Does Trade Liberalization Foster Intimate Partner Violence?

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Abstract: We exploit unexpected and drastic unilateral tariffs reductions in Peru during the 2000s. We find that in districts where male employment was more vulnerable to these reductions, we observe a statistically significant increase in intimate partner violence with respect to less vulnerable districts. Our findings show that several causal paths may be at play, which appear to highlight the fact that these paths may complement and even exacerbate each other. Our findings hold when applying a broad array of robustness tests.

JEL Classification Codes: O19, O24, F13, J12.

Keywords: Domestic violence, Tariff reduction, Gender-specific shocks, Differences-in-Differences, Latin America

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1 Introduction

Whereas from a macroeconomic perspective there is little doubt that trade liberalization is beneficial to countries, recent studies demonstrate that productive reallocation among sectors due to liberalization may redistribute gains unevenly and may even result in undesirable effects, for instance, in terms of inequality, poverty, crime, mental distress, and child labor among others.[1]

In this research we go a step further and consider the fact that trade liberalization may also impact female and male labor differently. This, because gender composition of employment may be skewed towards either males or females depending on the specific economic activity under consideration. When trade liberalization impacts industries more predominantly associated with male-related activities, within-household dynamics may evolve differently compared to how liberalization may impact more predominantly women-related industries. In particular, it may be argued that the magnitude, uncertainty and pervasiveness of the shocks may impact males and females differently, which may result in increased intimate partner violence (Tauchen, et al., 1991).[2]

Overall, the rates of intimate partner violence in many countries around the world are high and pervasive. This is particularly true in developing countries, as they are more traditional and more male-dominated. According to the Pan American Health Organization (2019), physical or sexual intimate partner violence has affected more than a quarter of women at some point in their lives. Furthermore, intimate partner violence has long-term effects on women's health. Women abused by their partners are 16% more likely to give birth to a low weight baby (World Health Organization, 2013), and are associated with higher substance abuse, worse mental health, and a higher incidence of chronic diseases (Coker et al 2002; Ackerson and Subramanian, 2008; Ellsberg et al., 2008).

In our research we focus on the process of trade reform in the case of Peru during the 2000s. Specifically, between 2004 and 2011 trade openness in the country increased rapidly, substantially and unexpectedly, as tariffs in thousands of different products were dramatically and unilaterally reduced as a result of a large and drastic liberalization policy. The average tariff was reduced from 10.34% in 2004 to 2.96% in 2011. These reductions

[1] Examples are Edmonds et al. (2009, 2010), Autor, et al. (2018), Kis-Katos and Sparrow (2015), Dix-Carneiro and Kovak (2015, 2017), Dix-Carneiro et al. (2018), Colantone et al. (2019), Pierce and Schott (2020), and others.

[2] Intimate partner violence is also known simply as domestic violence and it is defined as physical or psychological harm by a current or former partner or spouse. This type of violence can occur among heterosexual or same-sex couples and does not require sexual intimacy. For more information, refer to the Centers for Disease Control and Prevention website.

were concentrated in mostly highly protected sectors. This is illustrated by the fact that prior to the reform no sector had tariff rates of 0%, but after policy implementation, around 50% of (six-digit level) industries became fully unprotected by tariffs.[3] Methodologically, we employ a differences-in-differences approach by exploiting gender-related labor composition by industry and district level. For example, if male labor is mostly specialized in mining when tariffs are reduced in a particular district, they will become relatively more vulnerable to trade liberalization with respect to male workers in other districts. Likewise, if female labor within a district specializes in textiles when tariffs are reduced, they will become relatively more vulnerable to trade liberalization with respect to female workers in other districts. We compute gender-specific measures of vulnerability to trade liberalization, which in order to simplify we call "male tariffs vulnerability" (MTV) and "female tariffs vulnerability" (FTV) measures. In addition, we control for district fixed effects and a set of initial conditions interacted with quadratic trends as it is usual in the literature measuring the effect of trade liberalization, and cluster standard errors at the district level.[4]

Using data from DHS surveys along with our measures of tariff vulnerability, we find that trade liberalization appears to foster intimate partner violence in Peruvian districts where tariff rate reductions affected male employment the most. For the period 2004 to 2011, districts experiencing an average [interquartile range] decrease in our MTV measure saw an increase on physical intimate partner violence of 27.20 [7.94] percentage points relative to districts experiencing no change. Similarly, physical intimate partner violence increased by 3.01 [2.68] percentage points in districts experiencing an average [interquartile range] decrease in our measure of FTV, albeit this impact is not statistically different from zero. By focusing on differences across districts we assess how intimate partner violence changes relative to other districts.[5] Some key heterogeneities appear to be rather relevant. In particular, women with less education appear to suffer from more physical intimate partner violence. Similarly, the impact of trade liberalization seems to be larger among women that were aged 19 or less when they started living with their first partner.

We argue that there may be multiple causal paths through which trade liberalization

[3] Own calculations.

[4] Our identification strategy is similar to Autor, et al., (2018) and Shenhav (2016). The former employs gender-specific components of U.S. labor demand shocks coming from competition with China to explore whether changes in relative economic outcomes of young men versus young women affected marriage and fertility during 1990-2014. The latter exploits gender-specific Bartik shocks and gender differences in occupational choice to test their impact on relative gender earnings in U.S. states. In contrast to Bartik shocks, which are typically used as local labor demand shifters, our identification variation comes from the reduction in tariffs.

[5] Given our empirical approach, we are unable to identify the economy-wide effect of the reduction in tariffs.

affect IPV. Income changes may change marital dynamics as well as the bargaining power within households (Buller et al., 2018). Decreases in income may increase poverty-related stress, deteriorate mental health (Devries et al., 2013) and increase alcohol use (Jones et al., 2015), all of which may contribute to an increase in IPV. Moreover, a relative earnings decline in males may foster violence, as a reaction to a perceived threat in terms of a potential change in the status quo. This is known as the "male backlash theory" (Tauchen et al., 1991, Macmillan and Gartner, 1999; Heath, 2014; Hidrobo and Fernald, 2013). Nevertheless, some men may actually end up decreasing IPV in order to maintain marriage stability (e.g., Aizer, 2010; Eswaran and Malhotra, 2011; Anderberg et al., 2016). In addition, another IPV causal path may occur through increased physical interaction in the household due to males losing their jobs. This is known as the "theory of exposure" (Tauchen et al., 1991). Finally, from a general equilibrium perspective, income changes may impact marriage outcomes for instance, in the form of assortative matching, which may shift the bargaining positions and lead to increased IPV (Browning et al., 2011).[6]

We apply a comprehensive set of robustness tests that appear to support our findings. First, we find that intimate partner violence is not correlated with post-reform tariff changes, which is consistent with the no presence of pre-existing trends. In addition, we apply placebo tests by using a pre-reform measure of intimate partner violence. We also test whether the initial measures employed to construct our tariffs vulnerability indices are exogenous conditional on observables. Furthermore, we address the possibility of conflating short- and long-term effects. In addition, we study inward and outward migration patterns and apply permutation tests as well. Finally, we exploit the fact that trade liberalization does not only impact the prices of output goods, but also of intermediate inputs.

Nonetheless, while our results appear to be robust, we cannot discard the fact that liberalizing trade may somehow change attitudes towards violence, and hence, reporting behavior. If women in areas more exposed to trade liberalization are more willing to share their violent interactions with their partners, then our estimates may be overestimated. Since we lack other data sources, we cannot rule out this possibility, although the overwhelming evidence we present in terms of mechanisms and robustness tests lead us to believe that reporting bias responding endogenously to trade liberalization is unlikely. In fact, recent papers studying the Peruvian context have successfully used DHS data (see

[6]In concurrent work Erten and Keskin (2021) study a similar question in the context of Cambodia's WTO accession. Whereas they suggest male backlash as the main mechanism behind their result, our findings indicate that in the Peruvian context there are multiple pathways possibly reinforcing each other. Also, we find that only male vulnerability to tariffs is relevant, whereas female vulnerability is significantly less robust. In Erten and Keskin (2021) they focus on the average exposure of a district to tariffs, rather than differentiating between genders.

Diaz and Saldarriaga, 2021, forthcoming).[7]

The rest of the paper is organized as follows. Section 2 provides institutional background. Section 3 describes the data and the empirical strategy. Section 4 presents our baseline findings. Section 5 presents the possible mechanisms explaining our result. Section 6 provides robustness tests. Finally, Section 7 concludes.

2 Institutional Background

During the 2000s, the Peruvian economy enjoyed a very favorable external environment due to a sharp increase in commodity prices. Between 2000 and 2010, exports grew from around US$ 8,000 million to more than US$ 40 million and the gross domestic product per capita increased by fifty percent. The aim was to further take advantage of the favorable environment by seeking new international markets and signing free trade agreements with other countries. Interestingly, the administration at the time pursued a drastic and unexpected policy change with little warning. Tariffs were cut drastically and unilaterally between 2007-2008 and again between 2010-2011 albeit somewhat less dramatically. These actions were not consulted with the private sector and took practically all the economic agents by surprise. In fact, this surprising action is highlighted by the fact that even the own government documents describe pursuing a policy of slowly reducing tariffs as a very important policy strategy so as to not compromise in any way the bargaining position of the Peruvian government when negotiating free trade agreements with other nations, a crucial policy objective at the time (MEF, 2006).[8]

The main reduction in tariffs occurred during 2007 and was rather large. It included nearly 5,000 different products and eliminated most tariffs and related fees. Unsurprisingly, the sectors that were the most protected, were also the most affected by the reduction in tariffs. This can be seen in Figure 1. After the reform, tariff rates were simplified in two categories 9%, or 17% and around half of the six-digit level products were assigned no tariff

[7] A recent study in urban Peru shows no differences in reporting behavior between DHS questions about violence and other more private methods, i.e. list methods (Aguero and Frisancho, 2020).

[8] The surprise in the government's actions is illustrated by the comments made by José Luis Silva Martinot at that time, who in 2011 was the previous head of the most important association of exporters. He remarked: "with free trade agreements, tariffs were going to be cut after 10 to 17 years, others after a shorter time and some others not at all. However, in the end they were all totally eliminated." Similarly, Eduardo Farah, ex-head of the National Society of Industries said: "with these measures, the country loses bargaining power for the negotiation of future free trade agreements" (La Republica, 2011). Context is important: the President that pursued these policies, Alan García, was the same one who a decade earlier had brought the country to the brink of political and economic meltdown, with terrorism at its highest and skyrocketing inflation rates. When García was re-elected he was eager to reposition himself as a market friendly leader and as such, he did everything in his power to pursue pro-business policies.

at all.[9]

[Figure 1 here]

A second wave of tariff reductions occurred in 2010 and 2011 and while it was still significant, this wave was less dramatic than the first one. Figure 2 illustrates these tariff reduction waves. Panel A shows the evolution of average tariffs. On average, they decreased from 10.35% in 2004 to 2.98% in 2011. Panel B shows tariff reductions by sectors. As described in the next section, the differences in timing and magnitude in tariff reductions along with district-level variation in employment, including male-female industrial intensity differences, provide our identifying variation.

[Figure 2 here]

3 Data and Empirical Strategy

3.1 Data

The data for this research come from several sources. We first construct a measure of tariff vulnerability to trade liberalization at the district level for each year between 2004 and 2011. In order to do this, we use the 1993 Peruvian Household Census and calculate employment shares by industry and gender for each district, which are used to weigh how tariff reductions may impact each district. In addition, we use data on Most-Favored-Nation (MFN) tariffs at the six-digit level of the Trade Classification Harmonized System (HS). MFN tariffs are what countries impose on imports from other members of the World Trade Organization (WTO), unless the country is part of a preferential trade agreement. In practice, these rates are the highest and most restrictive that WTO members charge one another (World Bank, 2021). In addition, we match the industry codes reported by the World Bank (i.e. HS2007) to the industry code used in the Census (i.e. ISIC3).[10]

It is important to emphasize that the 1993 Census is the closest available to the first wave of tariff reductions in 2007.[11] The data on intimate partner violence come from the Demographic and Health Surveys (DHS) conducted by the Ministry of Health between 2004

[9] Prior to the 2007 trade reform not a single product was tariff free.

[10] We employ the concordance table provided by the World Bank here.

[11] In parallel with the trade reforms, in 2007 a National Census was also carried out. Jaeger, et al., (2018) argue that lagging the base period used to weigh tariff cuts may help with the identification by minimizing the correlation between tariff changes and current demand shocks. It should be pointed out that our results are similar if we instead rely on the 2007 Census, as we explain below.

and 2011.[12] In general, the survey contains detailed information on the characteristics of females and the incidence of intimate partner violence. The data consist of women aged 15 to 49 who are asked if they have ever suffered from emotional or physical violence by a partner by any different means. In the case of physical violence, women report in different items of the survey if they have ever been (i) pushed, shook, or thrown something at, (ii) slapped or arm twisted, (iii) punched with fists or something harmful, (iv) kicked or dragged, (v) strangled or burnt, (vi) threatened with a knife, gun or other weapon, (vii) attacked with a knife, gun or other weapon, (viii) forced to have sex when not wanted, and (ix) forced to make other sexual acts when not wanted by her spouse.

Since we rely on self-reported data, it is possible that liberalizing trade may affect attitudes towards violence and thus reporting behavior. If women in areas more exposed to trade liberalization are more willing to share their violent interactions with their partners our estimates may be overestimated. Since we lack other data sources, we cannot rule this possibility out, although the overwhelming evidence we present in terms of mechanisms and robustness tests lead us to believe that reporting bias responding endogenously to trade liberalization is highly unlikely. A recent study on Peru shows no differences in reporting behavior between DHS questions about violence and other more private methods, i.e. list methods (Aguero and Frisancho, 2020). Recent papers studying the Peruvian context use the DHS data rather convincingly (e.g., Diaz and Saldarriaga, 2021, forthcoming).

We construct a dummy variable that accounts for physical intimate partner violence (PIPV) according to the measures of violence described above and focus on females that are in a relationship, only.[13] We also compute a dummy variable that describes emotional intimate partner violence (EIPV) including controlling behavior.[14] In addition, we employ several demographic variables available in the survey. Finally, other data collected are exports (aggregated to the 6-digit level) and foreign direct investment by industry (aggregated

[12]We were able to match our tariffs vulnerability data to all districts available in the survey, which were 1066 (out of the 1793 districts that existed in 1993). We used appropriate district identifiers to secure consistency throughout our period of analysis.

[13]It may be claimed that IPV measures are based on an endogenously changing sample of respondents. This does not appear to be the case, as we find that the probability of being currently in a relationship, breaking up or divorcing is not associated with our variables of interest, as we explain below. A relationship refers to one between a male and a female, only.

[14]Details regarding the construction of these variables are available in Appendix B. According to the World Health Organization it is possible to differentiate between emotional intimate partner violence (i.e. a husband humiliating his wife, threatening to harm her or to take away her children) and controlling behavior (i.e. a husband trying to limit his wife's contact with her family or friends, being jealous or insisting on knowing where she is). Furthermore, whereas it is conceivable to find instances of physical intimate partner violence among adults from females to males, the overwhelming majority of cases in our country of study, Peru, occur from males to females (96% according to the Ministry of Women and Vulnerable Populations (2019)).

to the 2-digit level, the highest available), which we use as controls. Appendix B provides definitions and description of the data.

Table 1 provides summary statistics.[15] The average incidence of PIPV (12 months), EIPV (12 months), and controlling behavior in Peru is 15.4%, 17.1%, and 67.7% respectively.[16] In addition, we find that other variables show a pattern that is consistent with the literature on intimate partner violence, including the age of the bride, the age difference between the couple as well as their education gap.[17]

[Table 1 here]

3.2 Empirical strategy

Our identification approach is analogous to other research on trade liberalization, such as Edmonds et al. (2009, 2010), Kis-Katos and Sparrow (2015), Gaddis and Pieters (2017), Dix-Carneiro and Kovak (2015, 2017). The main idea is to exploit the distribution of *overall* employment within each district and across industrial sectors in order to measure how households are impacted by tariff changes. Unlike previous research, we exploit the pre-reform composition of *male and female* employment in addition to the time-series variation stemming from tariff changes.[18] As shown in Table A.1 the labor force is predominantly male in a significant number of industries and it is predominantly female in others.

As described above, this is relevant as trade liberalization may impact males and females differently. As an illustrative example, consider the case of districts with industries where male labor is predominant, such as mining. If tariffs are reduced in those districts, the treated male workers will become relatively more vulnerable to trade liberalization in relation to unexposed male workers in other districts. Likewise, in the case of districts with relatively more textile industries and where female labor tends to predominate, if tariffs are reduced, these female workers will become relatively more vulnerable to trade liberalization with respect to unexposed female workers in other districts.

Our differences-in-differences strategy is closest to Autor, et al., (2018) and Shenhav (2016). The former employs gender-specific components of the United States large labor demand shocks coming from competition with China to explore whether changes in relative

[15] Some women report that their partner lives elsewhere, even though they are a still couple.

[16] In 2004, 15.7%, 18.2% and 67.7% of women reported having suffered corresponding episodes of physical and emotional violence and in 2011 these figures are of 14.2%, 16.7% and 65.7%, respectively.

[17] See for instance Jensen and Thornton (2003), Yount, et al. (2018), Mabsout and van Staveren (2010), Heath (2014), Aizer (2010), Fiedberg and Webb (2006), Hidrobo and Fernald (2013), among others.

[18] Notice that the share of female workers per industry in 1993 is uncorrelated with tariff reductions in the period 2004-2011, as shown in Figure A.1.

economic outcomes of young men versus young women affect marriage and fertility. The latter exploits gender-specific Bartik shocks and gender differences in occupational choices to test their impact on relative gender earnings in the United States.[19]

We compute two sex-specific measures of tariffs vulnerability to trade liberalization for each district d and year t, which to simplify we simply call "male tariffs vulnerability" (MTV) and "female tariffs vulnerability" (FTV):

$$MTV_{d,t} = \sum_i \frac{L^M_{1993,i,d}}{L_{1993,d}} \times tariff_{i,t} \tag{1}$$

$$FTV_{d,t} = \sum_i \frac{L^F_{1993,i,d}}{L_{1993,d}} \times tariff_{i,t} \tag{2}$$

where $L^G_{1993,i,d}$ is the number of workers of gender $G = \{M, F\}$,[20] employed in sector i in district d in 1993, $L_{1993,d}$ is the district d's total number of workers in 1993, and $tariff_{i,t}$ is the Most-Favored-Nation (MFN) tariff of industry i at year t. We also use more recent census data, that is, from 2007, to construct these same measures of vulnerability and results are very similar.

Given that tariffs are mechanically assigned zeros in the non-tradable sector, districts with larger non-tradable sectors will automatically yield a lower value for both MTV and FTV.[21] If the size of the non-tradable sector in 1993 is correlated with any unobserved determinant of current intimate partner violence within households the resulting coefficients may be biased. For example, the size of the non-tradable sector may be correlated with female employment, which in turn may be correlated with intimate partner violence within households (Gaddis and Pieters, 2017; Aizer, 2010). Given the above, the evidence presented in this research fully excludes the non-tradable sector in the construction of our measures of tariffs vulnerability, which is standard practice in the literature (Kovac, 2013).[22] Figure 3 graphically shows the variation of tariff reductions by district. The darker the district, the deeper the tariff reduction faced.[23] In Figure A.2 we show the distribution of MTV

[19] See also Chauvin (2018).

[20] M and F stands for male and female, respectively.

[21] We follow Topalova (2005, 2010), Edmonds et al. (2009, 2010), and Kis-Katos and Sparrow (2015) and define our variable of interest at the district level. According to Census data, in 2017 approximately 70% of employed individuals work in the same district they live.

[22] We also exclude these four 4-digit ISIC3 industry codes, 1110, 0111, 0112, and 0121, which account for extraction of crude petroleum and natural gas; growing of cereals and other crops; growing of vegetables, horticultural specialties and nursery products, and farming of cattle, sheep, goats, horses, asses, mules and hinnies. We do this because tariff changes in these sectors were not parallel to tariffs changes in other sectors during the period prior to the first wave of tariff reductions. It should be said that we do not find any significant differences in our results when including these industries.

[23] This figure should be seen just as a reference because the variation we are actually exploiting comes

and FTV for years 2004 and 2011.

[Figure 3 here]

Based on our approach above, we estimate the following reduced form:

$$\begin{aligned} y_{j,d,t} &= \alpha + \beta_1 MTV_{d,t} + \beta_2 FTV_{d,t} + \alpha_d + \alpha_t + \\ &+ f(W_{d,1993}, trend, \gamma_1) + [\gamma_2^{'} X_{j,d,t} + \gamma_3^{'} Z_{d,t}] + \varepsilon_{j,d,t} \end{aligned} \tag{3}$$

where $y_{j,d,t}$ is a dummy variable that takes the value of 1 if woman j reports in year $t \in$ [2004, 2011] to have been attacked by her partner in the last 12 months. α_d and α_t are respectively district and year fixed effects. α_d capture time-invariant heterogeneity at the district level, while α_t controls for macroeconomic shocks affecting the country as a whole. We also include a set of 1993 initial conditions (i.e. $W_{d,1993}$) interacted with time trends as it is usually done in the literature (e.g. Edmonds et al, 2009, 2010; Gaddis and Pieters, 2017; Kis-Katos and Sparrow, 2015; and Topalova, 2010.). It is important to control for these trends because there may be some characteristics, correlated with the 1993 initial conditions, capable of predicting developments in intimate partner violence. Hence, by including these trends we attenuate potential bias produced by the dynamics stemming from these initial conditions (Goldsmith-Pinkham, Sorkin and Swift, 2018). In our baseline specification we consider the following set of initial conditions interacted with linear and quadratic trends: the district's population size, the share of individuals with complete primary, high school and post-secondary education, the share of female employment, and the share of employment destined to agriculture and fishing, mining, manufacturing, and construction. The aim is to capture the broad employment structure of each district, which may be correlated with household dynamics. Furthermore, we consider initial conditions with regard to educational levels as Goldsmith-Pinkhman, et al., (2019) show that in Autor, et al., (2013) the industries driving identification were located in more educated areas. In Section 6.3 we conduct some robustness exercises by trying with different sets of initial conditions.

We also consider a set of time-varying individual and household level covariates, $X_{j,d,t}$, based on the literature of determinants of intimate partner violence (Jensen and Thornton, 2003; Yount, et al., 2018; Mabsout and van Staveren, 2010; Heath, 2014; Aizer, 2010; Hidrobo and Fernald, 2013; among others). These covariates consist of the woman j's age and years of education, her partner's age and years of education, her age when she started

from year–to–year changes in the vulnerability variables rather than the long-differences depicted here.

living with her first partner, a dummy variable on whether she speaks Spanish, the household's size, and the sex of the household head. In addition, we include the altitude at where the household is located.[24] Finally, $Z_{d,t}$ is a set of time-varying district level variables that may be correlated with MTV and FTV. This set consists of a measure of vulnerability to exports and to foreign direct investments as well as a measure of vulnerability to input tariffs.[25] During the period of analysis exports and foreign direct investment grow exponentially and heterogeneously across sectors. Just as with MTV and FTV, this growth may affect a district in a particular way depending on how specialized the district is with respect to an industry. We also include a measure of vulnerability to input tariffs, as tariff changes may influence households not only through final output prices, but also through intermediate input prices (Edmonds, et al., 2010).[26] Details on the construction of the time-varying district level variables considered in the analysis is available in Appendix B.

The male and female vulnerability coefficients, β_1 and β_2, are our parameters of interest. They measure the impact of a change in tariff protection in industries that are more male-predominant or female-predominant on the probability of suffering intimate partner violence. Throughout all this paper we report these coefficients multiplied by minus one to facilitate the reading of our tables as we are interested on the effect of a decrease in tariffs. We identify β_1 and β_2 by comparing more vulnerable to less vulnerable districts hence as with any differences-in-differences framework we are not identifying the effect of trade liberalization in the economy as a whole, but its differential effect on the more vulnerable districts (Topalova, 2005, 2010). The assumption implicitly made in order to estimate β_1 and β_2 is that any unobserved district-specific time varying shock affecting the chances of suffering intimate partner violence is uncorrelated with any change in our two measures of tariffs vulnerability over time. Since our measures of tariffs vulnerability, MTV and FTV, are simply the interaction between the 1993 initial industrial composition with the national level tariff changes, the only source of bias comes from differential time-trends in intimate partner violence correlated with both sources of variation simultaneously (Topalova, 2005, 2010).

[24] In Peru, there is a negative correlation between the altitude and access to health services and economic development.

[25] We have not gender weighted these measures of vulnerability, although all of our results are unaffected by this weighting.

[26] We follow Edmonds, et al., (2010) and use the 1993 Peruvian national input-output table, the 1993 national census and the World Bank's data on output tariffs to construct this measure.

4 Main Results

4.1 Physical intimate partner violence

Table 2 presents our main findings. Column 1 to column 3 report different versions of equation (3) using our measures of violence over the past 12-months. All regressions include district and year fixed effects as well as a set of initial conditions interacted with linear and quadratic trends, as was described above. Standard errors are clustered at the district level. Column 1 shows that a unit decrease in the measure of male tariffs vulnerability increases physical violence in 1.29 percentage points. On the other hand, tariff cuts on industries that are predominantly female do not yield any significant impact on physical violence. These results are robust to the inclusion of individual and household level covariates (see column 2).[27] In column (3), when we control for time-varying controls at the district level (i.e. FDI, exports and input tariffs), the coefficient on MTV is larger and statistically significant. The coefficient on FTV becomes positive and sizable, albeit non significantly.

We compute a measure of intensity of physical violence by adding up all the corresponding dummy variables that refer to a particular episode of physical intimate partner violence in our survey. This measure of intensity goes from zero to nine. In addition, we also apply a principal components approach. We run specification (3) using all these as dependent variables. We find similar results, which we present in column 5 to column 8 in Table 2.[28]

[Table 2 here]

There are two issues to consider. First, controlling for input tariffs increase the magnitude of the coefficient on MTV and FTV, because tariff changes may influence households through final output prices, but also through intermediate input prices (Edmonds et al., 2010) and these impacts may be opposite in coefficient sign. When we ignore input tariffs, our measures of vulnerability may conflate both effects. For instance, lower output tariffs may negatively impact industries as they lose their protection. In contrast, lower input tariffs may positively affect certain industries through access to cheaper inputs. To the extent that these opposing effects are transmitted to within-household dynamics, we may observe opposite effects of output and input tariffs on the incidence of intimate partner violence. Similar conclusions have been reached in the literature for other outcomes. For example, Kis-Katos and Sparrow (2015) find that decreases in output tariffs raise poverty,

[27] After including the individual level covariates we lose around 50 observations.

[28] In Table A.11 we report an analogous table, but we use measures of lifetime violence instead. Results are similar.

whereas decreases in input tariffs have the opposite effect. Similarly, Amiti and Cameron (2012) show that input tariffs reductions contributed to the closure of the industrial skill wage gap in Indonesia, whereas Dix-Carneiro and Kovak (2015) show that cuts in output tariffs modestly widened the skill wage gap in Brazil.[29] Second, these effects are of economic significance. We quantify the average impact of this trade policy but take into account that this counterfactual calculation compares a situation in which a district experiences the average decrease in tariff vulnerability against a district that suffers no change at all. This is not observed in the data since all districts are exposed to some degree. Nonetheless, it is a useful exercise as it allows one to better grasp the magnitude of the effect. A more realistic counterfactual may be to compare a district experiencing a decrease in tariff vulnerability located in the percentile 75 against another experiencing such decrease in tariff vulnerability located in the percentile 25. We refer to this counterfactual as an interquartile effect, in contrast to the average effect. We report both calculations.

According to our preferred estimates—those from column 3 in Table 2—a unit decrease in MTV while keeping FTV constant (and input tariffs), increases physical intimate partner violence in 3.04 percentage points. This translates to an average [interquartile] effect of 27.20 [7.94] percentage points relative to districts experiencing no change in MTV. In addition, a unit decrease in FTV while keeping MTV constant (and input tariffs), increases physical intimate partner violence in 1.92 percentage points. Again, this means that the average [interquartile] effect of FTV is of 3.01 [2.68] percentage points. Note that, on average, male employment was more protected than female employment before the reform. In 2004, the average measure of MTV was 13.73, while the average measure of FTV was 2.61. After the reforms, in 2011, these measures were 4.79 and 1.04 respectively. Moreover, in the previous calculation we use coefficients from column 3, controlling for input tariffs. Measuring the effect of MTV on a counterfactual world keeping constant FTV but allowing MTV and input tariffs to vary, means that the average [interquartile] decrease in MTV would imply an effect of 11.63 [3.40] percentage points.[30]

To further analyze the economic significance of our findings, we focus on the general effect of trade liberalization reported in column 4. We construct this measure in a similar fashion as before. The main difference is that here we employ the initial shares of the *overall* industrial employment, as it is usually done in the literature (please refer to Appendix B for details in the construction). We show that for each unit decrease in the measure of tariffs vulnerability, intimate partner violence increases by 3.07 percentage points relative

[29] We explore the issue of input tariffs in Section 6.2.

[30] For this calculation we use coefficients from column 2.

to districts that were less intensively exposed.[31] This coefficient implies an effect of 30.51 [3.46] percentage points on districts experiencing the average [interquartile] tariff cut on local industries relative to districts experiencing no change at all (while keeping input tariffs constant). If we allow input tariffs to vary, the average [interquartile] impact would be of 11.74 [1.33] percentage points.[32]

4.2 Falsification and placebo tests for pre-existing trends

Pre-trends.

Whereas recent research shows that current productivity of Peruvian industries may not predict future tariffs (Baldarrago and Salinas, 2017) the possibility that pre-existing trends may be correlated with changes in the outcome being studied still needs to be addressed, as the government may endogenously protect certain industries depending on their productivity.

We follow Topalova (2010) and test whether pre-existing trends in intimate partner violence are correlated with post-reform tariff changes. If tariff cuts are correlated with pre-existing trends in intimate partner violence, the coefficients β_1 and β_2 should be similar whether we use pre- or post-reform data. Since the first wave of tariffs cuts occurred between 2007 and 2008 and the second wave occurred between 2010 and 2011 we use the period 2004 to 2007 as pre-reform data. We run two regressions. The first one links the 2004-2007 incidence of intimate partner violence using 2007-2010 tariff data to take advantage of the first wave of tariff reductions. The second one relates intimate partner violence with the 2008-2011 tariff data to take advantage of the second wave.[33]

The results from these regressions are reported in the first two columns in Table 3. We estimate our preferred specification, which includes individual- and district-level covariates. We can compare these results to those under column 3 in Table 2. The estimated coefficient for MTV in column is negative and around 60% smaller in absolute value than our baseline estimate, whereas the corresponding coefficient in column 2 is positive and 56% smaller.

[31] If we allow input tariffs to vary, this coefficient would be 0.0118.

[32] Figure 3 suggests that reductions in MTV and FTV are correlated, which is in fact true as their correlation is about -73.3%. However, we reach similar conclusions if we consider each of these variables separately. On the one hand, if we add MTV only and run the same specification as that from column 3 the estimated coefficient is 0.0253, which is significant at the 1% level and 17% smaller than the coefficient from the same column. On the other hand, if we add FTV alone, its coefficient is 0.0134 but not statistically significant.

[33] To clarify, in the first regression we match 2004 data on intimate partner violence with 2007 tariffs, 2005 data with 2008 tariffs, 2006 data with 2009 tariffs, and 2007 data with 2010 tariffs. For the second regression, we match the data on intimate partner violence from 2004 with 2008 tariffs, 2005 data with 2009 tariffs, and so on.

Both are statistically indistinguishable from zero. Similarly, our estimates for FTV in column 1 and 2 are statistically indistinguishable from zero.

We also run a placebo test exploiting one particular question from our survey data: "Have your father ever beaten your mother?" Since women from the survey are adults, this episode of physical intimate partner violence refers to a *past* event, long before tariffs were first cut. We can think of this variable as a pre-reform measure of intimate partner violence at the household level. Then, we run a regression between this variable and our measures of tariff cuts vulnerability. We report our results in column 3 in Table 3. We find an estimated coefficient for MTV that is statistically indistinguishable from zero, which is reassuring of our identification strategy, especially considering that this question has a great explanatory power when predicting intimate partner violence. However, our estimation of the coefficient of FTV is statistically significant at the 10% level and positive, which suggests that our estimation of β_2 may be upward biased in our baseline specifications of Table 2. In unreported regressions, once we include this question as another control, the coefficient for FTV decreases from 0.0192 to 0.0146, while the coefficient for MTV stays at 0.0304.

In the following subsection, we delve into the issue of parallel trends in a more systematic way by performing a series of permutation tests.

[Table 3 here]

Permutation tests.

We carry out a number of permutation tests to show that our main results are not driven by spurious effects caused by (i) trends in intimate partner violence and (ii) time invariant cross-sectional patterns across districts. We randomize our sample to generate false data that we use to re-estimate equation (3). These placebo tests are useful to check whether our model is mis-specified and to calculate empirical p-values (Hsiang and Jina, 2014). We randomize the vector $[MTV_{d,t}, FTV_{d,t}]$ 2,000 times, with replacement and holding everything else fixed. We re-estimate equation (3) each time (the same equation estimated for column 3 in Table 2).[34]

Following Hsiang and Hina (2014), we conduct this randomization in two ways. First, we randomize the cross-sectional structure between districts. That is, we randomly re-assign each district's complete history of MTV and FTV to another district while preserving the ordering of years. Since this preserves the time structure within the data, this exercise serves

[34] i.e. including the set of initial conditions interacted with linear and quadratic trends, and the set of time-varying district level covariates. Our results are similar if we do not include them, but they are available upon request.

to test whether national trends are generating spurious correlations. Second, we randomize the time structure within districts. Put it differently, we randomly re-order each district's time-series of MTV and FTV while keeping them assigned to the original district. Since this preserves the cross-sectional structure of the data and only alters its time structure, this exercise serves to test whether time invariant cross-sectional patterns across high and low vulnerable districts are generating spurious results.

Figure 4 shows our results. We confirm that both randomization procedures give two distributions properly centered at zero. Furthermore, both empirical p-values are below 0.001. Hence, there is no evidence from this exercise that neither national trends nor cross-sectional patterns differentiated between high and low vulnerable districts are driving our results.

[Figure 4 here]

4.3 Treatment effects across exposure deciles

We now exploit the cross-sectional dimension of the data to test whether the change in IPV is greater when tariff protection is reduced the most. We divide MTV and FTV into deciles, and re-estimate our main specification, that is, using the complete set of controls. We consider as base category the highest level of tariff protection (i.e. when MTV or FTV are in their highest decile). Since our main specification includes district fixed effects, we are estimating the effect on IPV when a district transitions from the highest level of tariff protection to a lower level of tariff protection (i.e. when exposure to trade liberalization increases). Standard errors were clustered at the district level.

Results are shown in Figure 1. We depict 95% confidence intervals. We observe that as male exposure increases (i.e. through a reduction in tariff protection), IPV increases. There is a clear gradient. For instance, when a district transitions from the highest level of tariff protection to the lowest level of tariff protection, IPV increases by 14 percentage points. However, when a district transitions from the highest level of tariff protection to the median level of protection, IPV increases by 9-10 percentage points, approximately. Decreasing tariff protection from the highest level to the second highest does not result in a change in IPV. In contrast, changes in FTV never result in statistically significant changes to IPV.

[Figure 5 here]

4.4 Heterogeneous effects

We discuss whether the effect of trade liberalization is larger on different female sub-samples, including females that: (i) are younger than their partners (Friedberg and Webb, 2006; Mabsout and van Staveren, 2010), (ii) are very young when they started living with their first partner (Jensen and Thornton, 2003; Heath, 2014; Yount, et al., 2018), (iii) have little education (Heath, 2014; Aizer, 2010), and (iv) are less educated than their partners (Mabsout and van Staveren, 2010; Hidrobo and Fenald, 2013; Aizer, 2010). Each of these categories is associated with a higher probability of suffering intimate partner violence according to the literature, and may affect the responsiveness of intimate partner violence to changes in income caused by tariff changes (e.g. Hidrobo and Fernald, 2013).

In Table 4 we show the results of estimating the following equation:

$$\begin{aligned} y_{j,d,t} &= \alpha + \beta_1 MTV_{d,t} + \beta_2 FTV_{d,t} + \alpha_d + \alpha_t + f(W_{d,1993}, trend, \gamma_1) + \\ &+ \delta_0 D_{i,t} + \delta_1 [D_{i,t} \times MTV_{d,t}] + \delta_2 [D_{i,t} \times FTV_{d,t}] \\ &+ [\gamma_2^{'} X_{j,d,t} + \gamma_3^{'} Z_{d,t}] + \varepsilon_{j,d,t} \end{aligned} \tag{4}$$

where $D_{i,t}$ can be: (i) a dummy variable that takes the value of 1 whether the woman "j" is older than her partner (see column 1), (ii) a dummy whether she was at least 19 years old when she started living with her first partner (see column 2)[35], (iii) a dummy whether she has completed high-school (see column 3), and (iv) a dummy whether she is more educated than her partner (see column 4). The coefficients δ_1 and δ_2 measure the heterogeneous effect of trade liberalization. The row labeled 'Test Male' shows the p-value of testing the null hypothesis: $\beta_1 + \delta_1 = 0$. Likewise, the row labeled 'Test Female' shows the p-value of testing the hypothesis: $\beta_2 + \delta_2 = 0$.

Although not all the interactions with MTV are statistically significant, the negative signs of the coefficients suggest that increases in intimate partner violence are smaller among females that ex-ante were well positioned in their household. Females that are older than their partners (column 1), that are aged 19 or more when they started living with their first partner (column 2), or that have at least completed high school (column 3), experience smaller increases in intimate partner violence. For, FTV, interactions are mostly not statistically different from zero, although they remain positive.

[Table 4 here]

[35] 19 years old is the median age at first cohabiting in our sample

4.5 Other forms of violence

We also estimate the impact of MTV and FTV on emotional intimate partner violence and on controlling behavior. Please, refer to the data appendix B for details on the construction of these variables.[36] Overall, results are similar, as male vulnerability to trade liberalization increases emotional violence. In the case of FTV, decreases in output tariffs triggered episodes of emotional violence, but not of controlling behavior. Results are shown in Table 5.

[Table 5 here]

5 Mechanisms

In this section, we first describe the impact of trade liberalization on several outcomes related to labor markets, households' well-being, and the marriage market. We also provide a discussion on our findings in the context of current theories on IPV.

5.1 Impacts on males' and females' labor outcomes

We study whether MTV and FTV are related to changes in labor market outcomes. We employ data from the National Household Surveys between 2004 and 2011 (ENAHO for its Spanish acronym). In particular, we use information on employment, monthly earnings, hours worked, size of firms, and related characteristics including age, education, and others. We pool these data and construct dummy variables that take the value of one if the individual is (i) employed, (ii) employed at a small enterprise or (iii) employed at a non-small enterprise.[37] We also construct a variable for monthly earnings, differentiating between earnings in non-small and small enterprises, as trade liberalization is likely to impact workers differently. Finally, we also use a measure of hours worked differentiating between hours in small and non-small firms.

We run our preferred specification for the sample of males aged between 18 and 70 (reported in Panel A of Table 6), as well as for the sample of females within the same age range (reported in Panel B of Table 6). We find that tariff reductions are not associated with changes in the probability of employment for either males or females (see columns 1 to 3 of Panel A and Panel B). However, decreases in MTV are associated with lower

[36] The questions about controlling behavior are quite ambiguous in the time of reference. They are worded in present tense, but do not refer to a specific timeline.

[37] Small enterprises are defined as firms having three or fewer workers, which include around 50% of the workers. Our findings do not change if we decrease or increase this threshold.

earnings for males. Interestingly, we do not find any statistically significant results for MTV nor FTV in the sample of females. Decreases in earnings are concentrated among workers employed in small firms. Also, on average, decreases in MTV are associated with fewer hours spent working for both males (column 7, Panel A) and females (column 7, Panel B), albeit not significantly. This effect is stronger for workers in small firms, and it is statistically significant for males. On the contrary, reductions in MTV are associated with more hours for workers in big firms. This effect is statistically significant for males. We find a similar pattern for FTV, although the coefficients are not statistically different from zero in any case.[38]

[Table 6 here]

5.2 Impacts on households' well-being and alcohol related outcomes

We turn to analyze how trade liberalization affected the overall position of the household in terms of annual income, annual expenditures, and poverty by using data from the 2004-2011 waves of National Household Survey (ENAHO). In addition, we use DHS to explore the impact of trade liberalization on partners' alcohol consumption and wives' opinions about justifiability of violence. We also study how trade liberalization has affected mental health using data on suicides and deaths caused by mental illness.

Results are reported in Panel A of Table 7. Decreases in both MTV and FTV are associated with lower household income and expenditures (see columns 1 and 2). A decrease in a unit of MTV decreases annual income by 1.64% and annual expenditures by 2.05% (where the latter is statistically different from zero at the 5% level). These coefficients imply an average [interquartile] impact of 14.67% [4.28%] and, 18.34% [5.36%] respectively. Similarly, a unit decrease in FTV decreases annual household income by 1.38% and annual household expenditures by 1.58%, albeit not significantly. These coefficients translate to an average [interquartile] impact of 2.16% [1.92%], and 2.48% [2.20%]. We use measures of poverty and extreme poverty constructed by the National Institute of Statistics and find that a unit decrease in MTV increases poverty and extreme poverty by 1.47 and 0.80 percentage points.[39] The corresponding coefficients are statistically different from zero.

[38] Our survey include information for informal workers, who tend to be disproportionally employed in small firms. Informality is defined as those not having labor contracts or health insurance. Also, self-employed workers are considered as being part of the informal sector. We report corresponding results in Table A.2. We find analogous results as those in Table 6. In particular, MTV is associated with lower earnings among informal workers.

[39] A household is defined as poor if its unable to consume 2318 kilocalories per day as well as spend on basic services such as clothing, rent, health, transportation, education, among others. A household is defined as extremely poor if its unable to consume 2318 kilocalories per person on a daily basis (INEI, 2000).

Regarding FTV, we find that a unit decrease increases poverty by 0.91 percentage points (albeit the coefficient is not statistically significant) and decreases the probability of extreme poverty by 1.55 percentage points. This suggests that the impact of MTV and FTV are heterogeneous and affect households through the income distribution differently.

In Panel B, we report our results for alcohol related outcomes. Column 1 shows the effect on the likelihood of partners consuming alcohol in the last 12 months. We do not find a significant impact for alcohol consumption for MTV and FTV. However, even if the likelihood of consumption is not affected, the timing at which alcohol is consumed may change. For column 2 we construct an indicator variable taking the value of one whenever an episode of PIPV occurred while the wife's partner was under the influence of alcohol or drugs. We find that decreases in both MTV and FTV increases the likelihood of PIPV episodes under the influence of alcohol. Finally, the fact that intimate partner violence is mainly observed in the case of male vulnerability and far less in the case of female vulnerability is consistent with the fact that females see themselves as part of a patriarchal, traditional society and as such, tend to accept their living condition. This is corroborated with DHS data on whether females justify being physically abused by their spouses.[40] Results are reported in column 3 of Panel B in Table 7. We find that both reductions in MTV and FTV are positively related to the justification of physical abuse. An average [interquartile] decrease in MTV and FTV imply an increase in the extent to which women justify violence against them by 17.3 [5.0] and 4.2 [3.7] percentage points relative to less affected districts, respectively.[41]

Finally, for Panel C we use raw and age-standardized data from the Ministry of Health to study suicide rates and mortality due to mental illness for three periods, 2001-2005, 2006-2010, and 2011-2015. We take first differences to equation (3) (where t now stands for one of the three periods) and get: $\Delta y_{d,t} = +\beta_1 \Delta MTV_{d,t} + \beta_2 \Delta FTV_{d,t} + \alpha_t + \gamma_1^{'} W_{d,1993} + \gamma_{2d,t}^{'}] + \varepsilon_{d,t}$, where we have implicitly assumed $f(W_{d,1993}, trend, \gamma_1)$ to be linear in $W_{d,1993}$. We use the same variables for $W_{d,1993}$, but in addition we control for the initial level of either suicide rates or mortality due to mental illness in the period 2001-2005, $y_{d,01-05}$. Coefficients in columns (1) imply that an average [interquartile] decrease in MTV and FTV would lead to an increase in suicides of 9.15 [2.67] per 100,000 persons and 3.07 [2.73] per 100,000 persons. Coefficients in columns (2) imply similar magnitudes. These

[40] We use a dummy variable that reflects whether going out without telling the husband, arguing with him, refusing to have sex with him, child neglect, or burning meals are justifiable reasons to get physically abused.

[41] Some women did not answer all the survey questions resulting in some variation in the number of observations in the regressions.

impacts are statistically significant. Columns (3) and (4) show that decreases in MTV and FTV also lead to increases in deaths due to mental illness, albeit these increases are not statistically different from zero.

[Table 7 here]

5.3 Impacts on marriage market outcomes

We explore whether trade liberalization affects marriage and divorce rates taking into account age and education differences between couples. We construct a dummy variable that takes the value of one for women that are currently married, and zero otherwise. We construct another dummy variable taking the value of one for women that were married but no longer are. For current couples, we simply compute the age and education difference, both in terms of years and run our preferred specification using these outcomes variables.[42] Results are shown in Table 8. Overall, we do not find major statistically significant impacts in marriage-related outcomes.

[Table 8 here]

5.4 Discussion

In the previous section, we describe how trade liberalization impacts labor outcomes, well-being, and marriage-related outcomes. In this section, we discuss how they all relate to IPV. Our starting point involves an analysis of how income changes affect IPV.

Buller et al. (2018) propose three pathways through which income changes can impact IPV: (i) economic security and emotional well-being, (ii) intra-household conflict, and (iii) women's empowerment. The first causal pathway refers to the overall position of the household in terms of income. As the budget constraint of the household tightens, poverty-related stress may increase, which in turn may accentuate the likelihood of IPV episodes. This impact may be reinforced through a deterioration in mental health (Devries et al., 2013) as well as via increased alcohol consumption, which may act as a trigger (Heise, 2012; Jones et al., 2015).[43] The second causal pathway may operate through marital dynamics and conflict. For instance, increased access to cash may reduce arguments over budget issues,

[42] Notice that we only condition on ethnicity (as measured by language of the mother) and altitude. This is because now education and age are used as outcomes variables. We control for altitude because there is a negative correlation between the altitude and access to economic development.

[43] Research in several disciplines recognize a strong association between alcohol consumption and marital violence. See Feshbach (1964), Foran and O'Leary (2008), Angelucci (2008), and Card and Dahl (2011).

thereby, decreasing conflict. However, if the newly acquired funds are used in selfish ways (e.g. to purchase alcohol or tobacco), increases in income may generate marital conflict. The third causal pathway refers to situations in which the bargaining position of women changes within the household. Consider the case of women receiving cash transfers. A decline in the relative income position of males may foster violence towards women as a reaction to a perceived threat in terms of a potential change in the status quo (i.e. male backlash; see Tauchen et al., 1991, Macmillan and Gartner, 1999; Heath, 2014; Hidrobo and Fernald, 2013). However, the net IPV impact may be unclear, as some men may end up decreasing IPV in order to maintain marriage stability and satisfaction in women (e.g., Aizer, 2010; Eswaran and Malhotra, 2011; Anderberg et al., 2016). Related to the above, and from a general equilibrium perspective, one should also consider that changes in income may impact marriage market outcomes, including the degree of assortative matching, which may lead to impacts on IPV by also shifting the bargaining position of spouses (Browning et al., 2011).

In addition, there are other theories that help explain IPV that might be of relevance in our context. A particularly relevant one is the so-called "theory of exposure", by which increased physical interaction between males and females in the household may increase friction in the couple and help trigger episodes of violence. This, due to males being forced to stay longer hours at home, either because of layoffs, temporary work suspensions, or reduction in work hours. (Tauchen et al., 1991).

Given our findings, we argue that there are multiple causal mechanisms through which trade liberalization impacts IPV in the Peruvian context. First, our results on household-related outcomes suggest a tightening of the budget constraint, indicating that poverty-related stress may be one of the causal mechanisms. We provide evidence on this by exploring the role of income in the household and on the likelihood that households may end up below the poverty line, as shown in Panel A of Table 7. Similarly, and in line with the literature on poverty-related stress, we show that trade liberalization may affect the timing at which males drink alcohol, which may incentivize violence towards their spouses. This is shown in Panel B of Table 7. These findings are also consistent with a higher incidence of suicide rates in more exposed districts.[44] This is shown in Panel C. In fact, a higher incidence of suicide rates is also consistent with the first mechanism described above, as poverty-related stress may exacerbate mental health issues.

[44]We find that trade liberalization deteriorates mental health while also increasing IPV. Our interpretation is that worsening mental health may induce more episodes of IPV. Although, it is true that more frequent episodes of IPV may also deteriorate mental health. Whether the link goes from mental health illness to IPV or vice-versa, is not part of our study.

In addition, our results on individual labor outcomes suggest that males tend to end up worse-off compared to females. This implies that women may improve their bargaining position relative to men (Table 6). In net terms, this can either increase or decrease IPV depending on how men may react to the shift in bargaining power. Given that the average increase in IPV in our setting is quite high, this may suggest that males tend to react violently to the shift in power, on top of the stress-induced IPV outlined above.

Using back-of-the-envelope calculations we argue that in order to rationalize the differences in magnitudes in three different studies on the same country, one may require an explanation involving a male backlash mechanism.[45] In a study on rainfall shocks and spousal abuse in Peru, Díaz and Saldarriaga (2020) find that droughts during cropping season decrease household income by 15-20%, especially through a reduction in female labor opportunities. In our setting, trade liberalization also decreases household income by 15-20%, but mainly through a drop in male income. The much larger impact on IPV in our setting (∼20 p.p.) relative to the one in their setting (∼8 p.p.), despite a similar impact on household income, may be explained by the fact that while the improvement in the bargaining position of males in Díaz and Saldarriaga (2020) may push IPV down relative to a counterfactual world without a male backlash mechanism, the loss of power by males in our study may push IPV up, resulting in the divergent impacts on IPV featured in these two studies. In other words, in a counterfactual world featuring no male backlash, a 15% decrease in household income would generate an increase in IPV of between 8 and 20 percentage points.

We reach an analogous conclusion when comparing our findings to those in Díaz and Saldarriaga (2021). They show that a cash transfer program targeting Peruvian women that amounts to about 10% of household income decreases IPV by around 3 percentage points. That is, even though transfers were sizeable and directed to women, which improved their bargaining power, IPV decreased by a smaller margin. In the absence of a male backlash mechanism and taking as reference our results and those in Diaz and Saldarriaga (2020), the 10% increase in income should be accompanied by a decrease of IPV of somewhere in between (10/15)*8=5.33 and (10/15)*20=13.33 percentage points, and not 3 percentage points.[46] Thus, it appears the presence of a male backlash mechanism rationalizes findings in these three studies.

It should be emphasized that we cannot rule out the theory of exposure, either. While

[45] The three studies are Diaz and Saldarriaga (2020), Diaz and Saldarriaga (forthcoming), and our study.

[46] We are scaling the 8 and 20 percentage points increase in IPV by (10/15) to reflect the fact that the income changed by 10% in Diaz and Saldarriaga (forthcoming), whereas it changed by around 15% in Diaz and Saldarriaga (2020) and in our study

we do not find an effect on male and female employment on the extensive margin, we do find some impacts on the intensive margin, namely, hours worked. In particular, we find that males in more impacted districts decrease the time spent working. It is possible that males increase the time they spend at home, thereby increasing the risk of IPV. Finally, general equilibrium responses materialized through changes in the marriage market do not seem to be a likely causal pathway as we do not find major impacts on marriage and divorce rates, nor on the age and education gap between partners.

In short, the net impact of trade liberalization on IPV seems to be mediated through increases in poverty-related stress and in the time couples spend together. Moreover, comparisons with other studies in similar settings seem to suggest that these impacts may be reinforced by a male backlash mechanism. Interestingly, the marriage market does not seem to be a causal pathway.

6 Robustness and Threats to Identification

In this section, we pursue a comprehensive battery of tests in order to confirm our findings.

6.1 Distribution of employment across industries in 1993 vs 2007

The gender and industry composition with respect to employment in 1993 may be different to the employment composition in 2007 at the start of the reform. If true, this may weaken the relationship between the trade reform and the experimented vulnerability of male and female workers. However, it must be noted that our results are very similar if we construct our measures of MTV and FTV using the 2007 Census instead of the 1993 Census and the vast majority of our findings hold although the coefficient on FTV becomes statistically significative and always positive, suggesting that reductions in FTV generates more IPV. Also, the coefficient on MTV becomes 20% smaller. Details are available in Appendix C.1.

6.2 Sex-specific vulnerability to input tariffs

Tariff cuts affect prices of both output goods and intermediate inputs. However, reductions in output and input prices may have opposing effects over households. Lower output prices may negatively impact certain households as some industries lose their protection to international competition. In contrast, lower input prices may positively affect households by increasing access to cheaper inputs and varieties of better quality (Amiti and Konings, 2007; Topalova and Khandelwal, 2011; Goldberg et al, 2010; Fieler et al, 2018). To the extent

that these two effects are transmitted to within-household dynamics, we should observe opposite effects of output and input tariffs on the likelihood of intimate partner violence. Our analysis shows that our main results are robust to input tariff considerations. We provide evidence in favor of the conjecture that the effects of output tariffs and input tariffs should be of opposite sign and is fully in line with the current literature. Please see Appendix C.2.

6.3 Sensitivity to initial conditions

Whereas we employ a more general estimator, it still may be viewed as part of the family of shift-share identification instruments and in particular of Bartik estimators. The basic idea of this family of estimators is to weight national-level changes with local employment shares. Goldsmith-Pinkhman, et al., (2019) establish the identifying assumptions in this context. One implication of this analysis is that if there is an 'infinite' number of industries affected by random tariff shocks, the presence of a large number of shocks causes any initial bias stemming from differences in shares to average out. In contrast, if the number of industries is 'finite', for identification we require initial shares to be exogenous in the parallel trends sense. While we argue our setting is more akin to the situation where there is an 'infinite' number of industries affected by random tariff shocks since we employ 76 industries, we can test whether initial shares are exogenous by controlling for a initial set of covariates interacted with trends. This way, we use alternate sets of initial covariates $W_{d,1993}$. Results are robust to all specifications, suggesting that either our baseline specification is already controlling for any potential bias generated by the initial shares, or tariff cuts are indeed 'big' in number. Details are reported in Appendix C.3.

6.4 Conflating past and current shocks

Jaeger, et al., (2018) argue that if it takes time for markets to adjust, shift-share instruments may conflate short-term responses and long-term effects. In this situation they suggest adding lagged measures of the instrument. Following their suggestion, we control for dynamic responses by adding lagged measures of MTV and FTV and include five lags. Overall, main conclusions of our analysis remain unchanged after controlling for lags. For more information, see Appendix C.4.

6.5 Selective migration

Selective migration may bias our results as it may affect the composition of victims between highly and lowly affected areas. For instance, if females that were already victims before

liberalization migrate to highly affected areas, we will observe that trade liberalization is associated with a higher prevalence of violence. The opposite is true if female victims migrate from high to low vulnerable areas. This is because our dependent variable asks about past episodes of violence, including those that happened before liberalization. However, migration does not appear to be systematically related to MTV and FTV. This goes in line with Dix-Carneiro et al. (2015) as they show that migration may play a limited role as an adjustment mechanism to tariff cuts in Brazil.

Moreover, we also evaluate if the effect of MTV is larger on the sample of migrants compared with the sample of non-migrants. On the one hand, if female victims are migrating *from* districts in which male employment was hit harder by liberalization, we would be underestimating the effect of MTV on the whole sample. Hence, the effect on the sample of non-migrants should be larger. On the other hand, if female victims are migrating *into* affected districts, we would be overstating the effect of MTV and the effect on the sample of non-migrants should be smaller. The same logic applies for FTV. However, in Appendix C.5 we show that the impact of MTV is similar between those who have changed residence and those who have not. However, the effect of FTV tends to be larger in the sample of migrants, suggesting that we may be overestimating the effect of FTV, which was, however, non-statistically significant.

6.6 Spillover effects

While we have already shown that endogenous migration does not seem to be an issue in our context (see Section 6.5 or Appendix C.5.) and thus the potential for spillover effects is quite limited, we estimate spillover effects across districts as another check. If changes in IPV arise from changes in tariff vulnerability in bordering/neighboring municipalities, then this could bias our results. In particular, we run the following specification, akin to equation (3):

$$\begin{aligned} y_{j,d,t} &= \alpha + \beta_1 MTV_{d,t} + \ddot{\beta}_1 NMTV_{d,t} + \beta_2 FTV_{d,t} + \ddot{\beta}_2 NFTV_{d,t} + \alpha_d + \alpha_t \\ &+ f(W_{d,1993}, trend, \gamma_1) + [\gamma_2^{'} X_{j,d,t} + \gamma_3^{'} Z_{d,t}] + \varepsilon_{j,d,t} \end{aligned} \tag{5}$$

We have included the average MTV and FTV of district d's neighbors, namely, $NMTV_{dt}$ and $NFTV_{dt}$ respectively. $\ddot{\beta}_1$ and $\ddot{\beta}_2$ identify the spillover effects of shocks to neighboring districts. Standard errors are clustered at the district level.

In Table A.12 we replicate the three first columns of the paper's Table 2. We also add

three more columns showing the results from estimating the equation above with different sets of covariates. We can see that after accounting for spillover effects, our main results are virtually unchanged. Moreover, both $\ddot{\beta}_1$ and $\ddot{\beta}_2$ are never statistically different from zero. In unreported results we also show that the conclusions are exactly the same if we use the other outcomes featured in Table 2 in our paper. These are available upon request.

7 Concluding Remarks

We ask whether trade liberalization may impact household dynamics and increase physical intimate partner violence. This question, one that has not been addressed before, is rather relevant as countless people around the world suffer from physical violence on a daily basis. We exploit an unexpected tariff reduction across several industries in Peru during the 2000s and find that in districts where male employment was more vulnerable to the reform, physical intimate partner violence increased with respect to control districts. We find that a unit decrease in MTV while keeping FTV constant, increases physical intimate partner violence by 3.04 percentage points. This is translated to an average [interquartile] effect of 27.20 [7.94] percentage points relative to districts experiencing no change in male vulnerability. In districts where female employment was more vulnerable to the trade reform, we also find that violence increases, but this finding tends to be significantly less robust as in the case of males.

We find evidence that there are several causal paths through which trade liberalization may impact IPV. First, poverty-related stress appears to be one of them, which is also consistent with the behavior with respect to alcohol consumption and suicide rates that we observe. Second, we find that our results are consistent with the male backlash mechanism by which a relative improvement in earnings by females is received with violence toward them, as males feel threatened. In fact, not only do we find that alcohol may be a trigger conducive to male backlash, but we also confirm that women justify violence against them, which is consistent in traditional societies in developing countries, such as Peru.[47] Third, an exposure mechanism may also be at play, as males appear to expand the time they spend at home, which according to this mechanism, increases the risk of IPV. Finally, general equilibrium responses that may materialize through changes in the marriage market do not seem to be a likely causal pathway as we do not find major impacts on marriage and divorce rates, nor on the age and education gap between partners.

[47] For example, according to a national survey carried out in 2019 by a Ipsos, a consulting firm, 71% of Peruvians say that is justifiable to physically assault women in case of infidelity.

Our findings show that more than trying to pinpoint one specific predominant mechanism that may link openness to IPV, many of the causal paths that may explain the latter are, in fact, complementary and may exacerbate one another. In our specific case, the final impact of trade liberalization on IPV seems to be mediated through increases in poverty-related stress and in the time couples spend together. Moreover, comparisons with other studies in similar settings seem to suggest that these impacts may be reinforced by male backlash mechanisms.

Our results are robust to falsification and placebo tests, sensitivity to initial conditions, conflation of past and current shocks, selective migration, permutation tests and input-tariffs considerations. Also, we find considerable heterogeneity, as education and the age of first cohabiting appear to be key variables that correlate with our findings. Finally, we also exploit the fact that when overall tariffs are reduced, both prices of output goods and intermediate inputs are affected. In particular, these reductions in output and input prices may have opposing effects over households. Lower output prices may negatively impact certain households as some industries lose their protection to international competition. In contrast, lower input prices may positively affect households by increasing access to cheaper inputs and varieties of better quality. We find that these opposing effects may transmit to household dynamics as male and female vulnerability to input tariff cuts are associated with decreases and increases in physical intimate partner violence respectively.

From a policy perspective, our findings demonstrate that sometimes, sensible economic policies can have negative, unexpected repercussions. They also provide an opportunity to policymakers to pursue proactive policy measures in order to help prevent or alleviate this issue. Two specific measures that governments may find useful are educational messages for instance, via traditional and social media and an increase in peer awareness on the typical red flags associated with intimate partner violence.

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Table 1: Intimate Partner Violence – Summary Statistics

Panel A: Pooled sample					
Variable	Number Obs	Mean	Std. Dev	Min	Max
PIPV (last 12 months)	51,343	0.154	0.361	0	1
EIPV (last 12 months)	51,513	0.171	0.377	0	1
Controlling behavior	50,903	0.677	0.468	0	1
Age at first cohabiting	51,507	19.998	4.626	10	48
Age	51,515	33.634	8.228	15	49
Partner's age	51,507	37.679	9.373	15	96
Years of educ. (YoE)	51,515	8.311	4.510	0	17
Partner's YoE	51,507	9.047	3.822	0	17
HH. head is women	51,515	0.086	0.280	0	1
Non-spanish	51,510	0.139	0.346	0	1
HH. size	51,515	4.767	1.782	1	19
Altitude	51,515	1498	1450	0	5037
Panel B: Average violence by survey year					
Variable	2004	2006	2008	2010	2011
PIPV (last 12 months)	0.157	0.147	0.169	0.150	0.142
EIPV (last 12 months)	0.182	0.166	0.170	0.163	0.167
Controlling behavior	0.677	0.653	0.727	0.666	0.657

Notes: The sample consists of women that were in a relationship when they were surveyed and that report whether they have ever suffered physical intimate partner violence or not. PIPV and EIPV stands for physical and emotional intimate partner violence. Definitions of variables are described in Appendix B.

Table 2: The Effect of Trade Liberalization on Physical Intimate Partner Violence (PIPV)

	Has suffered from PIPV in the last 12 months				Violence intensity		1st principal component	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
MTV	0.0129	0.0130	0.0304		0.0319	0.0754	0.0122	0.0286
	(0.0046)***	(0.0045)***	(0.0064)***		(0.0129)**	(0.0198)***	(0.0048)**	(0.0073)***
FTV	-0.0022	-0.0037	0.0192		-0.0093	0.0517	-0.0020	0.0203
	(0.0126)	(0.0121)	(0.0149)		(0.0350)	(0.0425)	(0.0129)	(0.0156)
TV				0.0307				
				(0.0064)***				
Mean dep. var.	0.154	0.154	0.154	0.154	0.398	0.398	0.150	0.150
N. districts	1066	1066	1066	1066	1066	1066	1066	1066
Adjusted R^2	0.0184	0.0284	0.0286	0.0286	0.0280	0.0278	0.0286	0.0287
N	51343	51060	51060	51060	51060	51060	51060	51060
District and year FE	X	X	X	X	X	X	X	X
Initial conditions	X	X	X	X	X	X	X	X
Individual-level covariates		X	X	X	X	X	X	X
District-level covariates			X	X		X		X

Notes: Standard Errors clustered at the district level. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level. PIPV stands for physical intimate partner violence. *MTV* stands for "male tariffs vulnerability", while *FTV* stands for "female tariffs vulnerability". Note that we have multiplied the coefficients on *MTV* and *FTV* by minus one to facilitate the reading of our tables as we are interested in the effect of a reduction in tariffs. *TV* stands for tariffs vulnerability.
The set of initial conditions includes the district's population,the share of individuals with complete primary, high school and post-secondary education, the share of female employment, the share of employment destined to agriculture and fishing, mining, manufacture and construction. Each of these variables is interacted with linear and quadratic trends. **The set of individual-level covariates** includes the age and years of education of both partners, the age of the female when she started living with her first partner, a dummy that captures whether the female speaks Spanish, the size of the household, the sex of the household head, and the altitude at which the household is located. **The set of district-level covariates** includes a measure of vulnerability to foreign direct investment, a measure of vulnerability to exports, and a measure of vulnerability to input tariffs. Details on the construction of these variables can be found in Appendix B.

Table 3: Falsification and Placebo Tests, Physical Intimate Partner Violence

	Falsification: PIPV (2004-2007)		Placebo: PIPV between parents
	(1)	(2)	(3)
MTV (2007-2010)	-0.0122		
	(0.0316)		
FTV (2007-2010)	-0.0192		
	(0.0900)		
MTV (2008-2011)		0.0133	
		(0.0267)	
FTV (2008-2011)		-0.0043	
		(0.0744)	
MTV (2004-2011)			0.0056
			(0.0105)
FTV (2004-2011)			0.0363
			(0.0203)*
Mean dep. var.	0.152	0.152	0.481
N. districts	595	595	1066
Adjusted R^2	0.0293	0.0293	0.0385
N	11,778	11,778	48674
District and year FE	X	X	X
Initial conditions	X	X	X
Individual-level covariates	X	X	X
District-level covariates	X	X	X

Standard Errors clustered at the district level. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level. PIPV stands for physical intimate partner violence. *MTV* stands for "male tariffs vulnerability", while *FTV* stands for "female tariffs vulnerability". Note that we have multiplied the coefficients on *MTV* and *FTV* by minus one to facilitate the reading of our tables as we are interested in the effect of a reduction in tariffs.

The set of initial conditions includes the district's population,the share of individuals with complete primary, high school and post-secondary education, the share of female employment, the share of employment destined to agriculture and fishing, mining, manufacture and construction. Each of these variables is interacted with linear and quadratic trends.**The set of individual-level covariates** includes the age and years of education of both partners, the age of the female when she started living with her first partner, a dummy that captures whether the female speaks Spanish, the size of the household, the sex of the household head, and the altitude at which the household is located. **The set of district-level covariates** includes a measure of vulnerability to foreign direct investment, a measure of vulnerability to exports, and a measure of vulnerability to input tariffs. Details on the construction of these variables can be found in Appendix B.

Table 4: Heterogeneous Effects on Physical Intimate Partner Violence

	Has suffered from PIPV in the last 12 months			
	(1)	(2)	(3)	(4)
MTV	0.0304 (0.0064)***	0.0315 (0.0064)***	0.0322 (0.0065)***	0.0313 (0.0065)***
FTV	0.0183 (0.0148)	0.0178 (0.0150)	0.0184 (0.0150)	0.0192 (0.0151)
Older than partner $\times MTV$	-0.0006 (0.0013)			
Older than partner $\times FTV$	0.0058 (0.039)			
$\geq$ 19 when cohabiting $\times MTV$		-0.0021 (0.0010)**		
$\geq$ 19 when cohabiting $\times FTV$		0.0038 (0.0031)		
High-school $\times MTV$			-0.0033 (0.0012)***	
High-school $\times FTV$			0.0065 (0.0036)*	
More educated $\times MTV$				-0.0013 (0.0010)
More educated $\times FTV$				-0.0004 (0.0032)
Mean dep. var. (D=0)	0.151	0.171	0.160	0.155
Mean dep. var. (D=1)	0.167	0.140	0.146	0.153
Test Men	0.000	0.000	0.000	0.000
Test Women	0.120	0.151	0.0963	0.203
N. districts	1066	1066	1066	1066
Adjusted R^2	0.0293	0.0287	0.0287	0.0286
N	51060	51060	51060	51060
District and Year FE	X	X	X	X
Initial conditions	X	X	X	X
Individual-level covariates	X	X	X	X
District-level covariates	X	X	X	X

Notes: Standard Errors clustered at the district level. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level. PIPV stands for physical intimate partner violence. MTV stands for "male tariffs vulnerability", while FTV stands for "female tariffs vulnerability". Note that we have multiplied the coefficients on MTV and FTV and in the interaction terms by minus one to facilitate the reading of our tables as we are interested in the effect of a reduction in tariffs.

The set of initial conditions includes the district's population,the share of individuals with complete primary, high school and post-secondary education, the share of female employment, the share of employment destined to agriculture and fishing, mining, manufacture and construction. Each of these variables is interacted with linear and quadratic trends. **The set of individual-level covariates** includes the age and years of education of both partners, the age of the female when she started living with her first partner, a dummy that captures whether the female speaks Spanish, the size of the household, the sex of the household head, and the altitude at which the household is located. **The set of district-level covariates** includes a measure of vulnerability to foreign direct investment, a measure of vulnerability to exports, and a measure of vulnerability to input tariffs. Details on the construction of these variables can be found in Appendix B.

Table 5: The Effect of Trade Liberalization on Other Forms of Violence

	EIPV over last 12 months			Controlling behavior		
	Dummy	Intensity	PC	Dummy	Intensity	PC
	(1)	(2)	(3)	(4)	(5)	(6)
MTV	0.0291	0.0533	0.0307	0.0125	0.1024	0.0424
	(0.0066)***	(0.0121)***	(0.0070)***	(0.0118)	(0.0376)***	(0.0148)***
FTV	0.0386	0.0559	0.0322	-0.0005	0.0585	0.0242
	(0.0144)***	(0.0267)**	(0.0154)**	(0.0236)	(0.0786)	(0.0313)
Mean dep. var.	0.171	0.279	0.161	0.677	1.503	0.578
N. districts	1066	1066	1066	1066	1066	1066
Adjusted R^2	0.0248	0.0255	0.0254	0.0349	0.0464	0.0460
N	51241	51241	51241	50635	50635	50635
District and year FE	X	X	X	X	X	X
Initial conditions	X	X	X	X	X	X
Individual-level covariates	X	X	X	X	X	X
District-level covariates	X	X	X	X	X	X

Notes: Standard Errors clustered at the district level. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level. $EIPV$ stands for emotional intimate partner violence. MTV stands for "male tariffs vulnerability", while FTV stands for "female tariffs vulnerability". EIPV stands for emotional intimate partner violence. Note that we have multiplied MTV and FTV by minus one to facilitate the reading of our tables as we are interested in the effect of a reduction in tariffs.

The set of initial conditions includes the district's population,the share of individuals with complete primary, high school and post-secondary education, the share of female employment, the share of employment destined to agriculture and fishing, mining, manufacture and construction. Each of these variables is interacted with linear and quadratic trends. **The set of individual-level covariates** includes the age and years of education of both partners, the age of the female when she started living with her first partner, a dummy that captures whether the female speaks Spanish, the size of the household, the sex of the household head, and the altitude at which the household is located. **The set of district-level covariates** includes a measure of vulnerability to foreign direct investment, a measure of vulnerability to exports, and a measure of vulnerability to input tariffs. Details on the construction of these variables can be found in Appendix B.

Table 6: The Effect of Trade Liberalization on Labour Outcomes

Panel A: Males' labor outcomes (ENAHO)									
	Employment	...In small firms	...In big firms	Log earnings	...In small firms	...In big firms	Log hours	...In small firms	...In big firms
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
MTV	-0.0050	0.0038	-0.0088	-0.0336	-0.0626	-0.0011	-0.0104	-0.0410	0.0213
	(0.0034)	(0.0056)	(0.0062)	(0.0164)**	(0.0198)***	(0.0170)	(0.0086)	(0.0114)***	(0.0095)**
FTV	-0.0060	0.0049	-0.0110	-0.0319	-0.0431	-0.0020	0.0110	-0.0019	0.0247
	(0.0062)	(0.0096)	(0.0102)	(0.0317)	(0.0409)	(0.0341)	(0.0136)	(0.0201)	(0.0151)
Mean dep. var.	0.868	0.463	0.405	868.7	682.1	1088.3	48.44	47.59	49.43
N. districts	1249	1249	1249	1249	1242	1232	1249	1242	1232
N	170176	170176	170176	136401	73731	62670	136376	73725	62651
Panel B: Females' labor outcomes (ENAHO)									
	Employment	...In small firms	...In big firms	Log earnings	...In small firms	...In big firms	Log hours	...In small firms	...In big firms
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
MTV	-0.0023	0.0031	-0.0053	-0.0136	-0.0059	-0.0006	-0.0165	-0.0214	0.0077
	(0.0068)	(0.0062)	(0.0039)	(0.0222)	(0.0269)	(0.0439)	(0.0161)	(0.0183)	(0.0205)
FTV	-0.0127	-0.0031	-0.0096	0.0450	0.0616	-0.0083	-0.0070	-0.0147	0.0065
	(0.0098)	(0.0098)	(0.0077)	(0.0389)	(0.0459)	(0.0671)	(0.0230)	(0.0263)	(0.0318)
Mean dep. var.	0.667	0.446	0.221	516.3	405.1	804.3	43.74	42.60	46.67
N. districts	1249	1249	1249	1238	1232	1097	1238	1232	1097
N	181422	181422	181422	85728	61837	23891	86022	61914	24108
District and year FE	X	X	X	X	X	X	X	X	X
Region-year FE	X	X	X	X	X	X	X	X	X
Individual-level covariates	X	X	X	X	X	X	X	X	X
District-level covariates	X	X	X	X	X	X	X	X	X

Notes: Standard Errors clustered at the district level. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level. *MTV* stands for "male tariffs vulnerability", while *FTV* stands for "female tariffs vulnerability". Note that we have multiplied the coefficients on *MTV* and *FTV* by minus one to facilitate the reading of our tables as we are interested in the effect of a reduction in tariffs.

The set of initial conditions includes the district's population,the share of individuals with complete primary, high school and post-secondary education, the share of female employment, the share of employment destined to agriculture and fishing, mining, manufacture and construction. Each of these variables is interacted with linear and quadratic trends. **The set of individual-level covariates in Panel A** includes the age and years of education of both partners, the age of the female when she started living with her first partner, a dummy that captures whether the female speaks Spanish, the size of the household, the sex of the household head, and the altitude at which the household is located. **The set of individual-level covariates in Panel A and B** includes controls for age, age squared, years of education, years of education-squared, the size of the household, a dummy that captures whether the female speaks Spanish, and the sex of the household head. **The set of district-level covariates** includes a measure of vulnerability to foreign direct investment and a measure of vulnerability to exports. Details on the construction of these variables can be found in Appendix B.

Table 7: The Effect of Trade Liberalization on Households' Well Being and Alcohol Consumption

Panel A: Household outcomes (ENAHO)				
	Log HH Income	Log HH Expenses	Poverty	Extreme poverty
	(1)	(2)	(3)	(4)
MTV	-0.0164	-0.0205	0.0147	0.0080
	(0.0118)	(0.0091)**	(0.0064)**	(0.0038)**
FTV	-0.0138	-0.0158	0.0091	-0.0155
	(0.0185)	(0.0163)	(0.0123)	(0.0089)*
Mean dep. var.	25824.1	21193.5	0.410	0.125
N. districts	1249	1249	1249	1249
N	129331	129337	129337	129337
District and year FE	X	X	X	X
Initial conditions	X	X	X	X
Individual-level covariates	X	X	X	X
District-level covariates	X	X	X	X

Panel B: Alcohol related outcomes and justifiability of violence (DHS)			
	Alcohol consumption (last 12 months)	Partner under influence when PIPV occurred	Justifiability of violence
	(1)	(2)	(3)
MTV	-0.0100	0.0168	0.0194
	(0.0091)	(0.0077)**	(0.0045)***
FTV	0.0138	0.0392	0.0264
	(0.0192)	(0.0180)**	(0.0122)**
Mean dep. var.	0.608	0.180	0.0592
N. districts	1066	1066	1035
N	51236	51235	58225
District and year FE	X	X	X
Initial conditions	X	X	X
Individual-level covariates	X	X	X
District-level covariates	X	X	X

Panel C: Suicide and mortality due to mental health rates (Ministry of Health)				
	Δ Suicide rate (raw)	Δ Suicide rate (adjusted)	Δ Mortality due to mental illness (raw)	Δ Mortality due to mental illness (adjusted)
	(1)	(2)	(3)	(4)
Δ*MTV*	1.0232	0.9990	2.1772	1.0517
	(0.5092)**	(0.5070)**	(1.9136)	(1.6791)
Δ*FTV*	1.9581	1.9722	0.9735	0.2154
	(1.0117)*	(0.9946)**	(2.3847)	(2.0785)
Mean dep. var. (levels)	3.102	2.946	13.17	11.36
N. districts	1793	1793	1793	1793
N	3586	3586	3586	3586
District and year FE	X	X	X	X
Initial conditions	X	X	X	X
District-level covariates	X	X	X	X

Notes: Standard Errors clustered at the district level. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level. PIPV stands for physical intimate partner violence. MTV stands for "male tariffs vulnerability", while FTV stands for "female tariffs vulnerability". Note that we have multiplied the coefficients on MTV and FTV by minus one to facilitate the reading of our tables as we are interested in the effect of a reduction in tariffs.

The set of initial conditions includes the district's population,the share of individuals with complete primary, high school and post-secondary education, the share of female employment, the share of employment destined to agriculture and fishing, mining, manufacture and construction. Each of these variables is interacted with linear and quadratic trends. **The set of individual-level covariates** includes the age and years of education of both partners, the age of the female when she started living with her first partner, a dummy that captures whether the female speaks Spanish, the size of the household, the sex of the household head, and the altitude at which the household is located. **The set of district-level covariates** includes a measure of vulnerability to foreign direct investment and a measure of vulnerability to exports. Details on the construction of these variables can be found in Appendix B.

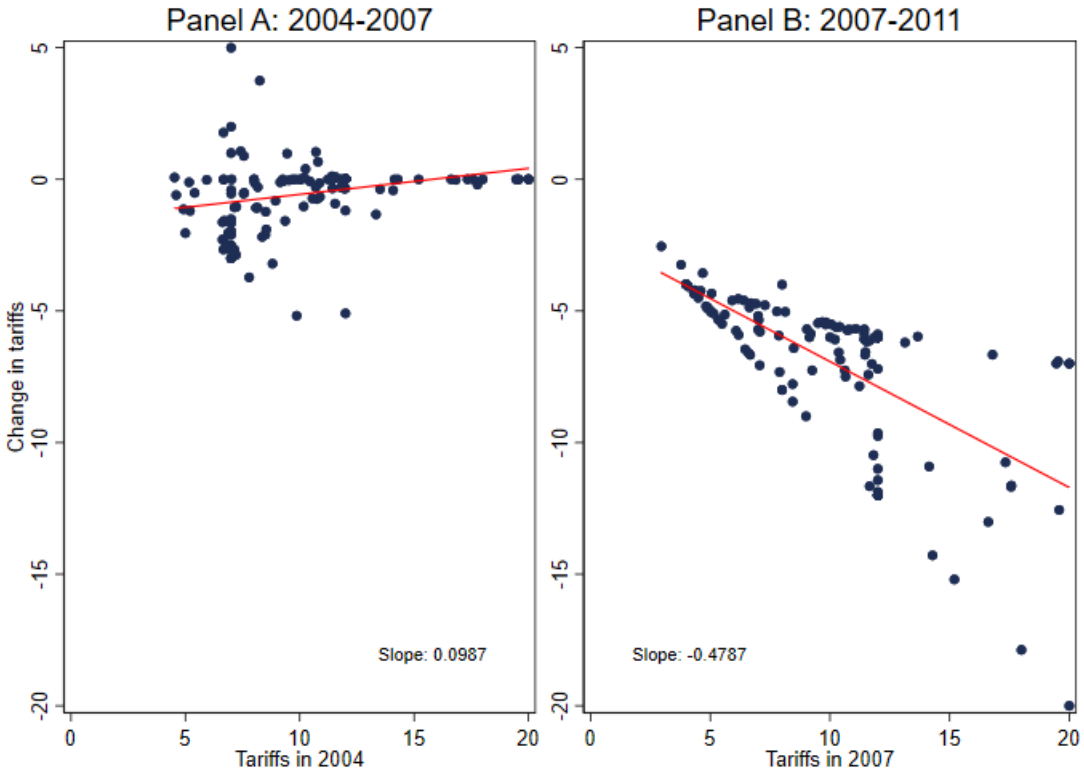
Table 8: The Effect of Trade Liberalization on Marriage Market Outcomes

	Currently married	Formerly married	Age gap	Education gap
	(1)	(2)	(3)	(4)
MTV	0.0035	0.0002	-0.0525	-0.0272
	(0.0067)	(0.0038)	(0.1081)	(0.0744)
FTV	0.0066	-0.0020	-0.0215	0.1834
	(0.0133)	(0.0079)	(0.2235)	(0.1377)
Mean dep. var.	0.596	0.0961	4.054	0.743
N. districts	1067	1067	1067	1067
Adjusted R^2	0.0337	0.00569	0.0153	0.0726
N	104090	104090	62066	61758
District and year FE	X	X	X	X
Initial conditions	X	X	X	X
Individual-level covariates	X	X	X	X
District-level covariates	X	X	X	X

Notes: Standard Errors clustered at the district level. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level. PIPV stands for physical intimate partner violence. *MTV* stands for "male tariffs vulnerability", while *FTV* stands for "female tariffs vulnerability". Note that we have multiplied the coefficients on *MTV* and *FTV* by minus one to facilitate the reading of our tables as we are interested in the effect of a reduction in tariffs.

The set of initial conditions includes the district's population,the share of individuals with complete primary, high school and post-secondary education, the share of female employment, the share of employment destined to agriculture and fishing, mining, manufacture and construction. Each of these variables is interacted with linear and quadratic trends. **The set of individual-level covariates** includes a dummy that captures whether the female speaks Spanish and the altitude at which the household is located. **The set of district-level covariates** includes a measure of vulnerability to foreign direct investment and a measure of vulnerability to exports. Details on the construction of these variables can be found in Appendix B.

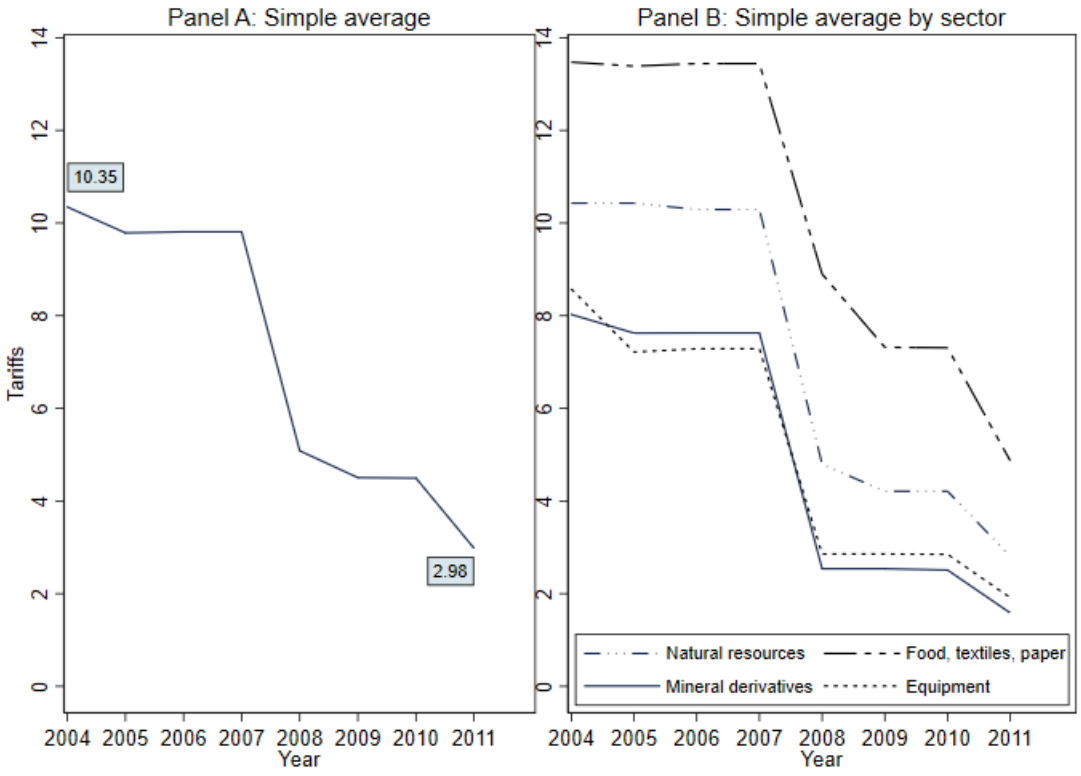
Figure 1: Correlation between initial tariffs and tariff changes



Source: World Bank TRAINS and World Bank's concordance tables

Notes: Tariffs and tariff changes were computed at the industry level using ISIC3 codes. Originally, industries were coded based on the Trade Classification Harmonized System (HS). We translated this classification into the International Standard Industrial Classification (ISIC3) using the concordance tables available online.

Figure 2: MFN tariffs, 2004-2011

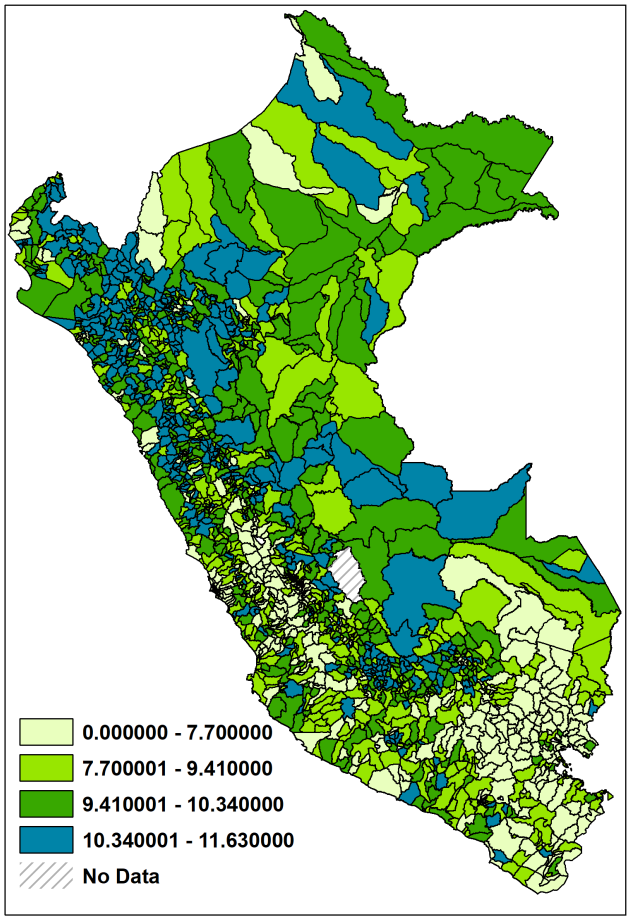


Source: World Bank TRAINS and World Bank's concordance tables

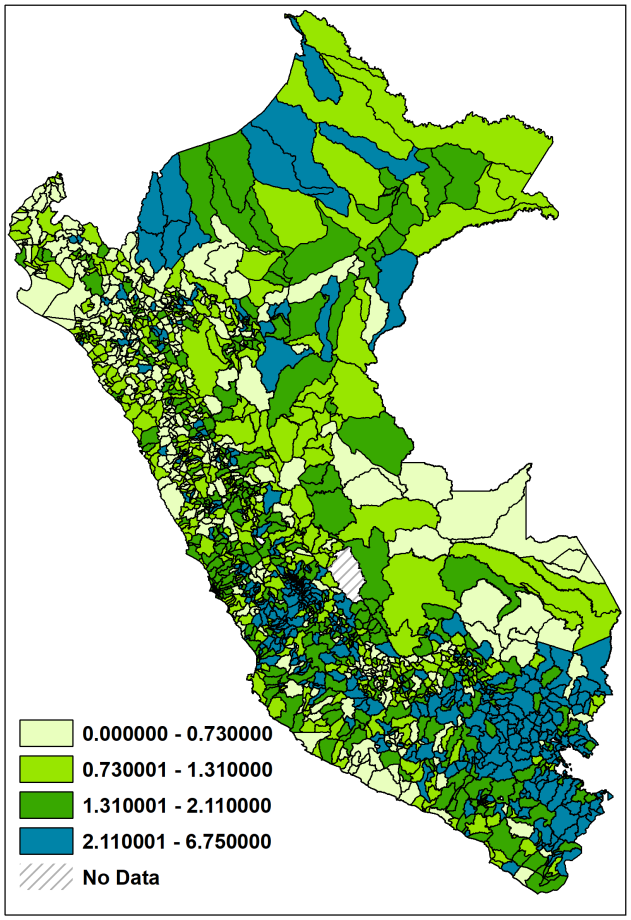
Notes: Tariffs were computed at the industry level using ISIC3 codes. Originally, industries were coded based on the Trade Classification Harmonized System (HS). We translated this classification into the International Standard Industrial Classification (ISIC3) using the concordance tables available online.

Figure 3: Reductions in tariffs vulnerability, 2004-2011

Panel A. *MTV*



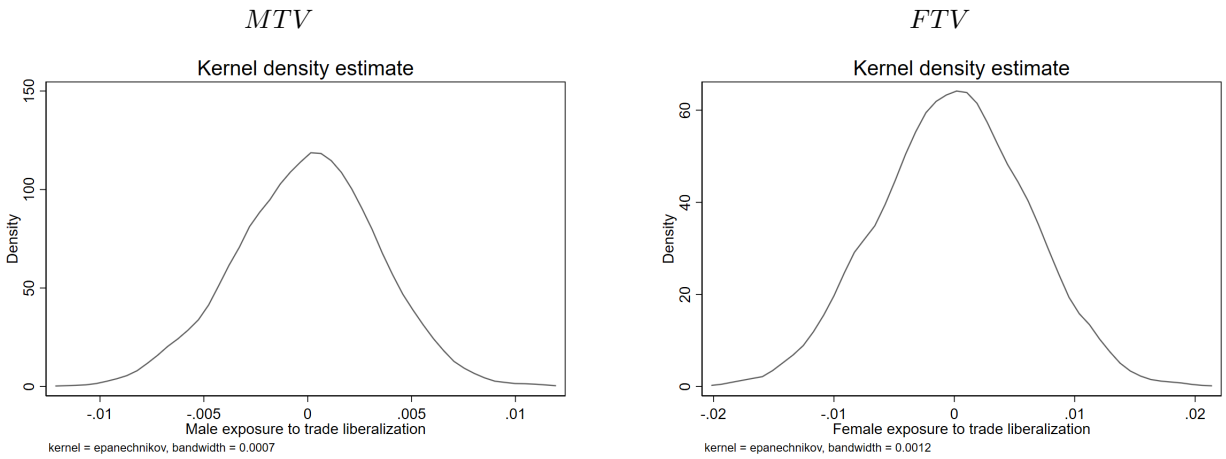
Panel B. *FTV*



Source: World Bank TRAINS, World Bank's concordance tables and the 1993 Population and Household Census. Own calculations.
Notes: *MTV* stands for "male tariffs vulnerability", while *FTV* stands for "female tariffs vulnerability". Each color accounts for 25% of observations. To facilitate the visualization of the figure we have multiplied MTV and FTV by minus one as we are interested in the effect of a reduction in tariffs.

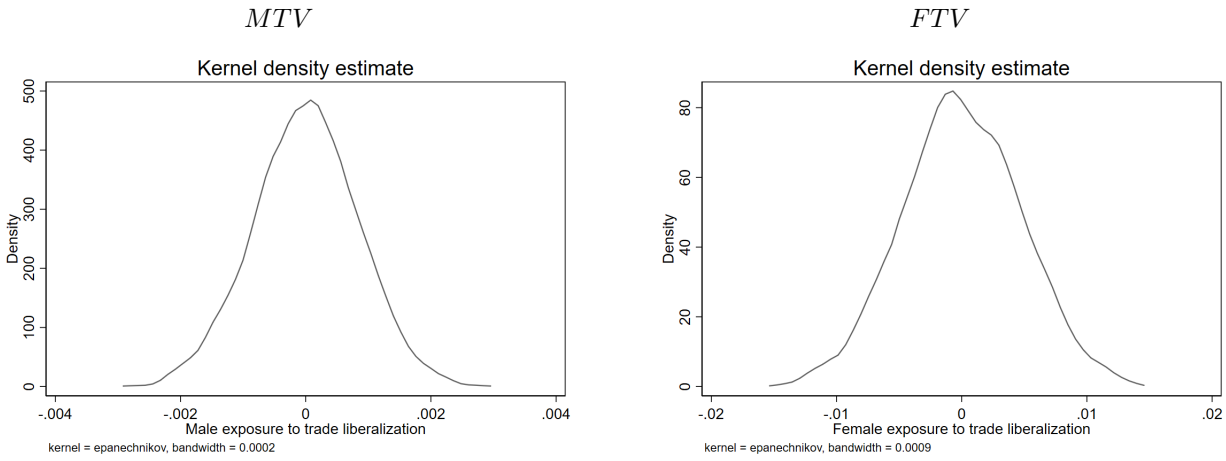
Figure 4: Empirical Distribution of Coefficients for Male and Female Vulnerability

Panel A: Randomizing cross-sectional structure between districts



Empirical p-value: <0.001 | Empirical p-value: <0.001

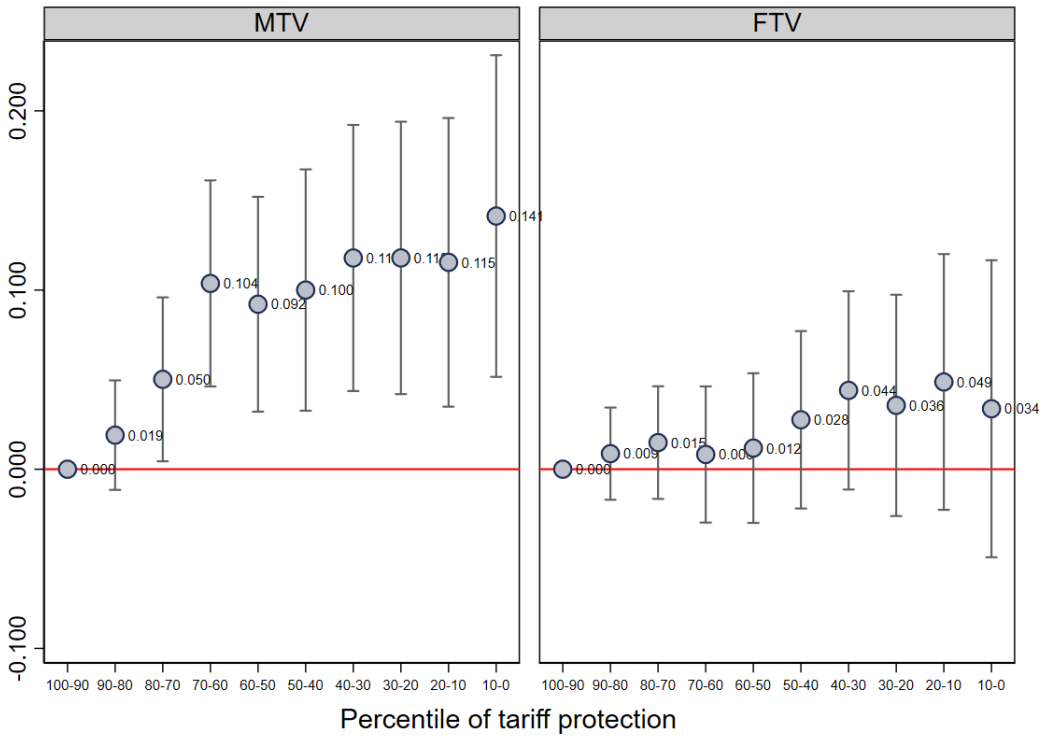
Panel B: Randomizing time structure within districts



Empirical p-value: <0.001 | Empirical p-value: <0.001

Notes: MTV stands for "male tariffs vulnerability", while FTV stands for "female tariffs vulnerability". Distribution of point estimates for $MTV_{d,t}$ and $FTV_{d,t}$ based on equation 3. Note that we have multiplied the coefficients on MTV and FTV by minus one to facilitate the visualization of the figure as we are interested in the effect of a reduction in tariffs. Regressions include district and years fixed effects; initial conditions interacted with liner and quadratic trends; and the sets of individual- and district-level covariates. Each distribution is constructed by repeating the randomization and estimation procedure 2,000 times.

Figure 5: The effect on IPV when a district transitions from the highest level of tariff protection to a lower level of protection



Notes: *MTV* stands for "male tariffs vulnerability", while *FTV* stands for "female tariffs vulnerability". Regressions include district and years fixed effects; initial conditions interacted with liner and quadratic trends; and the sets of individual- and district-level covariates.

A Appendix: Tables and Figures

Table A.1: Top 10 Traded Industries by...:

Panel A: ...the share of male workers

Industry (ISIC3 Group)	Share of male workers
Manufacture of furniture (361)	0.962
Quarrying of stone, sand and clay (141)	0.958
Manufacture of structural metal products, tanks, reservoirs and steam generators (281)	0.953
Mining of uranium and thorium ores (120)	0.952
Manufacture of products of wood, cork, straw and plaiting materials (202)	0.950
Fishing, aquaculture and service activities incidental to fishing (050)	0.949
Mining of non-ferrous metal ores, except uranium and thorium ores (132)	0.946
Manufacture of aircraft and spacecraft (353)	0.945
Mining and quarrying n.e.c. (142)	0.938
Manufacture of other fabricated metal products; metal working service activities (289)	0.936

Panel B: ...the share of female workers

Industry (ISIC3 Group)	Share of female workers
Manufacture of knitted and crocheted fabrics and articles (173)	0.679
Other service activities (930)	0.614
Manufacture of wearing apparel, except fur apparel (181)	0.567
Extraction and agglomeration of peat (103)	0.500
Farming of animals (012)	0.426
Manufacture of coke oven products (231)	0.375
Manufacture of optical instruments and photographic equipment (332)	0.372
Manufacture of other textiles (172)	0.337
Manufacture of other chemical products (242)	0.311
Spinning, weaving and finishing of textiles (171)	0.283

Source: 1993 Population and Household Census

Table A.2: The Effect of Trade Liberalization on Labour Outcomes by Informality

Panel A: Males' labor outcomes (ENAHO)									
	Employment	...In informal jobs	...In formal jobs	Log earnings	...In informal jobs	...In formal jobs	Log informal	...In small jobs	...In formal jobs
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
MTV	-0.0050	0.0000	-0.0048	-0.0336	-0.0340	-0.0242	-0.0104	-0.0136	-0.0047
	(0.0034)	(0.0047)	(0.0037)	(0.0164)**	(0.0165)**	(0.0248)	(0.0086)	(0.0096)	(0.0140)
FTV	-0.0060	-0.0047	-0.0014	-0.0319	-0.0432	0.0446	0.0110	0.0059	0.0233
	(0.0062)	(0.0086)	(0.0065)	(0.0317)	(0.0331)	(0.0557)	(0.0136)	(0.0154)	(0.0263)
Mean dep. var.	0.868	0.699	0.167	868.7	655.8	1701.6	48.44	47.34	52.66
N. districts	1249	1249	1249	1249	1247	1081	1249	1247	1081
N	170176	170176	170176	136401	108352	27749	136376	108341	27735
Panel B: Females' labor outcomes (ENAHO)									
	Employment	...In informal jobs	...In formal jobs	Log earnings	...In informal jobs	...In formal jobs	Log hours	...In formal jobs	...In formal jobs
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
MTV	-0.0023	-0.0046	0.0016	-0.0136	-0.0314	0.0454	-0.0164	-0.0243	0.0193
	(0.0068)	(0.0066)	(0.0017)	(0.0222)	(0.0259)	(0.0558)	(0.0161)	(0.0179)	(0.0270)
FTV	-0.0127	-0.0185	0.0036	0.0450	0.0332	0.0626	-0.0063	-0.0095	0.0450
	(0.0098)	(0.0098)*	(0.0032)	(0.0389)	(0.0447)	(0.1023)	(0.0231)	(0.0252)	(0.0655)
Mean dep. var.	0.667	0.577	0.0537	516.3	413.2	1240.4	43.71	42.49	48.53
N. districts	1249	1249	1249	1238	1236	787	1238	1236	787
N	181422	181422	181422	85728	69757	9371	85708	69749	9361
District and year FE	X	X	X	X	X	X	X	X	X
Region-year FE	X	X	X	X	X	X	X	X	X
Individual-level covariates	X	X	X	X	X	X	X	X	X
District-level covariates	X	X	X	X	X	X	X	X	X

Notes: Standard Errors clustered at the district level. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level. *MTV* stands for "male tariffs vulnerability", while *FTV* stands for "female tariffs vulnerability". Note that we have multiplied the coefficients on *MTV* and *FTV* by minus one to facilitate the reading of our tables as we are interested in the effect of a reduction in tariffs.
The set of initial conditions includes the district's population,the share of individuals with complete primary, high school and post-secondary education, the share of female employment, the share of employment destined to agriculture and fishing, mining, manufacture and construction. Each of these variables is interacted with linear and quadratic trends. **The set of individual-level covariates in Panel A** includes the age and years of education of both partners, the age of the female when she started living with her first partner, a dummy that captures whether the female speaks Spanish, the size of the household, the sex of the household head, and the altitude at which the household is located. **The set of individual-level covariates in Panel A and B** includes controls for age, age squared, years of education, years of education-squared, the size of the household, a dummy that captures whether the female speaks Spanish, and the sex of the household head. **The set of district-level covariates** includes a measure of vulnerability to foreign direct investment and a measure of vulnerability to exports. Details on the construction of these variables can be found in Appendix B.

Table A.3: The Effect of Trade Liberalization on Physical Intimate Partner Violence (using 2007 shares)

	Has suffered from PIPV in the last 12 months			
	(1)	(2)	(3)	(4)
MTV	0.0109	0.0108	0.0243	
	(0.0043)**	(0.0043)**	(0.0056)***	
FTV	0.0298	0.0272	0.0420	
	(0.0092)***	(0.0091)***	(0.0053)***	
TV				0.0264
				(0.0073)***
Mean dep. var.	0.154	0.154	0.154	0.154
N. districts	1044	1044	1044	1044
Adjusted R^2	0.0184	0.0284	0.0286	0.0285
N	50835	50558	50558	50558
District and year FE	X	X	X	X
Initial conditions	X	X	X	X
Individual-level covariates	X		X	X
District-level covariates	X			X

Notes: Standard Errors clustered at the district level. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level. PIPV stands for physical intimate partner violence. MTV stands for "male tariffs vulnerability", while FTV stands for "female tariffs vulnerability". Note that we have multiplied the coefficients on MTV, and FTV by minus one to facilitate the reading of our tables as we are interested in the effect of a reduction in tariffs.

The set of initial conditions includes the district's population,the share of individuals with complete primary, high school and post-secondary education, the share of female employment, the share of employment destined to agriculture and fishing, mining, manufacture and construction. Each of these variables is interacted with linear and quadratic trends. **The set of individual-level covariates** includes the age and years of education of both partners, the age of the female when she started living with her first partner, a dummy that captures whether the female speaks Spanish, the size of the household, the sex of the household head, and the altitude at which the household is located. **The set of district-level covariates** includes a measure of vulnerability to foreign direct investment and a measure of vulnerability to exports. Details on the construction of these variables can be found in Appendix B.

Table A.4: The Effect of Lower Input Tariffs on Physical Intimate Partner Violence

	Has suffered from PIPV in the last 12 months			
	(1)	(2)	(3)	(4)
MTV	0.0304	0.0289	0.0286	0.0336
	(0.0064)***	(0.0068)***	(0.0067)***	(0.0067)***
FTV	0.0192	-0.0207	-0.0164	-0.0135
	(0.0149)	(0.0324)	(0.0309)	(0.0307)
ITV	-0.0837			
	(0.0244)***			
$MITV$		-0.0808	-0.0811	-0.0868
		(0.0259)***	(0.0252)***	(0.0244)***
$FITV$		-0.0035	-0.0156	-0.0179
		(0.0631)	(0.0610)	(0.0609)
Mean dep. var.	0.154	0.154	0.154	0.154
N. districts	1066	1066	1066	1066
Adjusted R^2	0.0286	0.0186	0.0286	0.0286
N	51060	51343	51060	51060
District and year FE	X	X	X	X
Initial conditions	X	X	X	X
Individual-level covariates	X		X	X
District-level covariates	X			X

Notes: Standard Errors clustered at the district level. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level. PIPV stands for physical intimate partner violence. MTV stands for "male tariffs vulnerability", while FTV stands for "female tariffs vulnerability". ITV stands for "input tariffs vulnerability". Similarly, $MITV$ and $FIPV$ stands for "male input tariffs vulnerability" and "female input tariffs vulnerability". Note that we have multiplied the coefficients on MTV, FTV, ITV $MITV$ and $FIPV$ by minus one to facilitate the reading of our tables as we are interested in the effect of a reduction in tariffs.
The set of initial conditions includes the district's population,the share of individuals with complete primary, high school and post-secondary education, the share of female employment, the share of employment destined to agriculture and fishing, mining, manufacture and construction. Each of these variables is interacted with linear and quadratic trends. **The set of individual-level covariates** includes the age and years of education of both partners, the age of the female when she started living with her first partner, a dummy that captures whether the female speaks Spanish, the size of the household, the sex of the household head, and the altitude at which the household is located. **The set of district-level covariates** includes a measure of vulnerability to foreign direct investment and a measure of vulnerability to exports. Details on the construction of these variables can be found in Appendix B.

Table A.5: Sensitivity to initial conditions

	Has suffered from PIPV in the last 12 months					
	(1)	(2)	(3)	(4)	(5)	(6)
MTV	0.0304	0.0323	0.0304	0.0302	0.0310	0.0184
	(0.0064)***	(0.0065)***	(0.0064)***	(0.0064)***	(0.0066)***	(0.0072)**
FTV	0.0192	0.0235	0.0192	0.0122	0.0176	0.0209
	(0.0149)	(0.0168)	(0.0149)	(0.0158)	(0.0172)	(0.0122)*
Mean dep. var.	0.154	0.154	0.154	0.154	0.154	0.154
N. districts	1066	1066	1066	1066	1066	1066
Adjusted R^2	0.0286	0.0290	0.0286	0.0286	0.0291	0.0298
N	51060	51060	51060	51060	51060	51060
District and Year FE	X	X	X	X	X	X
Individual-level covariates	X	X	X	X	X	X
District-level covariates	X	X	X	X	X	X
Initial conditions: baseline	X		X	X		
Initial conditions: by sex		X			X	
Initial conditions: demographics			X		X	
Initial conditions: labor				X	X	
Region-year FE						X

Notes: Standard Errors clustered at the district level. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level. PIPV stands for physical intimate partner violence. MTV stands for "male tariffs vulnerability", while FTV stands for "female tariffs vulnerability". Note that we have multiplied the coefficients on MTV and FTV by minus one to facilitate the reading of our tables as we are interested in the effect of a reduction in tariffs.

Initial conditions: baseline. This set includes the population's size, the share of female employment, the share of employment destined to agriculture and fishing, mining, manufacture and construction. Each of these variables is interacted with linear and quadratic trends. **Initial conditions: by sex.** This set includes the share of male and female employment destined to agriculture and fishing, mining, manufacture and construction. We also consider the population's size and the district's aggregate share of female employment. Each of these variables is interacted with linear and quadratic trends. **Initial conditions: demographics.** This set includes the share of individuals that live together, the share of individuals that are Catholics, and the share of individuals that are Evangelists. We also consider the share of the population that speaks Spanish, the share of the population that is female, and the share of people younger than 18, aged between 18 and 40, and aged between 40 and 65. Each of these variables is interacted with linear and quadratic trends. **Initial conditions: labor.** This set includes the share of overall employment, and the share of workers employed in small and medium firms. We interact these variables with linear and quadratic trends. Each of these variables is interacted with linear and quadratic trends. **The set of individual-level covariates** includes the age and years of education of both partners, the age of the female when she started living with her first partner, a dummy that captures whether the female speaks Spanish, the size of the household, the sex of the household head, and the altitude at which the household is located. **The set of district-level covariates** includes a measure of vulnerability to foreign direct investment, a measure of vulnerability to exports, and a measure of vulnerability to input tariffs. Details on the construction of these variables can be found in Appendix B.

Table A.6: Autocorrelation of ΔMTV

Years	11-10	10-09	09-08	08-07	07-06	06-05	05-04	04-03	03-02	02-01	01-00	00-99	99-98
2011-2010	1.00												
2010-2009	-0.47	1.00											
2009-2008	0.28	-0.57	1.00										
2008-2007	0.40	0.57	0.09	1.00									
2007-2006	.	.	.	.	.								
2006-2005	-0.24	-0.32	-0.06	0.02	.	1.00							
2005-2004	0.52	0.51	-0.73	0.31	.	-0.16	1.00						
2004-2003	-0.70	-0.71	0.72	-0.32	.	0.27	-0.93	1.00					
2003-2002	0.70	0.71	-0.72	0.32	.	-0.26	0.93	-1.00	1.00				
2002-2001	-0.55	0.60	-0.65	0.34	.	-0.21	0.75	-0.82	0.83	1.00			
2001-2000	0.45	-0.56	0.86	0.20	.	0.20	-0.71	0.71	-0.71	-0.62	1.00		
2000-1999	0.50	0.58	-0.93	-0.04	.	0.06	0.71	-0.72	0.72	0.63	-0.93	1.00	
1999-1998	-0.56	-0.63	0.39	-0.19	.	0.29	-0.48	0.66	-0.67	-0.52	0.37	-0.39	1.00

Source: World Bank TRAINS, 1993 Population and Household Census, World Bank's Concordance Table

Table A.7: Autocorrelation of ΔFTV

Years	11-10	10-09	09-08	08-07	07-06	06-05	05-04	04-03	03-02	02-01	01-00	00-99	99-98
2011-2010	1.00												
2010-2009	0.16	1.00											
2009-2008	0.69	-0.08	1.00										
2008-2007	0.93	0.18	0.56	1.00									
2007-2006	.	.	.	.	.								
2006-2005	0.08	-0.22	-0.04	0.11	.	1.00							
2005-2004	0.47	0.10	0.06	0.75	.	0.06	1.00						
2004-2003	-0.51	-0.27	-0.02	-0.77	.	-0.07	-0.97	1.00					
2003-2002	0.51	0.28	0.02	0.77	.	0.07	0.97	-1.00	1.00				
2002-2001	0.38	0.20	-0.04	0.63	.	0.19	0.82	-0.85	0.85	1.00			
2001-2000	0.75	-0.02	0.99	-0.64	.	-0.01	0.15	0.13	0.13	0.05	1.00		
2000-1999	-0.69	0.09	-0.99	0.56	.	0.04	-0.06	0.02	-0.02	0.04	-0.99	1.00	
1999-1998	-0.11	-0.54	0.11	-0.13	.	0.11	-0.07	0.21	-0.21	-0.15	0.06	-0.12	1.00

Source: World Bank TRAINS, 1993 Population and Household Census, World Bank's Concordance Table

Table A.8: Controlling for previous shocks

	Has suffered from PIPV in the last 12 months					
	(1)	(2)	(3)	(4)	(5)	(6)
MTV	0.0304	0.0310	0.0291	0.0319	0.0322	0.0347
	(0.0064)***	(0.0069)***	(0.0068)***	(0.0069)***	(0.0069)***	(0.0071)***
FTV	0.0192	0.0219	0.0153	0.0083	0.0103	0.0123
	(0.0149)	(0.0167)	(0.0171)	(0.0187)	(0.0188)	(0.0189)
L1.*MTV*		-0.0035	0.0068	0.0046	0.0042	0.0038
		(0.0042)	(0.0053)	(0.0057)	(0.0056)	(0.0056)
L1.*FTV*		-0.0043	-0.0180	-0.0055	-0.0022	-0.0002
		(0.0173)	(0.0173)	(0.0200)	(0.0201)	(0.0201)
L2.*MTV*			0.0025	0.0076	0.0080	0.0061
			(0.0050)	(0.0069)	(0.0069)	(0.0071)
L2.*FTV*			0.0602	0.0451	0.0483	0.0460
			(0.0170)***	(0.0207)**	(0.0206)**	(0.0207)**
L3.*MTV*				-0.0057	-0.0051	-0.0129
				(0.0286)	(0.0299)	(0.0305)
L3.*FTV*				0.0439	0.0535	0.0494
				(0.0413)	(0.0422)	(0.0428)
L4.*MTV*					0.0134	0.0323
					(0.0174)	(0.0204)
L4.*FTV*					-0.1572	-0.1415
					(0.0839)*	(0.0874)
L5.*MTV*						0.0281
						(0.0143)**
L5.*FTV*						0.0052
						(0.0664)
Mean dep. var.	0.154	0.154	0.154	0.154	0.154	0.154
N. districts	1066	1066	1066	1066	1066	1066
Adjusted R^2	0.0286	0.0286	0.0288	0.0288	0.0289	0.0289
N	51060	51060	51060	51060	51060	51060
District and year FE	X	X	X	X	X	X
Initial conditions	X	X	X	X	X	X
Individual-level covariates	X	X	X	X	X	X
District-level covariates	X	X	X	X	X	X

Notes: Standard Errors clustered at the district level. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level. PIPV stands for physical intimate partner violence. *MTV* stands for "male tariffs vulnerability", while *FTV* stands for "female tariffs vulnerability". Note that we have multiplied the coefficients on *MTV* and *FTV* by minus one to facilitate the reading of our tables as we are interested in the effect of a reduction in tariffs.

The set of initial conditions includes the district's population,the share of individuals with complete primary, high school and post-secondary education, the share of female employment, the share of employment destined to agriculture and fishing, mining, manufacture and construction. Each of these variables is interacted with linear and quadratic trends. **The set of individual-level covariates** includes the age and years of education of both partners, the age of the female when she started living with her first partner, a dummy that captures whether the female speaks Spanish, the size of the household, the sex of the household head, and the altitude at which the household is located. **The set of district-level covariates** includes a measure of vulnerability to foreign direct investment, a measure of vulnerability to exports, and a measure of vulnerability to input tariffs. Details on the construction of these variables can be found in Appendix B.

Table A.9: The Effect of Trade Liberalization on Migration

	Has changed residence at least once ...			
	... ever	... since 1991	... in the last 5 years	... in the last year
	(1)	(2)	(3)	(4)
MTV	-0.0044	-0.0017	0.0131	0.0013
	(0.0123)	(0.0114)	(0.0075)*	(0.0043)
FTV	-0.0013	0.0152	0.0142	-0.0017
	(0.0236)	(0.0217)	(0.0151)	(0.0084)
Mean dep. var.	0.569	0.436	0.170	0.0512
N. districts	1066	1066	1066	1066
Adjusted R^2	0.0967	0.0825	0.0414	0.0163
N	51511	51511	51511	51511
District and year FE	X	X	X	X
Initial conditions	X	X	X	X
Individual-level covariates	X	X	X	X
District-level covariates	X	X	X	X

Notes: Standard Errors clustered at the district level. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level. MTV stands for "male tariffs vulnerability", while FTV stands for "female tariffs vulnerability". Note that we have multiplied the coefficients on MTV and FTV by minus one to facilitate the reading of our tables as we are interested in the effect of a reduction in tariffs.

The set of initial conditions includes the district's population,the share of individuals with complete primary, high school and post-secondary education, the share of female employment, the share of employment destined to agriculture and fishing, mining, manufacture and construction. Each of these variables is interacted with linear and quadratic trends. **The set of individual-level covariates** includes the age and years of education of both partners, the age of the female when she started living with her first partner, a dummy that captures whether the female speaks Spanish, the size of the household, the sex of the household head, and the altitude at which the household is located. **The set of district-level covariates** includes a measure of vulnerability to foreign direct investment, a measure of vulnerability to exports, and a measure of vulnerability to input tariffs. Details on the construction of these variables can be found in Appendix B.

Table A.10: The Effect of Trade Liberalization by Migration Status

	Has suffered from PIPV in the last 12 months			
	(1)	(2)	(3)	(4)
MTV	0.0312	0.0307	0.0305	0.0304
	(0.0064)***	(0.0064)***	(0.0064)***	(0.0064)***
FTV	0.0163	0.0173	0.0182	0.0195
	(0.0148)	(0.0148)	(0.0148)	(0.0149)
$M_{ever} \times MTV$	-0.0015			
	(0.0010)			
$M_{ever} \times FTV$	0.0071			
	(0.0031)**			
$M_{1991} \times MTV$		-0.0010		
		(0.0010)		
$M_{1991} \times FTV$		0.0084		
		(0.0031)***		
$M_{5yrs} \times MTV$			-0.0020	
			(0.0015)	
$M_{5yrs} \times FTV$			0.0056	
			(0.0043)	
$M_{1yr} \times MTV$				0.0023
				(0.0022)
$M_{1yr} \times FTV$				0.0089
				(0.0073)
Mean dep. var. (M=0)	0.143	0.141	0.148	0.152
Mean dep. var. (M=1)	0.162	0.170	0.183	0.179
Test Men	0.000	0.000	0.000	0.000
Test Women	0.116	0.0907	0.131	0.0904
N. districts	1066	1066	1066	1066
Adjusted R^2	0.0287	0.0288	0.0287	0.0286
N	51056	51056	51056	51056
District and Year FE	X	X	X	X
Initial conditions	X	X	X	X
Individual-level covariates	X	X	X	X
District-level covariates	X	X	X	X

Notes: Standard Errors clustered at the district level. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level. PIPV stands for physical intimate partner violence. MTV stands for "male tariffs vulnerability", while FTV stands for "female tariffs vulnerability". Note that we have multiplied the coefficients on MTV and FTV by minus one to facilitate the reading of our tables as we are interested in the effect of a reduction in tariffs.

The set of initial conditions includes the district's population,the share of individuals with complete primary, high school and post-secondary education, the share of female employment, the share of employment destined to agriculture and fishing, mining, manufacture and construction. Each of these variables is interacted with linear and quadratic trends. **The set of individual-level covariates** includes the age and years of education of both partners, the age of the female when she started living with her first partner, a dummy that captures whether the female speaks Spanish, the size of the household, the sex of the household head, and the altitude at which the household is located. **The set of district-level covariates** includes a measure of vulnerability to foreign direct investment, a measure of vulnerability to exports, and a measure of vulnerability to input tariffs. Details on the construction of these variables can be found in Appendix B.

Table A.11: The Effect of Trade Liberalization on Physical Intimate Partner Violence (PIPV)

	Has suffered from PIPV				Violence intensity		1st principal component	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
MTV	0.0209	0.0215	0.0351		0.0623	0.0940	0.0230	0.0342
	(0.0066)***	(0.0065)***	(0.0087)***		(0.0230)***	(0.0334)***	(0.0085)***	(0.0123)***
FTV	0.0358	0.0331	0.0498		0.0717	0.1168	0.0305	0.0457
	(0.0178)**	(0.0174)*	(0.0213)**		(0.0599)	(0.0705)*	(0.0222)	(0.0262)*
TV				0.0348				
				(0.0087)***				
Mean dep. var.	0.379	0.380	0.380	0.380	1.078	1.078	0.407	0.407
N. districts	1066	1066	1066	1066	1066	1066	1066	1066
Adjusted R^2	0.0369	0.0609	0.0610	0.0610	0.0845	0.0845	0.0862	0.0863
N	51515	51232	51232	51232	51232	51232	51232	51232
District and year FE	X	X	X	X	X	X	X	X
Initial conditions	X	X	X	X	X	X	X	X
Individual-level covariates		X	X	X	X	X	X	X
District-level covariates			X	X		X		X

Notes: Standard Errors clustered at the district level. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level. PIPV stands for physical intimate partner violence. *MTV* stands for "male tariffs vulnerability", while *FTV* stands for "female tariffs vulnerability". Note that we have multiplied the coefficients on *MTV* and *FTV* by minus one to facilitate the reading of our tables as we are interested in the effect of a reduction in tariffs. *TV* stands for tariffs vulnerability.

The set of initial conditions includes the district's population,the share of individuals with complete primary, high school and post-secondary education, the share of female employment, the share of employment destined to agriculture and fishing, mining, manufacture and construction. Each of these variables is interacted with linear and quadratic trends. **The set of individual-level covariates** includes the age and years of education of both partners, the age of the female when she started living with her first partner, a dummy that captures whether the female speaks Spanish, the size of the household, the sex of the household head, and the altitude at which the household is located. **The set of district-level covariates** includes a measure of vulnerability to foreign direct investment, a measure of vulnerability to exports, and a measure of vulnerability to input tariffs. Details on the construction of these variables can be found in Appendix B.

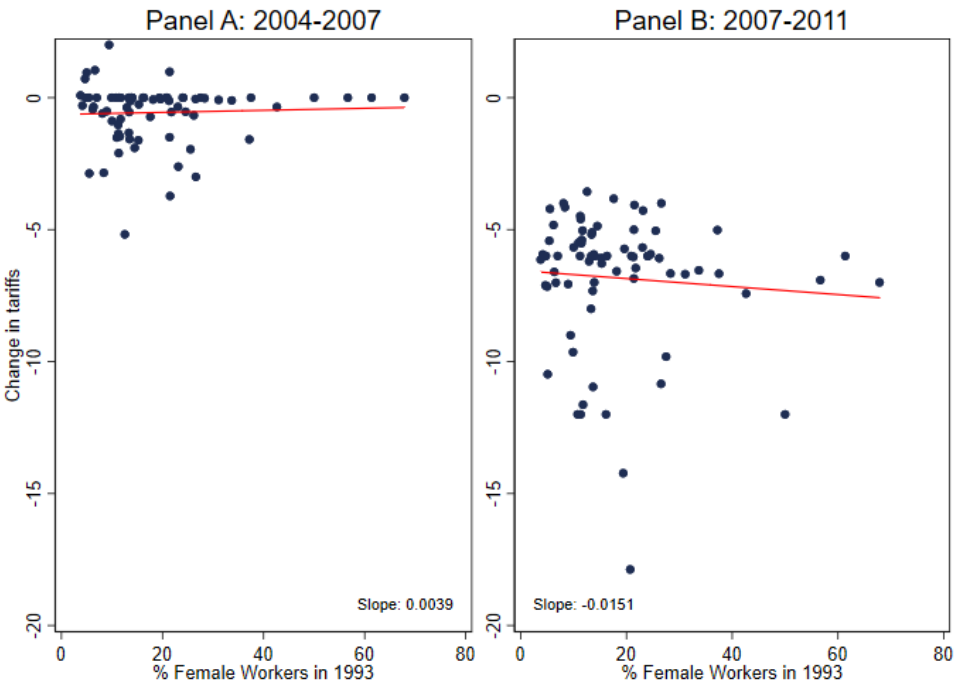
Table A.12: The Effect of Trade Liberalization on Physical Intimate Partner Violence, accounting for spillovers

	Has suffered from PIPV in the last 12 months					
	(1)	(2)	(3)	(4)	(5)	(6)
MTV	0.0129	0.0130	0.0304	0.0124	0.0122	0.0300
	(0.0046)***	(0.0045)***	(0.0064)***	(0.0046))***	(0.0045)***	(0.0065)***
FTV	-0.0022	-0.0037	0.0192	-0.0008	-0.0033	0.0225
	(0.0126)	(0.0121)	(0.0149)	(0.0129)	(0.0124)	(0.0151)
$NMTV$				0.0006	0.0013	0.0003
				(0.0037)	(0.0036)	(0.0036)
$NFTV$				-0.0124	-0.0145	-0.0131
				(0.0120)	(0.0117)	(0.0115)
Mean dep. var.	0.154	0.154	0.154	0.154	0.154	0.154
N. districts	1066	1066	1066	1066	1066	1066
N	51343	51060	51060	51343	51060	51060
District and year FE	X	X	X	X	X	X
Initial conditions	X	X	X	X	X	X
Individual-level covariates		X	X		X	X
District-level covariates			X			X

Notes: Standard Errors clustered at the district level. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level. PIPV stands for physical intimate partner violence. MTV stands for "male tariffs vulnerability", while FTV stands for "female tariffs vulnerability". Note that we have multiplied the coefficients on MTV and FTV by minus one to facilitate the reading of our tables as we are interested in the effect of a reduction in tariffs. $NMTV$ and $FMTV$ stand for male and female tariffs vulnerability at neighboring districts.

The set of initial conditions includes the district's population,the share of individuals with complete primary, high school and post-secondary education, the share of female employment, the share of employment destined to agriculture and fishing, mining, manufacture and construction. Each of these variables is interacted with linear and quadratic trends. **The set of individual-level covariates** includes the age and years of education of both partners, the age of the female when she started living with her first partner, a dummy that captures whether the female speaks Spanish, the size of the household, the sex of the household head, and the altitude at which the household is located. **The set of district-level covariates** includes a measure of vulnerability to foreign direct investment, a measure of vulnerability to exports, and a measure of vulnerability to input tariffs. Details on the construction of these variables can be found in Appendix B.

Figure A.1: Correlation between the share of female workers per industry in 1993 and tariff changes

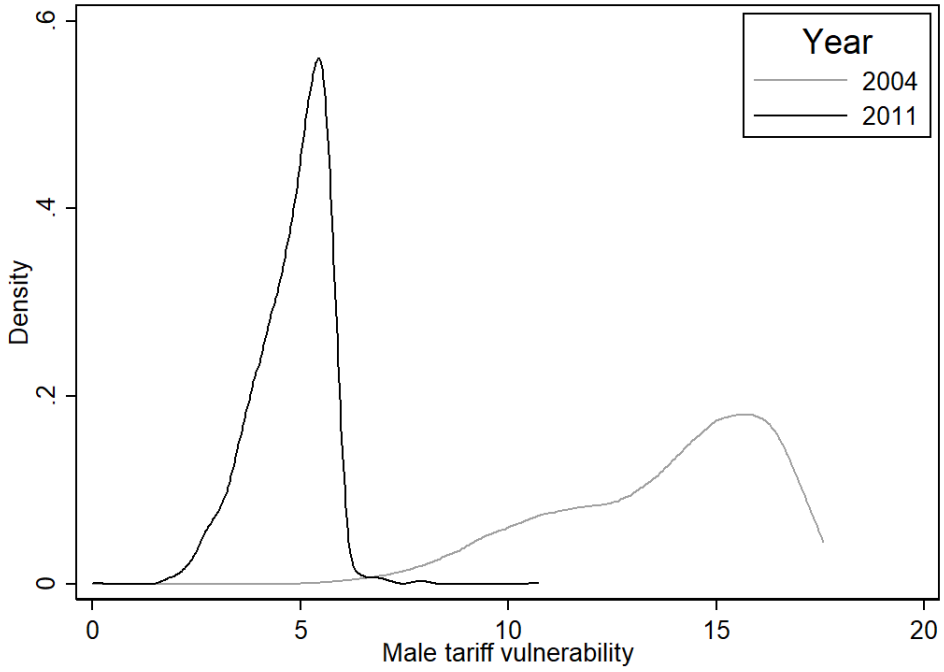


Source: World Bank TRAINS, World Bank's concordance tables, and 1993 Population and Household Census

Notes: Tariff changes were computed at the industry level using ISIC3 codes. Originally, industries were coded based on the Trade Classification Harmonized System (HS). We translated this classification into the International Standard Industrial Classification (ISIC3) using the concordance tables available online.

Figure A.2: Distribution of Male and Female Vulnerability in 2004 and 2011

Panel A: Male Tariff Vulnerability



Panel B: Female Tariff Vulnerability

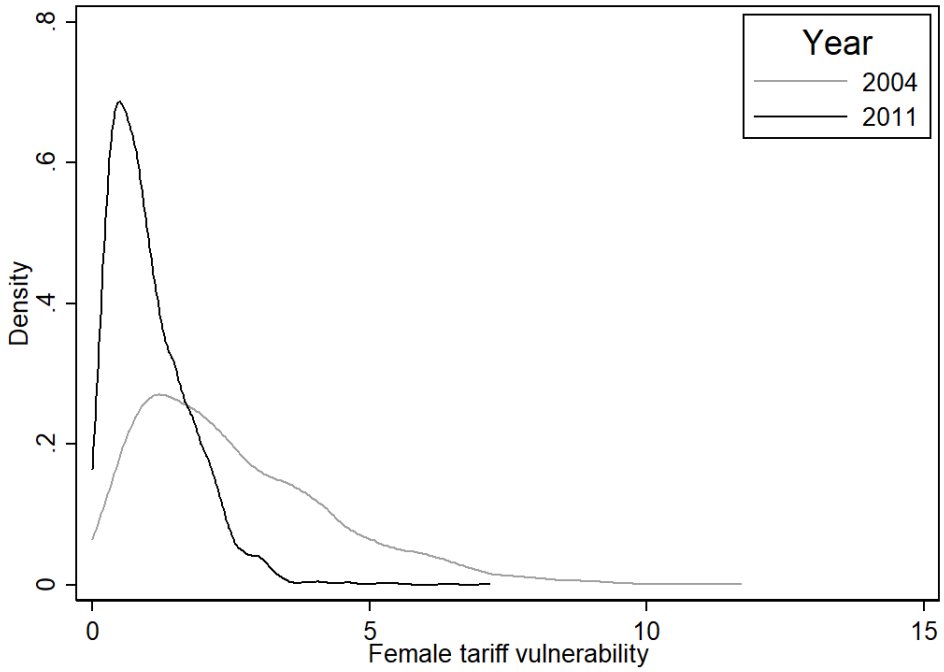
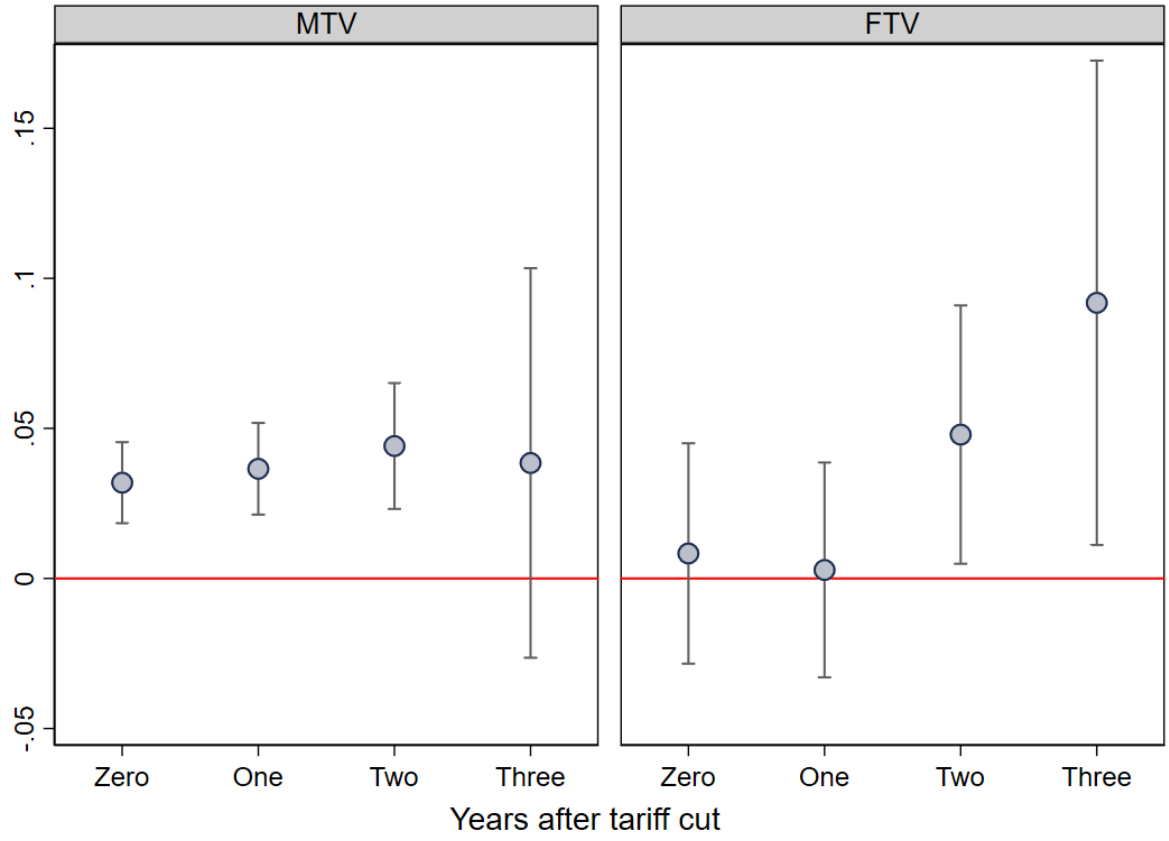


Figure A.3: Accumulated Effect of Trade Liberalization



Notes: Based on coefficients from column 6 in Table A.8. 95% confidence intervals. *MTV* stands for "male tariffs vulnerability", while *FTV* stands for "female tariffs vulnerability". Note that we have multiplied the coefficients on *MTV* and *FTV* by minus one to facilitate the reading of our tables as we are interested in the effect of a reduction in tariffs.

B Data Appendix

B.1 Individual-level Outcomes

Physical Intimate Partner Violence (Source: DHS)

Dummy: Takes the value of one for women that have ever been (i) pushed, shook or thrown something at, (ii) slapped or arm twisted, (iii) punched with fist or something harmful, (iv) kicked or dragged, (v) strangled or burnt, (vi) threatened with a knife/gun or other weapon, (vii) attacked with knife/gun or other weapon, (viii) forced to have sex when not wanted, and (ix) forced to make other sexual acts when not wanted, by her spouse. This variable is defined at the individual level and comes from the DHS surveys. We only consider women that were in a relationship when they were surveyed.

Intensity: Using each of the categories described above we compute dummies and a measure of intensity by adding them together. Hence, this measure goes from 0 to 9 and its average value is of 1.12 with a standard deviation of 1.76.

Principal component: Using the dummy variables described above we compute the first component from a principal component analysis, which accounts 41% of the total variance. Its average value is of 0.42 and has a standard deviation of 0.65.

Emotional Intimate Partner Violence (Source: DHS)

Dummy: Takes the value of one for women that have ever been (i) humiliated, (ii) threatened with harm, and (iii) threatened of going away from home or taking away the children by her spouse. This variable is defined at the individual level and comes from the DHS surveys. We only consider women that were in a relationship when they were surveyed.

Intensity: Using each of the categories described above we compute dummies and a measure of intensity by adding them together. Hence, this measure goes from 0 to 3 and its average value is of 0.50 with a standard deviation of 0.88.

Principal component: Using the dummy variables described above we compute the first component from a principal component analysis, which accounts 63% of the total variance. Its average value is of 0.29 and has a standard deviation of 0.51.

Controlling behavior (Source: DHS)

Dummy: Takes the value of one for woman reporting that her husband: (i) feels jealous when she talked with other men, (ii) accuses her of unfaithfulness, (iii) prohibit her to meet her girl friends, (iv) tries to limit her contact with family, (v) insists on knowing where she is, and (vi) withhold money from her because of lack of trust. This variable is defined at the individual level and comes from the DHS surveys. We only consider women that were in a relationship when they were surveyed.

Intensity: Using each of the categories described above we compute dummies and a measure of intensity by adding them together. Hence, this measure goes from 0 to 6 and its average value is of 1.50 with a standard deviation of 1.55.

Principal component: Using the dummy variables described above we compute the first component from a principal component analysis, which accounts 43% of the total variance. Its average value is of 0.58 and has a standard deviation of 0.62.

B.2 Individual-level controls

Summary statistics are shown in Table 1. "Age at first cohabiting" is the age in years when the respondent started living with her first partner. "Age" is the age in years. "Partner's age" is the age in years of each woman's partner. "Years of educ. (YoE)" is the education in years. "Partner's YoE" is the education in years of each woman's partner. "HH. head is women" is a dummy indicating if the household head is female. "Non-spanish" is a dummy that indicates whether a particular woman speaks Quechua, Aymara or any other language different from Spanish. "HH. size" is the number of individuals living in each woman's household. "Altitude" is the meters over the sea level at which the household is located. Source: DHS.

B.3 District-level variables

Vulnerability to Tariff Changes: For district "d" at year "t" we construct the following measure of vulnerability:

$$TV_{d,t} = \sum_{i}^{I} \frac{L_{1993,i,d}}{L_{1993,d}} \times tariff_{i,t} \tag{6}$$

where $L_{1993,i,d}$ is the number of workers in sector "i" in district "d" in 1993, $L_{1993,d}$ is the district "d"'s total number of workers in 1993, and $tariff_{i,t}$ is the Most-Favored-

Nation (MFN) tariff of industry "i" at year "t". To compute this variable we exclude the services sector altogether, as this has become standard practice in the literature. Finally, since the Census industry codes use the International Standard Industrial classification (ISIC 3) aggregated at the 3-digit level, whereas tariff data use the Trade Classification Harmonized System (HS), we convert HS codes into ISIC3 codes using the concordance tables available at the World Bank's website. This means that we are able to distinguish between $I = 76$ different industries.

Vulnerability to Tariff Changes by Sex: Refer to Section 3.2. In addition, since the Census industry codes use the International Standard Industrial classification (ISIC 3) aggregated at the 3-digit level, whereas tariff data use the Trade Classification Harmonized System (HS), we convert HS codes into ISIC3 codes using the concordance tables available at the World Bank's website. This means that we are able to distinguish between 76 different industries.

Input Tariffs: We follow Edmonds, et al., (2010) and use the 1993 Peruvian national input-output table, the 1993 national census, and MFN tariffs to construct this variable. For each industry i, we create an input tariff for that industry as the weighted average of tariffs on goods used for production in industry i (which is between parenthesis in equation 8). Such weights were constructed using industry j's share of industry i's total input cost, which we call $sc_{j,i,1993}$. Then, the district input tariff is computed by weighting industry i's input tariff by i's employment share in the district in 1993:

$$ITV_{d,t} = \sum_{i}^{I} \frac{L_{i,d,1993}}{L_{d,1993}} (\sum_{j}^{J} sc_{j,i,1993} \times tariff_{j,t}) \tag{7}$$

We do not exclude the services sector when computing the input tariff of industry i, $(\sum_j^J sc_{j,i,1993} \times tariff_{j,t})$ to reflect the fact that some services may be used in the production of output goods. However, we do not consider them for the set of output industries I. Once we account for the industries considered in I and in J, we are able to distinguish between 32 different industries. This is because the Peruvian input-output table features 45 sectors, hence we had to work at that level of aggregation.

Input Tariffs by sex: We compute the following measures of vulnerability:

$$(G)ITV_{d,t} = \sum_{i}^{I} \frac{L^G_{i,d,1993}}{L_{d,1993}} (\sum_{j}^{J} sc_{j,i,1993} \times tariff_{j,t}) \tag{8}$$

where $G = \{M, F\}$, M stands for male, and F stands for female. To construct (9) we apply the same considerations as in the computation of (8) above.

Foreign Direct Investments: $FDI_{d,t} = \sum_i^I w_{i,d} \times FDI_{i,t}$, where the employment in production sector i in district d as a share of total employment in the district is defined as $w_{i,J(i),d} \equiv L_{i,d,1993}/L_{d,1993}$. $FDI_{i,t}$ is the total foreign direct investments destined to sector i (sector codes aggregated to 2-digits). This data was compiled from the Private Investment Promotion Agency (Pro Inversión) and it distinguishes between 14 different sectors. We drop the services sector when computing $w_{i,d}$.

Exports: $Exports_{d,t} = \sum_i w_{i,d} \times Exports_{i,t}$, where $w_{i,d} \equiv L_{i,d,1993}/L_{d,1993}$ is the employment in production sector i in district d as a share of total employment in the district. $Exports_{i,t}$ is the total value of exports made by firms in sector i. This data was compiled from the Worlbank's TRAINS Data. We drop the services sector when computing $w_{i,d}$. Since the Census industry codes use the International Standard Industrial classification (ISIC 3) aggregated at the 3-digit level, whereas exports data use the Trade Classification Harmonized System (HS), we convert HS codes into ISIC3 codes using the concordance tables available at the World Bank's website. This means that we can distinguish between $I = 76$ different industries.

C Robustness and Threats to Identification

C.1 Distribution of employment across industries in 1993 vs 2007

One may be worried that the gender and industry composition of 1993 employment is very different to the composition in 2007, during the start of the reform, weakening the relationship between the trade reform and the experimented vulnerability of male and female workers. Then, it must be noted then that our results are very similar if we construct our measures of MTV and FTV using 2007 shares. We re-run our main specification using both historical and 12-month measures of violence and show the results in Table A.3. The main difference with respect our basic results is that in this specification the coefficient for FTV is statistically significant and larger (it becomes 4.20 in our preferred specification whereas it was 1.92 when using 1993 shares), while the coefficient on MTV is 20% smaller (it turns from 3.04 to 2.43).

C.2 Sex-specific vulnerability to input tariffs

Tariff cuts affect prices of both output goods and intermediate inputs. However, reductions in output and input prices may have opposing effects over households. Lower output prices may negatively impact certain households as some industries lose their protection to international competition. In contrast, lower input prices may positively affect households by increasing access to cheaper inputs and varieties of better quality (Amiti and Konings, 2007; Topalova and Khandelwal, 2011; Goldberg et al, 2010; Fieler et al, 2018). To the extent that these two effects are transmitted to within-household dynamics, we should observe opposite effects of output and input tariffs on the likelihood of intimate partner violence. This is an empirical question. Analogous conjectures have been tested in the literature for other outcomes. Kis-Katos and Sparrow (2015) find that decreases in output tariffs raise poverty, whereas decreases in input tariffs have the opposite effect. Similarly, Amiti and Cameron (2012) show that input tariff reductions contribute to the closure of the industrial skill wage gap in Indonesia, whereas Dix-Carneiro and Kovak (2015) show that cuts in output tariffs modestly widened the skill wage gap in Brazil.

In what follows, we test whether reductions in output and input tariffs have coefficients of opposite sign. We already have shown that reductions in output tariffs increases the likelihood of violence. To test whether input tariffs cuts reduce the likelihood of violence, we compute two additional measures of vulnerability to input tariffs (i.e. $MITV$ and $FITV$) by exploiting the pre-reform composition of male and female employment to weigh

input tariffs accordingly.[48] We estimate the following specification, which is analogous to equation (3):

$$\begin{aligned} y_{j,d,t} &= \alpha + \beta_1 MTV_{d,t} + \beta_2 FTV_{d,t} + \rho_1 MITV_{d,t} + \rho_2 FITV_{d,t} \\ &+ \alpha_d + \alpha_t + f(W_{d,1993}, trend, \gamma_1) + [\gamma_2^{'} X_{j,d,t} + \gamma_3^{'} Z_{d,t}] + \varepsilon_{j,d,t} \end{aligned} \tag{9}$$

where ρ_1 and ρ_2 measure the impact of input tariff reductions on the likelihood of physical intimate partner violence in more vulnerable districts relative to less vulnerable districts. This time, the set of time-variant district-level covariates, $Z_{d,t}$, does not consider input tariffs as they have already been included. Table A.4 shows our results. For ease of comparison, under column 1 we show the same estimation exhibited under column 3 of Table 2, including the coefficient on the overall measure of input tariffs vulnerability, which we used as a district-level covariate.

Column 1 suggests that reductions in input tariffs are negatively associated with increases in intimate partner violence. From column 2 to column 4, we disaggregate overall input tariffs by sex-predominance in industry as explained above. Column 4 is our preferred specification as it includes individual- and district-level covariates. MTV is still associated with increases in intimate partner violence, and FTV is statistically non-significant. For input tariffs, we find that larger reductions in MITV and FITV decrease violence, albeit only the coefficient on MTV is statistically different from zero. All in all, this analysis shows that our main results are robust to input tariff considerations and provides evidence in favor of the conjecture that the effects of output tariffs and input tariffs should be of opposite sign, which goes in line with findings in the literature.

[Table A.4 here]

C.3 Sensitivity to initial conditions

Whereas we employ a more general estimator, it still may be viewed as part of the family of shift-share identification instruments and in particular of Bartik estimators. Goldsmith-Pinkhman, et al., (2019) show that there are two set of alternative identification conditions in this context. First, if the number of industries is fixed, we require, conditional on observables, exogenous initial employment shares—those employed to construct the Bartik shock. This is because the two-stage least square estimator is equivalent to a generalized method of

[48] Please see Appendix B.

moments estimator using the initial shares as instruments.[49] The second alternative identification condition states that when the number of industries goes to infinity along with the number of locations, what matters is whether the tariff cuts are uncorrelated with the bias stemming from the initial shares. If this is the case, the presence of a large number of shocks causes the bias to average out. This latter identification condition seems to be more relevant in our context since (i) we employ a "large" number of industries (i.e. 76 different industries) and (ii) tariff cuts were a consequence of an unexpected and massive trade reform and do not seem to be correlated with pre-existing trends in our outcome of interest.

Even if the second condition does not hold in our context, we can test to some extent whether the first condition is satisfied. That is, we test whether the initial shares used to construct our measures of tariffs vulnerability are exogenous conditional on observables. If so controlling by different sets of initial conditions should not affect our estimates. We run specification (3) testing different sets of initial conditions, $W_{d,1993}$, interacted with linear and quadratic linear trends. In the first column of Table A.5 we report our baselines results. Recall that with this set, our intention was to capture broad employment structure of each district, which may be correlated with household dynamics. In the second column, we report our results when controlling the employment structure of each district but differentiating between male and female employment. In the third column, we consider variables related to household dynamics, demographics and social norms in addition to those considered in column 1: the share of individuals that live together, the share of individuals that are Catholics, and the share of individuals that are Evangelists, where other beliefs is the omitted category. To control for demographics at the district level we use the share of Spanish speakers, female, younger than 18, aged 18 to 40, aged 40 to 65; older than 65 is the omitted category. In column 4, we consider other variables linked to the structure of labor markets. These are the share of overall employment, and the share of workers employed in small and medium firms. In column (5) we consider all these variables together and in column (6) we replace them with region-year fixed effects. Results are robust in all specifications. This suggests that either our baseline specification is already partialling out the potential bias generated by the initial shares or tariff cuts are indeed uncorrelated with this potential bias.[50]

[Table A.5 here]

[49] One caveat is that not *every* share should be exogenous. Goldsmith-Pinkhman, et al., (2019) show that in practice just a small number of industries tends to account for a large portion of the identifying variation.

[50] Our findings are similar if we consider year dummies instead of linear and quadratic trends.

C.4 Conflating past and current shocks

In recent years shift-share instruments have been criticized. Jaeger, et al., (2018) argue that if it takes time for markets to adjust, shift-share instruments may conflate short-term responses and long-term effects. In this situation they suggest adding lagged measures of the instrument. However, to be able distinguish between short- and long-term effects, the variation of the instrument across time periods should be independent enough. In our context, the composition of industries affected by tariff reductions and their magnitudes vary across time, which is reflected in the fact that the auto-correlation in tariff changes across districts once we condition on district fixed effects seems to be low. Following Jaeger, et al. (2018) we calculate the serial correlation of the first difference of our variables of interest. Results are shown in Table A.6 and Table A.7. Compared to Jaeger et al. (2018) our serial correlations seem to be low. As such, we control for dynamic responses by adding lagged measures of MTV and FTV and include five lags.[51] Results are shown in Table A.8. Overall, β_1 and β_2, remain almost unchanged if we add these lags. In general coefficients on MTV tend to be larger as we control for the lagged structure, while coefficients on FTV tend to become smaller.

Furthermore, using coefficients in column 4 we can construct estimates for the accumulated effect of MTV and FTV over a period of three years.[52] These are shown in Figure A.3. The effect of MTV on physical intimate partner violence seem to be triggered contemporaneously with tariff cuts, and not after. Not surprisingly, after three years point estimates are not statistically different from zero although they remain fairly constant. For FTV we find that at first effects are not different from zero in statistical terms, but after two and three years the effect becomes positive.

[Table A.8 here]

[Figure A.3 here]

C.5 Selective migration

Selective migration may bias our results as it may affect the composition of victims between highly and lowly affected areas. For instance, if females that were already victims before

[51] Jaeger, et al., (2018) estimate mid-to-long-term impacts of immigration inflows employing data from different decades. We focus on short-term impacts as we exploit year-to-year changes. It is reasonable to expect more persistence as it takes time for markets to adjust.

[52] We use estimates from this column rather than column 5 or 6 because adding further lags seem to generate noisier results as suggested by the statistically significant coefficients on terms lagged five years. A priori, we cannot think in any reason why we would observe an effect after five years and not before.

liberalization migrate to highly affected areas, we will observe that trade liberalization is associated with a higher prevalence of violence. The opposite is true if female victims migrate from high to low vulnerable areas. This is because our dependent variable asks about past episodes of violence, including those that happened before liberalization.

However, given that we exploit year-to-year changes in tariffs vulnerability, migration may not be a problem. This is especially true if we consider that the short- and medium-term migration rates seem to be low. In fact, only 5.12% and 17.0% of our sample have changed their residence in the last year and in the last five years, which means that the share of people reallocating from one district to another is even lower, as these figures consider both inter-district and within-district reallocations. In fact, according to 2007 Census data, in the last five years, the inter-district migration rate of females between 15 and 49 years old was of 16.1% (and 15.9% in 2017 according to the 2017 Census).

Moreover, migration does not appear to be related to MTV and FTV. In Table A.9 we estimate equation (3) using dummies indicating if individuals have changed their residence as dependent variables. These are: (i) a dummy variable that takes the value of 1 whether the female "j" has at least changed her residence once during her lifetime, M_{ever}; (ii) a dummy whether she has changed her residence at least once since 1991, M_{1991}; (iii) a dummy whether she has changed her residence at least once in the last five years, M_{5yrs}; and (iv) a dummy whether she has changed her residence at least once in the last year, M_{1yr}. Our results show that MTV and FTV in general are not statistically associated with the probability of changing residence. Although, for 5-year migration in column (3) we do find a statistically significant result at the 10% for the coefficient on MTV. In conclusion, endogenous sorting does not seem to be a problem in our setting. This goes in line with Dix-Carneiro et al. (2015) as they show that migration may play a limited role as an adjustment mechanism to tariff cuts in Brazil.

[Table A.9 here]

We also evaluate if the effect of MTV is larger on the sample of migrants compared with the sample of nonmigrants. On the one hand, if female victims are migrating *from* districts in which male employment was hit harder by liberalization, we would be underestimating the effect of MTV on the whole sample. Hence, the effect on the sample of nonmigrants should be larger. On the other hand, if female victims are migrating *into* affected districts, we would be overstating the effect of MTV and the effect on the sample of nonmigrants should be smaller. The same logic applies for FTV.[53] To carry out this exercise, we estimate

[53] We should note that positive or negative selection into migration could also affect the magnitude of the effect of MTV. The direction of this bias is difficult to know a priori.

the following equation:

$$\begin{aligned} y_{j,d,t} &= \alpha + \beta_1 MTV_{d,t} + \beta_2 FTV_{d,t} + \alpha_d + \alpha_t + f(W_{d,1993}, trend, \gamma_1) + \\ &+ \delta_0 M_{i,t} + \delta_1 [M_{i,t} \times MTV_{d,t}] + \delta_2 [M_{i,t} \times FTV_{d,t}] \\ &+ [\gamma_2^{'} X_{j,d,t} + \gamma_3^{'} Z_{d,t}] + \varepsilon_{j,d,t} \end{aligned} \tag{10}$$

Where $M_{i,t}$ is one of the dummies defined above. The coefficients δ_1 and δ_2 measure the difference in the effect of trade liberalization between migrants and non-migrants. We show the results of estimating equation (6) in Table A.10. The row labeled 'Test Male' shows the p-value of testing the null hypothesis: $\beta_1 + \delta_1 = 0$. Likewise, the row labeled 'Test Female' shows the p-value of testing the hypothesis: $\beta_2 + \delta_2 = 0$. Table A.10 shows that the effect of MTV is similar among those that have changed their residence and those that have not. However, the effect of FTV tend to be bigger in the sample of migrants, suggesting that we may be overestimating the effect of FTV, which was already non-significant in our preferred specification anyway.

[Table A.10 here]