income transfer programs in reducing early pregnancy. As a result of this review, the heterogeneity of effects between countries was highlighted, and directions for future research were proposed, especially in developing country contexts.

1 Introduction

Teen pregnancy is a phenomenon of high social and economic relevance, whose effects go beyond the individual sphere of young mothers and reverberate in their family and community contexts. Although often approached from medical, psychological, or educational perspectives, the economic analysis of this phenomenon offers valuable tools to identify direct and indirect costs, as well as to evaluate the effectiveness of public policies aimed at mitigating it.

This paper conducts a brief review of the economic literature on adolescent pregnancy, with special attention to the causal effects of this experience on variables such as schooling, participation in the labor market, intergenerational well-being, and dependence on government assistance. The analysis is based on 40 selected studies, favoring empirical evidence with strong power of causal identification, such as models with instrumental variables, fixed effects, and quasi-experimental designs.

Among the main findings, it is observed that early pregnancy tends to compromise the educational trajectory of adolescent mothers, reducing their chances of completing secondary education and, consequently, negatively impacting their insertion in the labor market. In addition, the literature identifies significant externalities, both negative (such as educational impairment to siblings and children) and positive (such as the reduction in the incidence of pregnancy among friends who witness the challenges of early motherhood).

A recurring aspect in the literature is the heterogeneity of results between developed and developing countries. While studies conducted in contexts such as Mexico, Chile, and Brazil reveal important aspects of the effects of adolescent pregnancy, most of the available evidence is still concentrated in developed countries — probably because of the availability of data. This asymmetry reinforces the urgency of expanding the body of empirical results on the subject in contexts of developing economies, even if at the expense of less power of causal identification.

This work also contemplates the main strategies of public intervention evaluated by the literature. Engaging sex education policies, family planning programs, expanded access to contraceptives, and indirect actions, such as conditional income transfers, stand out. In general, studies indicate that the effectiveness of these policies depends not only on the provision of information and resources but also on the way in which communication with the target audience occurs and the creation of clear incentives for preventive behavior.

The contribution of this work lies, therefore, in systematizing the main findings of recent economic literature, identifying robust patterns and inconsistencies, and proposing promising paths for future research and the formulation of more effective policies.

The rest of this work is divided as follows: in section 2, both the methodology of the literature review and that of the analyzed works are presented and discussed; in section 3, the results of the effects of an early pregnancy on adolescent parents are presented; in section 4, various designs of public policies and mitigation strategies are discussed; and section 5 concludes the main directions suggested for future research in the area.

2 Methodology

A. Literature Review Methodology. For the construction of this literature review, the following were used: (i) academic articles published in high-impact journals in the field of economics; (ii) technical reports from multilateral institutions with recognized academic relevance; and, to a lesser extent, (iii) other academic articles in areas related to economics, but which represent fundamental contributions to the question. The literature review proposes, therefore, to analyze studies that prioritize the causal identification of the effects of pregnancy in adolescence. In total, 40 studies were analyzed.

Therefore, it is noted that the discussion and the results presented here approach the issue from a particular point of view — that of economic science. Put another way, some important repercussions of pregnancy in adolescence, such as the psychological/emotional cost of responsibility for the child as regards the mental health of adolescent parents, for example, are not treated here with due prominence because they are not the object of study of the science employed.

This work, then, can be understood as a critical discussion about the contribution of economic science to the understanding of adolescent pregnancy, recognizing the methodological limits represented by this academic circumscription.

B. Methodology of the Analyzed Publications. Teen pregnancy has been the object of study in economics since at least the 90s (Bronars & Grogger, 1994; Ribar, 1994). Thus, the methodological treatment of the issue has undergone several changes over time and was, to a large extent, a relevant actor in understanding the disagreement in the field about the results (Ashcraft et al., 2013).

All the methodologies discussed here attempt to solve the major endogeneity problem involved in adolescent pregnancy: adolescents do not get pregnant randomly. Since the treatment studied (pregnancy) is not random, the researcher must employ some strategy in order to isolate its causal effect.

This literature review identifies the main empirical strategies in the treatment of the question, such as: (1) fixed-effects models; (2) Instrumental Variable (IV) models; and (3) quasi-experimental designs. Another possible division of these methodologies, as exposed in Diaz and Fiel (2016), is into (1) OLS models; (2) models with fixed effects; (3) IV models; and (4) models with propensity score matching. In what follows, I will discuss in more detail the practical implications for the results, as well as possible mechanical biases, derived from the use of each of these methodologies.[1]

Fixed Effects Models. It is natural to assume that, although pregnancies are not randomly distributed in the adolescent population, some observable characteristics of both the individual and their place of residence may serve as good predictors of the probability of becoming pregnant (Fletcher & Wolfe, 2009; Kearney & Levine, 2012). However, even if these characteristics are included as controls in the empirical analysis, it is not possible to completely remove the risk that factors that are not observable in the individual are correlated with the incidence of treatment (religion, for example).

[1] See Diaz and Fiel (2016) for a more in-depth econometric discussion of the methodologies mentioned.

That said, conditional on the observable variables, the exact time of pregnancy can be considered random, and given that the unobservable variables would change continuously and smoothly, while the pregnancy event generates abrupt changes, it would then be possible to recover the causal effects. Berthelon et al. (2025), Kleven, Landais, Posch, et al. (2019), and Kleven, Landais, and Søgaard (2019) are examples of papers that employ this identification strategy. In addition, these studies use an event study both to describe the dynamics of the estimated effects and to defend the identification strategy.

It should also be noted that the estimation of the causal impact of adolescent pregnancy by a family-level fixed effects model (comparison between sisters) is understood by the literature as flawed. For a more in-depth discussion and examples of how the strategy can be flawed, see Heissel (2017) and Holmlund (2005).

IV Models. The second class of models employed is based on the strategy of instrumentalization of treatment to identify causal effects. The most commonly used instruments are spontaneous abortions, since they would constitute an exogenous variation and would impact the endogenous variable only through the pregnancy channel. Examples of articles that employ this strategy are Hotz et al. (2005), Miller (2009), and Ribar (1994).

A point that is discussed, in an exquisite way, in Ashcraft et al. (2013) is that, although unintuitive at first, miscarriages may not be random events. The argument put forward by the authors is that, even if this is a random event from a biological perspective, it does not hold from a social perspective — in particular due to the possibility of intentional abortions. The authors econometrically identify that there is an existence of "upwards" bias when employing a IV, i.e., the naïve instrumentalization of adolescent pregnancy by spontaneous abortions implies a more "benign" view of pregnancy in adolescence. OLS estimation, on the other hand, would have a "downward" bias, tending to an excessively negative view of the treatment. Finally, they derive a consistent estimator for the causal effect of treatment under the hypothesis that the dependent variable is independent of the timing of the intentional abortion.

The contribution of Ashcraft et al. (2013) cannot be underestimated, since it points to the solution of a debate in the literature about the inconsistency of the findings. Reflections on this contribution can be seen from 2006 onwards, when the preliminary results of the study were published for the first time. The reader should therefore keep this date in mind in the discussions that follow.

The challenge of (selection) bias, although essential, is not the only problem in estimating the causal effects of adolescent pregnancy. Diaz and Fiel (2016) argue that inconsistencies in the literature, even after the contribution of Ashcraft et al. (2013), arise from the high degree of heterogeneity of effects. To reconcile the results of the literature, they abandon the ambition of estimating the "true" causal effect for an estimation of variations derived from adolescent pregnancy.

Quasi-Experiments. The third class of models employed is quasi-experiments, which explore a design of differences in differences, or similar, to identify causal effects. Similar to what has been discussed above, the use of miscarriages as quasi-experiments is a practice widely used in the literature. The interpretation of the results, however, must be done carefully: the effect found in this type of scenario identifies the impact of adolescent pregnancy among pregnant women. Although this reading guarantees causality of the estimates from the econometric perspective, it should be noted that the reservations about the (possible) non-randomness of abortions remain.

An alternative to the use of the consistent estimator by Ashcraft et al. (2013) is to limit treatment to late miscarriages, as first observed in Fletcher and Wolfe (2009). This strategy is based on the idea that most intentional abortions happen during the first few months of pregnancy, and therefore, late-term abortions happen almost exclusively because of sufficiently random events. Ashcraft et al. (2013) demonstrate that the results of this specifica-

tion are (almost) unbiased and that the inclusion of family characteristics as a control increases the efficiency of the estimator, unlike the scenario of IV, for example.

In addition to miscarriages, other quasi-experiment designs include treatment definitions such as a friend's pregnancy (Yakusheva & Fletcher, 2015), a sister's pregnancy (Heissel, 2017), and policy changes (Kuka & Shenhav, 2024).

3 Costs of Teen Pregnancy

This section portrays the main margins by which the economic literature understands that an adolescent pregnancy generates costs (or adverse effects) for mothers, children, family, and society. In addition, an international comparison is also presented in order to identify a possible heterogeneity of effects on the sociocultural and economic context.

A. Education. In general, modern literature understands that teenage pregnancy reduces the years of schooling, the probability of finishing high school, and the school performance of mothers (Ashcraft et al., 2013; Berthelon et al., 2025; Diaz & Fiel, 2016; Fletcher & Wolfe, 2009; Narita & Diaz, 2016), although these have been more strongly contested points in the past (Azevedo et al., 2012; Hotz et al., 2005; Ribar, 1994). Much of this divergence in findings is due to the aforementioned methodological problem presented by Ashcraft et al. (2013); however, the disparity in results persists beyond this margin.

Azevedo et al. (2012), for example, employs a quasi-experiment of miscarriages in Mexico and finds that adolescent mothers are more educated than their counterparts. One hypothesis that may help to understand this result concerns aspirations: these young mothers feel more motivated to finish their studies in order to be able to ensure a better future for their children. Another hypothesis is that, since these adolescent mothers tend to receive more government benefits (Azevedo et al., 2012; Fletcher & Wolfe, 2009), this would provide the financial security necessary for them to finish their studies. None of these points is tested, however, nor are they tested in the other studies analyzed in this review.

Quantifying the impacts of adolescent pregnancy (and fatherhood) on fathers remains a topic that has been little explored in the literature. One of the rare examples of answers in this sense can be seen in Berthelon et al. (2025), who were able to identify the adolescent parents of 93.5% of the children in their study in Chile. The results indicate that the effect for men is significantly smaller than that for women, although both are negatively and persistently impacted over time. Consequently, teenage pregnancy can increase gender inequalities, a fact that has already been observed for pregnancies from the age of 20 in the context of both developed and developing countries, although to a lesser extent (Kleven, Landais, & Søgaard, 2019; Kleven et al., 2024).

B. Labor Market. Similar to that of education, the literature understands that teenage pregnancy implies penalties in the labor market for mothers (Anderson et al., 2002; Ashcraft et al., 2013; Diaz & Fiel, 2016; Narita & Diaz, 2016), although some studies point in the direction of (almost) null effects (Hotz et al., 2005) or even positive ones (Azevedo et al., 2012). These effects on the labor market are mainly manifested by differences in the participation rate and level of wages.

There is also evidence that more educated women have higher salary penalties than those with less schooling (Anderson et al., 2002). The authors argue that this occurs because absences (or delays in entry) in the labor market are more harmful to activities that require a higher level and development of human capital.[2]

[2] It is important to highlight that there are at least three precautions necessary for the interpretation of this result. The first is the context, since the study is centered on the USA and, therefore, extrapolations to the Brazilian reality must be carried out carefully. The second concerns methodology, which boils down to a fixed-effects model without any quasi-experimental design and, therefore, does not estimate the causal effect of adolescent pregnancy. The third is that this analysis disregards qualitative discontinuities in income loss; For example, a loss of wages, even if small, for a woman with a low level of education may be enough to imply crossing the poverty line.

Moreover, these penalties, in a broader sense, are passed down from one generation to another, from parents to daughters, but not to sons (Kleven, Landais, & Søgaard, 2019). In particular, girls who grow up in environments with a more traditional division of labor incur greater penalties when they become mothers.

Since adolescent pregnancy is a phenomenon generally limited to young women in situations of social vulnerability (Kearney & Levine, 2012), there is suggestive evidence that this is a phenomenon that can aggravate social inequalities in the long term. The empirical verification of this hypothesis, however, remains a point largely unexplored in the literature.

C. Externalities. Though the literature focuses mostly on the impacts of an adolescent pregnancy on the mother, it is reasonable to assume that the entire social cycle of adolescent parents is affected, as well as the future child. This process of being affected indirectly by someone else's decision is called externality and is the focus of this subsection.

Yakusheva and Fletcher (2015) shows that having a friend who has gone through a teenage pregnancy decreases an individual's probability of going through the same process by 6 percentage points. The mechanism evidenced by the authors is that of a learning process: once they witness firsthand the difficulties of being a teenage mother, they take steps to prevent the same from happening to them. The idea that information transmission is an important variable to encourage adolescent birth control behaviors is reinforced by Kearney and Levine (2015b), even if they follow a completely different research design.

Not all externalities are "positive", however. Heissel (2017), for example, finds that having a sister who becomes an adolescent mother decreases academic performance and increases the probability of dropping out of school for the non-pregnant counterpart. The author argues that this occurs due to the diversion of attention of the adolescent mother's parents, who start to concentrate on both the pregnant daughter and the grandchild, thus reducing the attention dedicated to the other children.

Not only siblings, but the children themselves can also be negatively affected. Miller (2009) uses miscarriages, although it is not restricted to adolescents, as a quasi-experiment to estimate the impact of a 1-year delay in pregnancy on the school performance of the (future) child. The results indicate that pregnancy postponements imply an improvement in grades by a significant magnitude — 10% of the difference between the grades of children of parents with higher education and children of parents with incomplete high school.

Similarly, but focusing on adolescents, Aizer et al. (2022) finds, albeit in smaller magnitudes, long-term adverse effects for the children of adolescent mothers and identify poor selection of fathers as a probable mechanism, especially for mothers of high socioeconomic status. Johansen et al. (2024) finds, on the other hand, that the delay in pregnancy has no impact on the child's future school performance.

In addition, Shoesmith (2017) finds evidence of a positive relationship between teenage pregnancy and the children's criminal involvement, which would indicate even more severe externalities not only for the mother's social circle, but also for the mother's social circle, and also for society.

D. International Comparison. Notably, the literature has explored much more of the effects of adolescent pregnancy in the context of developed countries. Among all the studies analyzed in this section, only Azevedo et al. (2012), Berthelon et al. (2025), and Narita and Diaz (2016) conduct work focused on developing countries, focusing on Mexico, Chile, and Brazil, respectively.

One of the most fundamental reasons for this imbalance concerns the availability of data that enable causal inference analyses, which are much more common in the context of developed countries. However, the need for further studies that address this problem is reinforced here, particularly in the Latin American context, even at the cost of causal identification at the

individual level. Narita and Diaz (2016) set an example of how such works can be instructive to public debate.

Another point that motivates this need for more studies in the context of developing countries is the disparity of results. While Berthelon et al. (2025) and Narita and Diaz (2016) find adverse effects of adolescent pregnancy on young women, Azevedo et al. (2012) found positive effects. A more robust body of empirical work would help to understand the important margins to understand this heterogeneity of results. That said, in general, the results for developing countries are qualitatively similar to those for developed countries.

4 Public Policies and Mitigation Strategies

The costs of adolescent pregnancy are remarkable, and this is reported even among the studies that do not encounter losses for mothers, depicted in section 3. In addition to the externalities already discussed, one way in which these costs materialize is due to the greater need for government assistance for these teenage mothers. Azevedo et al. (2012), Fletcher and Wolfe (2009), and Hotz et al. (2005) find a positive relationship between dependence on social assistance and teenage pregnancy, so that it can be intuited that this is also an issue for public finances. Put another way, even if there are no costs for an adolescent pregnancy for mothers or children, there are costs for the government and, therefore, for society.

Therefore, the objective of this section is to present what the literature understands as the component elements of successful (or not) policies in mitigating adolescent pregnancy. I also highlight Lopoo and Raissian (2012) and Moffit (1998) as two literature reviews of great importance on the effect of public policies on the birth rate, even if focused on the context of the USA.

A. Information. Various awareness campaigns regarding the costs of teenage pregnancy, typically carried out in the context of youth sex education in schools, have already been conceived and carried out (Brasil, 2024, for example); however, their effectiveness as a mitigation strategy is questionable. An explanation for the possible inefficiency of these traditional information campaigns concerns the way communication is carried out with the target audience.

Kearney and Levine (2015b) explores how the television program "16 and Pregnant", a successful reality show broadcast between 2009 and 2013 by MTV, specialized in the adolescent audience, acted in the prevention of early pregnancy. The research finds significant effects of exposure to TV programs (treatment) on the reduction of adolescent pregnancy, to the point that the treatment explains 24% of the reduction in juvenile pregnancy during the period under analysis.

The argument presented by the study is that exposing the costs of a pregnancy during adolescence to the mother's personal life, even before the birth of the child, would sensitize young people in a similar situation. The authors argue that adolescents were not aware of how disruptive a pregnancy at this stage of life could be. However, when confronting the dramas and dilemmas experienced by a pregnant couple portrayed on the TV show, they began to independently seek ways to prevent the same from happening to them. This narrative is corroborated by an analysis of the results of Google searches and social media posts during the period of airing of new episodes of the program, which revealed a substantial increase in engagement with topics related to contraception and abortion.

As a result of this experience, two major conclusions for future public policies can be highlighted. First, the way in which communication takes place with young audiences is fundamental. The program demonstrated the costs of early pregnancy in a way that connected and entertained the target audience, which is important for the treatment to be effective. Second, potentially, more relevant than offering knowledge about contraceptive methods is to awaken in young women the individual desire to be in-

formed about them.

B. Family Planning. Perhaps the most immediate intervention when thinking about strategies to mitigate teenage pregnancy is the expansion of access to contraceptives for young women. In this sense, Bentancor and Clarke (2017), Lindo and Packham (2017), and Luca et al. (2021) find evidence that access to contraceptives, especially the "next-day pill", has substantial effects on reducing and delaying early pregnancy. These analyses suggest that expanding access to contraceptive methods, therefore, has significant implications for women's educational and professional trajectories; see the previous section.

Although case studies typically find a negative relationship between contraceptive availability and adolescent pregnancy, this is not unanimous in the literature. Girma and Paton (2011), for example, reports zero effects of access to contraceptives on the rate of early pregnancy and, in a worrying way, identifies an increase in the incidence of sexually transmitted diseases. These findings indicate that the effects of contraceptive access programs can vary substantially depending on the implementation context and associated risk behaviors.

Although important, contraceptives are not the only way in which access to health services can reduce the likelihood of teenage pregnancy. Brown et al. (2020), for example, finds evidence that access to a comprehensive set of health care services induces a reduction in adolescent pregnancy rates when analyzing the increase in Medicare eligibility.

In this sense, the literature has also identified that family planning and counseling initiatives have relevant and lasting impacts. Bailey et al. (2019) and Kearney and Levine (2015a) associate such programs with significant and persistent reductions in fertility, both by postponing pregnancies and by reducing the total number of children. In addition, Bailey et al. (2019) shows that children born after the implementation of these programs tend to have better living conditions: they are more likely to live in households with higher incomes, less exposed to poverty, and less dependent on public assistance. These results reinforce the importance of family planning policies as an instrument for promoting intergenerational well-being.

C. Conditional Cash Transfer Programs. Several studies find that the increase in maternal schooling reduces the probability of a premature pregnancy, even if it occurs through mandatory classroom attendance regimes (Black et al., 2008; Duflo et al., 2015, 2021). Therefore, it is reasonable to assume that policies to encourage education should act to reduce the incidence of teenage pregnancy.

Conditional Cash Transfer programs (CCT), such as the *Bolsa Família* Program, can therefore represent a significant channel for the reduction of early pregnancies if they create positive incentives for attendance and scholastic performance. Cortés et al. (2016), for example, translates this idea into a simple model of adolescent behavior. In this theoretical exercise, the authors find that, in addition to incentives for education, it is also necessary for the CCT to have a limited and determined duration. Using data from two CCT in Bogotá, the authors find evidence supporting the theoretical model, as only the CCT that conditioned the benefits to school performance led to a reduction in adolescent pregnancy rates.

Qualitatively similar results can be found in Baird et al. (2011), Barham et al. (2024), and Olson et al. (2019), where I highlight the last work as of particular interest for the Brazilian case, since the study focuses on the impact of the *Bolsa Família* Program. The authors use the PNAD and a "triple difference" design to find that the magnitude of the reduction in early pregnancy rates derived from the inclusion of adolescents aged 15 to 17 in the *Bolsa Família* Program is 3 percentage points — enough to equalize the difference between the rates of poor and non-poor adolescents.

That said, Kearney and Levine (2015a) points out that the granting of benefits not linked to school performance may even have adverse effects. The authors find evidence for the U.S. that more generous government benefits lead to higher rates of teenage pregnancy. Put another

way, not only the character but also the value of the benefit matters, for it to be understood as a policy to combat early pregnancy.

5 Conclusion

This review of the economic literature on the impacts of teenage pregnancy has identified some important directions for future research in the field:

1. 1. Investigate the mechanisms that explain the positive effects of pregnancy in adolescence identified in some studies, such as the one by Azevedo et al. (2012), with an emphasis on the role of social aspirations and benefits.
2. Evaluate effects on adolescent fathers.
3. Analyze early pregnancy as a vector of (intergenerational) perpetuation of social and gender inequalities.
4. Investigate effects in the context of developing countries, with a focus on causal evidence and individual-level analyses.
5. Evaluate the intergenerational impact and margins of heterogeneity of family planning programs (increased access to contraceptives, for example) and conditional income transfers in different contexts.

Suggested Citation

Chaves Maia, P. H. (2025). *Costs and Interventions Regarding Adolescent Pregnancy: A Brief Literature Review*. Technical Note ImdsNT003-2025. Rio de Janeiro: Institute for Mobility and Social Development

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