

Female Labor Productivity Reduces Domestic Violence: Evidence from Peru*

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Abstract

This study investigates the impact of greater economic opportunities for women on domestic violence in Peru. I construct exogenous shifters of gender-specific labor productivity by exploiting gender-specific specialization in the production of major export crops, along with time variation in international crop prices and cross-sectional variation in crop planting patterns. Female labor productivity reduces domestic violence, including severe physical violence and female homicide. I find no evidence that these effects are driven by changes in total household income, increases in women's bargaining power in the household, or changes in beliefs about the role and treatment of women. I argue instead that results are driven by increases in women's independence and the ability to seek support outside the domestic sphere. The effects are stronger in districts with more unequal gender norms, in contrast to theories of "male backlash" that predict the opposite.

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1 Introduction

Domestic violence—defined as any physical, sexual or psychological violence occurring within the family—is a major global public health problem (UN, 1993). It is estimated that 30% of women experience domestic violence in their lifetime, and this figure is even larger in low and middle-income countries (WHO, 2021). In Peru, the setting of this study, 40% of women in nationally-representative surveys declare they are victims of domestic violence. Four hundred women and girls “disappear” on average each month, often because they are murdered by a family member (Defensoría del Pueblo, 2021).¹ Domestic violence has far reaching consequences: it drains health care resources, causes victims to lose productive time, and reduces quality of life for victims and their relatives, all of which amounts to substantial economic costs.² Despite the gravity of the present situation and the impact on women’s health and wellbeing, little empirical evidence exists to explain the causes of domestic violence or policies that might reduce it, especially in developing countries.

A central question in this context is how growing economic opportunities for women affect the level and severity of domestic violence. Economic theory, however, is ambiguous in its prediction of how changes in women’s employment and earnings potential should be expected to affect spousal abuse. Standard household bargaining models predict that improvements in the woman’s outside option increase her bargaining power and therefore *decrease* violence (Farmer and Tiefenthaler, 1997; Aizer, 2010). On the other hand, models consistent with sociological theories of “male backlash” incorporate domestic violence as a tool to ensure male control and predict that improvements in the woman’s labor market opportunities could instead lead to an *increase* in domestic violence (e.g. Eswaran and Malhotra, 2011). According to this narrative, men might retaliate violently against improvements in female status, especially in places with very unequal gender norms.

This uncertainty about the relationship between female labor market potential and domestic violence is part of a broader debate about whether economic development alone, and the resulting economic opportunities for women, leads to gender equality; while some studies find that income growth precipitates women’s empowerment, others contend that development alone fails to shift gender norms or the treatment of women (Duflo, 2012). It is essential, therefore, to turn to data in order to investigate how changes in a woman’s economic opportunities affect domestic abuse.

This paper investigates the causal effect of female labor productivity on domestic violence in Peru, and explores its underlying mechanisms. There are two challenges in iden-

¹Survey responses were compiled from Peru’s Demographic and Health Surveys (DHS).

²Max et al. (2004) estimate that the total (direct and indirect) costs of domestic violence amounted to 5.8 billion dollars for the United States in 1995, which helps to substantiate the magnitude of the economic burden.

tifying the causal effect of female labor productivity—taken here to encompass both higher employment and improved wages for women that result from better labor opportunities—on domestic violence. First, women’s employment and income are endogenous, which could bias correlational evidence because of reverse causality or omitted variable bias. Second, an increase in women’s labor productivity also increases overall household income, which could have an independent effect on domestic violence.

I overcome these identification challenges by constructing exogenous gender-specific shifters of agricultural labor productivity. I use the gender-specific specialization in the production of major export crops, along with changes in international crop-level prices and pre-period crop planting patterns of each district, to construct district-level female- and non-female-specific shifters of labor productivity.³ In particular, three major crops—asparagus, rice, and tea—rely disproportionately on female labor. Several scholars have argued that this is a result of specific features of the cultivation and production process that lend women a comparative advantage (e.g. [Calisaya Arangoitia and Flores Mego, 2006](#); [Ferm, 2008](#)). These are the set of crops that are used to construct the female labor productivity shifter. The non-female-specific shifter is constructed using other export crops—mangoes, for example—that involve substantial amounts of physical labor and strength and, as a result, rely disproportionately on male labor ([Davenport, 2006](#)). The female-specific shifter captures the causal effect of women’s labor productivity. The comparison between the female-specific and non-female-specific shifters distinguishes between the effect of women’s labor market opportunities from the effect of men’s or household-level economic opportunities, which could have an independent effect on domestic violence.

To assess the validity of the identification strategy, I merge the gender-specific shifters for labor productivity to wage data from the *Encuesta Nacional de Hogares sobre Condiciones de Vida y Pobreza*, a nationally representative dataset on employment characteristics and consumption, and employment data from all geo-coded rounds of the Demographic and Health Surveys (DHS). The female-specific shifter has a large, positive effect on female, but not male, agricultural wages and employment, while the non-female shifter increases male, but not female, wages. These results demonstrate that changes in each gender-specific labor productivity measure indeed shifts the appropriate gender’s wages and employment, lending credibility to the identification strategy.

I investigate the relationship between female labor productivity and domestic violence by combining the gender-specific productivity shifters with seven years of nationally representative household survey data on domestic violence collected between 2000-2009 by the

³In some places, culture determines crop specialization by gender ([Duflo and Udry, 2004](#)); in Peru, differences in the care-intensity of production and physical demands of labor have led to marked differences in women’s employment across crops. This argument is related to that in [Qian \(2008\)](#), which shows that women and men have outsize roles in the cultivation of different crops in China.

DHS.⁴ The main result is that increases in female labor productivity significantly reduce the incidence of domestic violence. The estimates suggest that the average aggregate increase in female labor productivity during the sample period, as I measure it, reduced the incidence of domestic violence by 19%. Moreover, the effect of non-female labor productivity on domestic violence is indistinguishable from zero and significantly different from the effect of the female-specific measure, suggesting that the decrease in domestic abuse is driven by female productivity specifically rather than by changes in overall household income.⁵

These findings extend even to extreme forms of violence. First, using the DHS, I categorize all domestic violence questions into either physical or psychological violence, and find comparable effects focusing only on physical violence. Second, I use nationally representative crime data available from 2013 to 2017 in order to measure the number of female homicides in each province-year. I find that female labor productivity reduces the number of female homicides perpetrated by a long-term partner or ex-long-term partner; this type of murder, termed “femicide”, is almost always the culmination of years of domestic violence and abuse (Hill, 2020). Consistent with the proposed mechanism, I also show that female labor productivity has no effect on other types of female homicide or male homicide, suggesting the results are not driven by decreases in overall crime levels in districts with higher female labor productivity.

A range of robustness and inference tests support the main findings. There is no evidence of pre-existing trends in the relationship between female labor productivity and domestic violence, consistent with a causal interpretation of the results. I also document that the results are robust to the inclusion of a broad set of controls, including the age and education of both the woman and her partner, trends in the geographic location of the district, interviewer and ethnicity fixed effects, and a range of household characteristics and proxies for household income. The estimated relationship between female labor productivity and domestic violence remains similar across specifications. The results are also qualitatively similar if the dependent variable is the district-level average proportion of women who are domestic violence victims, instead of a binary variable at the individual level, to match the district-level measure of gender-specific labor productivity.

To further support the validity of the main finding and rule out the possibility that the baseline result is operating through any channel that is not specific to *women’s* wages or employment, I also construct 1000 placebo female labor productivity shifters using randomly

⁴Section 3 discusses the measurement of domestic violence in greater detail. The DHS uses unique, state-of-the-art survey strategies, which have been validated using experimental elicitation methods in the Peruvian context (Aguero and Frisancho, 2021).

⁵In addition, Table A8 shows that the results remain qualitatively similar and the coefficient capturing the effect of female labor productivity on domestic violence is not attenuated after controlling for a number of proxies for household income.

selected combinations of large Peruvian export crops. I then repeat the main regression specification, using each placebo measure of female labor productivity as the dependent variable, and plot the distribution of the coefficients. I find that the effect of the measure constructed using the female-specific crops on domestic violence is in the far left tail of the distribution. This result suggests that the main estimates are driven by changes in local economic opportunities that are specific to women.

I then investigate the channels through which changes in female labor productivity affect domestic violence. The first possibility is that the results are driven by changes in household income. However, the absence of a relationship between non-female labor productivity and domestic violence, the distribution of the effect of placebo shifters on domestic violence, and the fact that the baseline results are similar after controlling directly for household income proxies, are inconsistent with the findings being driven by income effects.

Second, household bargaining models predict that positive shocks to female labor productivity induce increases in women's bargaining power and as a result, more decision making power in the household; this could allow them to "bargain" for less violence. Yet I find no evidence that female labor productivity increases women's autonomy to make decisions in several household domains, making it unlikely that the findings are driven by a major shift in bargaining power. This is consistent with evolutionary and feminist theories that emphasize that domestic violence is not necessarily declining in women's reservation utilities (Wilson and Daly, 1993; Eswaran and Malhotra, 2011; Yllo and Straus, 2017), and with the possibility that a more attractive outside option may not translate into increases in female bargaining power if the threat of leaving the relationship is not credible (Hill, 2020).

Another prominent possibility is that increases in female labor productivity precipitate changes in gender norms, and those, in turn, guide domestic violence behavior (Wilson and Daly, 1993; Yllo and Straus, 2017). However, using survey data from the DHS on both women's beliefs about the acceptability of violence and men's attitudes towards women, I find no systematic evidence that female labor productivity affects attitudes about gender.

Drawing on evidence from three empirical tests, I argue instead that greater independence and the liberty to seek help is the mechanism most consistent with the results. First, I show that the main results are driven by women who are actually employed, and not by those who have greater employment opportunity but are not employed themselves. This is consistent with an important role for realized independence and time spent away from home, above and beyond a change in the outside option. Second, I find that women with higher labor productivity are more likely to seek help related to domestic abuse from individuals outside their family, and less likely to do so from individuals inside their family, indicating the importance of an expanded social network that results from the gain in economic opportunity. Third, I document that increases in female labor productivity induce

increases in the volume of calls made to the national domestic violence helpline, which emphasizes the importance of being able to seek help from outside the domestic sphere. These results suggest that an important way in which increases in female labor productivity affect levels of domestic violence is by increasing women's ability to reach out for help from resources outside their family.

While the paper's main estimates uncover a negative relationship between women's labor market opportunities and domestic violence, it is possible that this average effect masks substantial heterogeneity. For example, theories of "male backlash" suggest that in places with higher levels of domestic violence and more unequal gender norms the relationship between women's labor productivity and domestic violence could be substantially dampened or even positive (e.g. [Macmillan and Gartner, 1999](#); [Tankard and Paluck, 2016](#)). However, I find no evidence of weaker effects in districts where women are more subordinate. If anything, the main effect is *stronger* in districts with a higher pre-period level of domestic violence, indicating that economic opportunities for women could be most beneficial in places where abuse is most severe.

Taken together, these results document that exogenous changes in women's labor productivity substantially reduce domestic violence, even in Peru which has high baseline levels of domestic violence and where theories of male backlash might have predicted the opposite result. I find that the effects extend to extreme forms of domestic violence, including physical violence and murder, and argue that greater independence and the ability to seek support from outside the household play an important role in driving the results. These findings indicate that, especially in regions where women are traditionally subordinate, greater labor market opportunities or policies designed to increase women's mobility and independence could curtail violence against women.

This paper builds on existing work investigating how changes in economic opportunities affect domestic violence. Most existing evidence is from rich countries. For example, [Aizer \(2010\)](#) finds that a narrowing of the gender wage gap in California reduced hospitalizations for assault, and [Anderberg et al. \(2016\)](#) documents that own-age female unemployment rates increase self-reported domestic violence in the United Kingdom. This paper, in contrast, focuses on a developing country with substantially lower female labor force participation and more unequal gender norms, where the direction of the effect could be very different.

A handful of studies have investigated the correlation between female earnings or employment and domestic violence in developing countries; all such studies that I identified find that greater economic opportunities for women is *positively* correlated with domestic violence, consistent with my own correlational analysis in [Table A1](#) (e.g. [Weitzman, 2014](#); [Bandyopadhyay et al., 2020](#); [Frankenthal and Dutta, 2021](#), using data from India). Similarly, several sociological studies have argued that increases in female status could increase vio-

lence from men who are threatened by women’s advances (Messerschmidt, 2019; Flood et al., 2021). My findings stand in stark contrast to this correlational evidence, and document that in Peru—and even in Peruvian districts with the most unequal gender norms—women’s labor market opportunities have a negative causal effect on domestic violence.

A small and recent literature has examined the impact of one-time shocks to labor market conditions on domestic violence in developing countries.⁶ Erten and Keskin (2021) show that intimate partner violence increased in Cambodia following their accession into the WTO and Erten and Keskin (2018) document that increases in women’s schooling led to increases in psychological violence in Turkey. In contrast, contemporaneous work by Sanin (2022) examines the impact of the construction of coffee mills on domestic violence in Rwanda and finds that mill expansion led to decreases in domestic violence. By separately identifying the effect of female and male employment opportunities, this study distinguishes the effect of women’s labor market opportunities from changes in household income or location-level income shocks and equilibrium effects.⁷ By exploiting the rich, additional data available in Peru and substantial variation across regions in prevailing gender norms, I also investigate the mechanisms driving the main effect.

Finally, this study adds to our understanding of domestic violence in Latin America, where patriarchal cultural norms have led to high levels of violence against women (Garcia-Moreno et al., 2006; Wilson, 2014). In Peru, a growing amount of government attention in the past decade has been devoted to this topic (e.g. Mitchell, 2013; Kavanaugh et al., 2018; Agüero et al., 2020; The World Bank, 2021). The primary objective of these projects is to identify interventions that reduce violence against women and thereby inform public policy design. By demonstrating how and why increases in women’s labor market opportunities impact domestic violence in Peru, this paper contributes to this body of evidence and suggests that expanding access to economic opportunities outside the household could have major negative effects on violence against women.⁸

The paper is organized as follows. Section 2 provides information on domestic violence and gender norms in Peru (2.1) and on the gender specificity of export crops used in the analysis (2.2). Section 2.3 summarizes different economic models of domestic violence and

⁶Some work also estimates the impact of cash transfer programs in developing countries on intimate partner violence, including Bobonis et al. (2013), Hidrobo et al. (2016), Haushofer et al. (2019), Heath et al. (2020). The effect of cash transfers on domestic violence could be very different from real-world changes in economic opportunities: cash transfers have no effect on time spent outside of the household, and are often one-off occurrences unlikely to affect women’s bargaining power, beliefs, or independence.

⁷The coffee mill introduction that Sanin (2022) exploits, for example, represents a large one-time shock to the mill catchment area that affects both male and female wages; the effect on male wages is in fact 0.57 log points *larger* than the effect on female wages (Table 6).

⁸More broadly, this paper is also related to a large body of work investigating a range of cultural and economic causes and consequences of female labor force participation and women’s empowerment (e.g. Goldin and Katz, 2002; Beaman et al., 2012; Alesina et al., 2013; Lowes, 2022).

their predictions. Section 3 describes the data used in the analysis and introduces the paper's empirical strategy. Section 4 outlines the findings and the last section concludes.

2 Background

Several important elements make Peru an ideal context to study the relationship between women's labor market opportunities and domestic violence. First, Peru suffers from high and pervasive levels of domestic violence, and understanding the forces that determine the pattern of abuse could have major health and wellbeing benefits. Understanding the relationship between women's labor market opportunities and domestic violence in a developing country with high levels of domestic violence is crucial, especially because existing theories suggest that this relationship could be very different in these places compared to places where gender norms are relatively equal (Eswaran and Malhotra, 2011, see Section 2.3). Second, a significant proportion of Peruvian workers are employed in export-based agricultural production where employment differs markedly by gender for each crop; this allows for the estimation of plausibly exogenous gender-specific shifters of labor productivity.⁹ Finally, Peru is one of the few countries for which multiple years of geo-coded, comprehensive domestic violence data exists, making this investigation possible.

2.1 Domestic Violence and Gender Norms in Peru

Violence against women is a pervasive problem in Latin America, in part as a consequence of the region's history of political and military sexual violence against women (Boesten, 2012). In Peru, domestic violence is an important public health concern: in February 2021, an average of sixteen women and girls were reported missing every day (Defensoría del Pueblo, 2021). According to the Demographic and Health Survey (DHS), the nationally representative source of domestic violence data used in this analysis, 42% of Peruvian women reported being victims of domestic violence in 2000.¹⁰ Recently, domestic violence has been called a 'shadow pandemic' in Peru due to rising cases of disappearing women and cases of domestic violence since the beginning of the Covid-19 pandemic.¹¹

Previous research has argued that social norms about gender roles affect behavior toward women and the prevalence of domestic violence.¹² In Peru, a culture of "machismo" is

⁹The agricultural sector in Peru accounts for 15% of total export value and employs 25% of the Peruvian labor force (Urriola et al., 2018).

¹⁰This number was 48% in 2009, illustrating the alarming pattern of high and increasing rates of violence.

¹¹See the National Public Radio's 2020 article "[The Women of Peru are Suffering from a Shadow Pandemic.](#)"

¹²For example, Alesina et al. (2016) show that cultural factors arising from pre-colonial customs influence the level and acceptance of violence against women in a set of African countries. Multiple studies have found that men are more prone to abusing if (i) they have been socialized into rigid gender roles, (ii) they believe men

pervasive and may underly the high levels of domestic violence. According to data from ENARES 2019 (*Encuesta Nacional Sobre Relaciones Sociales*), 53% of Peruvians believe that a woman's main job is her role as a mother and as a wife. More than a quarter of Peruvians believe a 'good' wife should obey her husband even if she disagrees with him, and 24% think it is important for men to show their wives "who is the boss." Strikingly, over 15% of respondents believe beating is justified under one of the hypothetical situations described.¹³

While the level of domestic violence in Peru is high, there is also substantial heterogeneity across regions. For example, in the province of Lambayeque, in the region of same name in the Northern coast of Peru, 30% of women in the DHS sample are victims of domestic violence. On the other hand, in the province of Huamanga, in the region of Ayacucho in central Peru, almost 60% of women indicate they are victims of violence. These differences make it possible to investigate the effect of female labor productivity on domestic violence separately in places that have relatively high and relatively low levels of domestic violence, but that belong to the same legal and political context.

2.2 Export Crops and Gender-Specific Labor

In Peru, several large export crops rely disproportionately on female labor ([Calisaya Arangoitia and Flores Mego, 2006](#); [Ferm, 2008](#)). A range of studies argue that this is due to women's comparative advantage in production and processing ([Maria, 1986](#); [Duara and Mallick, 2012](#); [Santa María et al., 2020](#)). The three key female-dominated crops are asparagus, rice, and tea. These crops comprise a large share of Peru's agricultural economy: in 2019 the export value of these three crops put together was approximately 9.3% of total Peruvian agricultural exports.¹⁴ Export demand shocks that affect these crops, therefore, have a large impact on labor market opportunities that disproportionately affect female workers.

Asparagus, rice, and tea require skills that, on average, are more common in women than in men. This leads employers to strongly favor female labor because they believe women are better equipped to perform these tasks ([Santa María et al., 2020](#)).¹⁵ Asparagus is a delicate

are superior to women, or (iii) they feel their masculinity has been threatened ([Dutton and Golant, 2008](#)).

¹³These include: If the woman does not complete household chores to the satisfaction of her partner, if the woman disobeys her partner, if she refuses to have sex, if she asks her partner whether he is unfaithful, and if the partner suspects or finds out that she is unfaithful. These patterns are also reflected in data on decision making power. In the DHS for the years of the analysis, just 65% of women are employed and only 54% of women can make decisions alone about their own healthcare; 16% declare that asking their partner's permission to seek medical help is a "big problem."

¹⁴Calculated using data from the Observatory of Economic Complexity (OEC). See <https://oec.world/en> for more information.

¹⁵Other crop supply chain characteristics increase the likelihood that a woman, rather than a man, would be willing to supply labor: seasonality and relatively low wages ([Calisaya Arangoitia and Flores Mego, 2006](#)). Women are more likely to be willing to enter and leave the labor market according to the season, often with informal contracts. Culturally, women are not the primary providers for the family, and therefore are also more

vegetable, so harvesting, processing, and packaging favors skills considered to be 'feminine', such as fine motor skills and attention to detail (Calisaya Arangoitia and Flores Mego, 2006). As a result, of the 60,000 Peruvians employed in the asparagus industry, around 70% of field workers and more than 95% of processing plant workers are women (Ferm, 2008).

Rice is also a major export crop that employs fine motor skills at certain stages of the cultivation process. Weeding and transplanting rice seeds requires great dexterity and nimbleness; Maria (1986) describes how women have to constantly bend down to plant each rice seedling into the field, and hence are much better labor for rice cultivation.¹⁶ Albeit a somewhat smaller export crop, many sources have documented the strong preference for female employment in tea plantations. The price of tea is often directly linked to the quality of the leaves, which have to be manually selected and hand picked (Qian, 2008). As is the case with asparagus and rice, these characteristics lead employers to strongly favor women, who they argue are more attentive to detail and have more delicate hands, leading to higher quality (and higher priced) tea (Duara and Mallick, 2012).

The remaining major export crops used in the analysis rely on substantial physical strength and grip power and, as a result, tend to favor male employment. This set of crops is composed of avocado, mango, grapes, and quinoa. For example, commercial orchards, such as those involved in mango production, require constant pruning to control tree size and productivity, which is a labor intensive task that favors taller, stronger workers (Davenport, 2006). Quinoa production involves thrashing and intense upper body strength, and more recently the use of heavy machinery in industrialized contexts (Quiroga et al., 2013).

These qualitative accounts indicate that there are marked differences in gender-specific labor for cultivation of these crops. In Section 3.3, I empirically investigate the impact of demand shifters for both sets of crops on gender-level wages and employment. I find that the shifter constructed using the crops in which women specialize increases female, but not male, wages and employment, and the analogous pattern of effects holds for the shifter constructed using crops in which men specialize.

2.3 Economic Models of Domestic Violence

Existing economic models of domestic violence incorporate it as an outcome of non-cooperative household bargaining between spouses. These models provide little guidance on the impact of female labor productivity on domestic violence, especially in countries with unequal gender norms like Peru, for two main reasons.

First, depending on how domestic violence is parametrized, economic models can yield

likely to accept the lower, more uncertain wages that are offered by large plantation farms.

¹⁶Maria (1986) also documents that, when asked why men do not transplant the seeds, a male farmer in India replied: "Men cannot bend their backs the whole day, as can women."

opposite predictions for the sign of the effect of increases in female status on domestic violence. One set of models incorporates domestic violence as an outcome of the household bargaining process that depresses female utility, but is a pleasurable act for the abuser (Farmer and Tiefenthaler, 1997; Bloch and Rao, 2002; Aizer, 2010).¹⁷ This framework predicts that increases in woman’s status raise her outside option and bargaining power, thereby *reducing* domestic violence. In contrast, a second set of models proposes that violence is solely an instrument to increase the abuser’s bargaining power. Abusers do not have a “taste” for domestic violence; instead, violence is a means through which men ensure that women “behave” in their best interest (Eswaran and Malhotra, 2011; Tankard and Paluck, 2016). An increase in female reservation utility may therefore be accompanied by an *increase* in domestic violence, driven by the fact that men use violence to counteract any increase in a spouse’s status. This work is consistent with sociological theories of “male backlash,” which suggest that improvements in a woman’s outside option can increase domestic violence in contexts with unequal gender norms, where men are especially threatened by changes in women’s status (Messerschmidt, 2019; Flood et al., 2021).^{18,19}

Second, economic models make assumptions which might be too strong in practice, and sometimes suggest unlikely mechanisms underpinning the relationship between women’s status and domestic violence. This is especially true in developing contexts, where qualitative accounts do not support the mechanisms proposed by economic theory. Many cases of domestic violence clearly cannot be explained by the channels emphasized in household bargaining models. For example, especially in low and middle income countries, a non-negligible number of domestic violence cases culminate in the murder of the woman, termed femicide (Hill, 2020). It seems implausible that femicide is driven by a desire to extract resources from a spouse or by a special appetite for violence, given the extremity of the act and potential punishment for murder. Moreover, bargaining models assume both partners are rational, utility maximizing individuals. However, some evidence suggests that domestic violence acts are often triggered by random causes and therefore *irrational*, and these findings cast doubt on theories that portray domestic violence as a set of intentional, rational acts.²⁰ Finally, the threat of exit is a key force in theoretical work, and its credibility is crucial

¹⁷This is usually driven by an assumption that violence increases male utility directly.

¹⁸Indeed, Macmillan and Gartner (1999) suggest that employment plays a symbolic role for the woman, above and beyond its impact on socioeconomic resources.

¹⁹Other models distinguish between two roles domestic violence can play from the point of view of the assailant. *Expressive* violence is violence used as a source of pleasure, whereas *instrumental* violence is used as a vehicle to extract resources (Haushofer et al., 2019; Tauchen et al., 1991). Although a detailed discussion of these models is not relevant here, the number of different ways economists have attempted to model domestic violence, and lack of consensus, is illustrative of the need for evidence on the topic.

²⁰For example, Card and Dahl (2011) find that domestic violence levels increase following unexpected losses of professional football teams. The results of Angelucci (2008) also indicate a strong role for alcohol abuse in determining the incidence of violence.

for increases in reservation utility to translate into higher intra-household bargaining power. However, women who are victims of domestic violence live in fear of their partners, and, anecdotally, this can make it prohibitively dangerous to leave the relationship (Hill, 2020). If in practice it is not feasible for the woman to leave her abusive partner, shifts in the quality of her outside option may have no impact on bargaining power or domestic violence.²¹

Given the conflicting predictions of household bargaining models, empirical evidence is essential to shed light on the relationship between changes in the status of women and domestic violence in developing countries. After discussing the empirical methodology and data, I first determine the sign of the relationship between female labor productivity and domestic violence in Peru (Section 4.1). I then probe the underlying causal mechanisms, with a special focus on the set of channels proposed by these existing theories (Section 5).

3 Methodology

This section outlines the data and empirical strategy used for the analysis. Section 3.1 describes in detail the main sources of data, including the *Encuesta Nacional de Hogares sobre Condiciones de Vida y Pobreza* (ENAHO), which has information on wages, the Domestic Violence Module of the DHS, the *IV Censo Nacional de Comisarías*, from which I obtain homicide data, and *Línea 100*, which records national data on domestic violence helpline calls. Section 3.2 explains the construction of the labor productivity measures and the paper’s main identification strategy. Section 3.3 documents that the female labor productivity shifter is a strong predictor of female, but not male, wages and employment.

3.1 Data

Labor Productivity In order to construct gender-specific shifters of labor productivity, I first divide seven of Peru’s major export crops into those that predominately rely on female labor and those that do not.²² Asparagus, tea, and rice are the three crops in which female laborers specialize. This procedure is described in greater detail in Section 2.2. I next retrieve data on the international price of each crop for each year in the sample period from the FAOStat database.²³ Data on the share of land dedicated to planting a specific crop in the period preceding the analysis is obtained from EarthStat, which reports global raster files

²¹Fear of retaliation in case the woman leaves the relationship is well-founded: it is not uncommon, in fact, that perpetrators of femicide are *ex*-partners of the victims. For example, in 2016, 21% of femicides recorded by precincts in the *IV Censo Nacional de Comisarías* data were perpetrated by *ex*-partners or *ex*-husbands.

²²I select major export crops following the Peruvian Ministry for Foreign Trade and Tourism. The crops that compose the female-specific shifter are asparagus, rice, and tea. The crops that compose the non-female-specific shifter are avocado, grapes, mangoes, and quinoa.

²³International prices are calculated as the average of prices in all countries in that year, *excluding* Peru.

documenting the best estimates of the distribution of planted area for each crop in 2000 (Monfreda et al., 2008). In order to measure the share of land devoted to each crop in each district, I overlay the EarthStat raster files with shapefiles outlining the administrative subdivisions of Peru from DIVA-GIS.

Wages Wage data are obtained from the *Encuesta Nacional de Hogares sobre Condiciones de Vida y Pobreza* (ENAHO), an annual, nationally representative survey that collects information from employed Peruvians on consumption patterns and employment characteristics. For each year since 2005, I use the ENAHO data to measure agricultural wages at the district level, separately for men and women.²⁴ These data make it possible to investigate the relationship between the gender-specific agricultural labor productivity shifters and wages.

Domestic Violence and Other Household Data Data on domestic violence are obtained from all four geo-coded rounds of the Peruvian Demographic Health Survey (DHS), from 2000 to 2009. The DHS is a comprehensive health survey that collects household data on sociodemographic characteristics and health outcomes. Its domestic violence module contains several specific questions on whether particular behaviors occur in the household (e.g. “Does your husband/partner ever slap you?”). The main measure of domestic violence that I use throughout the analysis is an indicator that equals one if a woman reports any instance of domestic violence. In order to investigate more extreme forms of violence, I also construct an indicator that equals one if a woman reports any instance of physical violence. The data are geo-referenced and track domestic violence over time; both are crucial characteristics for the identification strategy, which relies on location-specific crop geography and time variation in crop prices.

A central challenge in analyses of domestic violence is the difficulty of collecting data due to safety concerns, sampling strategies, and ethical considerations. Moreover, due to the sensitivity of the issue, there is reason to believe that women might underreport the incidence of domestic violence. The DHS uses the best known practices for systematically collecting data on domestic violence (see e.g. Alesina et al., 2016, on this point).²⁵ Enumerators are trained extensively on the best practices when collecting sensitive data; interviews only occur in private, and interviewers record whether the interview was interrupted, all of which reduces reporting bias. In addition, the structure of the domestic violence module is adapted from the Conflict Tactic Scale (Straus, 2017), which asks specific and objective questions in order to reduce bias stemming from subjective perceptions of violence and provides

²⁴Agricultural workers include all categories of workers related to agriculture. These include *explotadores agrícolas*, *trabajadores agropecuarios*, and *peones de labranza y peones agropecuarios*.

²⁵For a more detailed discussion of the methodology used by the DHS, see Appendix A. For more information on the questionnaires, refer to the [DHS Domestic Violence Module Methodology Report](#).

respondents with many opportunities to reveal victimization (Bender, 2017). Finally, Aguero and Frisancho (2021) independently measure the local prevalence of domestic violence using a randomized list experiment in Peru and find no evidence of a difference between their estimates and the DHS data, lending further credibility to the DHS's domestic violence measurement in Peru.²⁶

I also compile data on women's decision making power over a series of household-related decisions, information about when women believe domestic violence is justified, and men's attitudes and behaviors towards their partners. The DHS also provides information on whether victims of domestic violence sought help, and who they reached out to. I return to these data in the analysis of mechanisms. Finally, while the DHS does not report data on wages, it does report information on employment, which is useful for investigating the validity of the female labor productivity shifter.

Homicides To supplement the data on femicide from the DHS, I collect precinct level data on homicides from the *IV Censo Nacional de Comisarías*, which is available for 2013, 2014, 2016, and 2017. The data report all homicides registered by a precinct, the gender of the perpetrator and the victim, and the relationship between victim and perpetrator. I code as femicide all homicides for which the perpetrator is a male, the victim is a female, and the perpetrator is either the (current or ex-) husband or long term partner of the victim. I link each precinct to one of the 192 provinces in Peru and compute the total number of femicides in each province. I do the same for male homicides and female homicides perpetrated by a stranger (non-femicides), and use these as a placebo measure of violence that should not be as closely linked to female labor productivity.

Helpline Calls I collect data on the volume of calls to the national domestic violence helpline service, *Línea 100*. The service, provided by the Ministry for Women and Vulnerable Populations of the Peruvian Government, offers information, guidance, advice, and emotional support to victims of domestic violence and their families.²⁷ The calls are received by women trained as lawyers, psychologists, or social workers. It is completely free to call and the line is available 24 hours every day of the week. It can be reached via mobile phone, landline, or public telephone from any part of the country, and is available in Spanish, Quechua, and Aymara, the three most prevalent languages in Peru. In extreme cases, the

²⁶In addition, they redo their analysis focusing on subgroups defined by eight characteristics that could be correlated with respondents' costs of exposure (and therefore with misreporting). The results suggest that for all but one dimension, tertiary education, there are no significant gaps between the prevalence of domestic violence reported across both methods. Following their findings, all results presented here are robust to controlling for the respondent's education in years.

²⁷See the [Peruvian government website's](#) description of the resource.

calls will be referred to *Centro Emergencia Mujer* (Center for Women’s Emergencies) or to the *Servicio de Atención Urgente* (Urgent Service), but otherwise the purpose of the helpline is to provide victims with someone to safely talk to. The number of calls received by the helpline in each of the 25 regions every year is available from 2011 to 2020.²⁸ These data provide an independent way of assessing whether changes in female labor productivity impact how often domestic violence victims reach out for help and support.

3.2 Empirical Strategy

The main empirical challenge in estimating the effect of female labor productivity on domestic violence is that labor productivity is endogenous to the incidence of domestic violence. To overcome this, I develop measures for gender-specific labor productivity by combining variation across crops in gender-specific specialization, variation across districts in crop planting patterns, and variation over time in crop-level export prices.²⁹ Section 2.2 describes the gender-specificity of crop-level agricultural production in Peru, and Section 3.1 describes the data used to construct the share of district-level land area devoted to each crop, as well as variation in international crop prices.

Using this information, I construct a shifter of female-specific labor productivity. Define the set of export crops as \mathcal{K} indexed by k , and let the set of female-specific crops be $\mathcal{F} \subset \mathcal{K}$; furthermore, let d index districts and t index years. Female labor productivity is defined as:

$$\text{Female Labor Productivity}_{dt} = \sum_{k \in \mathcal{F}} \left(\frac{\text{Area}_{kd}}{\sum_{k' \in \mathcal{K}} \text{Area}_{k'd}} \right) \cdot \log(\text{World Price}_{kt}) \quad (1)$$

In words, the measure of female labor productivity is the sum over all female-specific crops of the share of local agricultural land devoted to each crop in the pre-period multiplied by the contemporaneous international price. Thus, district-level changes in female labor productivity are driven by yearly fluctuations in international prices, which are plausibly independent from potential local trends in domestic violence in Peru. Figure 1 shows how Female Labor Productivity_{dt} changes overtime in the six largest regions; even after aggregating the measure to the region level, there is substantial variation in predicted female labor productivity both over time within each region and across regions.

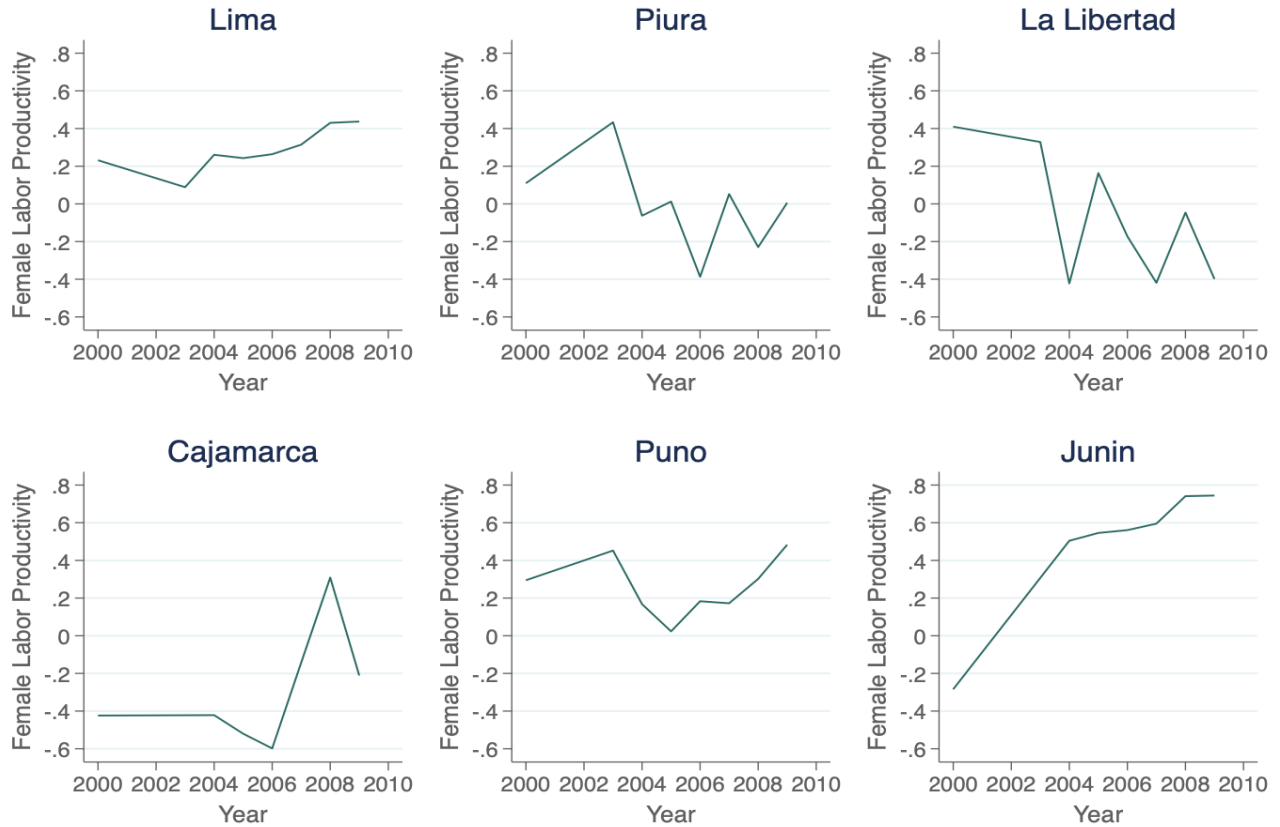
The main estimating equation is:

$$\text{Domestic Violence}_{idt} = \beta \cdot \text{Female Labor Productivity}_{dt} + \alpha_d + \delta_{pt} + X'_{idt}\Gamma + \epsilon_{idt} \quad (2)$$

²⁸I exclude 2020 from the analysis, because calls more than doubled during the Covid-19 pandemic. Results are similar if I include 2020 instead.

²⁹Identification follows from the exogeneity of shocks to international crop prices, even if district level crop composition is endogenous (Borusyak et al., 2020).

Figure 1: Variation in Female Labor Productivity Over Time



Notes: This figure plots the value of female labor productivity over the time span used in the main analysis (2000-2009) for the six most populated regions in Peru: Lima, Piura, La Libertad, Cajamarca, Puno, and Junin, respectively. The region's name is indicated at the top of each graph. Female labor productivity is the sum of the shares of agricultural land in a district devoted to each crop in the set of female-specific export crops multiplied by the log of the yearly international price for that crop (see Equation 1). The region-level values are calculated as the average of the values for all districts in that region.

where the unit of observation is an individual i in a district d and year t . Domestic Violence $_{idt}$ is a binary variable that equals one if the respondent is a victim of domestic violence. The baseline specification controls for district fixed effects, α_d , and province by year fixed effects, δ_{pt} . I document the robustness of the results to the inclusion of a series of additional controls, X'_{idt} . Throughout, standard errors are clustered at the district level.³⁰

The coefficient of interest is β , which captures the causal effect of female labor productivity—

³⁰Districts are the third-level country subdivisions of Peru. There are 1838 in total, of which 823 are represented in the DHS. Provinces are the second-level administrative subdivision of Peru; there are 192 provinces in total, 189 of which are present in the data. Standard errors can be clustered at the province level instead; the results remain very similar (Table A6). I also show that the precision of the baseline findings is similar using Conley (1999) standard errors (Table A7).

employment and wage earning opportunities—on domestic violence. $\beta > 0$ implies that female labor productivity increases domestic violence while $\beta < 0$ implies that female labor productivity reduces domestic violence. As discussed in Section 2.3, either sign is possible according to theories corresponding to different models of domestic violence.

A main goal of the paper is to estimate the effect of women’s labor market potential on domestic violence; estimates of β from Equation 2, however, may capture both the effect of higher female labor productivity and the effect of higher overall household income. To distinguish between these two channels, I construct an analogous labor productivity shifter for non-female-specific crops \mathcal{NF} , described in Section 2.2. I estimate a version of (1) focusing on the set of crops in which men specialize to construct a shifter for non-female-specific labor productivity.³¹ I then include the non-female shifter on the right hand side of (2). Comparing the effect of female-specific and non-female-specific labor productivity separates the effect of female labor productivity from overall income effects.

3.3 Validating the Labor Productivity Measures

Two key assumptions that support the interpretation of the coefficients outlined above are that the female labor productivity measure shifts female, but not male, labor productivity, and that the non-female labor productivity shifter affects male, but not female, labor productivity. In order to investigate these hypotheses, I estimate the relationship between the gender-specific labor productivity measures and gender-specific wages and employment. It is worth pointing out that for changes in labor productivity to affect domestic violence, they need not actually affect employment or wages; changes in women’s outside option or their employment *potential* could shape household bargaining even if wages or employment do not change in practice (Pollak, 2005). As a result, these estimates should not be interpreted as true first stages, but rather reassuring validations of the key mechanism underpinning the labor productivity shifters.

Table 1 documents the relationship between female labor productivity and gender-specific wages, collected from the ENAHO survey, and employment, collected from the DHS. In particular, it reports the effect of the female shifter separately on wages and employment for agricultural workers of both genders. Column 1 confirms the strong positive effect of female labor productivity on female agricultural wages. Although investigating the effect of female labor productivity on the extensive margin—female employment—in the DHS is a stringent

³¹In particular, the non-female labor productivity shifter is defined as

$$\text{Non-Female Labor Productivity}_{dt} = \sum_{k \in \mathcal{NF}} \left(\frac{\text{Area}_{kd}}{\sum_{k' \in \mathcal{K}} \text{Area}_{k'd}} \right) \cdot \log(\text{World Price}_{kt})$$

Table 1: The Effect of Female Labor Productivity on Wages and Employment

	Dependent Variable is			
	Female		Male	
	Wages	Employment	Wages	Employment
	(1)	(2)	(3)	(4)
Female Labor Productivity	2.402** (1.000)	1.361* (0.801)	0.323 (1.158)	0.0652 (0.598)
District Fixed Effects	yes	yes	yes	yes
Province by Year Fixed Effects	yes	yes	yes	yes
Observations	13,361	94,465	13,755	92,250
R-squared	0.778	0.515	0.728	0.497

Notes: The dependent variable in columns 1 and 3 is the standardized monthly wage for agricultural workers in a district and year, for females (column 1) and males (column 3). The dependent variable in columns 2 and 4 is a binary variable that equals one if individuals are employed, and zero otherwise, for females (column 2) and males (column 4). *Female labor productivity* is the sum of the shares of agricultural land in a district devoted to each crop in the set of female-specific export crops multiplied by the log of the yearly international price for that crop (see Equation 1). All regressions are weighted by the number of agricultural workers in the district and control for district and province by year fixed effects. Standard errors are clustered at the district level. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

test, column 2 shows that shocks to female labor productivity also increase the likelihood that the woman is employed in agriculture. To further test the sensitivity of these results, I construct 1000 placebo measures for female labor productivity using a randomly selected set of three large export crops and investigate the effect of these placebos on women’s wages and employment. Figure A1 plots the histogram of the coefficients obtained from running the regressions in column 1 (panel 1) and 2 (panel 2), but replacing female labor productivity with each of these placebos. Reassuringly, the effect of female labor productivity is in the very right tail of both distributions, indicating that the three crops chosen as female-specific are much more closely related to women’s wages and employment compared to other major export crops.

Next, I report evidence that male wages and employment respond to shocks to non-female labor productivity, but not to female labor productivity. Columns 3 and 4 of Table 1 document that female labor productivity has no effect on male wages and employment, suggesting that the measure indeed captures changes in labor productivity restricted to women. Table A2 shows a similar pattern to the female shifter’s for the relationship between non-female labor productivity and gender-specific wages: non-female labor productivity has a positive and significant effect on male, but not female, agricultural wages. Taken together, these results support the strategy of using the female labor productivity shock as an exogenous shifter of women’s wages and employment to examine the effect of changes in female

labor productivity on domestic violence, and distinguishing between the effect of changes in *female* productivity and overall household income by comparing the effects of the female and non-female specific shifters.

4 Female Labor Productivity Reduces Domestic Violence

4.1 Main Results

Table 2 documents the main results, estimates of Equation 2 in which the domestic violence indicator is the dependent variable. In column 1, only the female labor productivity shifter is included on the right hand side, along with district and province by year fixed effects. The coefficient of interest is negative and significant, indicating that female labor productivity reduces the incidence of domestic violence. The estimate implies that the average increase in female labor productivity in a district during the sample period reduced the likelihood of domestic violence by 19%.

In column 2, I control directly for age and education-bin fixed effects for both the female respondent and her partner; the estimate is very similar.³² In column 3, I control for the latitude and longitude of each district interacted with year fixed effects, and the results are again similar. These controls fully absorb any trends in geographic location, which might be correlated with the data on the patterns of crop planting in each district that is used to construct the shifter.

There is no evidence that the effect of female labor productivity on domestic violence is driven by increases in household income. Columns 4-6 repeat the same specifications in columns 1-3, but include the shifter for non-female-specific labor productivity in the regression and report the *p*-value of the difference between the effect of female and non-female labor productivity on domestic violence. The coefficient on female labor productivity remains negative and significant, and if anything slightly larger in magnitude. The coefficient on non-female labor productivity is positive but statistically indistinguishable from zero. Importantly, the difference between the female and non-female coefficients is statistically significant. These findings suggest that the negative effect of female labor productivity on domestic violence is not mediated by changes in household income, and are instead specific to female productivity.

While the main results incorporate all forms of domestic violence in order to construct the dependent variable, the results are very similar after restricting attention only to phys-

³²These controls are potentially important in light of evidence that education can mediate the relationship between income and domestic violence (Hidrobo and Fernald, 2013).

Table 2: Female Labor Productivity Reduces Domestic Violence

	Dependent Variable is Any Domestic Violence (=1)					
	(1)	(2)	(3)	(4)	(5)	(6)
Female Labor Productivity	-0.777** (0.359)	-0.881** (0.440)	-0.904** (0.445)	-1.035** (0.491)	-1.196** (0.500)	-1.213** (0.516)
Non-Female Labor Productivity				0.257 (0.276)	0.312* (0.178)	0.305 (0.188)
District Fixed Effects	yes	yes	yes	yes	yes	yes
Province by Year Fixed Effects	yes	yes	yes	yes	yes	yes
Education and Age Fixed Effects	no	yes	yes	no	yes	yes
Latitude and Longitude by Year	no	no	yes	no	no	yes
p-value, Female = Non-Female	-	-	-	0.071	0.015	0.019
Observations	38,634	33,986	33,986	38,634	33,986	33,986
R-squared	0.090	0.116	0.116	0.090	0.116	0.116

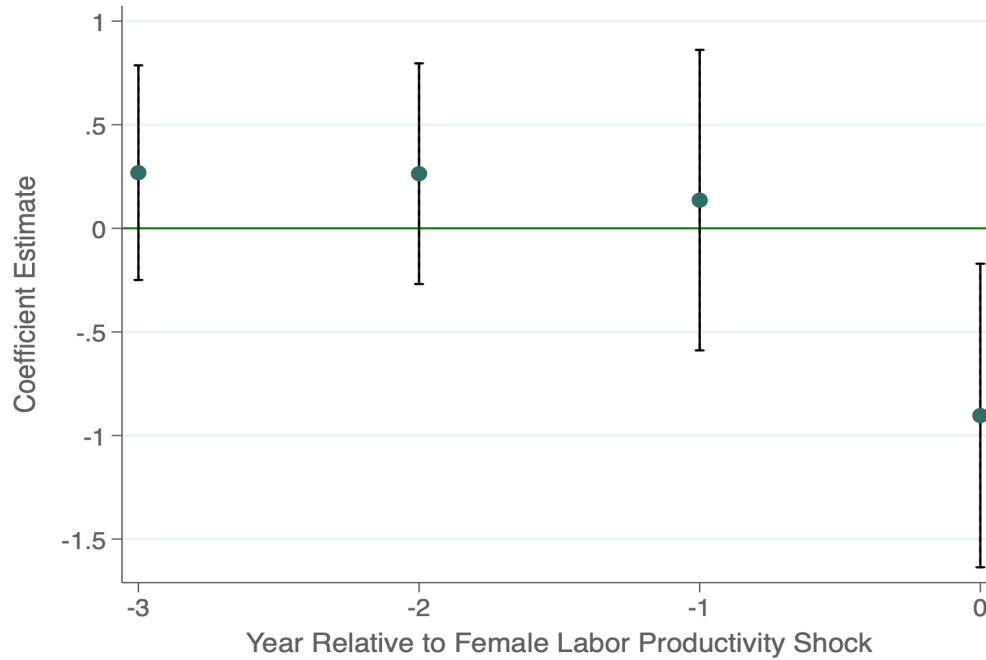
Notes: The dependent variable is a binary variable that equals one if the respondent reports being a victim of any kind of domestic violence, including physical, sexual, and psychological. *Female labor productivity* is the sum of the shares of agricultural land in a district devoted to each crop in the set of female-specific export crops multiplied by the log of the yearly international price for that crop (see Equation 1). *Non-female labor productivity* is constructed analogously, using the set of non-female specific export crops instead. All regressions control for district and province by year fixed effects. Columns 2 and 5 additionally control for the age and education bins of the respondent and her partner. Columns 3 and 4 also control for latitude and longitude interacted with year. The p-values reported are for the F-test for the difference between the female and non-female labor productivity coefficients. Standard errors are clustered at the district level. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

ical forms of domestic violence.³³ Appendix Table A3 is identical to Table 2, except the dependent variable is an indicator for physical domestic violence, and the estimates are very similar in magnitude. This suggests that increases in female labor productivity reduce the incidence of more severe, physical manifestations of domestic violence, and the effect is not restricted to psychological abuse.

Dynamics To rule out the possibility that pre-existing trends are driving the main effect, I investigate whether there are pre-existing trends in the relationship between female labor productivity and domestic violence. Figure 2 displays the results of regressing domestic violence on the first, second, and third lead of the female specific shifter graphically. The results show no indication of pre-existing trends in the relationship between female labor productivity and domestic violence. Table A4 records the results of these regressions. In all columns, the coefficient on the leading values of female labor productivity is positive, close to zero, and statistically insignificant.

³³Here, physical violence includes any kind of physical, severe, or sexual violence, and excludes psychological violence or emotional abuse.

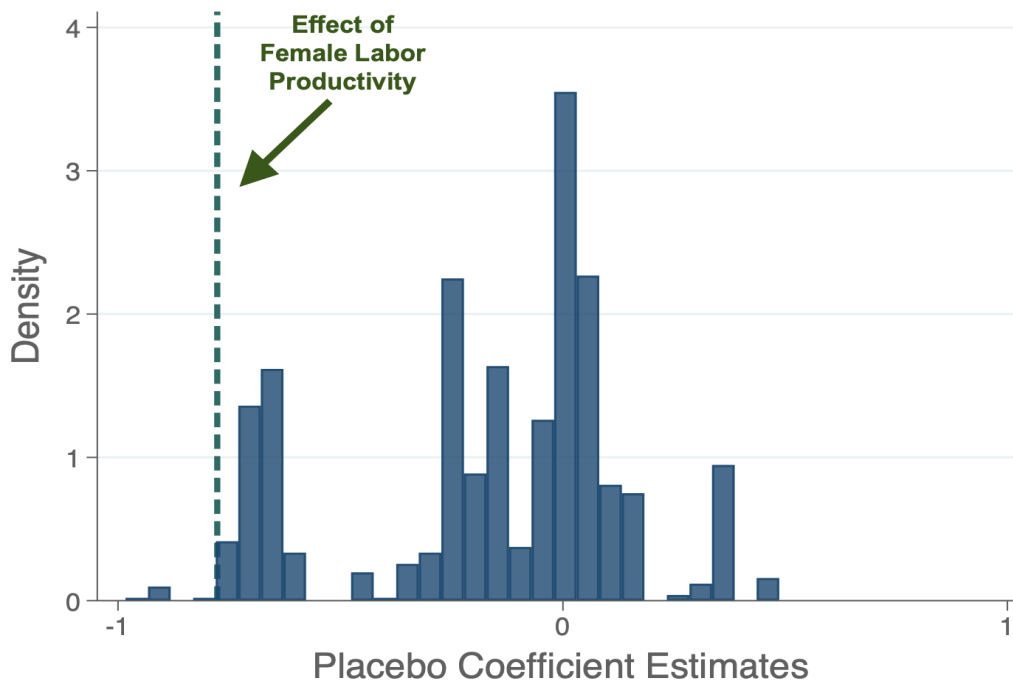
Figure 2: Event Study of The Effect of Female Labor Productivity on Domestic Violence



Notes: This figure plots the coefficient estimate of leading values of the proxy for female labor productivity on current domestic violence. The dependent variable is a binary variable that equals one if the respondent reports being a victim of any kind of domestic violence. Each point is a coefficient from a separate regression. The x-axis indicates the year relative to the dependent variable. All regressions control for district and province by year fixed effects, latitude and longitude interacted with year, and age and education bins for the respondent and her partner. Standard errors are clustered at the district level. 90% confidence intervals are reported.

Falsification test The underlying logic of the measure for female labor productivity is that women specialize in the cultivation and production of certain crops. If the findings are truly driven by female-specific labor productivity changes, and not general household income changes, then we should not expect to find as strong a relationship between export shocks to other randomly selected sets of crops and domestic violence. In order to show that the findings are specific to the set of female-specific crops, discussed in Section 2.2, I construct placebo shifters by randomly selecting sets of three crops from 30 large crops included in the *EarthStat* database (excluding the female-specific crops used in the main analysis), constructing shifters for labor productivity from these three crops, and estimating versions of Equation 2 with the placebo shifters as the independent variable of interest. The main estimate from Table 2 is in the far left tail of the coefficient distribution, displayed in Figure 3; fewer than 1.1% of the placebo shifters are more negative than the main estimate, suggesting that the effect is truly restricted to the female-specific crops. This result is consistent with

Figure 3: The Effect of Placebo Shifters for Female Labor Productivity on Domestic Violence



Notes: This figure graphs the effect of placebo proxies for labor productivity on domestic violence. From 30 large Peruvian crops, excluding the three crops considered female specific in the main analysis (asparagus, rice, and tea), three crops were randomly selected to compose a placebo proxy for labor productivity, and the main regression (Table 2, column 1) was estimated on this placebo. This process was repeated 1000 times. The histogram plots the effect of these 1000 placebo proxies on domestic violence. The dotted line marks the effect of the female labor productivity as defined in the analysis on domestic violence.

the interpretation of the baseline estimates as the causal effect of increases in female labor productivity on domestic violence.

Robustness: controlling for observables Appendix Table A5 further tests the robustness of the main estimates by documenting that they are similar after including a range of additional controls and under a number of sample restrictions. Column 1 controls for district and province by year fixed effects, respondent and partner characteristics, and latitude and longitude by year, corresponding to column 6 from Table 2. The main analysis and results exclude underage respondents, to ensure full comprehension of the questions, and respondents whose interview was interrupted by another family member, to avoid biasing results. Columns 2 and 3 show the results are robust if these groups of respondents are included in the estimation. Column 4 includes ethnicity fixed effects, and column 5 adds interviewer

fixed effects, in order to rule out any differences in the reported prevalence of domestic violence across different cultures or to different interviewers. The effect of female labor productivity on domestic violence remains negative and significant throughout, and the difference between the female and non-female labor productivity coefficients is significant in all specifications.

Robustness: inference In the main analysis, labor productivity is measured at the district level while the outcome variable is at the individual level. Appendix Table A6 reports estimates for which the unit of observation is the district-year and the outcome variable is the share of women that experienced domestic violence in the district. The results are virtually unchanged, and are robust to the inclusion of latitude and longitude interacted with year fixed effects (Columns 2 and 4). The precision of the estimates is also similar after clustering by province, a larger administrative unit than the district (Table A6, column 5-6). Moreover, the results also remain the same after accounting for spatial correlation. Coefficient t-statistics of the baseline district level specification (column 1, Table A6) with standard errors following Hsiang (2010)'s application of Conley (1999) are shown in Table A7. The coefficient is significant at the same level using a range of values for kernel cutoff distance.

4.2 Female Homicide

In the most extreme cases, domestic violence results in female homicide, or femicide. While femicide can be considered a form of domestic violence, it does not fit well within the bargaining framework. It seems unlikely that small changes in the woman's outside option drive men to deliberately commit murder, for two important reasons. First, unlike other forms of domestic violence, it is much more likely that murder would lead to severe consequences. This should act as a powerful deterrent. Second, to the extent that domestic violence is used as a tool to extract resources from women, femicide cannot serve that purpose. However, since female labor productivity reduces the prevalence of domestic violence on average, and potentially opportunities for violent behavior, it may affect the average severity of domestic violence and hence the likelihood that a dispute escalates. If femicide is the result of specific, uncontrolled outbursts (Hill, 2020), then reducing the number of potentially violent situations could reduce the number of femicides.

Table 3 investigates the effect of female labor productivity on the number of femicides using crime data from *IV Censo Nacional de Comisarías*. Across columns, the dependent variable is the inverse hyperbolic sine transformation of the number of homicides recorded by the precincts in a province and year.³⁴ In column 1, homicides are coded as femicides if the

³⁴I use the inverse hyperbolic sine transformation of the count of femicides as the dependent variable be-

Table 3: Female Labor Productivity Reduces the Number of Femicides

	Dependent Variable is (inverse hyperbolic sine of)			
	Number of Femicides by partner	Number of Femicides by (ex-) partner	Number of Other Female Homicides	Number of Male Homicides
	(1)	(2)	(3)	(4)
Female Labor Productivity	-0.902* (0.494)	-0.933* (0.553)	-0.260 (0.399)	-0.00917 (0.465)
Province Fixed Effects	yes	yes	yes	yes
State by Year Fixed Effects	yes	yes	yes	yes
Observations	663	663	663	663
R-squared	0.778	0.837	0.952	0.963

Notes: The dependent variable across columns is the inverse hyperbolic sine transformation of the number of homicides in each province and year. The category of homicide changes in each column: in column 1 it is the murder of a woman perpetrated by her husband or long-term partner. In column 2 it is the murder of a woman perpetrated by her (ex-)husband or (ex-)long-term partner. In column 3 it is the murder of a woman by a perpetrator that is not a family member, and in column 4 it is the murder of a man. *Female labor productivity* is the sum of the shares of agricultural land in a district devoted to each crop in the set of female-specific export crops multiplied by the log of the yearly international price for that crop (see Equation 1). All specifications control for province and state by year fixed effects. Standard errors are clustered at the province level. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

victim is a woman and the perpetrator is either her husband or long term partner, and in column 2 the definition of femicide is broadened to also include perpetrators who are ex-husbands or ex-long term partners. In both cases, female labor productivity has a negative and significant effect on the number of femicides.

Columns 3 and 4 report the results of two falsification tests. The dependent variable in column 3 is the (inverse hyperbolic sine of the) number of female homicides that are *not* femicides (i.e. the perpetrator is not a family member and does not know the victim personally) and in column 4 the dependent variable is the (inverse hyperbolic sine of the) number of male homicides. In both cases, the effect of female labor productivity on the number of homicides is small and insignificant. In other words, increases in female labor productivity decrease the number of femicides but have no effect on other kinds of homicide. This suggests the result is not driven by an impact on overall crime levels, and is instead specific to violence against women in the domestic sphere.

cause there are zeroes in the data. The results are similar if the dependent variable is the raw count of femicides instead (not reported).

5 Mechanisms

Having documented that female labor productivity has a meaningful negative impact on domestic violence, this section investigates the mechanisms that underpin this relationship. I find little evidence suggesting that the findings are driven by changes in household income, changes in female bargaining power and role in household decision making, or changes in beliefs about gender roles and domestic violence. Instead, the findings suggest that higher labor productivity affords women with greater independence because of time spent away from the home. In line with this result, I find that increases in female labor productivity make it more likely that domestic violence victims reach out for help from someone outside the family or from a government-provided resource. Finally, I find no evidence that the main results are weaker in districts with more unequal gender norms at baseline; if anything, the results are stronger in places with higher baseline incidence of domestic violence, which is inconsistent with the key predictions of theories of “male backlash” described in Section 2.3.

5.1 Household Income Effects

Past work has found a strong, negative correlation between wealth and domestic violence (Weede, 1981; Larsen et al., 2021).³⁵ Bhalotra et al. (2021) also argue that reducing either male or female employment can lead to increases in domestic violence. This pattern suggests that the baseline results could be driven simply by increases in household income that result from gains in female labor productivity.³⁶ There are several reasons, however, why it is unlikely that the main results are driven by income effects. First, if overall income drove the finding, we would expect a similar, negative effect of both female and non-female labor productivity on domestic violence. If anything, however, I find a *positive* and insignificant effect of non-female labor productivity on the level of domestic violence. The fact that the effect of the female-specific labor productivity shock is in the very left-tail of the distribution of the effects of 1000 placebo labor productivity shocks (Figure 3) is further indication that the main effect is not operating through increases in household income.

An alternative strategy for ruling out this possibility is to control directly for various measures of household consumption. While the DHS does not report actual consumption, it does report whether the household owns a broad range of household goods. Including these

³⁵In line with this idea, other research has found that economic growth improves a range of women’s outcomes, e.g. by relaxing the constraints faced by poor households (who often sacrifice the health and wellbeing of women in these situations) (Rose, 1999; Miguel, 2005), by liberating women from the home (Greenwood et al., 2005), or by expanding their legal rights (Doepke and Tertilt, 2009; Fernández, 2014).

³⁶Card and Dahl (2011) argue that emotional stress can increase levels of domestic violence; to the extent that increases in income alleviate hardship and stress, this could be an additional channel through which income affects domestic violence.

covariates in the regression introduces a “bad control” problem, but makes it possible to assess whether the main mechanism is likely to be changes in household resources. Results controlling for several measures of income and consumption are presented in Appendix Table A8 and the findings are qualitatively very similar, further indicating that income effects are not an important mechanism.

5.2 Women’s Bargaining Power

Canonical models of domestic violence (e.g. Farmer and Tiefenthaler, 1997) hypothesize that it is the outcome of a bargaining process between men and women, in which women bargain for less violence while men can derive utility from acting violently. If increases in female labor productivity reduce domestic violence through increases in bargaining power, we might expect to see this improvement impact other facets of household decision making.

Table 4 reports the relationship between female labor productivity and several measures of the woman’s decision-making power within the household. Each column captures a different decision-making domain: (i) her own money, (ii) her own healthcare, (iii) household purchases, (iv) visiting relatives, and (v) cooking. The dependent variable in each column equals one if the respondent alone can make a decision in each of these domains, and zero otherwise. Across the columns, the coefficients are indistinguishable from zero, suggesting that increases in female labor productivity, as I measure them, do not change women’s decision making power within the household in these domains. It is unlikely, therefore, that female labor productivity reduces domestic violence by increasing women’s bargaining power and allowing them to “bargain” for less violence.

This null result is in line with the idea that women’s bargaining power might not increase as a result of gains in female labor productivity, as traditional household bargaining models predict, in violent relationships. Even if household bargaining models are correct to assert that the bargaining power of each partner is determined by their outside option, this may not be true in abusive relationships if the assumption that she can choose to leave the relationship is too strong in practice (see Section 2.3 and Hill, 2020, on the challenges and dangers associated with exiting an abusive relationship). If she cannot leave, bargaining power will not be responsive to increases in her outside option, since that outside option no longer functions as a threat point.

In line with the possibility that female labor productivity affects domestic violence through a channel other than bargaining power, some work in sociology posits that domestic violence should not be modelled as an outcome of a bargaining process between partners. Instead, it is better understood as the result of evolutionary causes for jealousy (Wilson and Daly, 1993) or patriarchal social systems that hold that women’s status should be subordinate (Yllo and

Table 4: The Effect of Female Labor Productivity on Women’s Decision-Making Ability

	Dependent Variable = 1 if Respondent has autonomy over				
	How to spend her money	Her own health care	Household purchases	Visiting relatives	Cooking
	(1)	(2)	(3)	(4)	(5)
Female Labor Productivity	0.534 (0.384)	0.447 (0.498)	0.191 (0.286)	0.383 (0.373)	-0.413 (0.257)
District Fixed Effects	yes	yes	yes	yes	yes
Province by Year Fixed Effects	yes	yes	yes	yes	yes
Observations	22,699	43,809	43,808	43,804	43,802
R-squared	0.135	0.136	0.118	0.083	0.080

Notes: The dependent variable is a binary variable that equals one if the respondent indicates she can make decisions alone about the subjects indicated at the top of each column, and zero otherwise. *Female labor productivity* is the sum of the shares of agricultural land in a district devoted to each crop in the set of female-specific export crops multiplied by the log of the yearly international price for that crop (see Equation 1). All regressions control for district and province by year fixed effects. Standard errors are clustered at the district level. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Straus, 2017). Both of these theories suggest that domestic violence is borne out of men’s need to control the sexuality of women, and therefore might, but need not be, responsive to changes in the quality of the outside option of each partner. This effect, however, would not operate through changes in bargaining power, but through changes in gender norms or increases in female autonomy, for example.

5.3 Gender Norms

Changes in female labor productivity could affect beliefs about gender. Fernández et al. (2004), for example, find that men who have working mothers have more gender-progressive attitudes, Dahl et al. (2021) find men who serve with women in the military have more progressive views about gender norms and gender identity, and Field et al. (2021) document that increasing women’s control of earnings increases female labor supply and influences norms about gender in India. As described in Section 2.1, gender norms can be, in turn, important determinants of violent behavior towards women.

To study this mechanism, I first investigate the effect of female labor productivity on women’s beliefs about whether domestic beating is justified under a number of different scenarios. Table 5 shows the relationship between female labor productivity and whether the respondent believes beating is justified: (i) if she goes out without telling her partner, (ii) if she neglects the children, (iii) if she argues with her partner, (iv) if she refuses to have sex with her partner, and (v) if she burns the food. The coefficient on female labor productivity is insignificant for all measures of acceptance, except for a negative and marginally significant effect of female labor productivity on the likelihood that the respondent believes beating is

Table 5: The Effect of Female Labor Productivity on Women’s Acceptance of Violence

	Dependent Variable = 1 when Respondent Believes Beating is Justified if				
	She goes out without telling her partner	She neglects the children	She argues with her partner	She refuses to have sex with her partner	She burns the food
	(1)	(2)	(3)	(4)	(5)
Female Labor Productivity	0.137 (0.241)	-0.513* (0.268)	-0.146 (0.126)	-0.0853 (0.0978)	0.183 (0.169)
District Fixed Effects	yes	yes	yes	yes	yes
Province by Year Fixed Effects	yes	yes	yes	yes	yes
Observations	26,492	26,456	26,478	26,417	26,500
R-squared	0.078	0.086	0.072	0.063	0.061

Notes: The dependent variable is a binary variable that equals one if the respondent believes beating is justified under the specific scenarios described at the top of each column, and zero otherwise. *Female labor productivity* is the sum of the shares of agricultural land in a district devoted to each crop in the set of female-specific export crops multiplied by the log of the yearly international price for that crop (see Equation 1). All regressions control for district and province by year fixed effects. Standard errors are clustered at the district level. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

justified is she neglects the children (column 2). Therefore, female labor productivity does not systematically affect women’s beliefs about the acceptability of domestic violence.

Although there is no evidence that women’s beliefs about domestic violence are changing, it is possible that *male* norms change in response to increases in female labor productivity and drive the results. To study this possibility, I estimate the relationship between female labor productivity and men’s respect and affection for their spouses, attitudes that are driven by gender norms. Table A9 reports the relationship between female labor productivity and whether the respondent’s partner has control issues and whether he demonstrates care and affection towards her.³⁷ Control issues are: (i) if he is jealous when she talks to other men, (ii) if he accuses her of being unfaithful, (iii) if he does not let her see girlfriends, (iv) if he limits her, (v) if he insists on knowing her whereabouts, and (vi) if he does not trust her. Attitudes of respect and affection are: (i) if he is tender, (ii) if he spends free time with her, (iii) if he takes her opinion into account, (iv) if he respects her wishes, and (v) if he respects her rights. The dependent variable in columns 1 and 3 is a binary variable that equals one if the partner has any control issues or displays any of the respectful attitudes, and zero otherwise, respectively. The dependent variable in columns 2 and 4 is the number of control issues and the number of caring attitudes, respectively. The effect of female labor productivity on the extensive (columns 1 and 3) and intensive margin (columns 2 and 4) of these male behaviors is indistinguishable from zero in all cases.

In sum, I find no evidence to support the hypothesis that female labor productivity de-

³⁷The sample size for this table is somewhat larger because these questions are asked to all DHS respondents, and not just those randomized to answer the domestic violence module questions.

creases domestic violence via changes in gender norms, either from the perspective of the man or from the perspective of the woman. One small caveat to this finding is that, like all survey questions about behavior, the answers to these questions might be biased due to social desirability. In particular, women who enjoy higher wages or employment might report that violence is less acceptable or that their partners are more respectful towards them if they have learned these to be the socially desirable answers.³⁸ However, if this were true, it seems likely that these effects would bias the results toward finding a positive relationship between female labor productivity and progressive attitudes toward women, while I consistently find a mixture of both positive and negative relationships instead, and largely insignificant effects.

5.4 Independence and the Liberty to Seek Help

Another possibility is that better labor market opportunities for women affect the amount of time they spend independently and the information and connections they make outside of the household, and this increases the likelihood that they are able to escape or prevent violent episodes by reaching out for help (Rose and Campbell, 2000; Sylaska and Edwards, 2014). If independence and time spent away from the home are important mechanisms, then the relationship between changes in female labor productivity and domestic violence should be strongest for women who are themselves actually employed. Larger effects for employed, compared to unemployed, women could indicate that the finding is driven by greater overall independence, rather than increases in household bargaining power as a consequence of changes in her reservation utility.

In Table 6, I compare the effect of female labor productivity on domestic violence separately for employed and unemployed women. This analysis should be interpreted with caution, since employment is a potential *outcome* of changes in labor productivity and the women in the sample who are employed could simply be those for whom the measure has the largest effect on outside options. With this caveat in mind, however, I find a substantially larger negative effect of female labor productivity on the sample of employed, compared to unemployed, women. In the sample of unemployed women, the effect of female labor productivity is also negative, but insignificant.

These findings indicate that actual employment and independence, as opposed to simply a better outside option *potential*, is an important underlying mechanism. Greater indepen-

³⁸Studies have consistently found a positive correlation between education and social status and misreporting due to social desirability bias across a range of topics. For example, Silver et al. (1986) and Bernstein et al. (2001) show that respondents who have completed college are the most likely to overreport voter participation, Jeffery (1996) reports that men tend to increasingly underreport their body weight as their level of education increases.

Table 6: The Effect of Female Labor Productivity on Domestic Violence for (Un)employed Women

	Dependent Variable is Any Domestic Violence (= 1)	
	Employed Respondents	Unemployed Respondents
	(1)	(2)
Female Labor Productivity	-1.160*** (0.434)	-0.269 (0.355)
District Fixed Effects	yes	yes
Province by Year Fixed Effects	yes	yes
Observations	28,892	9,483
R-squared	0.103	0.143

Notes: The dependent variable is a binary variable that equals one if the respondent reports being a victim of any kind of domestic violence, including physical, sexual, and psychological. The sample in column 1 is all employed respondents, while the sample in column 2 is all unemployed respondents. *Female labor productivity* is the sum of the shares of agricultural land in a district devoted to each crop in the set of female-specific export crops multiplied by the log of the yearly international price for that crop (see Equation 1). All regressions control for district and province by year fixed effects. Standard errors are clustered at the district level. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

dence means the woman spends less time in the household, and could, for example, give her more or better opportunities to escape violent episodes. This mechanism is consistent with [Bhalotra et al. \(2021\)](#), who compare the effect of female and male job loss with and without benefits and conclude that an important channel through which employment reduces domestic violence is time spent away from the home. [Dugan et al. \(1999\)](#) also argue that shifts in factors such as marriage, divorce, and declining domesticity are important in reducing women’s exposure to domestic violence.

Greater female independence might also enhance the woman’s ability to seek help from those outside her household. To test for this, I investigate the relationship between female labor productivity and seeking help from family members or from individuals outside the family, using data from the DHS. In column 1 of [Table 7](#), the dependent variable is an indicator that equals one if the woman has sought help related to domestic violence from members of her immediate family, and the coefficient is negative and insignificant. In column 2 the dependent variable is a binary variable that equals one if the woman sought help from her extended family, and again the coefficient is negative but insignificant. In column 3, the dependent variable is an indicator that equals one if the woman has sought help related to domestic violence from someone *outside* her family, including friends, employers, doctors, and the police, and the coefficient is positive and significant. Therefore, female labor pro-

Table 7: The Effect of Female Labor Productivity on Seeking Help

	Dependent Variable is			
	Respondent sought help from immediate family	Respondent sought help from extended family	Respondent sought help from others	Number of Calls to Domestic Violence Helpline
	(=1)	(=1)	(=1)	
	(1)	(2)	(3)	(4)
Female Labor Productivity	-0.632 (0.404)	-0.263 (0.185)	0.643** (0.321)	8.278** (3.480)
District Fixed Effects	yes	yes	yes	-
Province by Year Fixed Effects	yes	yes	yes	-
Region Fixed Effects	-	-	-	yes
Year Fixed Effects	-	-	-	yes
Observations	21,734	21,734	21,734	216
R-squared	0.095	0.084	0.098	-

Notes: The dependent variable in the first three columns is a binary variable that equals one if the respondent, who is a victim of domestic violence, sought help from immediate family (column 1), extended family (column 2), or any others (column 3), and zero otherwise. The immediate family category includes parents, siblings, and children. The extended family category includes any other family, such as in-laws or cousins, and "others" includes friends, employers, doctors, religious leaders, and the police. The dependent variable in column 4 is the number of calls in each region and year received by the national domestic violence helpline, *Línea 100*. *Female labor productivity* is the sum of the shares of agricultural land in a district devoted to each crop in the set of female-specific export crops multiplied by the log of the yearly international price for that crop (see Equation 1). The regressions in columns 1 to 3 are estimated using OLS and control for district and province by year fixed effects, and the regression in column 4 is estimated using poisson pseudo maximum likelihood and controls for region and year fixed effects. Standard errors are clustered at the district level in the first three columns and at the region level in column 4. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

ductivity increases the likelihood that a woman seeks help from non-family members, which could be an important driver of the main effect if women are better able to escape violence with their help.

In line with this result, I find evidence that increases in female labor productivity also increase the volume of calls made to the national domestic violence helpline, *Línea 100*. Column 4 of Table 7 shows the effect of female labor productivity on the number of calls made to the helpline in each region and year from 2011 to 2019. The coefficient is positive and significant, and suggests that the average female labor productivity shock experienced by a district over the ten years of the sample period would have roughly doubled the number of calls to the helpline.³⁹

These findings indicate that women shift toward seeking help from non-family members and potentially individuals less close to or influenced by their husbands. Relying on in-

³⁹The change in female labor productivity over the main sample period for the average district is an increase of 0.26. Multiplying the coefficient from the regression by this number gives the percent change in the number of calls for the average district from 2000 to 2009 (215%). This exercise is meant to illustrate the magnitude of the effect, but should not be taken too seriously, since the analysis is at the region level and effects might not scale proportionally to the district level.

dividuals outside the family, and potentially developing an independent help and support network, is consistent with the previous findings on the role of independence and time away from the home driving the effect.

5.5 Male Backlash

Some theories of domestic violence predict that the impact of female labor productivity could hinge on prevailing attitudes toward women and the level of domestic violence (Macmillan and Gartner, 1999; Tankard and Paluck, 2016). This work predicts that men who are accustomed to male dominance and female dependence might feel threatened by gains in female status, and that domestic violence might increase in response to gains in economic opportunity for women as a way to reinstate male authority. If this is true, the effect of female labor productivity on domestic violence could be very different in places with higher acceptability of domestic violence and stricter gender norms.

I exploit the substantial cross-sectional heterogeneity in norms across Peruvian districts to investigate whether more unequal places observe smaller negative effects, or even positive effects, of female labor productivity on domestic violence, which would be evidence of “male backlash.”⁴⁰ Table 8 reports the results from an augmented version of Equation 2, in which the independent variables are interactions between female labor productivity and indicators for whether a district at baseline (i.e. in 2000) was above or below median in terms of: acceptance of violence, female decision-making power, and domestic violence.

In all three columns, each corresponding to a different measure of baseline district-level norms, the effects of female labor productivity on domestic violence is very similar for districts above and below median in terms of gender attitudes. If anything, the baseline results are stronger in districts with less equal baseline gender norms and a higher level of domestic violence (column 3). These results are inconsistent with the idea of “male backlash”, and show that even in places with unequal gender norms, higher female labor productivity can substantially reduce domestic violence. This result is consistent with the idea that the mechanism driving the result is *not* changes in gender norms or bargaining power. Male backlash would be more likely if this were the case because places with more unequal gender norms could be more resistant to gains in female status.

⁴⁰For example, in Tintay Punco, a district in the region of Huancavelica, the share of women who are victims of domestic violence is 17%. This district is at the first percentile of the distribution. At the 99th percentile is the district of Marangani, in the region of Cusco, where 74% of women are victims of domestic violence. The same level of heterogeneity is not present in previous studies focusing on high-income countries (Aizer, 2010; Anderberg et al., 2016).

Table 8: Heterogeneous Effects of Female Labor Productivity on Domestic Violence

	Dependent Variable is Any Domestic Violence (=1)		
	(1)	(2)	(3)
Female Labor Prod.*Above Median Acceptability of Violence	-0.781** (0.359)		
Female Labor Prod.*Below Median Acceptability of Violence	-0.743** (0.364)		
Female Labor Prod.*Above Median Female Decision-Making Power		-0.661* (0.362)	
Female Labor Prod.*Below Median Female Decision-Making Power		-0.770** (0.352)	
Female Labor Prod.*Above Median Domestic Violence			-1.210*** (0.335)
Female Labor Prod.*Below Median Domestic Violence			-0.676** (0.331)
District Fixed Effects	yes	yes	yes
Province by Year Fixed Effects	yes	yes	yes
p-value, Above Median = Below Median	0.632	0.211	0.000
Observations	38,634	38,634	38,634
R-squared	0.090	0.090	0.091

Notes: The dependent variable is a binary variable that equals one if the respondent reports being a victim of any kind of domestic violence, including physical, sexual, and psychological. *Female labor productivity* is the sum of the shares of agricultural land in a district devoted to each crop in the set of female-specific export crops multiplied by the log of the yearly international price for that crop (see Equation 1). Acceptability of violence is calculated from questions that ask respondents whether beating is justified under different scenarios. Female decision-making power is calculated from questions about her decision-making power within the household. The p-values reported are for the F-test for the difference between the coefficients of female labor productivity interacted with above and below median measures of gender norm strictness. All regressions control for district and province by year fixed effects. Standard errors are clustered at the district level. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

6 Conclusion

This paper develops gender-specific shifters for labor productivity and combines them with nationally representative data on domestic violence to estimate the causal effect of female labor productivity on domestic violence in Peru. I find that female labor productivity reduces the incidence of domestic violence, and that this effect is not driven by increases in household income. In addition, I find this negative effect holds for more severe types of violence, including physical domestic violence and femicide.

I also investigate the mechanisms through which increases in female labor productivity reduce domestic violence. I find no evidence of changes in gender norms or women's bargaining power within the household. Instead, the results are consistent with greater independence and time spent away from the household, which free women to seek help outside of the domestic sphere, driving the observed effect. Therefore, although the main negative effect of female labor productivity on domestic violence is consistent with the prediction of standard economic models of the household, it is not because of the bargaining channel they

propose, for which I find no evidence. Instead, I find evidence that distance from the household and new connections outside domestic life that result from increases in female labor productivity are responsible for increasing women's ability to escape violence.

Theories of "male backlash" hypothesize that increases in female status could have a positive effect on the incidence of domestic violence in contexts with very unequal gender norms in which violence against women is normalized. Peru in many ways fits this description, and, in many contexts including the present study, there is a positive correlation between women's employment and domestic violence. However, my main findings show a negative causal effect of increases in female labor productivity on domestic violence. This effect holds even for districts with the highest acceptability of violence against women, highest levels of domestic violence, and lowest female autonomy over household decision-making.

The results imply that existing public policies that aim to increase female labor force participation rates or women's mobility and independence may have the unintended positive consequence of remediating domestic violence. However, the results taken as a whole are inconsistent with changes in women's labor market opportunities affecting women's status within the household (as measured by decision-making power) or gender norms. These results are in line with previous work arguing that the recent changes in economic status of women, which result from economic development, are not enough to fully promote female empowerment and ensure gender equality (Duflo, 2012).

References

- Aguero, Jorge and Veronica Frisancho**, “Measuring violence against women with experimental methods,” 2021.
- Agüero, Jorge M, Úrsula Aldana, Erica Field, Veronica Frisancho, and Javier Romero**, “Is Community-Based Targeting Effective in Identifying Intimate Partner Violence?,” in “AEA Papers and Proceedings,” Vol. 110 American Economic Association 2014 Broadway, Suite 305, Nashville, TN 37203 2020, pp. 605–609.
- Aizer, Anna**, “The gender wage gap and domestic violence,” *American Economic Review*, 2010, 100 (4), 1847–59.
- Alesina, Alberto, Benedetta Briochi, and Eliana La Ferrara**, “Violence against women: A cross-cultural analysis for Africa,” Technical Report, National Bureau of Economic Research 2016.
- , **Paola Giuliano, and Nathan Nunn**, “On the origins of gender roles: Women and the plough,” *The quarterly journal of economics*, 2013, 128 (2), 469–530.
- Anderberg, Dan, Helmut Rainer, Jonathan Wadsworth, and Tanya Wilson**, “Unemployment and domestic violence: Theory and evidence,” *The Economic Journal*, 2016, 126 (597), 1947–1979.
- Angelucci, Manuela**, “Love on the rocks: Domestic violence and alcohol abuse in rural Mexico,” *The BE Journal of Economic Analysis & Policy*, 2008, 8 (1).
- Arangoitia, Miguel Calisaya and Karim Flores Mego**, “La agroexportación no tradicional en el país de las maravillas,” *Lima: Asociación Aurora Vivar*, 2006.
- Bandyopadhyay, Debasis, James Allan Jones, and Asha Sundaram**, “Gender Bias and Male Backlash as Drivers of Crime Against Women: Evidence from India,” *The University of Auckland Business School Research Paper Forthcoming*, 2020.
- Beaman, Lori, Esther Duflo, Rohini Pande, and Petia Topalova**, “Female leadership raises aspirations and educational attainment for girls: A policy experiment in India,” *science*, 2012, 335 (6068), 582–586.
- Bender, Annah K**, “Ethics, methods, and measures in intimate partner violence research: the current state of the field,” *Violence against women*, 2017, 23 (11), 1382–1413.

- Bernstein, Robert, Anita Chadha, and Robert Montjoy**, “Overreporting voting: Why it happens and why it matters,” *Public Opinion Quarterly*, 2001, 65 (1), 22–44.
- Bhalotra, Sonia, Diogo GC Britto, Paolo Pinotti, and Breno Sampaio**, “Job displacement, unemployment benefits and domestic violence,” 2021.
- Bloch, Francis and Vijayendra Rao**, “Terror as a bargaining instrument: A case study of dowry violence in rural India,” *American Economic Review*, 2002, 92 (4), 1029–1043.
- Bobonis, Gustavo J, Melissa González-Brenes, and Roberto Castro**, “Public Transfers and Domestic Violence: The Roles of Private Information and Spousal Control,” *American Economic Journal: Economic Policy*, 2013, 5 (1), 179–205.
- Boesten, Jelke**, “The state and violence against women in Peru: intersecting inequalities and patriarchal rule,” *Social Politics*, 2012, 19 (3), 361–382.
- Borusyak, Kirill, Peter Hull, and Xavier Jaravel**, “Quasi-Experimental Shift-Share Research Designs,” 2020.
- Card, David and Gordon B Dahl**, “Family violence and football: The effect of unexpected emotional cues on violent behavior,” *The Quarterly Journal of Economics*, 2011, 126 (1), 103–143.
- Conley, Timothy G**, “GMM estimation with cross sectional dependence,” *Journal of econometrics*, 1999, 92 (1), 1–45.
- Dahl, Gordon B, Andreas Kotsadam, and Dan-Olof Rooth**, “Does integration change gender attitudes? The effect of randomly assigning women to traditionally male teams,” *The Quarterly Journal of Economics*, 2021, 136 (2), 987–1030.
- Davenport, Thomas L**, “Pruning strategies to maximize tropical mango production from the time of planting to restoration of old orchards,” *HortScience*, 2006, 41 (3), 544–548.
- Defensoría del Pueblo**, “¿Qué Pasó con Ellas? Reporte Igualdad y No Violencia Numero 13,” Technical Report, Defensoría del Pueblo 2021.
- Doepke, Matthias and Michele Tertilt**, “Women’s Liberation: What’s in it for Men?,” *The Quarterly Journal of Economics*, 2009, 124 (4), 1541–1591.
- Duara, Mridusmita and Sambit Mallick**, “Tea industry in Assam (India): issues of migration and gender discrimination,” in “Proceedings of International Conference on History and Society Development (ICHSD2012)” 2012, pp. 174–177.

- Duflo, Esther**, “Women empowerment and economic development,” *Journal of Economic literature*, 2012, 50 (4), 1051–79.
- **and Christopher Udry**, “Intrahousehold resource allocation in Cote d’Ivoire: Social norms, separate accounts and consumption choices,” Technical Report, National Bureau of Economic Research 2004.
- Dugan, Laura, Daniel S Nagin, and Richard Rosenfeld**, “Explaining the decline in intimate partner homicide: The effects of changing domesticity, women’s status, and domestic violence resources,” *Homicide Studies*, 1999, 3 (3), 187–214.
- Dutton, Donald G and Susan K Golant**, *The batterer: A psychological profile*, Basic Books, 2008.
- Erten, Bilge and Pinar Keskin**, “For better or for worse?: Education and the prevalence of domestic violence in turkey,” *American Economic Journal: Applied Economics*, 2018, 10 (1), 64–105.
- **and –**, “Trade-offs? The Impact of WTO Accession on Intimate Partner Violence in Cambodia,” Technical Report 2021.
- Eswaran, Mukesh and Nisha Malhotra**, “Domestic violence and women’s autonomy in developing countries: theory and evidence,” *Canadian Journal of Economics/Revue canadienne d’économique*, 2011, 44 (4), 1222–1263.
- Farmer, Amy and Jill Tiefenthaler**, “An economic analysis of domestic violence,” *Review of social Economy*, 1997, 55 (3), 337–358.
- Ferm, Nora**, “Non-traditional agricultural export industries: conditions for women workers in Colombia and Peru,” *Gender & Development*, 2008, 16 (1), 13–26.
- Fernández, Raquel**, “Women’s rights and development,” *Journal of Economic Growth*, 2014, 19 (1), 37–80.
- **, Alessandra Fogli, and Claudia Olivetti**, “Mothers and sons: Preference formation and female labor force dynamics,” *The Quarterly Journal of Economics*, 2004, 119 (4), 1249–1299.
- Field, Erica, Rohini Pande, Natalia Rigol, Simone Schaner, and Charity Troyer Moore**, “On Her Own Account: How Strengthening Women’s Financial Control Impacts Labor Supply and Gender Norms,” *American Economic Review*, 2021, 111 (7), 2342–75.
- Flood, Michael, Molly Dragiewicz, and Bob Pease**, “Resistance and backlash to gender equality,” *Australian Journal of Social Issues*, 2021, 56 (3), 393–408.

- Frankenthal, Isadora and Diya Dutta**, “Risk Factors for Gender-based Violence: The Case of Indian Agriculture,” 2021.
- Garcia-Moreno, Claudia, Henrica AFM Jansen, Mary Ellsberg, Lori Heise, and Charlotte H Watts**, “Prevalence of intimate partner violence: findings from the WHO multi-country study on women’s health and domestic violence,” *The lancet*, 2006, 368 (9543), 1260–1269.
- Goldin, Claudia and Lawrence F Katz**, “The power of the pill: Oral contraceptives and women’s career and marriage decisions,” *Journal of political Economy*, 2002, 110 (4), 730–770.
- Greenwood, Jeremy, Ananth Seshadri, and Mehmet Yorukoglu**, “Engines of liberation,” *The Review of Economic Studies*, 2005, 72 (1), 109–133.
- Haushofer, Johannes, Charlotte Ringdal, Jeremy P Shapiro, and Xiao Yu Wang**, “Income changes and intimate partner violence: Evidence from unconditional cash transfers in Kenya,” Technical Report, National Bureau of Economic Research 2019.
- Heath, Rachel, Melissa Hidrobo, and Shalini Roy**, “Cash transfers, polygamy, and intimate partner violence: Experimental evidence from Mali,” *Journal of Development Economics*, 2020, 143, 102410.
- Hidrobo, Melissa, Amber Peterman, and Lori Heise**, “The effect of cash, vouchers, and food transfers on intimate partner violence: evidence from a randomized experiment in Northern Ecuador,” *American Economic Journal: Applied Economics*, 2016, 8 (3), 284–303.
- **and Lia Fernald**, “Cash transfers and domestic violence,” *Journal of Health Economics*, 2013, 32 (1), 304–319.
- Hill, Jess**, *See What You Made Me Do: The Dangers of Domestic Abuse That We Ignore, Explain Away, or Refuse to See*, Sourcebooks, Inc., 2020.
- Hsiang, Solomon M**, “Temperatures and cyclones strongly associated with economic production in the Caribbean and Central America,” *Proceedings of the National Academy of sciences*, 2010, 107 (35), 15367–15372.
- Jeffery, Robert W**, “Bias in reported body weight as a function of education, occupation, health and weight concern,” *Addictive Behaviors*, 1996, 21 (2), 217–222.
- Kavanaugh, Guadalupe, Maria Micaela Sviatschi, and Iva Trako**, “Female officers, gender violence and human capital: Evidence from all-women’s justice centers in Peru,” *PSE Working*, 2018.

- Larsen, Lise Wessel, Win Thuzar Aye, and Espen Bjertness,** "Prevalence of Intimate Partner Violence and Association with Wealth in Myanmar," *Journal of Family Violence*, 2021, 36 (4), 417–428.
- Lowes, Sara,** "Kinship Structure and the Family: Evidence from the Matrilineal Belt," Technical Report, National Bureau of Economic Research 2022.
- Macmillan, Ross and Rosemary Gartner,** "When she brings home the bacon: Labor-force participation and the risk of spousal violence against women," *Journal of Marriage and the Family*, 1999, pp. 947–958.
- María, Bessy Castillo Santa, Bertha Nancy Larico Quispe, and Rubén Andrés Moreno Sotomayor,** "Integration of women in agriculture in Cañete-Peru [Integración de la mujer en la agricultura en Cañete, Perú]," *Journal of Sciences and Engineering*, 2020, 4 (1), 1–9.
- Maria, Mies,** "Indian Women in Subsistence and Agricultural Labour," 1986.
- Max, Wendy, Dorothy P Rice, Eric Finkelstein, Robert A Bardwell, and Steven Leadbetter,** "The economic toll of intimate partner violence against women in the United States," *Violence and victims*, 2004, 19 (3), 259–272.
- Messerschmidt, James,** *Nine lives: Adolescent masculinities, the body and violence*, Routledge, 2019.
- Miguel, Edward,** "Poverty and witch killing," *The Review of Economic Studies*, 2005, 72 (4), 1153–1172.
- Mitchell, Rhoda,** "Domestic violence prevention through the Constructing Violence-free Masculinities programme: an experience from Peru," *Gender & Development*, 2013, 21 (1), 97–109.
- Monfreda, Chad, Navin Ramankutty, and Jonathan A Foley,** "Farming the planet: Geographic distribution of crop areas, yields, physiological types, and net primary production in the year 2000," *Global biogeochemical cycles*, 2008, 22 (1).
- Pollak, Robert A,** "Bargaining power in marriage: Earnings, wage rates and household production," 2005.
- Qian, Nancy,** "Missing women and the price of tea in China: The effect of sex-specific earnings on sex imbalance," *The Quarterly Journal of Economics*, 2008, 123 (3), 1251–1285.

- Quiroga, Carla, Ramiro Escalera, Genaro Aroni, Alejandro Bonifacio, Juan Antonio González, Milton Villca, Raúl Saravia, and Antonio Ruiz,** “Traditional processes and technological innovations in quinoa harvesting, processing and industrialization,” *State of the art report on quinoa around the world in*, 2013, pp. 258–296.
- Rose, Elaina,** “Consumption smoothing and excess female mortality in rural India,” *Review of Economics and statistics*, 1999, 81 (1), 41–49.
- Rose, Linda E and Jacquelyn Campbell,** “The role of social support and family relationships in women’s responses to battering,” *Health Care for Women International*, 2000, 21 (1), 27–39.
- Sanin, Deniz,** “Paid Work for Women and Domestic Violence: Evidence from the Rwandan Coffee Mills,” 2022.
- Silver, Brian D, Barbara A Anderson, and Paul R Abramson,** “Who overreports voting?,” *American political Science review*, 1986, 80 (2), 613–624.
- Straus, Murray A,** *Measuring intrafamily conflict and violence: The conflict tactics (CT) scales*, Routledge, 2017.
- Sylaska, Kateryna M and Katie M Edwards,** “Disclosure of intimate partner violence to informal social support network members: A review of the literature,” *Trauma, violence, & abuse*, 2014, 15 (1), 3–21.
- Tankard, Margaret E and Elizabeth Levy Paluck,** “Norm perception as a vehicle for social change,” *Social Issues and Policy Review*, 2016, 10 (1), 181–211.
- Tauchen, Helen V, Ann Dryden Witte, and Sharon K Long,** “Domestic violence: A nonrandom affair,” *International Economic Review*, 1991, pp. 491–511.
- The World Bank,** “Combating Gender-Based Violence in Peru: Increasing Awareness and Resources to Prevent Violence Against Women,” *Projects and Operations*, 2021.
- UN,** “United Nations General Assembly, Declaration on the Elimination of Violence Against Women,” *United Nations General Assembly*, 1993, 48, 104.
- Urriola, NN, CA Aquino, Baral Pradeep et al.,** “Impact of agricultural exports on economic growth of Peru: the case of avocado and grapes.,” *Russian Journal of Agricultural and Socio-Economic Sciences*, 2018, 3 (75), 3–11.
- Weede, Erich,** “Income inequality, average income, and domestic violence,” *Journal of Conflict Resolution*, 1981, pp. 639–654.

Weitzman, Abigail, "Women's and men's relative status and intimate partner violence in India," *Population and Development Review*, 2014, 40 (1), 55–75.

WHO, "Violence against women prevalence estimates, 2018: global, regional and national prevalence estimates for intimate partner violence against women and global and regional prevalence estimates for non-partner sexual violence against women," 2021.

Wilson, Margo and Martin Daly, "An evolutionary psychological perspective on male sexual proprietariness and violence against wives," *Violence and victims*, 1993, 8 (3), 271–294.

Wilson, Tamar Diana, "Violence against women in Latin America," 2014.

Yllo, Kersti A and Murray A Straus, "Patriarchy and violence against wives: The impact of structural and normative factors," in "Physical violence in American families," Routledge, 2017, pp. 383–400.

Appendix

A Domestic Violence Data

The domestic violence data used in this study is collected from four waves of the Domestic Violence Module of the Demographic and Health Surveys (DHS) for Peru, between 2000 and 2009. The Demographic and Health Surveys are designed to be nationally representative household surveys that collect data on population, health, HIV, and nutrition. In particular, the Domestic Violence module aims to document the prevalence and consequences of domestic violence.

1. Methodology

- Sampling is designed to generate data that is representative (i) at the national level, (ii) at the residence level (urban-rural), and (iii) at the regional level (departments or states). This is achieved by basing the sample on a stratified two-way cluster design: in the first stage, enumeration areas are drawn from censuses, and in the second stage, households are selected from these enumeration areas.
- The DHS uses standard model questionnaires for all rounds (across years) and all countries, with the objective of ensuring the data collected is comparable across countries and within countries over time. This unique feature makes it possible to track the prevalence and severity of domestic violence over time.
- The DHS collects geographic information for some waves of the survey, including the years used in the present analysis. Each household is identified by its rough coordinates.
- The Domestic Violence module questions are designed to reduce reporting bias. To illustrate, below are the questions about domestic violence perpetrated by a partner:
 - (a) Does your husband/partner ever push you, shake you, or throw something at you?
 - (b) Does your husband/partner ever slap you?
 - (c) Does your husband/partner ever twist your arm or pull your hair?
 - (d) Does your husband/partner ever physically force you to have sexual intercourse with him when you did not want to?
 - (e) Does your husband/partner ever physically force you to perform any other sexual acts you did not want to?

- (f) Does your husband/partner ever force you with threats or in any other way to perform sexual acts you did not want to?
- (g) Does your husband/partner ever attack you with a knife, gun, or other weapon?
- (h) Does your husband/partner ever kick you, drag you, or beat you up?
- (i) Does your husband/partner ever try to choke you or burn you on purpose?

Direct, yes or no questions decrease mis-reporting because they relieve respondents of the burden of identifying domestic violence instances themselves, which would rely on each woman's definition or understanding of violence. The language of the questions is simple and straightforward, designed to minimize misunderstanding across respondents. Asking about various different behaviors in the household provides the respondent with several opportunities to reveal victimization, which reduces under-reporting. Moreover, the array of questions asked span psychological, sexual, and physical violence, which enables the researcher to separately identify different kinds of violence.

2. Best Practices for Sensitive Data

Several special precautions are taken to protect the privacy and well-being of respondents during the domestic violence module. First, interviewers are provided with additional training on administering the questions, dealing with crisis situations, avoiding further endangering respondents, and preparing themselves emotionally. Second, interviewers reiterate informed consent immediately prior to administering domestic violence questions. Third, interviewers ensure absolute privacy, interrupting or terminating the domestic violence interview if privacy is breached. Fourth, as a further privacy protection, only one woman per household receives the questions in the domestic violence module so that no one else in the household knows these issues were discussed during the interview. The woman is selected at random from among all women in the household who are eligible to be interviewed. Finally, respondents are provided with information and referrals for options and services available for women experiencing domestic violence or in need of other social services.

3. Privacy and Confidentiality

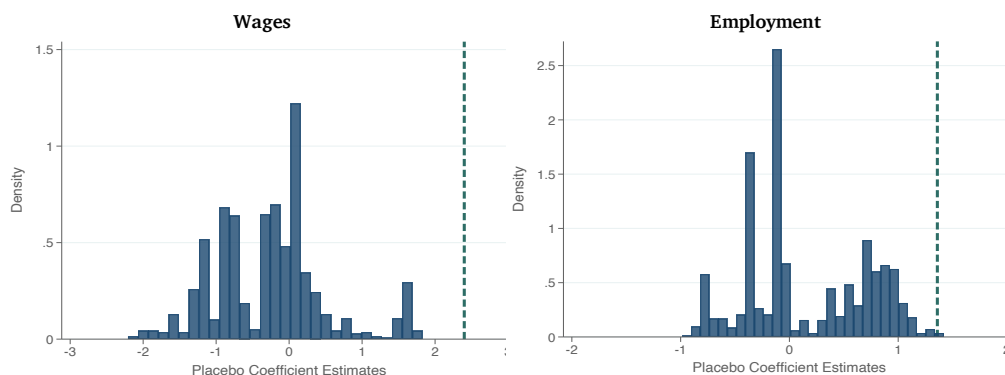
Privacy and confidentiality are crucial for the collection of reliable sensitive data. The DHS maintains strict standards for protecting the privacy of respondents and household members. Interviews are performed as privately as possible. Within each household, an eligible respondent may not be interviewed in the presence of another eligible respondent. Results of interviews are strictly confidential. DHS interviewers, health

specialists, editors, and supervisors are only allowed to discuss data with other team members, and these conversations are limited to essential communications. This is made clear to the respondent at the beginning of the interview.

To ensure anonymity, the geographic coordinates of each survey are displaced at a random distance and in a random direction. The displacement distance is up to two kilometers for urban households and up to five kilometers for rural households, with one percent of randomly selected rural clusters displaced a distance up to ten kilometers. This protocol ensures that neither the individual nor the household can be identified.

B Tables and Figures

Figure A1: The Effect of Placebo Shifters for Labor Productivity on Female Ag. Wages and Employment



Notes: This figure graphs the effect of placebo proxies for labor productivity on female agricultural wages (panel 1) and female agricultural employment (panel 2). From 30 large Peruvian crops, excluding the three crops considered female specific in the main analysis (asparagus, rice, and tea), three crops were randomly selected to compose a placebo proxy for labor productivity, and the regressions (Table 1, columns 1 and 2, respectively) was estimated on this placebo. This process was repeated 1000 times. The histogram plots the effect of these 1000 placebo proxies on female agricultural wages and employment. The dotted line marks the effect of the female labor productivity as defined in the analysis.

Table A1: The Correlation Between Women’s Employment and Domestic Violence

	Dependent Variable is Any Domestic Violence (=1)			
	(1)	(2)	(3)	(4)
Respondent Employed (=1)	0.115*** (0.00692)	0.0969*** (0.00634)	0.0696*** (0.00681)	0.0697*** (0.00684)
District Fixed Effects	no	yes	yes	yes
Province by Year Fixed Effects	no	yes	yes	yes
Education and Age Fixed Effects	no	no	yes	yes
Latitude and Longitude by Year	no	no	no	yes
Observations	38,593	38,586	33,948	33,948
R-squared	0.010	0.096	0.119	0.119

Notes: The dependent variable is a binary variable that equals one if the respondent reports being a victim of any kind of domestic violence, including physical, sexual, and psychological. The regression in column 2 controls for district and province by year fixed effects. The specifications in columns 3 and 4 additionally control for age and education bins of the respondent and her partner and latitude and longitude interacted with year, respectively. Standard errors are clustered at the district level. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Table A2: The Effect of Non-Female Labor Productivity on Wages

	Dependent Variable is Wages	
	Male	Female
	(1)	(2)
Non-Female Labor Productivity	1.196* (0.617)	0.274 (0.390)
District Fixed Effects	yes	yes
Province by Year Fixed Effects	yes	yes
Observations	13,755	13,361
R-squared	0.748	0.792

Notes: The dependent variable is the standardized monthly wage for agricultural workers in a district and year, for males (column 1) and females (column 2). *Non-female labor productivity* is the sum of the shares of agricultural land in a district devoted to each crop in the set of non-female-specific export crops multiplied by the log of the yearly international price for that crop (see Equation 1). All regressions are weighted by the number of agricultural workers in the district and control for district and province by year fixed effects. Standard errors are clustered at the district level. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Table A3: Female Labor Productivity Reduces Physical Domestic Violence

	Dependent Variable is Any Physical Domestic Violence (= 1)					
	(1)	(2)	(3)	(4)	(5)	(6)
Female Labor Productivity	-0.704** (0.278)	-0.736** (0.340)	-0.758** (0.342)	-0.841** (0.351)	-1.048** (0.355)	-1.088*** (0.362)
Non-Female Labor Productivity				0.136 (0.193)	0.310** (0.133)	0.325** (0.132)
District Fixed Effects	yes	yes	yes	yes	yes	yes
Province by Year Fixed Effects	yes	yes	yes	yes	yes	yes
Education and Age Fixed Effects	no	yes	yes	no	yes	yes
Latitude and Longitude by Year	no	no	yes	no	no	yes
p-value, Female = Non-Female	-	-	-	0.048	0.001	0.001
Observations	38,634	33,986	33,986	38,634	33,986	33,986
R-squared	0.082	0.109	0.110	0.082	0.109	0.110

Notes: The dependent variable is a binary variable that equals one if the respondent reports being a victim of any kind of physical domestic violence, including physical, severe physical, and sexual violence. *Female labor productivity* is the sum of the shares of agricultural land in a district devoted to each crop in the set of female-specific export crops multiplied by the log of the yearly international price for that crop (see Equation 1). *Non-female labor productivity* is constructed analogously, using the set of non-female specific export crops instead. All regressions control for district and province by year fixed effects. Columns 2 and 5 additionally control for the age and education bins of the respondent and her partner. Columns 3 and 4 also control for latitude and longitude interacted with year. The p-values reported are for the F-test for the difference between female and non-female labor productivity coefficients. Standard errors are clustered at the district level. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Table A4: Future Shocks to Female Labor Productivity Do Not Affect Current Domestic Violence

	Dependent Variable is Any Domestic Violence (= 1)		
	(1)	(2)	(3)
First Lead of Female Labor Productivity	0.136 (0.441)		
Second Lead of Female Labor Productivity		0.264 (0.324)	
Third Lead of Female Labor Productivity			0.269 (0.315)
District Fixed Effects	yes	yes	yes
Province by Year Fixed Effects	yes	yes	yes
Latitude and Longitude by Year	yes	yes	yes
Education and Age Fixed Effects	yes	yes	yes
Observations	23,746	23,746	23,746
R-squared	0.122	0.122	0.122

Notes: The dependent variable is a binary variable that equals one if the respondent reports being a victim of any kind of domestic violence, including physical, sexual, and psychological. *Female labor productivity* is the sum of the shares of agricultural land in a district devoted to each crop in the set of female-specific export crops multiplied by the log of the yearly international price for that crop (see Equation 1). First lead, second lead, and third lead refer to the value of female labor productivity one, two, and three years into the future, respectively. All regressions control for district and province by year fixed effects. Standard errors are clustered at the district level. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Table A5: Robustness of the Effect of Female Labor Productivity on Domestic Violence

	Dependent Variable is Any Domestic Violence (=1)				
	(1)	(2)	(3)	(4)	(5)
Female Labor Productivity	-1.212** (0.542)	-1.132** (0.508)	-1.029** (0.500)	-1.202** (0.540)	-0.971* (0.521)
Non-Female Labor Productivity	0.307 (0.205)	0.334 (0.204)	0.421** (0.196)	0.300 (0.208)	0.189 (0.202)
District Fixed Effects	yes	yes	yes	yes	yes
Province by Year Fixed Effects	yes	yes	yes	yes	yes
Latitude and Longitude by Year	yes	yes	yes	yes	yes
Education and Age Fixed Effects	yes	yes	yes	yes	yes
Sample Includes Underage Respondents	no	yes	no	no	no
Sample Includes Interrupted Interviews	no	no	yes	no	no
Ethnicity Fixed Effects	no	no	no	yes	no
Interviewer Fixed Effects	no	no	no	no	yes
p-value, Female = Non-Female	0.0272	0.0247	0.0244	0.0294	0.0700
Observations	33,982	35,449	36,668	33,971	33,959
R-squared	0.116	0.115	0.114	0.117	0.135

Notes: The dependent variable is a binary variable that equals one if the respondent reports being a victim of any kind of domestic violence, including physical, sexual, and psychological. *Female labor productivity* is the sum of the shares of agricultural land in a district devoted to each crop in the set of female-specific export crops multiplied by the log of the yearly international price for that crop (see Equation 1). *Non-female labor productivity* is constructed analogously, using the set of non-female specific export crops instead. All regressions control for district and province by year fixed effects, as well as latitude and longitude interacted with year and age and education bins of the respondent and her partner. Column 2 also includes underage respondents, excluded from the sample in the main analysis. Column 3 also includes respondents whose interview was interrupted, excluded from the sample in the main analysis. Columns 4 and 5 additionally control for ethnicity and interviewer fixed effects, respectively. The p-values reported are for the F-test for the difference between female and non-female labor productivity coefficients. Standard errors are clustered at the district level. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Table A6: Female Labor Productivity Reduces Domestic Violence at District Level

	Dependent Variable is Share of Respondents in a District that are Victims of Domestic Violence					
	(1)	(2)	(3)	(4)	(5)	(6)
Female Labor Productivity	-1.291** (0.513)	-1.389*** (0.507)	-1.423** (0.581)	-1.463** (0.602)	-1.423** (0.574)	-1.463** (0.605)
Non-Female Labor Productivity			0.129 (0.277)	0.0726 (0.315)	0.129 (0.249)	0.0726 (0.287)
District Fixed Effects	yes	yes	yes	yes	yes	yes
Province by Year Fixed Effects	yes	yes	yes	yes	yes	yes
Latitude and Longitude by Year	no	yes	no	yes	no	yes
Standard Errors Clustered by Province	no	no	no	no	yes	yes
p-value, Female = Non-Female	-	-	0.040	0.061	0.034	0.055
Observations	10,546	10,546	10,546	10,546	10,546	10,546
R-squared	0.255	0.257	0.255	0.257	0.255	0.257

Notes: The dependent variable is the share of respondents in a district and year who report being a victim of any kind of domestic violence, including physical, sexual, and psychological. *Female labor productivity* is the sum of the shares of agricultural land in a district devoted to each crop in the set of female-specific export crops multiplied by the log of the yearly international price for that crop (see Equation 1). *Non-female labor productivity* is constructed analogously, using the set of non-female specific export crops instead. All regressions control for district and province by year fixed effects. Columns 3 and 4 also control for latitude and longitude interacted with year. Columns 5 and 6 repeat the specifications in columns 3 and 4, respectively, clustering standard errors at the province level instead. The p-values reported are for the F-test for the difference between female and non-female labor productivity coefficients. Standard errors are clustered at the district level in columns 1 to 4, and at the province level in columns 5 and 6. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Table A7: District Level Specification: Accounting for Spatial Correlation

	Dep. Var. is Share of Respondents in a District that are Victims of Domestic Violence				
	Coefficient t-statistic for kernel cutoff distance (km):				
	10	20	50	100	200
	(1)	(2)	(3)	(4)	(5)
Female Labor Productivity	-2.82	-3.02	-2.93	-2.69	-2.97
District FE	yes	yes	yes	yes	yes
Province by Year FE	yes	yes	yes	yes	yes

Notes: All regressions follow the baseline district-level specification (Table A4, column 1). Columns report t-statistics for the coefficient estimate of female labor productivity in the district-level specification, with clustering that follows Hsiang (2010)'s application of Conley (2008) standard errors, for several values of kernel cutoff distance.

Table A8: The Effect of Female Labor Productivity on Domestic Violence is not Driven by Income Effects

	Dependent Variable is Any Domestic Violence (=1)					
	(1)	(2)	(3)	(4)	(5)	(6)
Female Labor Productivity	-1.211** (0.520)	-1.193** (0.536)	-1.174** (0.538)	-1.192** (0.535)	-1.199** (0.535)	-1.240** (0.538)
Non-Female Labor Productivity	0.299 (0.188)	0.291 (0.187)	0.295 (0.186)	0.304 (0.190)	0.302 (0.191)	0.333* (0.196)
Household has electricity	yes	yes	yes	yes	yes	yes
Household owns radio	no	yes	yes	yes	yes	yes
Household owns television	no	no	yes	yes	yes	yes
Household owns fridge	no	no	no	yes	yes	yes
Household owns bicycle	no	no	no	no	yes	yes
Household owns telephone	no	no	no	no	no	yes
p-value, Female = Non-Female	0.0206	0.0258	0.0275	0.0248	0.0247	0.0202
Observations	33,966	33,948	33,939	33,932	33,912	33,899
R-squared	0.116	0.117	0.117	0.117	0.117	0.118

Notes: The dependent variable is a binary variable that equals one if the respondent reports being a victim of any kind of domestic violence, including physical, sexual, and psychological. *Female labor productivity* is the sum of the shares of agricultural land in a district devoted to each crop in the set of female-specific export crops multiplied by the log of the yearly international price for that crop (see Equation 1). *Non-female labor productivity* is constructed analogously, using the set of non-female specific export crops instead. All regressions control for district and province by year fixed effects, age and education bins of the respondent and her partner, and latitude and longitude interacted with year. Each specification includes fixed effects for an additional variable that proxies for household income, indicated in the table. The p-values reported are for the F-test for the difference between female and non-female labor productivity coefficients. Standard errors are clustered at the district level. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Table A9: The Effect of Female Labor Productivity on Men’s Attitudes Towards Women

	Dependent Variable is			
	Partner has any control issues (= 1)	Number of control issues	Partner is loving and respectful (= 1)	Number of respectful attitudes
	(1)	(2)	(3)	(4)
Female Labor Productivity	-0.305 (0.469)	-1.165 (1.432)	-0.0757 (0.0757)	-1.069 (0.707)
District Fixed Effects	yes	yes	yes	yes
Province by Year Fixed Effects	yes	yes	yes	yes
Observations	45,553	45,553	45,553	45,553
R-squared	0.394	0.265	0.766	0.696

Notes: The dependent variable in column 1 is a binary variable that equals one if the respondent's partner has at least one of the six control issues raised by the DHS questionnaire, and zero otherwise. The dependent variable in column 2 is the number of control issues. Issues include if he is jealous when she talks to other men, accuses her of being unfaithful, does not let her see girlfriends, limits her, insists on knowing her whereabouts, and does not trust her. The dependent variable in column 3 is a binary variable that equals one if the respondent's partner demonstrates affection or respect in at least one of the five ways raised by the DHS questionnaire, and zero otherwise. The dependent variable in column 4 is the number of ways in which he displays affection or respect. These ways include: is he tender, does he spend free time with her, does he take her opinion into account, does he respect her wishes, and does he respect her rights. *Female labor productivity* is the sum of the shares of agricultural land in a district devoted to each crop in the set of female-specific export crops multiplied by the log of the yearly international price for that crop (see Equation 1). All regressions control for district and province by year fixed effects. Standard errors are clustered at the district level. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.