



No.348 / December 2010

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**IIS Discussion Paper No. 348**

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# Does reinforcing spouses' land rights improve children's outcomes? Evidence from a quasi-natural experiment in rural Vietnam

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**Abstract:** The aim of this paper is to investigate the relationship between laws strengthening women's rights, and children's outcomes, namely child labor and educational attainment. We analyze the effects of a land reform introduced in Vietnam in 2003 that had the objective of reinforcing women's land rights within households. The introduction of the 2003 Land Law represents a quasi-natural experiment which allows us to analyze how legal reforms are transformed and adopted by social norms. We investigate the effects of being part of the population of households targeted by the land law with the help of a household survey that permits detailed investigation of property rights at the plot level. We show that the land reform contributed to reducing girls' participation in household agricultural production and to increasing girls' educational attainment. We do not find comparable effects for boys.

**Key words:** Child labor, education, land rights, gender, land reform, Vietnam.

**JEL classification:** D13, O18, R20, R52

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The authors wish to thank Finn Tarp, Carol Newman, Marcel Fafchamps, Chris Ksoll, Rocco Macchiavello, and seminar participants at the Research Workshop at the Central Institute for Economic Management in Hanoi, the Nordic Conference in Development Economics 2010, the Annual Conference of the Irish Economic Association 2010, the 2010 Conference of the Scottish Economic Society, the 2009 ISNE conference, the 2009 IRCHSS GREP conference and the Development Working Group and graduate student seminars at the Department of Economics at Trinity College Dublin for valuable comments. Julia Anna Matz acknowledges funding from the Graduate Research Education Programme (GREP) by the Irish Research Council for the Humanities and Social Sciences (IRCHSS).

# 1. Introduction

Gender equality, female empowerment and the elimination of child labor are fundamental elements of economic development, as set out in the Millennium Development Goals (United Nations 2009). According to the International Labour Organization (ILO), about 215 million children between the ages of 5 and 17 are engaged in child labor around the world. Approximately two thirds of child workers are unpaid family laborers, while agriculture represents the largest sector employing approximately 60% of the child workforce. Girls in particular face the burden of being involved both in child labor and in domestic work, which often is not accounted for in official statistics (International Labour Organization 1999, 2010).

The aim of this paper is to investigate the relationship between laws intending to strengthen women’s rights, and children’s outcomes, namely child labor and educational attainment. To this end, we analyze the effects of a land reform which was introduced in Vietnam in 2003 with the aim of reinforcing women’s land rights within the household (UN Volunteers 2004). We provide evidence that the land reform contributed to reducing girls’ child labor and to increasing girls’ educational attainment. Several features make our findings particularly interesting. First, no change regarding inheritance and separation of assets in case of divorce is brought about by the land law, which is simply restating existing rights. Second, we study the effect of being *de jure* subject to the 2003 Land Law without *de facto* implementing it at the household level. Therefore, our findings are likely to reflect a change in customs and social norms driven by formal institutions towards more gender equality.

Following the land decollectivization introduced by the *Doi Moi*<sup>1</sup> reform program towards the end of the 1980s, the 1993 Land Law launched the issuance of land use certificates (LUC), which assigned land use rights on households’ land holdings. According to the 1993 Land Law, a LUC is (re)issued every time an additional plot is registered with the local government. Until 2003 land use certificates usually reported the name of the household head only. In the case of married couples, the husband’s name was customarily reported. In compliance with the recent Vietnamese 2003 Land Law, land use certificates must report the names of *both* spouses in the case of jointly owned plots and if the LUC is (re)issued after 2003 (The National Assembly of the Socialist Republic of Viet Nam 2003).

The 2003 Land Law constitutes a change of form rather than substance: the law does not affect issues such as inheritance and land allocation in the case of divorce. Both spouses

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<sup>1</sup> *Doi Moi* means “change and newness”, according to Do and Iyer (2008).

were entitled to equal land rights of jointly owned plots, regardless of whether one or both names were reported on the land use certificate, even before the introduction of the 2003 Land Law.

The 2003 Land Law, by reinforcing women's rights to land holdings, represents a unique quasi-natural experiment, which allows us to analyze how legal reforms are transformed and adopted by custom and social norms. If women have preferences for girls or wish to mitigate existing gender inequalities favoring boys, increased female bargaining power within the household would be reflected in lower intensities of child labor and higher educational attainment among girls.

Given possible endogeneity in the implementation of the 2003 Land Law at the household level, we exploit the introduction of the land law rather than its actual implementation. This means that we investigate the effect of being part of the population that is subject to the land law, irrespective of whether or not the law is implemented at the household level, as opposed to not being part of the target population of the law. By using a unique household data set that allows thorough inspection of the ownership of land rights at the individual plot level, we show that reinforcing existing land rights of female spouses has positive effects on girls' outcomes. It reduces their likelihood of participating in household agricultural production and increases their educational attainment. We argue that the lack of findings for boys partly reflects a move towards mitigating the differences in outcomes between girls and boys and therefore a move towards more gender equality, and may partly also mirror women's preference for girls. A series of robustness checks gives us confidence in our findings. We disentangle the effects of possible concurrent driving factors such as single ownership by one spouse only, plot registration, and land acquisition from the impact of the 2003 Land Law on child labor and children's educational attainment.

Child labor in Vietnam has declined substantially since the 1990s. Edmonds and Pavcnik (2005) demonstrate that an increase in the real price of rice associated with trade liberalization can account for almost half of the reduction in child labor in Vietnam in the 1990s. However, significant heterogeneity in child work rates is still observed. Edmonds and Turk (2002) provide evidence that the decrease in child workers has been the smallest in urban areas, the Central Highlands and the South Central coast. Moreover, girls are found to be more likely to work in the household and in the family's businesses and their work rates have declined to a smaller extent than those of boys during the 1990s. The authors attribute the difference in work rates between boys and girls to different levels of decision-making power within the household and to the gender division of labor.

In many developing countries, and especially in Asia, besides the differences in workloads, investment in children's education often exhibits a gender bias, with girls being at a disadvantage. Primary school enrollment rates are high considering Vietnam's level of GDP per capita due to the introduction of regulations in the Vietnamese Constitution in 1992, which made primary education mandatory and free of tuition fees. Primary school enrollment rates have increased from 69% in 1994-95 to 96% in 2006-07 according to a report by UNICEF (2010). However, other costs associated with children's education still occur, *e.g.* the cost of books, pens and clothing. In situations of financial distress, these and the opportunity cost of education often lead to the withdrawal of children from school (World Bank 1999). Our analysis focuses on the effects of the land reform on educational attainment of children above primary school age.

The general notion that women in low-income countries often have a lower share of power in household decision-making than women in developed countries (Pitt and Khandker 1998) also holds in Vietnam, according to a report by the World Bank (1999). In all of the four provinces investigated by the World Bank, different levels of decision-making power within the household are reported over issues like the allocation of resources, workloads and reproductive decisions and reflect gender inequality.<sup>2</sup>

Our study is related to the literature documenting that the gender of the income recipient matter for children's outcomes. Pitt and Khandker (1998) test for differences in the effects of parental participation in micro credit programs on children's schooling in Bangladesh. Mothers' participation is found to have robust positive effects on children's schooling rates, both for sons and daughters with differences depending on the type of credit program. In her seminal paper, Duflo (2003) investigates the relationship between an old-age social pension program and the health status of children living with an eligible recipient. The author finds a positive effect of the pension on girls and no effect on boys living with female pension receivers. No effect is found for children living with male pension receivers. Qian (2008) investigates the effects of increases in sex-specific income on children: a rise in female income, while keeping male income constant, lowers child mortality among daughters and has positive effects on educational measures for all children. On the other hand, an increase in male income, while keeping female income constant, raises child mortality among daughters and worsens their educational attainment, with no effect on boys. In a recent paper, Brulé (2010) finds that a law equalizing inheritance rights for men and women led to increases in perceived land ownership and in self-reported bargaining power of women in

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<sup>2</sup> The four provinces investigated by the World Bank (1999) are: Lao Cai, Ha Tinh, Tra Vinh and Ho Chi Minh City.

India. We depart from Brulé’s findings to show that laws reaffirming women’s rights on land holdings, by increasing female bargaining power within the household, have an impact on children’s outcomes.

Furthermore, our study contributes to the emerging literature on the relationship between formal and informal institutions as it aims to enhance the understanding of how legal reforms are transformed and adopted by custom and social norms. Aldashev et al. (2010) study how a formal law implemented by the state can “[...] *defend the rights of disadvantaged groups when customary norms favor the interests of traditional elites*[...]” (Aldashev et al. 2010, p. 5). Using a model of legal dualism, the authors show how the formal law can act as a ‘magnet’ in shaping customary norms and protect minorities or marginal groups. This is indeed the case with the Vietnamese 2003 Land Law. First, the law did not actually change the spouses’ statutory rights in terms of inheritance or in the case of divorce. Second, land law implementation was delayed by local officials. According to anecdotal evidence “[t]he *all-important local officials who administer and interpret the law often revert to age-old traditions and customary practices, which favor men, and thus failed to deliver on the law’s promises*” (UN Volunteers 2004, p. 1). Notwithstanding the delays in the law’s application, the introduction of the 2003 Land Law is found to have a positive impact on girls’ outcomes. The 2003 Land Law therefore appears to act as an application of the legal dualism discussed by Aldashev et al. (2010): on one hand, the formal institution reaffirms women’s rights on land; on the other, customary practices are ultimately shaped by the law itself.

The remainder of the paper is organized as follows. Section 2 provides background information regarding legal aspects of Vietnam’s land law system. Section 3 discusses the household survey data employed in the analysis. Section 4 introduces the estimation strategy and presents the main results. Section 5 explores the robustness checks, while Section 6 concludes.

## 2. Land reforms in Vietnam

In 1988 the Vietnamese government implemented the *Doi Moi* reform program, the first move towards a market economy.<sup>3</sup> Local governments privatized land use rights and allocated the land, which until 1988 had been farmed collectively, to households and individuals. Although land allocation was relatively slow, it achieved an equitable assignment of land use rights across households, a result supported by Ravallion and van de Walle

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<sup>3</sup> See Ravallion and van de Walle (2004, 2006, 2008) and Kirk and Tuan (2009) for a thorough analysis of Vietnam’s agrarian transition.

(2004) who do not find any evidence of the land allocation favoring households with government jobs.

As a next step in the land reform, the 1993 Land Law prescribed the issuance of land use certificates (LUCs), and made land use rights tradable. Although land is still owned by the State<sup>4</sup>, according to the 1993 Land Law land use rights can be transferred, exchanged, inherited and used as collateral.<sup>5</sup> LUCs grant the right to use the assigned plot for 20 years in the case of annual crops land and for 50 years in the case of perennial crops land. Local authorities allocate the land to households on the basis of the households' needs, *e.g.* with respect to the number of household members, and issue LUCs that entitle the holders to the rights to use the land. However, this right is conditional on compliance with the land law, on the individual using it for the designated purpose and in an effective and environmentally friendly fashion without harming adjacent land users (The National Assembly of The Socialist Republic of Viet Nam 2003). Investments in the land in order to cultivate it and increase its value are encouraged as implied by the long-term nature of the land use right. The 1993 Land Law was indeed perceived as a further commitment by the government to secure property rights and it led to an increase in the willingness to undertake long-term investments such as investments in irrigation and multi-year crops (Do and Iyer 2008).

The issuance of LUCs involves both pecuniary and non-pecuniary costs. Several actions of local bureaucracy are necessary in the process of granting land use rights so as to determine whether the farmer is eligible to the land and whether the transfer is legal, to settle existing disputes over the plot and to issue the actual LUC. In order to have a LUC issued, farmers have to pay a fee, which is around VND 20,000 or USD 1.50. However, fee exemptions are often granted to boost land registration rates in more remote regions and especially in mountainous areas (Do and Iyer 2008). Land may be used as collateral when applying for credit and may also be leased out with permission of the authorities. Should the LUC holder die, the land use right is transferred to the heirs like an asset; in the absence of heirs, the state recovers the land. Recovery of land is also permitted under special circumstances that require expropriation, for example during a war period, provided a reasonable compensation is granted to the expropriated land user (The National Assembly of The Socialist Republic of Viet Nam 2003).

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<sup>4</sup> In Vietnam land is owned by the entire Vietnamese people with the state being the exclusive representative unit of the people regarding management of the land (The National Assembly of the Socialist Republic of Viet Nam 2003).

<sup>5</sup> The LUC gives the right to transfer and rent out the land but not necessarily to determine the choice of crops to cultivate on that land (The National Assembly of the Socialist Republic of Viet Nam 2003). Markussen et al. (2009) find that 52% of the plots in their sample are restricted regarding crop choice.



According to the 2000 Marriage and Family Law, in the case of divorce, all land holdings that were acquired during marriage must be divided equally between spouses, taking into account the situation and property of each spouse and his/her investment and effort on the land and other contributions to family income, where housework has to be treated in the same fashion as income-generating labor (The National Assembly of The Socialist Republic of Viet Nam 2000).

Until 2003 land use certificates usually reported the name of the household head only, customarily the husband's name in the case of married couples (UN Volunteers 2004). The 2003 Land Law brought about a significant change in the titling of land use certificates. Article 48 of the 2003 Land Law explicitly mentions that "*[i]n case[s] where the land use rights are under joint ownership of the husband and wife, the certificate of such land use rights must include full names of the husband and full names of the wife*" (The National Assembly of The Socialist Republic of Viet Nam 2003, p. 29). Practically, the inclusion of the spouse's name on the LUC should automatically happen when the household requires having the LUC (re)issued in order to include an additional plot. As of the 2000 Marriage and Family Law spouses are officially entitled to equal rights to land holdings, irrespective of whether only the household head's name or both names are stated on the LUC. Ultimately the scope of the 2003 Land Law is to reaffirm women's rights over land holdings, rather than altering joint use rights.

### 3. Data

The main source of data employed in this study is the Vietnam Access to Resources Household Survey (VARHS), which was conducted in 2006 and 2008 in twelve provinces of Vietnam.<sup>6</sup> The VARHS was first conducted in 2002 and initially covered four provinces only.<sup>7</sup> The two following rounds carried out in 2006 and 2008 extended the initial 2002 sample to 3,269 households in 2008. The purpose of the VARHS is to gain quantitative information on possibilities and constraints of the rural population of Vietnam in accessing resources and markets. The VARHS contains general demographic characteristics of household members and more specific information on agricultural production, access to markets, and sources of income. In particular, the survey includes extensive information on

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<sup>6</sup> The Vietnam Access to Resources Household Survey was developed in collaboration between the Development Economics Research Group (DERG), Department of Economics, University of Copenhagen and the Central Institute of Economic Management (CIEM), the Institute for Labour Studies and Social Affairs (ILSSA) and the Institute of Policy and Strategy for Agriculture and Rural Development (IPSARD), Hanoi, Vietnam. The twelve provinces are: Ha Tay, Nghe An, Khanh Hoa, Lam Dong, Dac Lac, Dac Nong, Lao Cai, Dien Bien, Lai Chau, Phu Tho, Quang Nam and Long An (Danida 2007).

<sup>7</sup> The four provinces are: Ha Tay, Phu Tho, Quang Nam and Long An (Danida 2007).

agricultural land, its acquisition and use rights at plot level, which enables detailed investigation of the effects of the 2003 Land Law on children's outcomes. The 2008 round of the survey is the main source of data employed in this investigation, while the 2006 round is used for robustness checks.

The second source of data is the 2004 Vietnam Household Living Standards Survey (VHLSS), conducted by the General Statistics Office (GSO). The VHLSS sample overlaps with the VARHS sample, thus allowing the construction of a combined data set.

Table 1 presents summary statistics for the sample of children between the ages of 6 and 14 years not living with a single parent as the household head. The current sample is used in our assessment of the effects of the 2003 Land Law on child work. We measure child labor in terms of children's participation in household production which comprises agriculture, forestry and aquaculture. This measure is an applicable definition of child work for our purposes as household agricultural production is an important source of income in the rural areas that form our sample. The International Labour Organization rates agriculture as one of the three most dangerous sectors for children's health and safety and recognizes agriculture as a priority sector for the elimination of child work (International Labour Organization 2006).

Girls constitute 50% of the sample and a higher share of girls than boys is involved in household production, although the difference between boys and girls is not statistically significant. There is no statistically significant difference between boys and girls regarding school enrollment rates, reflecting the regulations in the Vietnamese Constitution in 1992 which made primary education mandatory. While boys have on average achieved slightly more years of education than girls, this difference is not statistically significant either.

**Table 1: Summary statistics – Children 6-14 years of age**

	Full sample	Girls	Boys
Age	10.96	10.99	10.93
School attendance	90.49%	90.1%	90.87%
Years of education	4.57	4.52	4.62
Household production	30.87%	32.04%	29.71%
Observations	1030	515	515
<b>Household characteristics</b>	<b>Mean</b>	<b>Median</b>	<b>Sd</b>
Number of children	3	3	1.37
Age of household head	45.90	42	12.36
Maximum no. of years of education among adult household members	7.55	9	3.68
Number of plots	5.14	5	3.03
Total area of plots (square meters)	12,374.08	6,540	21,812.61
Value of durables (2008 VND)	15,435.08	8300	30,924.46

The lower panel of Table 1 shows summary statistics at the household level. The average number of children in a household is 3, which is at least in part a result of Vietnam’s history regarding the two-child policy introduced in the late 1980s.<sup>8</sup> In 88% of the households in this sample the head of the household is male with an average age of approximately 46 years. Given that parents’ education is missing in some cases and that Vietnamese rural households generally span more than two generations, we consider the maximum number of years of education among adults (above the age of 18) within the household which exhibits a median value of 9 years of schooling. As we are interested in female bargaining power within the household, we control for women’s union membership among female household members. Women’s unions play an important role in Vietnamese society and, given the low membership fee, participation tends to be relatively widespread. About 59% of the households in our sample have at least one member who is active in a women’s union. On average households hold 5 plots, which are mainly devoted to rice cultivation (70%), while the total area of plots varies greatly, from as small as 36 square meters to total plot areas as large as 326,000 square meters. About 18% of the households in this sample have had a land use certificate (re)issued after 2003, *i.e.* after the 2003 Land Law

<sup>8</sup> Implementation and fines were heterogeneous across households and influenced by the geographical location and political involvement of household members (Bélanger et al. 2003).

was introduced.<sup>9</sup> Approximately 14% of the households in this sample hold a LUC that reports the names of both spouses.

Table 2 reports the corresponding information for the sample of children between the ages of 11 and 18 years not attending school at the time of the 2008 survey. We use this sample for the assessment of effects of the 2003 Land Law on the duration of education. We restrict the sample to children that did not attend school at the time of the survey in order to capture the educational attainment of children that have most likely finished their education, which reduces the sample size significantly. The sample contains all children that fulfill this criterion, are above the age of primary schooling and do not live with a single parent as the household head. Boys enjoy on average 0.62 more years of education than girls, while a higher share of girls is involved in household production. The great majority of children in this age group are involved in household production and neither of these differences between boys and girls is statistically significant.

**Table 2: Summary statistics – Children 11-18 years of age**

	<b>Full sample</b>	<b>Girls</b>	<b>Boys</b>
Age	16.14	16.14	16.15
Household production	72.02%	72.73%	71.26%
Years of education	6.43	6.13	6.75
Observations	361	187	174
<b>Household characteristics</b>	<b>Mean</b>	<b>Median</b>	<b>Sd</b>
Number of children	3.5	3	1.49
Age of household head	47.43	46	10.13
Maximum no. of years of education among adult household members	6.9	7	3.78
Number of plots	5.7	5	3.2
Total area of plots (square meters)	12,294.07	7,655	15,328.45
Value of durables (2008 VND)	12,312.93	5,867.5	34,302.18

Summary statistics at the household level for this sample are reported in the lower panel of Table 2. The mean number of children is 3.5, while the median is 3 children per household. The higher age of the household head reflects the older cohort of children

<sup>9</sup> The percentage of children in our sample living in a household that is *de jure* subject to the 2003 Land Law is 17.67%.

considered in this sample relative to the one presented in Table 1. About 7% of the households are headed by a woman, while women’s union membership is lower than in the previous sample: approximately 47% of the households have at least one member who is active in a women’s union. The average number of plots per household is 5.7 and the majority of plots are allocated to rice cultivation (79%). Approximately 11% of the households have registered an additional plot on the land-use certificate after 2003 and 15% of the households in the sample hold LUCs that report both spouses’ names.<sup>10</sup>

#### 4. Estimation strategy

According to the 2003 Land Law, land use certificates should report both names in case the couple was married before the last plot was registered on the LUC and if registration occurred after 2003, the year the land law was introduced (The National Assembly of The Socialist Republic of Viet Nam 2003). Approximately one third of eligible couples in our samples have the names of both the husband and the wife stated on their LUC. We do not find any evidence of a statistically significant relationship between law implementation at the household level and observable household characteristics such as ethnicity, employment status of household members and wealth measured by the value of durable goods.<sup>11</sup>

The weak implementation of the 2003 Land Law is the foundation of our estimation strategy in which we exploit the effects of the introduction of the land law on children living in households that are *de jure* subject to the 2003 Land Law rather than *de facto*. Households are *de jure* subject to the land law if the household head is married and if the LUC has been (re)issued after 2003 due to the registration of an additional plot. Households are *de facto* subject to the law in the presence of law implementation at the household level, *i.e.* if the household head is married, if the LUC has been (re)issued after 2003 *and* if it states the names of both the household head and his spouse. Given the anecdotal evidence reported in the introduction, implementation of the law at the household level is likely to have been delayed due to customary rules favoring men. Therefore, households with both names on the land use certificate may be characterized by a relatively high degree of female empowerment to begin with. In light of Aldashev et al. (2010), we maintain that knowledge of being *de jure* subject to the 2003 Land Law may constitute empowerment by re-assuring the spouse in her rights, allowing her bargaining position to increase within the household.

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<sup>10</sup> The percentage of children living in a household that is that is *de jure* subject to the 2003 Land Law is 10.53% in this sample.

<sup>11</sup> Results are not shown but available from the authors upon request.

Due to possible endogeneity of law implementation at the household level not captured by observable characteristics, the identification of the effects of the land law hinges on a comparison of the effects of plot registration before and after 2003 on children’s outcomes, irrespective of whether or not the LUC bears both names.

It is worth noting that we do not find any evidence of a statistically significant relationship between plot registration after 2003 and observable household characteristics such as ethnicity, value of durables and education of household members.<sup>12</sup> Plot registration after 2003 is negatively correlated with rice cultivation and positively associated with the number of plots and their total size, although these results are not robust and depend on the specification. These (weak) relationships exhibit intuitive explanations: the more plots a household has the rights to, the more often the LUC will be (re)issued. Given the time frame between the introduction of the land law and the 2008 survey, this weak relation does not appear surprising. We minimize the concern about this correlation by including the natural logarithm of the total size of operated plots in the set of household controls.<sup>13</sup> Households that have cultivated rice in any of the previous three seasons are likely to be constrained in their crop choice which indirectly implies that the rights to their plots are recognized by the commune so that (re)issuing the LUC may not appear necessary. We control for rice cultivation in our specification to minimize its influence on our identification strategy.<sup>14</sup>

In the main specification we investigate the effects of having registered at least one plot on the LUC after 2003 on two different outcome variables: child labor, measured in terms of children’s participation in household agricultural production, and years of education of children above the age of primary schooling. The econometric specification appears as follows:

$$Y_{ih} = \alpha_1 LUC\_after2003_h + \alpha_2 Female_{ih} + \alpha_3 LUC\_after2003_h * Female_{ih} + \mathbf{X}'_h \boldsymbol{\beta} + \mathbf{Z}'_{ih} \boldsymbol{\gamma} + u_{ih} \quad (1)$$

where  $Y_{ih}$  denotes one of the two outcomes of interest: a binary variable measuring participation in household production or the duration of education in years of child  $i$  in household  $h$ .  $LUC\_after2003_h$  is the main explanatory variable which takes value 1 if the household has registered at least one plot on its land use certificate after 2003 and 0 otherwise;  $Female_{ih}$  is a dummy for gender of the child, taking value 1 if the child is female and 0 otherwise. In presence of gender equality we would expect the coefficient of  $Female_{ih}$  to be statistically insignificant both for child labor and for educational attainment as the

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<sup>12</sup> Results are not shown but available from the authors upon request.

<sup>13</sup> Including the total number of plots does not alter the results.

<sup>14</sup> It should be noted that rice cultivation is not significantly related to either outcome variable of the main specification outlined in the following paragraphs.

dependent variable. If women have a preference for girls or wish to reduce existing gender inequalities, we would expect the increased bargaining power within the household brought about by the 2003 Land Law to be reflected in lower child labor and higher educational attainment among girls. This means that the estimated marginal effect for girls, which is the sum of the coefficients of  $LUC\_after2003$  and of the interaction term, would be statistically significant, negative in the specification for child labor and positive in the one for educational attainment. Stating a prior for the marginal effects for boys, given by the coefficient of  $LUC\_after2003$ , is not as straightforward.

We control for household characteristics,  $\mathbf{X}_h$ , and children's characteristics,  $\mathbf{Z}_{ih}$ . Regarding household characteristics, we control for gender of the household head, his/her age, maximum education among adults within the household, family composition, ethnicity, knowledge of the 2003 Land Law, whether rice was cultivated on any of the plots during the previous three seasons, whether a member of the household is active in a women's union and whether the family receives private transfers. Furthermore, we control for the natural logarithms of the value of durable goods<sup>15</sup> and of the total size of operated plots, the distance to the nearest primary, lower and upper secondary schools. With respect to individual characteristics, we control for age and whether the child is the first-born child. Finally, we control for district fixed effects in order to take into account geographical differences.

## 4.1 Child labor

Table 3 reports the results for participation in household production as the dependent variable. The findings support our prior of a negative relationship between the 2003 Land Law and girls' child labor. Column 1 reports the results of the main specification without household controls. Living in a household that is *de jure* subject to the 2003 Land Law does not have any effect on boys' likelihood of participating in household production, as the estimated coefficient of  $LUC\_after2003$  is not statistically significant. The estimated coefficient of the dummy variable *Female* is positive and statistically significant at the 10% level, which suggests that girls are more likely to participate in household agricultural production than boys in the absence of the law. The estimated coefficient of the interaction term  $LUC\_after2003*Female$  is negative and statistically significant at the 5% level. The lower panel of Table 3 reports the marginal effects of being *de jure* subject to the land law

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<sup>15</sup> The value of durable goods for all specifications is the total self-estimated value at the time of the 2008 VARHS for all of the household's durable goods. These include color TVs, black and white TVs, satellite dishes, video or DVD players, stereo systems (CD and radio), radios, cassette players (mono), telephones (including mobile phones), refrigerators, air conditioners, washing machines, hot water heaters, motorcycles, bicycles, boats, feed grinding machines, rice milling machines, grain harvesting machines, pesticide sprayers, tractors, ploughs, carts, cars and personal computers.

for girls, *i.e.* the sums of the estimated coefficients of *LUC\_after2003* and the interaction term, and the respective F- and p-values of the Wald test. The marginal effects for girls are negative and statistically significant for girls' labor participation rates, indicating that the 2003 Land Law reduces the likelihood of girls to participate in household production. This result supports the idea that the introduction of the land law may have shifted the balance of power within the household, giving greater bargaining power to women who in turn want to improve girls' outcomes in order to mitigate existing gender inequalities among the children in the household. The results hold when household controls are included (column 2) and the marginal effects for girls are negative and statistically significant at the 1% level. The land law, by reaffirming women's land rights, decreases the probability of girls' child labor by 13.9%.<sup>16</sup>

In the next step we disentangle these effects from the possible endogeneity associated with the implementation of the 2003 Land Law at the household level. We exclude from the sample households that have registered at least one plot after the introduction of the 2003 Land Law and whose land use certificates bear both spouses' names. Put differently, we test for the effects of being subject to the 2003 Land Law on children's outcomes *in the absence* of law implementation at the household level. Implementation of the land law requires knowledge of the law as well as the willingness to explicitly request its application. Reducing the sample does not alter the results (column 3).

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<sup>16</sup> Results from Probit estimation performed on separate regressions for boys and girls support the results of the linear probability model. Results are not presented but available from the authors upon request.



**Table 3: Child labor– Children 6-14 years of age.**

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
	<i>Participation in household agricultural production</i>					
LUC_after2003	0.00393 [0.0589]	-0.0101 [0.0568]	-0.00230 [0.0779]			
LUC_after2003*Female	-0.125** [0.056]	-0.129** [0.0506]	-0.163** [0.0651]			
Female	0.0473* [0.0279]	0.0457* [0.0264]	0.0465* [0.0268]	0.0388 [0.0264]	0.0380 [0.0249]	0.0418 [0.0261]
LUC_after2003_Reg				-0.0286 [0.0564]	-0.0199 [0.0579]	0.0282 [0.0818]
LUC_after2003_Reg*Female				-0.144** [0.0673]	-0.167** [0.0664]	-0.233*** [0.0857]
Household controls	No	Yes	Yes	No	Yes	Yes
Individual controls	Yes	Yes	Yes	Yes	Yes	Yes
District fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Marginal effects for girls	-0.1208	-0.1386	-0.1655	-0.1730	-0.1871	-0.2053
F-value	5.93	7.08	5.50	6.18	8.24	6.69
P-value	0.0163	0.0088	0.0206	0.0142	0.0048	0.0109
Sample	Full sample	Full sample	Reduced sample	Full sample	Full sample	Reduced sample
Observations	1030	1030	966	1030	1030	966
R-squared	0.117	0.193	0.197	0.119	0.194	0.198

Robust standard errors in parentheses.

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

A potential concern is that our findings for child labor may be driven by plot acquisition rather than by plot registration under the 2003 Land Law. We introduce a modified measure of being *de jure* subject to the land law to the specification presented in equation 1. The dummy variable *LUC\_after2003\_Reg* takes value 1 if the household has registered a plot after 2003 and has not acquired additional plots over that period and 0 otherwise. This variation in the definition of being *de jure* subject to the 2003 Land Law is a first attempt to disentangle the effects of plot acquisition from those of plot registration under the law. We will return to this issue in more detail in Section 5. The results presented in the last three columns of Table 3 confirm our previous findings. The land law decreases the probability of girls being involved in child labor but does not impact on boys' work participation rates, when excluding and including household controls (columns 4 and 5, respectively) and for the reduced sample (column 6).

## 4.2 Educational attainment

In this section we present results for educational attainment as the dependent variable for the sample of children between the ages of 11 and 18 years not living with a single parent as the household head. We report the regression results in Table 4, the marginal effects for girls are given in the lower panel.

Columns 1 and 2 present the results of the main specification as outlined in equation 1, when excluding and including household controls. The 2003 Land Law does not have any effect on the duration of education for boys and in the absence of the land law the duration of education is not significantly different between boys and girls, although the estimated coefficient of *Female* is negative. The 2003 Land Law does not have any statistically significant impact on educational attainment for girls when household controls are excluded from the specification (column 1) but becomes statistically significant at the 10% level once household controls are included (column 2). The effect is positive and ranges between an additional 1.28 and 1.82 years of education as reported in columns 1 and 2.

**Table 4: Educational attainment– Children 11-18 years of age.**

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
	<i>Educational attainment</i>					
LUC_after2003	0.0606 [0.681]	0.373 [0.791]	0.245 [0.887]			
LUC_after2003*Female	1.221 [0.888]	1.443 [0.939]	3.560*** [1.249]			
Female	-0.542 [0.476]	-0.429 [0.454]	-0.483 [0.450]	-0.536 [0.462]	-0.429 [0.442]	-0.432 [0.445]
LUC_after2003_Reg				-0.410 [0.699]	-0.242 [0.992]	-0.297 [1.350]
LUC_after2003_Reg*Female				1.823 [1.191]	2.393* [1.222]	3.810** [1.693]
Household controls	No	Yes	Yes	No	Yes	Yes
Individual controls	Yes	Yes	Yes	Yes	Yes	Yes
District fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Marginal effects for girls	1.2820	1.8154	3.8046	1.4130	2.1511	3.5135
F-value	1.84	3.05	6.72	1.34	3.02	3.39
P-value	0.1788	0.0840	0.0111	0.2507	0.0854	0.0686
Sample	Full sample	Full sample	Reduced sample	Full sample	Full sample	Reduced sample
Observations	361	361	348	361	361	348
R-squared	0.122	0.239	0.262	0.122	0.239	0.253

Robust standard errors in parentheses.

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

In column 3 we restrict the sample in the same fashion as in Table 3, *i.e.* we exclude households that have registered at least one plot after 2003 and whose LUC reports both spouses' names. The estimated coefficient of the interaction term  $LUC\_after2003*Female$  is positive and statistically significant at the 1% level. Overall, the effect of the 2003 Land Law on girls' educational attainment is positive and statistically significant at the 5% level.

The findings are robust to considering the alternative measure  $LUC\_after2003\_Reg$  explained in the previous section. The results hold for the full sample when including household controls (columns 5) and for the reduced sample (column 6). Similar to the findings for child work, the land law appears to positively affect girls' outcomes while no impact is found for boys.

## 5. Robustness checks

We conduct three types of robustness checks. First, given that the 2003 Land Law reinforces equal rights for both spouses on each plot acquired during marriage, we restrict the sample to couples who were married before registering at least one plot under the 2003 Land Law. Second, we disentangle the effects of plot acquisition from the effects of plot registration under the 2003 Land Law. Finally, we examine the effects of plot registration on children's outcomes in the absence of the 2003 Land Law. The robustness checks confirm the main findings and exclude possible concurrent factors: the reduction in girls' child labor and the increase in educational attainment for girls are indeed triggered by the 2003 Land Law.

### 5.1 Restricted sample

In the analysis presented in Section 4 we have focused on the effects of the 2003 Land Law on children not living with a single parent as the household head and have assumed that the household head was married prior to registering the latest acquired plot. This assumption is reasonable considering that out of wedlock childbearing is uncommon in Vietnam (Friedman et al. 2003) and that the youngest children included in our sample were born in 2002, *i.e.* before the introduction of the Land Law.<sup>17</sup> The Vietnam Access to Resources Household Survey (VARHS) as well as the Vietnamese Household Living Standards Survey (VHLSS) contain information regarding current marital status, but not about the date of change in marital status. Given the overlap between the samples of the VHLSS and the VARHS, we combine the information contained in the 2004 VHLSS and the 2006 and 2008 VARHS to restrict the sample to children living in households whose head

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<sup>17</sup> According to the 2000 Marriage and Family Law any plot acquired during marriage is considered jointly owned by the spouses (The National Assembly of The Socialist Republic of Viet Nam 2000).

was married before having registered at least one plot on the land use certificate.<sup>18</sup> By doing so, we adopt a conservative approach and exclude children living in a household that is not (with certainty) subject to the 2003 Land Law because of (the possibility of) private ownership of all plots by one spouse.

Columns 1 and 2 of Table 5 report the estimation results for participation in household production as the dependent variable following the specification outlined in equation 1. In line with our previous findings, being *de jure* subject to the 2003 Land Law reduces the likelihood of girls participating in household production. The lower panel of Table 5 presents the marginal effects for girls: the negative effect of the 2003 Land Law on girls' work rates is statistically significant at the 5% level when household controls are excluded (column 1) and at the 1% level when household controls are included (column 2). We do not find any statistically significant effects for boys or for gender inequality among children with respect to participation in household production.

**Table 5: Child labor and educational attainment– Restricted sample**

VARIABLES	(1)	(2)	(3)	(4)
	<i>Child labour</i>		<i>Educational attainment</i>	
LUC_after2003	-0.0860 [0.107]	-0.109 [0.103]	0.523 [0.898]	-0.405 [0.878]
LUC_after2003*Female	-0.154** [0.076]	-0.190** [0.0766]	2.014* [1.171]	1.347 [0.947]
Female	0.0307 [0.0454]	0.0478 [0.0510]	-1.603** [0.616]	-0.925 [0.829]
Household controls	No	Yes	No	Yes
Individual controls	Yes	Yes	Yes	Yes
District fixed effects	Yes	Yes	Yes	Yes
Marginal effects for girls	-0.2404	-0.2998	2.5362	0.9425
F-value	6.18	9.15	3.73	1.46
P-value	0.0147	0.0032	0.0593	0.2325
Sample	Age 6-14		Age 11-18	
Observations	383	383	112	112
R-squared	0.112	0.226	0.191	0.491

Robust standard errors in parentheses.

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

<sup>18</sup> We restrict the 2008 VARHS sample to include households whose heads were married in 2004 according to the 2004 VHLSS and registered a plot after 2004 and households whose heads were married in 2006 according to the 2006 VARHS and registered a plot after 2006. It is not possible to establish the sequence of events for all households due to the limited information regarding marital status which results in a loss of observations beyond the one intended by the restriction criteria.

Columns 3 and 4 report the results for the duration of education in years as the dependent variable and the marginal effects for girls are presented in the lower panel. We do not find an effect of the land law on boys' duration of education but the results indicate a negative and statistically significant effect of being female when household controls are excluded (column 3). The marginal effects of the 2003 Land Law for girls are reported in the lower panel: the land law appears to have a positive and statistically significant impact on girls' educational attainment, although this effect becomes statistically insignificant when household controls are included in the specification (column 4). The drastically reduced sample size may be an explanation for these less robust results.

## 5.2 Plot acquisition as the driving factor?

Bar and Basu (2009) and Basu et al. (2010) show, both theoretically and empirically, that the relationship between child labor and plot acquisition exhibits an inverted U-shape. As a next step in our robustness checks, we disentangle the effects of the 2003 Land Law from the effects of plot acquisition. We introduce the variable *plot\_after2003<sub>h</sub>*, which takes value 1 if the household has acquired a plot after 2003, and 0 otherwise. The rationale for this exercise is to ensure that the findings of Section 4 are the result of the 2003 Land Law and are not driven by the acquisition of an additional plot. We amend equation 1 by replacing *LUC\_after2003* with *plot\_after2003*:

$$Y_{ih} = \alpha_1 \textit{plot\_after2003}_h + \alpha_2 \textit{Female}_{ih} + \alpha_3 \textit{plot\_after2003}_h * \textit{Female}_{ih} + \mathbf{X}'_h \boldsymbol{\beta} + \mathbf{Z}'_{ih} \boldsymbol{\gamma} + u_{ih} \quad (2)$$

where the specification is identical to equation 1, apart from the new variable *plot\_after2003<sub>h</sub>*. If plot acquisition is not the driving factor of the reduced girls' labor and increased educational attainment, the estimated marginal effects for girls should not be statistically significant. The restrictions of the sample are identical to the main specification of Section 4 which results in identical sample sizes for the two dependent variables. Table 6 reports the results of this exercise. None of the estimated coefficients are statistically significant for participation in household production for both boys and girls which indicates that there is no statistically significant impact of land acquisition on children's participation in household production, excluding or including household controls (columns 1 and 2, respectively).

**Table 6: Child labor and educational attainment – Plot acquisition**

VARIABLES	(1)	(2)	(3)	(4)
	<i>Child labour</i>		<i>Educational attainment</i>	
Plot_after2003	0.0202 [0.0558]	-0.00624 [0.0525]	1.281* [0.682]	1.174** [0.589]
Plot_after2003*Female	-0.014 [0.065]	-0.00628 [0.0646]	-1.827** [0.837]	-1.960** [0.860]
Female	0.0271 [0.0289]	0.0230 [0.0276]	0.0520 [0.517]	0.205 [0.525]
Household controls	No	Yes	No	Yes
Individual controls	Yes	Yes	Yes	Yes
District fixed effects	Yes	Yes	Yes	Yes
Marginal effects for girls	0.0058	-0.0125	-0.5460	-0.7860
F-value	0.02	0.09	0.54	1.28
P-value	0.8985	0.7689	0.4655	0.2603
Sample	Age 6-14		Age 11-18	
Observations	1030	1030	361	361
R-squared	0.111	0.186	0.136	0.248

Robust standard errors in parentheses.

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

Columns 3 and 4 present the estimation results for educational attainment as the dependent variable. We find a statistically significant effect of plot acquisition on the duration of boys' education. The acquisition of at least one additional plot after 2003 is positively related to boys' educational attainment, which may be the result of a wealth or income effect. The estimated coefficient of the interaction term *plot\_after2003 \* Female* is negative and statistically significant at the 5% level. However, none of the marginal effects for girls is statistically significant; we can therefore conclude that plot acquisition is not the driving force behind the effects of the 2003 Land Law on girls' outcomes found in the main specification presented in Section 4.

### 5.3 Plot registration as the driving factor?

In order to isolate the effects of the 2003 Land Law from the effects of plot registration, we take advantage of the panel structure of the VARHS and employ the data of the round of the survey conducted in 2006. We use the econometric specification presented in equation 1 and go back by two years in every respect, *i.e.* for the data set as well as for the definition of the main explanatory variable. The idea is to isolate the impact of the land law on children's outcomes by considering the effect of land use certificates issued after 2001,

instead of land use certificates issued after 2003. The new variable  $LUC\_after2001$  takes value 1 if at least one plot was registered after 2001 and before 2004, *i.e.* before the 2003 Land Law effectively came into effect, and 0 otherwise. If the effect observed on children's outcomes is indeed related to the introduction of the 2003 Land Law, we should not observe any statistically significant impact of the variable  $LUC\_after2001$  on child labor and children's educational attainment among girls.

For neither boys nor girls the marginal effects of registering a plot after 2001 and before 2004 are statistically significant as shown in columns 1 and 2 of Table 7, which rules out that the effects found for girls in Section 4 are driven by the mere registration of a plot rather than by registration under the 2003 Land Law. The results are robust to the inclusion of household controls (column 2).

**Table 7: Child labor and educational attainment– Plot registration**

VARIABLES	(1)	(2)	(3)	(4)
	<i>Child labour</i>		<i>Educational attainment</i>	
LUC_after2001	0.0549 [0.0611]	0.0725 [0.0549]	1.590*** [0.368]	1.454*** [0.473]
LUC_after2001*Female	-0.104 [0.079]	-0.141* [0.0776]	-1.103* [0.653]	-1.230* [0.698]
Female	0.00741 [0.0283]	0.00711 [0.0281]	-0.00864 [0.235]	0.00468 [0.221]
Household controls	No	Yes	No	Yes
Individual controls	Yes	Yes	Yes	Yes
District fixed effects	Yes	Yes	Yes	Yes
Marginal effects for girls	-0.0486	-0.0684	0.4866	0.2241
F-value	0.89	1.38	0.67	0.16
P-value	0.3485	0.2423	0.4140	0.6928
Sample	Age 6-14		Age 11-18	
Observations	1751	1751	1186	1186
R-squared	0.179	0.221	0.210	0.303

Robust standard errors in parentheses.

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

Columns 3 and 4 present the same specification for duration of education as the dependent variable, excluding and including household controls, respectively. As the estimated coefficient of  $LUC\_after2001$  is statistically significant, registration of an additional plot after 2001 and before 2004 has a positive effect on the duration of education for boys which may be driven by the increased security regarding the household's land rights. The estimated coefficient of the interaction term  $LUC\_after2001 * Female$  is negative and statistically significant at the 10% level. However, none of the marginal effects for girls

are statistically significant, thus ruling out that the effects on girls' educational attainment presented in Section 4 are due to mere plot registration.

## 6. Conclusions

A growing strand of literature on household economics has analyzed the impact of the gender of income recipients on children's outcomes. Departing from this literature, we study how reinforcing women's land titling affects child labor and children's educational attainment. On the basis of a quasi-natural experiment offered by a recent Vietnamese land law and with the help of a household survey data set, we demonstrate empirically that the introduction of laws strengthening equal land rights of both the household head and his spouse has positive effects on the outcomes of girls living in households that are *de jure* subject to this law.

We provide robust evidence in favor of a negative association between legal exposure to the land law and girls' likelihood of participating in household production. We also find some evidence for a positive impact of the law on girls' educational attainment of considerable magnitude. The 2003 Land Law decreases the probability of girls' child labor by 13.9% and increases girls' education by 1.82 years according to our main results.

We do not find comparable effects for boys. In the absence of the law, girls are found to be more likely to play an active role in household agricultural production while no evidence is found for gender inequality with respect to educational attainment. It therefore appears that the increased bargaining power of women brought about by the 2003 Land Law can at least partly mitigate existing gender inequalities in work rates among children and may translate to educational attainment for girls only.

The robustness checks support the main findings: the effects found for girls can be attributed to the 2003 Land Law, ruling out other concurrent driving factors. In particular, we use a sub-sample of children living in households that are with certainty part of the population targeted by the 2003 Land Law in order to exclude private ownership by one spouse only. Furthermore, we ensure that neither the acquisition nor the mere registration of an additional plot acts as the driving factor instead of land registration under the law. By employing a previous round of the survey, we are able to study the impact of plot registration on children's outcomes *before* the introduction of the 2003 Land Law.

According to our findings, the introduction of laws aiming to strengthen the woman's position within the household by reinforcing equal land use rights positively impacts on the outcomes of girls by changing customary rules.





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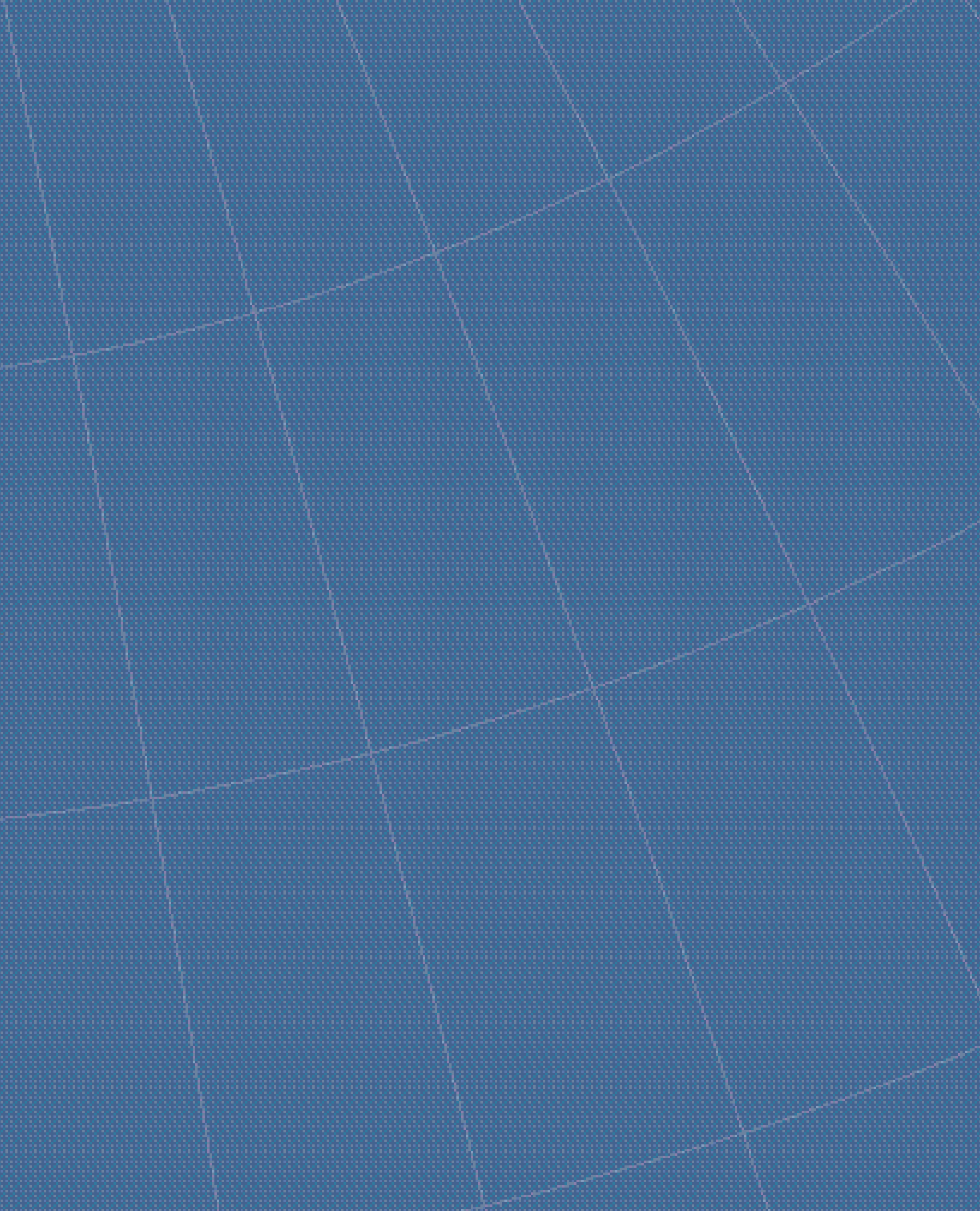
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