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THE DYNAMICS OF ABUSIVE RELATIONSHIPS*

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Abstract

Domestic abuse encompasses a range of damaging behaviours beyond physical violence, including economic and emotional abuse. This paper provides the first evidence on the impact of cohabiting with an abusive partner on victim's economic outcomes. In so doing, we highlight the systematic role played by economic suppression and coercive control in such relationships. Using administrative data and a matched control event study design, along with a within-individual comparison of outcomes across relationships, we document three new facts. First, women who begin relationships with (eventually) physically abusive men suffer large and significant earnings and employment falls immediately upon cohabiting with the abusive partner, which translates into a total household income loss. Second, this decline in economic outcomes is non-monotonic in women's pre-cohabitation outside options. Third, abusive men impose economic costs on all their female partners, even those who do not report physical violence. To rationalize these findings, we develop a new dynamic model of abusive relationships where women do not perfectly observe their partner's type, and abusive men have an incentive to use coercive control to sabotage women's outside options and their ability to later exit the relationship. We show that this model is consistent with all three empirical facts. We harness the model's predictions to revisit some classic results on domestic violence and show that the relationship between domestic violence and women's outside options is crucially linked to breakup dynamics.

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1 Introduction

Domestic abuse is a common yet complex phenomenon. Policymakers and advocates increasingly argue that domestic abuse is not restricted to physical violence but encompasses a range of damaging and coercive behaviours including economic and emotional abuse. Qualitative studies have documented economic control, sabotage, and exploitation as tactics employed by abusers (Postmus *et al.*, 2020; Stylianou, 2018; Sanders, 2015). Small surveys of victims consistently find that the majority of those who experience physical violence also had their economic empowerment undermined (Postmus *et al.*, 2012; Outlaw, 2009). Some survivors have described how physical violence began once they were economically dependent: "The first feature of control was financial. As soon as I had less economic independence that's when the [violence] started."[1]

The growing realization that economic control and sabotage might be important components of abusive relationships has led a number of countries to introduce "economic abuse" into their legal definition of domestic violence. For example, the United States Violence Against Women Reauthorization Act of 2022 includes behaviour that is "coercive, deceptive, or unreasonably controls or restrains a person's ability to acquire, use, or maintain economic resources" in its statutory definition.[2] Formally, economic abuse is considered as one dimension of a cluster of behaviours often referred to as "coercive control".[3] Charities and survivors groups are currently advocating for targeted economic support for survivors as well as reforms to the design of social support systems to reflect the risks that come with financial dependence on abusive spouses.[4]

Yet despite this increased policy importance, it is an open question whether a loss of economic independence and coercive control characterize abusive relationships *in general* and what this means for our understanding of domestic abuse and optimal policy. Indeed, the economics literature to date has largely focused on the causal channel running in the opposite direction,

[1] Survivor testimony as told to Surviving Economic Abuse (Abuse, 2018).

[2] See the United States Violence Against Women Reauthorization Act of 2021, 117th Congress. See also the UK's Domestic Abuse Bill 2021 in which economic abuse is included in the statutory definition of domestic violence as "any behaviour that has a substantial adverse effect on B's ability to: (a) acquire, use or maintain money or other property, or (b) obtain goods or services".

[3] See, for example, the UK Government's guidance on coercive control and financial abuse.

[4] See, for example, the evidence submitted to the UK's House of Lords report on the key working age benefit, Universal Credit (Committee, 2019).

i.e. on the impact of exogenous changes in economic conditions on the prevalence of physical domestic violence within couples.[5] For example, improvements in market-level wages and unemployment conditions for women relative to men have been found to lower the incidence of domestic violence in the United States and United Kingdom (Aizer, 2010; Anderberg *et al.*, 2016; Bhalotra *et al.*, 2021b). While this is vitally important research, it does not shed light on the role of economic abuse or capture the economic cost of cohabiting with an abusive spouse. Furthermore, changes in women's economic outside options can change women's incentives to form and dissolve relationships. If physically abusive relationships are pervasively accompanied by economic suppression, to what extent does an improvement in a woman's outside option make her more likely to leave an abusive partner versus reducing her exposure to violence within the existing relationship? Disentangling these channels is necessary to assess the relative importance of policy focused on within-relationship mediation compared to support for women exiting abusive matches.

In this paper, we fill this important gap in the literature. We use rich Finnish administrative data to provide the first empirical and theoretical analysis of the dynamic economic impacts of cohabiting with abusive men. Finland has been repeatedly criticized for its poor record on violence against women and girls (UN, 2014).[6] We link every police report in Finland to administrative records on employment, health, cohabitation status, and demographic characteristics. Our police data contains unique identifiers for both perpetrator and victim. This allows us to identify reports in which the victim and perpetrator were cohabiting at, or before, the time of an offense. Rather than treat reported physical violence as the event of interest, we consider women's outcomes for a long time series around the point of cohabitation with a partner who is later reported to be violent in that relationship. This innovation allows us to trace out the dynamic economic impacts of cohabiting with a partner who will later become physically abusive. In so doing, we are able to identify the economic shadow of physical abuse.

[5]The literature has also explored wider determinants of domestic violence including educational attainment (Erten and Keskin, 2018), culture (Tur-Prats, 2019, 2021), the tax and transfer system (Bobonis *et al.*, 2013), and lockdowns (Leslie and Wilson, 2020; Bullinger *et al.*, 2021; Hsu and Henke, 2021; Bhalotra *et al.*, 2021a).

[6]The UN report can be found here. We find that domestic violence is common in Finland: just over 1 out of every 35 cohabitation spells that started between 2006-2019 were associated with a police report of domestic violence.

We first estimate the impact of cohabiting with an abusive partner on women's labor market outcomes. In the five years before starting an abusive relationship, women's employment rates and annual earnings increase by 21% and 34% respectively. However, upon starting an abusive relationship, women's economic outcomes immediately deteriorate. Descriptively, women's employment rates *fall* in absolute terms by 4% and earnings by 6% in the two years following cohabitation with an abusive partner. These declines are in stark contrast to the growth in economic outcomes experienced prior to the relationship. There are two main threats to a causal interpretation of this result. First, a reverse causality argument: negative economic shocks may cause women to enter into "bad" matches rather than the relationship itself causing the decline in women's economic outcomes. Second, a "relationship effect" argument: women may reduce their labour force attachment in all relationships they form, even with partners who are not abusive.

To address reverse causality concerns, we use a matched difference-in-differences (DiD) design to analyze whether negative economic shocks at the market or firm level, or pre-cohabitation trends, are responsible for the deterioration of victims' labor market outcomes upon cohabiting with an abuser. With this strategy, we compare victims' outcomes to those of observationally identical women who both begin cohabitation spells with observationally identical partners at the same time. We find that women in abusive relationships have 6.4 percentage points lower employment rates compared to their matched control in the five years following cohabitation. This represents a 12% decline relative to victims' baseline employment rates. As with our descriptive results, this drop in employment appears immediately after cohabitation. Relative to their matched controls, victims' earnings fall by 26% compared to their average earnings in the three years before starting the relationship. Importantly, we find no statistically significant difference in local labor market measures of labor demand, nor firm and co-worker outcomes, between victims and their matched control suggesting that adverse shocks at the market and firm level are not responsible for the declines we estimate.

To analyze whether victims might reduce their labor market attachment in any relationship they form, we introduce a within-person across-relationship research design. Half of victims form other relationships in which no violence is reported over the time period we analyze. We use

victims' outcomes in their non-abusive relationships as an alternative counterfactual in a triple difference-in-differences design. If victims reduce their employment upon cohabitation in general, large differences in outcomes would also appear relative to their matched controls in their non-abusive relationships. We find, however, that victims' employment rates are significantly worse in their abusive compared to their non-abusive relationships. In the two years following cohabitation, victims' earnings are 20.2% lower in their abusive compared to non-abusive relationships relative to pre-cohabitation outcomes compared to their matched controls. This highlights that the fall in economic outcomes we document cannot simply be explained as a "victim" effect.

In our second set of results, we ask if men who are reported for physical abuse cause negative declines in the economic outcomes of all of their partners, not just for those partners in relationships characterized by reported physical violence. To do so, we identify women who form relationships with known perpetrators but where no physical violence is reported. We compare the economic outcomes of these women to their own matched control counterfactuals in a matched DiD design. We find significant declines in female labor market outcomes upon cohabiting with a domestic abuser even though these women do not report physical violence to the police at any point during or after the relationship. Women who do not report physical violence are, on average, more educated and have better outside options than women who report domestic violence to the police. These results are consistent with an abusive "type" of man who persistently suppresses his partners' outcomes, as opposed to just one bad match bringing out the worst in such men.

Finally, we analyze heterogeneity in the decline of victims' economic outcomes and the timing of reports of physical violence relative to the start of cohabitation. We find that women who report physical violence closer to the start of the relationship have the lowest economic outside options; victims with a first police report within three years of cohabitation are 9 p.p less likely to have a college degree and their pre-cohabitation employment rates are 7.9 p.p lower than women who first report violence later into a relationship. Importantly, we recover that the decline in women's economic outcomes upon cohabiting with an abusive spouse is non-monotonic in their outside option. Women with "intermediate" levels of education and pre-cohabitation earnings

suffer greater falls in employment rates and earnings than the least and most economically empowered women. This finding is hard to reconcile with a static model of exposure to physical violence in which the likelihood of abuse should decrease consistently in a woman's outside option.[7]

We use these empirical results to motivate a novel dynamic model of abusive relationships. Based on our second set of results described above, our model assumes that there are two types of men: abusive types, who gain utility from violence, and non-abusers. At the point of cohabitation, women have imperfect information about the man's type. In the first period, abusive men make a decision about whether to suppress an urge to be physically violent in favor of coercive control or non-abusive behaviour. Both violence and coercive control generate additional "household taxes" on female labor supply, which can cause women to reduce their labor market attachment, consistent with our first set of empirical results. Women update their belief about whether their partner is an abusive type on the basis of realized violence and the level of household taxes. At the beginning of the second period, women and men compare the expected utility of remaining in the relationship in the second period to what they could achieve if single. If either party expects to gain more when single, the relationship ends. Otherwise, the relationship continues into a second period and abusive men again make a decision about whether to suppress urges to be violent or controlling, and women make their labor supply decision.

We show that the model can generate a non-monotonic relationship between a woman's outside option and the prevalence of abuse (and associated suppression of female labor supply), consistent with our third set of empirical results. The inter-temporal linkages in the model create this non-monotonicity. Abusers have an incentive to suppress their urge for physical violence to conceal their type from "intermediate" outside option women who would leave such men if they knew they were abusive. Coercive control does not generate perfect learning about an abuser's type but suppresses female labor supply and reduces what a woman can earn as single outside the relationship in the second period. As a result, the probability of economic suppression and abuse in the early period can be non-monotonic and discontinuous in a woman's outside option:

[7] It is also inconsistent with a backlash model which would predict a monotonic increase in physical violence with women's outside options.

women with very low outside options are unlikely to leave an abusive relationship even if an abuser's type is revealed; women with very high outside options are likely to leave even if a partner is not abusive but the cost of suppressing their labour supply is very high. For intermediate outside option women, the dynamic incentives in the model are operative creating discontinuous jumps in incentives for suppression in the first period and the potential for a high degree of coercive control.

The model generates two channels through which high outside option women who cohabit with abusers can be less exposed to violence. First, the resource cost of abusing high outside option women is greater because any reduction in their labor supply results in a larger loss of income. This creates a greater incentive for abusive men to suppress the urge to be violent with such women. While we do not allow for endogenous changes in bargaining power (as this would act simply to reinforce our central mechanism while generating additional modeling complications), this is a similar type of "within-relationship" exposure argument that has been used to interpret much of the existing empirical results on the link between outside options and the prevalence of physical violence. However, in our model, a second "breakup" channel is also operative. With higher outside options women are more likely to leave an abusive partner and in so doing reduce their exposure to violence. The relationship dissolution channel has received relatively less attention in the empirical literature.

In the final part of the paper, we develop the implications of our model and empirical results for the existing literature and policy. In a consequential paper, Aizer (2010) shows that as women's outside options increase reported physical domestic violence decreases. This groundbreaking result has since been widely replicated, and we also replicate it in our context. We harness our unique data directly to test whether the breakup channel is a significant mechanism lying behind this result. We find that as women's outside options quasi-randomly increase, there is a substantial and significant increase in the rate of breakup amongst abusive couples, with no such impact on otherwise observationally similar non-abusive couples. On the other hand, relationship dissolution is less sensitive to changes in the outside option of abusive men compared to non-abusive men. This result points to the importance of programs that facilitate women's eco-

nomic independence and increase their ability to leave abusive relationships as key to reducing the prevalence of domestic violence.

This paper contributes to the existing economics literature on domestic violence by providing the first empirical evidence of the labor market consequences of cohabiting with an abusive spouse. There are a number of papers analyzing the impact of exogenous economic shocks to (market level) outside options on the prevalence of domestic violence (Aizer and Dal Bo, 2009; Heath, 2014; Anderberg *et al.*, 2016; Sanin, 2021) and on the impact of realized labor market shocks (Bhalotra *et al.*, 2021b) We show that it is vitally important to consider the opposite causal direction, namely that these relationships are independently characterized by economic suppression, which can itself make victims more vulnerable to abuse by reducing their ability to leave these relationships. Further, our results suggest that analyzing changes in women's economic outcomes only around the point of a report of physical domestic violence can understate the full economic costs of abusive relationships, as such estimates will fail to capture the labor market costs of coercive control.

Our empirical results also contribute to the applied literature on the impact of co-location with and physical exposure to abusive men. Stevenson and Wolfers (2006) find that the liberalization of U.S. divorce laws reduced spousal homicide and female suicide rates, partly through reducing the frictions to end abusive matches. A number of recent contributions have analyzed the impact of Covid-19 lockdown and social distancing restrictions on the prevalence and reporting of domestic violence (Leslie and Wilson, 2020; Arenas-Arroyo *et al.*, 2021; Berniell and Facchini, 2021; Hsu and Henke, 2021). In this paper, we show that abusive men consistently suppress female economic outcomes in the relationships that they form and that changes in women's outside options partly reduce their exposure to violence by increasing the likelihood of leaving abusive partners.

We supplement our new empirical results with a novel theoretical model of abusive relationships. There are a number of models of domestic violence, which can be roughly characterized according to whether violence is modeled as: (i) arising from bargaining between an abuser with a preference for violence and a victim (Aizer, 2010; Lewbel and Pendakur, 2019) (ii) a signal of dissatisfaction of some aspect of the relationship that cannot be perfectly communicated (Bloch

and Rao, 2002; Calvi and Keskar, 2021); (iii) driven by emotional cues that behavioral agents cannot perfectly suppress (Card and Dahl, 2011). The majority of this literature focuses on physical violence only, is static, and does not explicitly consider the relationship dissolution margin. It is the combination of these three features that makes our framework novel. First, we allow for abusers to engage in acts of coercive control as well as physical violence for both strategic ("instrumental") and expressive motivations. Second, our model is dynamic and the abuser's incentive to suppress an urge for violence can vary across the lifetime of the relationship. Third, we go beyond a within-relationship analysis to directly include the decision to break up or not in the model.

While there are a small number of contributions that include a subset of these mechanisms, there is no work that encompasses all of these channels. Anderberg and Rainer (2013) develop a theoretical model of economic abuse in which abusers engage in acts of economic sabotage to cause their spouse to specialize in home production. Anderberg *et al.* (2018) develops a dynamic model of women's behavior in violent relationships, including the breakup decision, where they learn their partner's type over time. Abuse is non-strategic in their framework and is modeled as arising probabilistically depending on an abusive man's age and his spouse's labor supply. Anderberg *et al.* (2016) develops a dynamic model where abusive men can expend effort suppressing the urge to be physically violent and women decide whether to stay in the relationship or not, but employment outcomes are exogenously determined by nature.

This paper proceeds as follows. Section 2 describes the unique panel data that we construct to study the dynamic evolution of women's economic outcomes in abusive relationships and presents descriptive results on the prevalence of domestic violence amongst cohabiting couples. Section 3 presents our main empirical results. Section 4 uses these results to motivate a dynamic model of coercive control and physical violence. Section 5 discusses the implications of our results for the interpretation of existing empirical results on the relationship between women's economic outside options and the prevalence of abuse. Section 6 concludes.

2 Data and Descriptive Statistics

Despite being one of the most advanced economies in the world with respect to women's education and political representation, women in Finland report one of the highest rates of domestic violence in the European Union. In 2014, 53% of Finnish women reported having been subject to domestic physical, sexual, or psychological violence since the age of 15 compared to the European Union average of 35% (Union, 2014). The country has also been criticized for being slow to develop support networks and womenâs shelters to assist women with abusive partners, and for its focus on mediation to resolve family issues involving intimate partner violence (Kotanen, 2018). A 2010 United Nations report was particularly condemning, stating that:

> "The Committee is concerned: (a) That insufficient resources have been allocated to the implementation of the Action Plan to Reduce Violence against Women 2010 -2015 and that the incidence of violence against women remains high ... (f) That the number and services of shelters, many of which [are] non-governmental organizations, are insufficient to meet the needs of women victims of violence; (g) That other services available for victims of gender-based violence, including rape crisis centres, 24 -hour helpline services and walk-in centres, are lacking."

To study the dynamics of abusive relationships and the impact of cohabitation with an abusive partner on victim's labor market outcomes, we construct unique administrative data from Finland. We observe all police reports filed between 2006-2019, which we merge with administrative data on labour market outcomes, marital status, and demographics. A police report is the first step in an investigation and occurs before a suspect is formally charged with a crime or a court case.[8] Importantly, the police data contains both perpetrator and victim unique national identifiers.

We perfectly link the set the police data with the Finnish Linked Employer-Employee Data (FLEED), i.e. a population register data containing annual income, annual employment, and demographic characteristics, using the unique perpetrator and victim identification numbers. We

[8]Reports can be filed online or in person at a police station. After an investigation, a suspect is charged only if the prosecutor considers that there is sufficient evidence to secure a conviction.

define a report as a domestic violence incident following official reporting by Statistics Finland. First, the crime recorded in the report must belong to a set of specified offenses that includes crimes like assault, sexual offenses, menace, and stalking.[9] Second, the victim and suspect must be cohabiting at the time of the offense, or they must have been cohabiting at some point in the five years before the offense.

However, in contrast to much of the preceding literature, the police report is not the event of interest in this paper. Rather, we use the linked police and FLEED data to identify couples where physical violence will occur at some point in their relationship history and then construct panel data on these couples' economic outcomes for a long time series around the point of first cohabitation. We are able to construct these couple-specific economic profiles because FLEED includes information on cohabitation status and economic outcomes for the universe of individuals living in Finland from age 15 until death, allowing us to identify the first year in which a couple starts living together. Thus, a key innovation of this paper is constructing a data set on economic outcomes for partners in relationships with police reports for domestic violence before and after cohabitation.

We make three core sample restrictions to arrive at the final set of couples we study. First, we restrict attention to domestic violence occurring in couples that start cohabiting in 2006 or later. This is so we can correctly identify any abuse during a cohabitation spell, given that we only observe police reports from 2006 onward. Second, we restrict our analysis to couples who experience male-on-female violence. While the majority of reports involve male-on-female violence, in 17% of cases the victim is a man and the suspect is a woman.[10] However, in 53% of couples in which female-on-male violence occurs, there is also a simultaneous report of male-on-female violence. Finally, victims and suspects must be aged between 21 and 65 at the point of cohabitation given our interest in labor market outcomes. As a way of assessing the population prevalence of police reports for domestic violence, we consider how many cohabitation spells that started in 2006 (the first year of our data and, therefore, unlikely to be subject to any report censoring issue) have at least one police report for domestic violence in their history. We find that 2.9% of

[9] A full list of crime codes can be found in Appendix C.

[10] Only a negligible proportion of reports involve same-sex violence.

cohabitations starting in this year, or 1 out of every 35 couples, were abusive.

Figure 1 summarises the key characteristics of our sample of police reports on domestic violence. Figure 1 Panel (a) gives the primary crime code associated with the offenses. 50% of reports are assaults, and a further 21% are petty assaults. The third most common crime category is "menace" (19%), which requires a perpetrator to intentionally cause fear of serious injury or death. Figure 1 Panel (b) gives the distribution of the number of police reports for domestic violence per abusive couple, i.e. per couple with at least one police report in their relationship history. 64% of couples have only a single police report in their history. However, the distribution of reports per couple is skewed; while the majority of couples file only a single report, there is a small number of couples with a very large number of domestic violence police reports. Figure 1 Panel (c) shows the number of years between when an abusive couple is first observed cohabiting and their first police report for domestic violence. 24% of couples experience their first police report in the first year that they are observed cohabiting, and 49% in the first two years. 51% of couples have their first report two years after the start of cohabitation or later. Thus, for many couples, there is a non-trivial gap between moving in together and a record of a violent incident.

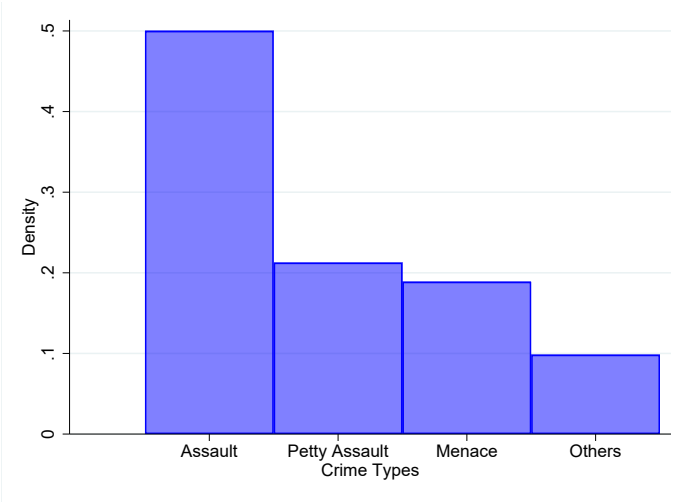
2.1 Demographic Characteristics of Cohabiting Couples

Table 1 reports summary statistics for all cohabiting men and women during our time period in the year before they first start cohabiting with a new partner. We divide the sample into the groups that we will exploit for our primary analysis. Amongst women, this is: (1) women in abusive relationships (victims); (2) women who cohabit with known abusers but who do not report domestic violence in their own relationship with such men (other cohabitees); (3) women who do not cohabit with known abusers (non-abusive). Amongst men, this is: (1) men who are abusive (perpetrators); (2) men who cohabit with victims but are not themselves reported as abusive (other cohabitees) (3) men who do not cohabit with victims (non-abusive).

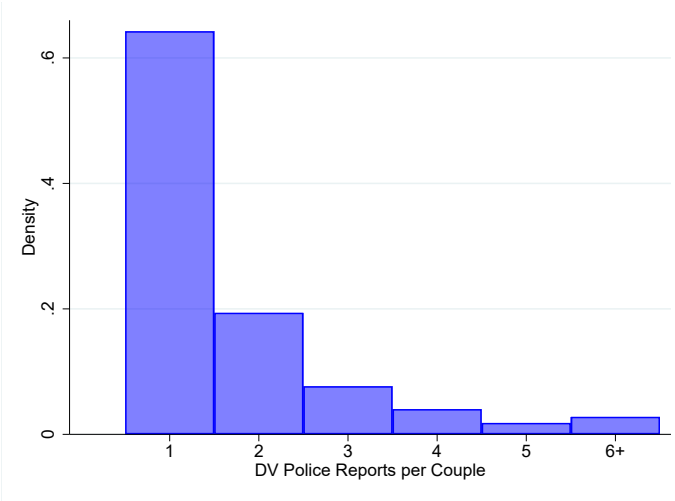
Table 1 shows that women and men who form relationships that are characterized by a police report for domestic violence are negatively selected on observables. They are less than half as likely to be college educated than those forming non-abusive relationships. The employment

Figure 1: Domestic Violence Police Report Descriptive Statistics

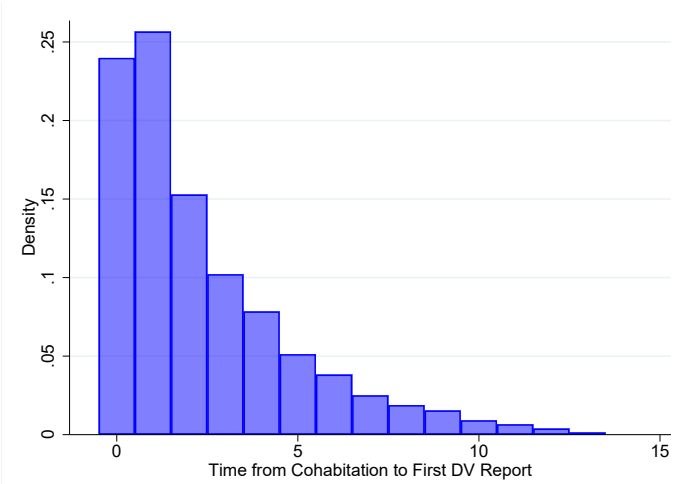
(a) Primary Crime Code



(b) Number of Reports per Couple



(c) Time from Cohabitation to First Report



Notes: Figure presents the histograms of (a) primary crime code; (b) police reports for domestic violence per couple; and (c) the number of years between when a couple is first observed cohabiting and the first police report for couples. All three panels restrict to couples with at least one police report for domestic violence (as defined in the text) in their relationship history. The sample is further restricted to couples that are first observed cohabiting after 2006, aged between 21-65 years old, and with police reports between a male perpetrator and female victim for domestic violence.

rates of both victims and perpetrators in the year before an abusive cohabitation starts are also substantially lower than those forming non-abusive relationships: 51% of victims and perpetrators are employed in the year before moving in with each other compared to 66% of those forming non-abusive relationships. Victims and perpetrators are both older and more likely to have children from prior relationships than those forming non-abusive relationships in the population at large.

Interestingly, abusive men are significantly more negatively selected on economic characteristics than other men with whom victims form relationships: the employment rates and earnings of men with whom victims cohabit but do not report any violence with are much closer to those of the characteristics of men forming non-abusive relationships with women who are never victims. Further, the women who cohabit with men who are abusive in another relationship but who do not file police reports for domestic violence themselves, are more positively selected on economic outcomes than victims. The employment rates and earnings of such women are much closer to those who cohabit with men who never have a police report for domestic violence filed against them.

3 The Economic Impacts of Cohabiting with an Abusive Partner

In this section, we establish the impact on women's economic outcomes of cohabiting with an abusive partner. First, we show that women's labour market outcomes immediately deteriorate upon entering a cohabiting relationship with a partner where a police report for domestic abuse will be filed later in the relationship. This deterioration in economic outcomes is unique to the abusive partner; women's labour market outcomes do not exhibit the same deterioration after starting cohabitation in her non-abusive relationships. Second, we find that on average all women who form relationships with abusive men experience negative labour market outcomes from cohabiting with them; in particular, this remains true for women who cohabit with these men but no police report is filed during the relationship. Third, we find that the decline in women's labor market outcomes is non-monotonic with respect to their pre-cohabitation economic empowerment in a way that is hard to rationalize by traditional theoretical models of domestic abuse.

Table 1: Demographic Characteristics of New Cohabitees

	Women			Men		
	Victims (1)	Other Cohabitees (2)	Non-Abusive (3)	Perpetrator (4)	Other Cohabitees (5)	Non-Abusive (6)
Age	31.43	32.36	29.34	33.73	34.08	31.14
	(10.70)	(10.93)	(10.61)	(10.57)	(10.71)	(10.91)
College	0.10	0.15	0.23	0.12	0.11	0.18
	(0.295)	(0.354)	(0.421)	(0.320)	(0.313)	(0.382)
High School	0.53	0.58	0.60	0.47	0.57	0.60
	(0.499)	(0.494)	(0.491)	(0.499)	(0.495)	(0.489)
Dropouts	0.38	0.28	0.17	0.42	0.32	0.22
	(0.485)	(0.448)	(0.379)	(0.493)	(0.467)	(0.414)
Employed at t-1	0.51	0.64	0.66	0.51	0.62	0.65
	(0.500)	(0.481)	(0.473)	(0.500)	(0.486)	(0.476)
Earnings at t-1	12137.22	16315.93	15951.51	16549.48	20437.99	21660.66
	(14520.2)	(16767.9)	(16352.8)	(19906.7)	(20481.1)	(23270.6)
No. Children	1.06	0.89	0.47	0.86	0.78	0.45
	(1.382)	(1.267)	(0.989)	(1.252)	(1.213)	(0.976)
Speak Finnish	0.90	0.91	0.90	0.85	0.89	0.88
	(0.304)	(0.286)	(0.300)	(0.355)	(0.317)	(0.330)
Prior Violent Crimes	0.09	0.05	0.01	0.77	0.31	0.07
	(0.747)	(0.627)	(0.266)	(3.169)	(2.127)	(0.964)
Observations	13767	8088	609872	13767	9580	609872

Notes: The data consists of all DV couples defined as cohabiting couples who appear in the police data for a domestic violence report, from 2006-2019. Non-DV couples consist of all other cohabiting couples in the same time period. Other cohabitees consist of other men (women) that victims (perpetrators) also cohabit with at some point in the sample period. College indicates the share with a bachelor's degree or higher. Note that the majority of those who go on to college in Finland also receive a master's degree. High school consists of those who graduate with either a vocational-secondary or academic-secondary degree as their highest educational degree. Prior violent crimes consist of all prior police reports for violent crimes and does not condition on arrests or convictions.

3.1 Victims' Labour Market Outcomes Fall After Cohabiting with an Abusive Partner

We start by documenting the employment impacts on women from cohabiting with partners who later appear in the police data for one (or more) instances of physical abuse against them. Figure 2 (a) and (b) shows the average employment rate and earnings respectively for women who start an abusive cohabitation spell at time zero for the five years before and after moving in with an abusive partner. As was clear from Table 1, pre-cohabitation employment rates and earnings are low for victims, although their labor market outcomes are improving in the years leading up to the start of the new relationship. In the five years before starting an abusive relationship, women's employment rates and annual earnings *increased* by 21% and 34% respectively. However, upon cohabitation, victim's economic outcomes immediately deteriorate. Descriptively, women's employment rates *fall* in absolute terms by 4% and earnings by 6% in the two years following cohabitation with an abusive partner.

These descriptive results might not capture the causal effect of cohabiting with an abusive partner for a number of reasons. First, there is a negative selection on observables for women who form abusive relationships. This selection suggests that cross-sectional comparisons could overstate the employment and earnings costs of forming abusive relationships if these women's labour market attachment is weak in general. Women who form abusive relationships, because they initially make a lower income and are less likely to be employed, may be more likely to drop out of employment in general, and not due to any action on the part of the abusive partner.

To address these types of concerns, we estimate a matched difference-in-differences design which allows us to carefully compare the outcomes of individuals who cohabit with a partner at the same time and are otherwise observationally identical before the cohabitation event, but one cohabits with an eventually physically abusive partner while the other relationship never results in a police report for domestic violence.

We identify women who are observationally identical to victims according to their key economic and demographic characteristics before they both start a cohabitation spell. Formally, we perfectly match on employment status in the year before cohabitation (-1) and, for women who are employed at -1, whether their earnings are above or below median. Within this set, we iden-

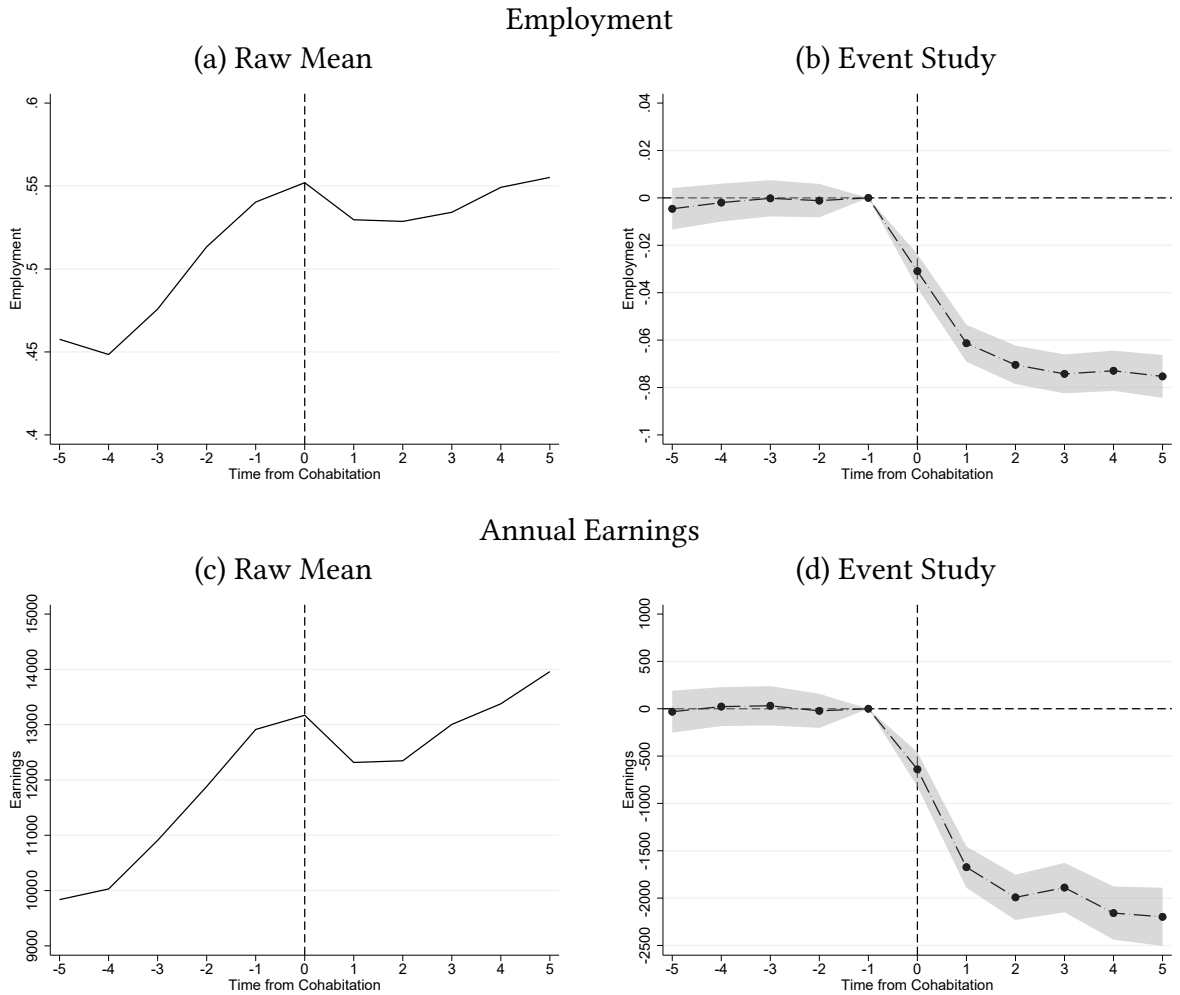
tify a victim's five nearest neighbor matches on the year of cohabitation, age, education, violent crime reports, their earnings and employment status in the four years prior to cohabitation, and their male partner's employment, earnings, age, education and violent crime reports in the year before cohabitation. This exercise leaves us with five matches for the victim who start a new relationship at the same time, who appear identical on observables in the years prior to the year in which cohabitation occurs, and who start a relationship with an observationally identical man, but who do not experience a police report for domestic violence at any point in their relationship history.

With matched control and "treatment" observations in hand, we estimate the following regression model:

$$Y_{it} = \sum_{j=-5, j\neq -1}^{5} \left(\delta_j D_{i,j} + \alpha_{m(i),j}\right) + \gamma_t + \epsilon_{it} \tag{1}$$

where Y_{it} represents the outcome of interest for woman i in year t. $D_{i,t-j}$ is an indicator variable for the treatment (being in an abusive relationship) in year j since the start of cohabitation. $\alpha_{m(i),j}$ give the set of match-by-time from start of cohabitation fixed effects. δ_j are the coefficients of interest, identifying the effects of being in an abusive relationship relative to the matched counterfactual in a non-abusive relationship. Given the inclusion of $\alpha_{m(i),j}$, δ_j is identified by variation between victims and their matched controls in the time period of interest. We omit the year prior to the event ($j = -1$), which means that all estimates of δ_j are relative to the year before the incident. Additionally, we include year fixed effects, γ_t. Standard errors are clustered at the match level.

Figure 2: Employment Impact of Cohabiting with an Abusive Partner



Notes: Panels (a) and (b) report descriptive and estimated impacts of cohabiting with a partner where there will eventually be a police report on employment of the female victim. The estimates in Panel (b) use the matched control to identify effects 5 years before and 5 years after cohabitation, estimating equation 1 (see main text for additional details), and with all estimates relative to the year before cohabitation which is omitted. Year 0 denotes the year at which cohabitation began. Panel (c) and (d) report the descriptive and estimated impacts of cohabiting with a partner where there will eventually be a police report on the earnings of the female victim. Employment indicates whether an individual was employed during the last week of the year (the reference week). Earnings are the sum of all taxable labor earnings during the preceding calendar year. This includes both wage and salary income, but also self-employment income, and is deflated to 2013 euros. Standard errors are clustered at the individual level.

We report results in Figure 2 (c) and (d) for employment and annual earnings respectively. The figures depict flat pre-trends prior to cohabitation. Directly after starting a cohabitation spell with an abusive partner, women's employment drops relative to their matched controls. This drop in employment is persistent: by five years after cohabitation, these women are on average 6.4 percentage points less likely to be employed compared with their matched controls

who do not experience a police report for domestic violence within their relationships. This represents a 12% decline relative to their baseline employment rates. Turning to earnings, victims' annual earnings are €1750 lower per year in the five years after cohabitation with an abusive partner relative to their matched controls. Appendix Figure A.1 shows that, relative to average earnings in the three years before cohabitation, this fall represents a 26% decline. Thus, relative to observationally identical women who start relationships with observationally identical men, victims of domestic abuse suffer significant drops in their labor market attachment immediately upon cohabitation. These effects are especially large given victims' low employment rates and earnings pre-cohabitation.

While our focus in this paper is on victim outcomes, we also consider whether the decline in female labor supply is compensated for by an increase in the labor supply of her abusive partner, thereby keeping overall household income constant. To do so, we sum spousal annual incomes to form a measure of household earnings for victims and their matched controls. Appendix Figure A.2 shows that while the trend in total earnings is indistinguishable between abusive couples and their matched controls prior to cohabitation (despite us not matching on male economic outcomes before $t = -1$), directly after cohabitation the total incomes of abusive couples diverge significantly. Thus, the decline in female labor supply is not matched by an increase in labor market participation amongst abusive men.

Robustness: Reverse Causality Our matched DiD strategy allows us to verify whether the declines in victims' economic outcomes are driven by market or firm-level shocks, rather than by the cohabitation event. For example, if there are mass layoffs in the women's industry or her firm, then she might be more likely to cohabit with a lower quality (and potentially abusive) partner, and also more likely to become unemployed. To establish robustness to local labor market-level shocks as an alternative possible explanation for our results, we construct the Bartik measure of (exogenous) female local labor demand. Specifically, we construct an index for average employ-

ment for women in a region r with education e at time t as:

$$\bar{Y}_{ret} = \sum_j \gamma_{re0j} Y_{\neg r,etj} \tag{2}$$

where j denotes industries. If victims disproportionately start relationships in markets characterized by negative labor market shocks, we should see that their index of labor demand is consistently lower than that of their matched control.

We also test the possibility that women who enter abusive relationships do so as a result of negative shocks to their firms. For example, a woman's firm might downsize or significantly cut pay, driving her to move in with a potentially abusive partner while concurrently causing a deterioration in her labour market outcomes. To test this, we examine the average earnings, turnover, and total number of employees (firm size) for the women in abusive relationships who were employed prior to starting an abusive relationship and their matched controls before and after cohabitation as the outcome of interest in Equation 1. Further, in Appendix Table A.1, we analyze employment outcomes relative to matched controls for the (selected) sample of victims who remain employed at $t = 0$ and, therefore, for whom we can eliminate job loss as a potential explanation for starting an abusive relationship.

Table 2 gives the stacked DiD results for these exercises. We find no evidence of differential labor market nor firm-level shocks for the women who begin a cohabitation spell with an abusive partner relative to their matched controls. We estimate precise zero effects on our Bartik index of labor demand, and average earnings, turnover, and firm size for those in employment pre-cohabitation relative to their matched control. Note that we do not match on these outcomes and so these results are not by construction. We further find significant negative declines in employment and earnings for women who remain employed for the first year of cohabitation (Appendix Table A.1 Column 3). Based on this evidence, we conclude that it is the start of the abusive relationship itself that causes the stark and immediate declines in the woman's labor market outcomes at cohabitation, rather than some other confounder at the market or firm level driving both the cohabitation choice and the deterioration in labor market outcomes.

Table 2: Robustness Checks for Reverse Causality

	(1) Bartik Index	(2) Earnings	(3) Firm Size	(4) Turnover
Abusive	0.0003	-12.9972	-18.0727	0.0012
	(0.0006)	(92.83)	(10.46)	(0.0026)
Observations	709484	318812	318812	303348
Dependent Mean	.647	23228	469	.282
Fixed effects				
Year	✓	✓	✓	✓
Time since cohabit × Match	✓	✓	✓	✓

Notes: Table reports difference-in-differences estimates from Equation (1) collapsed into a pre- and post-period. Data is from police reports linked to FLEED register data. The counterfactual observations are given by victims' matched controls. The sample is restricted to those employed at $t-1$ in columns (2)-(4). The Bartik index in (1) is constructed as in equation 2. Average earnings are the mean year-end earnings of all employees in the firm. Firm size is given by the number of year-end employees in the firm. Turnover is the share of employees leaving each year as a fraction of total employees in the plant. Standard errors are clustered at the individual level.

Robustness: Relationship Effect Women who cohabit with abusive partners might always experience a deterioration in their labor market outcomes upon moving in with a partner, even if their partner is never abusive. This concern might not be addressed by our matched difference-in-differences design if this relationship effect is an unobservable personality trait. To test this possibility, we leverage the fact that we can observe other cohabitation spells for victims where no domestic violence is reported in our data. This richness in the data allows us to compare a victim's outcomes in her abusive relationship to those in her non-abusive relationships. If we find an employment impact of a similar magnitude using this alternative counterfactual, such a result would confirm that the employment drop upon cohabitation we documented above is an abusive relationship effect as opposed to something that characterizes the victim's behavior upon starting relationships in general.

As victims are, by definition, different ages and have different relationship histories in their non-abusive relationships compared with their abusive relationships, we consider a triple difference-in-differences design. That is, we compare the difference in employment outcomes for victims relative to their matched controls in their abusive and non-abusive relationships. Formally, we

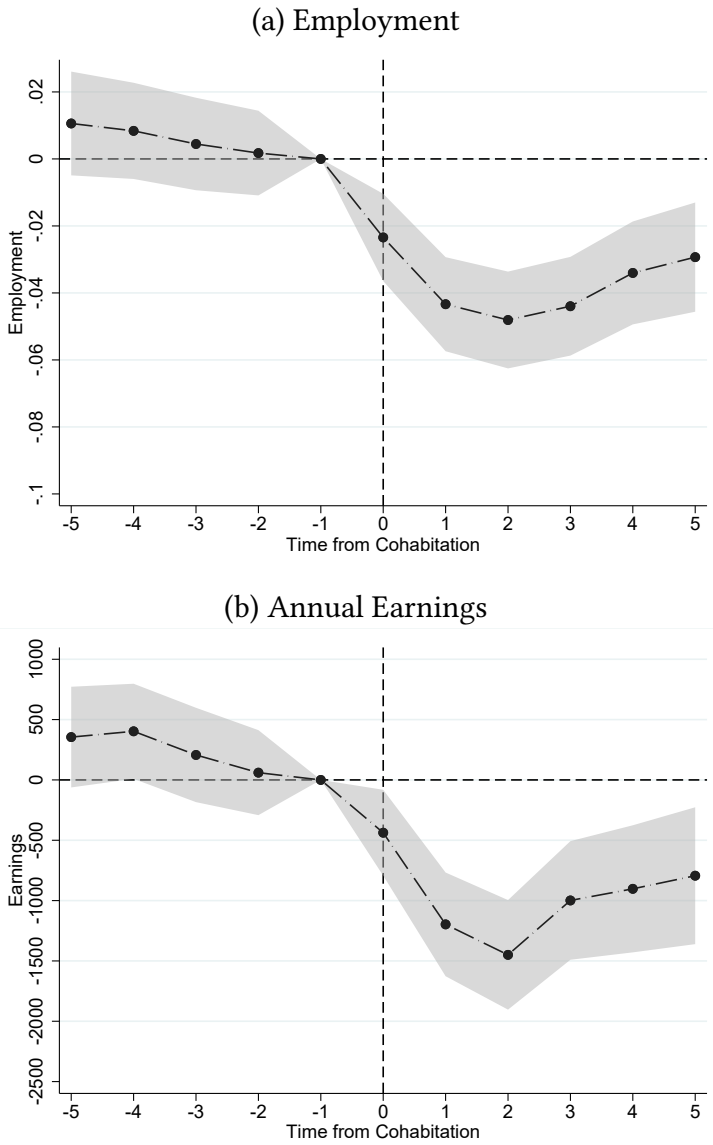
estimate the following event study specification:

$$Y_{it} = \sum_{j=-5, j\neq -1}^{5} \left(\delta_j \left(V_{i,j} \times A_{i,j}\right) + \omega_j V_{i,j} + \mu_j A_{i,j} + \alpha_{m(i),j} + \right) + \gamma_t + \epsilon_{it} \tag{3}$$

where $A_{i,j}$ is an indicator for whether an individual is a victim or a matched control to the victim in her abusive relationship and $A_{i,j}$ is an indicator for whether an individual is a victim in at least one of her relationships. Note that $(V_{i,j} \times A_{i,j})$ is equivalent to $D_{i,j}$ in Equation 1.

We report results from this exercise in Figure 3. This confirms an immediate decline in victims' economic outcomes upon starting an abusive relationship relative to outcomes in her non-abusive relationships. If victims always reduced their labor market attachment when forming relationships relative to observationally identical women, the coefficients reported in Figure 3 would be zero. This result suggests that it is cohabiting with a partner that will eventually result in a police report for physical abuse that leads to the deterioration in her economic outcomes, and not relationships *in general* that lead her to cut back on her labour supply.

Figure 3: Employment and Earnings Impacts of Cohabiting with an Abusive Partner: Triple Difference Design



Notes: Panel A (B) reports estimates of equation 3 comparing the employment (earnings) outcomes of women in abusive relationships to their non-abusive relationships, relative to their matched controls in a triple difference-in-differences design. Employment is a dummy indicating if the woman was employed before the relationship started. Earnings consist of all taxable labor market income each year and are measured in 2013 Euros. Standard errors are clustered at the individual level.

Robustness: Fertility Women who enter abusive relationships may be more likely to have children after cohabitation. If these women are pregnant and the pregnancy causes them to move in with their partners, and then the birth of the child causes both the physical abuse (due to the additional stress on the partnership) and the drops in employment (due to a child penalty effect

(Angelov *et al.*, 2016; Kleven *et al.*, 2019; Andresen and Nix, 2022)), then the economic declines we document above could be entirely due to children and not driven by abusive behavior by one's partner.

To test this possibility, Appendix Table A.1 reports stacked DiD results for victims relative to their matched controls for the sub-sample of women who have no change in their completed fertility between $t = -1$ and $t = 2$. While this is a selected sample, it allows us to confirm whether childbirth is driving our primary result. We find that our main results remain. There is almost no difference in the point estimates of our primary outcomes: we estimate treatment effects of -0.0637 and -0.2295 on employment and relative earnings respectively in the five years following cohabitation for the group of women with no change in completed fertility, compared to -0.0638 and -0.2566 in our primary specification. We therefore conclude that while fertility is likely an important component of abusive relationships (and indeed all relationships), changes in fertility do not explain the impacts on women's labor supply from cohabiting with an abusive partner.

3.2 Labor Market Outcomes Deteriorate for All Female Partners of Abusive Men

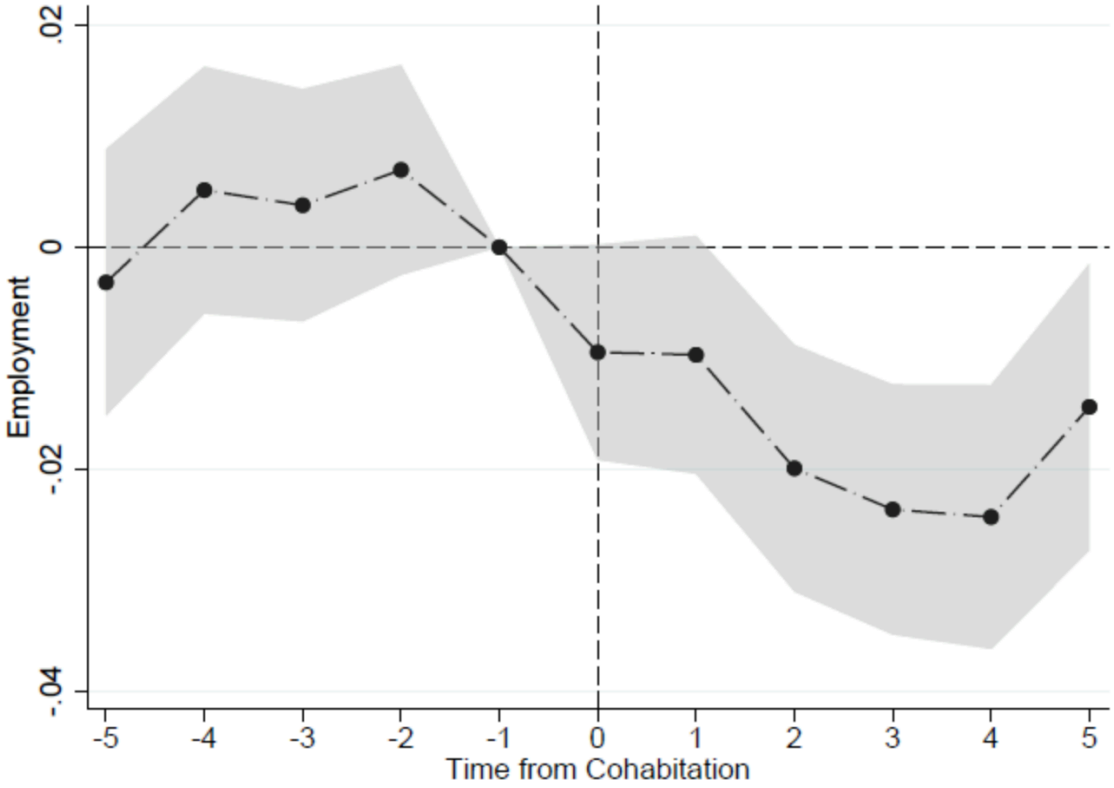
In Section 3.1, we showed that women who enter a relationship where there will be a police report for domestic abuse experience a significant deterioration in their labor market outcomes immediately following cohabitation, which persists for at least five years. However, this drop in labor supply is not present in victims' other relationships. Do abusive men impose labor market costs on their partners in their other relationships?

To test this possibility, we identify the other relationships that perpetrators of domestic violence form but in which no police report is filed. Specifically, we identify relationships starting since 2006 that do not result in police reports for domestic violence but for whom the male partner has at least one police report for domestic violence in some other relationship. A lack of decline in labor market outcomes for women in an abusive man's other relationships could be consistent with our findings in the previous section resulting from a negative "match shock", i.e. that this particular match was problematic. In contrast, if abusive men suppress women's economic out-

comes consistently, this would suggest that some men are systematically abusive, i.e. there are "abusive" types and "non-abusive" types of men.

Formally, we estimate Equation 1 for the labor market outcomes of other women who cohabit with abusive men relative to their matched controls (identified using the same procedure as described in Section 3.1). We report results in Figure 4. We find that in his other relationships where no police report is filed, an abusive man's partners still experience substantial declines in their employment outcomes directly after cohabitation, although somewhat smaller in size compared with the women in relationships where a police report is filed. These results are consistent with the subset of men who appear in police reports for physical domestic abuse imposing labor market costs across all of their relationships.

Figure 4: Impact of Cohabiting with an Abusive Man When No Police Report is Filed



Notes: Figure reports the impact on employment of cohabiting with a partner who in another relationship was the perpetrator in a police report of domestic violence. The estimated impact is from a matched difference-in-difference design as described in the text. Employment is a dummy equal to 1 if the individual is employed at the end of the year. Standard errors are clustered at the individual level.

3.3 Victims' Labor Market Deterioration is Non-Monotonic in Pre-Cohabitation Outside Options

Having established a robust negative impact of cohabiting with an abusive spouse on women's labor market outcomes, we now examine heterogeneity in the magnitude of this decline. We re-estimate Equation 1 separately by education groups and earnings terciles (defined over the three years preceding cohabitation) for victims and their matched controls. Figure 5 gives the stacked DiD estimate of the employment decline experienced by these different groups relative to their matched control observations who enter into non-abusive relationships. Appendix Figure A.3 reports the results of the same exercise for earnings.

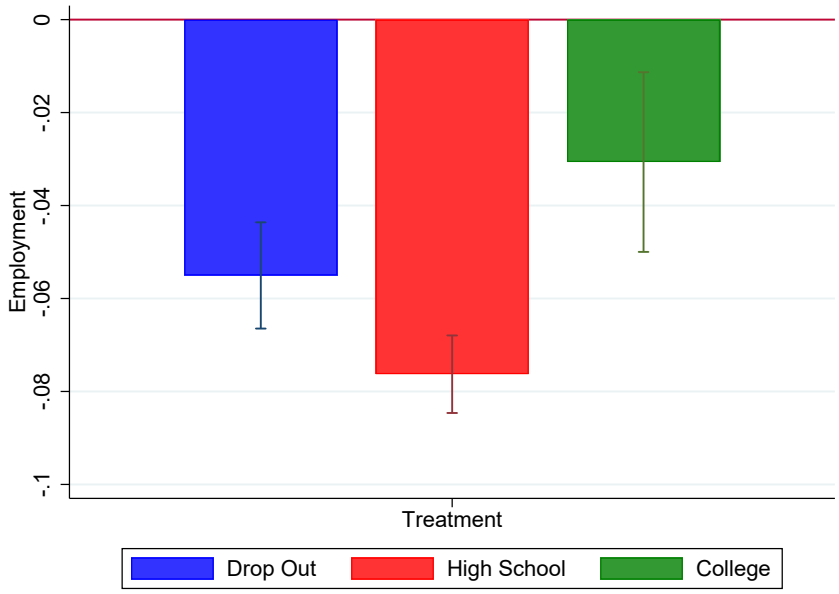
We find that those who have "intermediate" levels of education and pre-cohabitation earnings experience the largest declines in their employment rates upon starting an abusive relationship. Those with high school degrees have the largest drops in labor market outcomes, while those who are high-school dropouts and college graduates have smaller labour market suppression. This non-monotonicity across pre-cohabitation education levels is statistically significant. Similarly, we find that those in the middle earnings tercile prior to cohabitation experience the largest drop in their labour supply, with statistically significantly larger labour market suppression following cohabitation when compared with those with high earnings, and marginally significantly larger suppression compared with women who have low earnings prior to cohabitation.

This non-monotonic relationship between the decline in labor market outcomes and women's pre-cohabitation outside options is difficult to reconcile with a traditional physical violence and collective bargaining power story. Such models typically generate a monotonic relationship between a woman's outside option and her exposure to violence (Aizer, 2010). Thus, we would expect a similar monotonic relationship in the magnitude of her employment decline following cohabitation with such models, but this is not what we find, suggesting that a new framework is needed to understand these relationships.

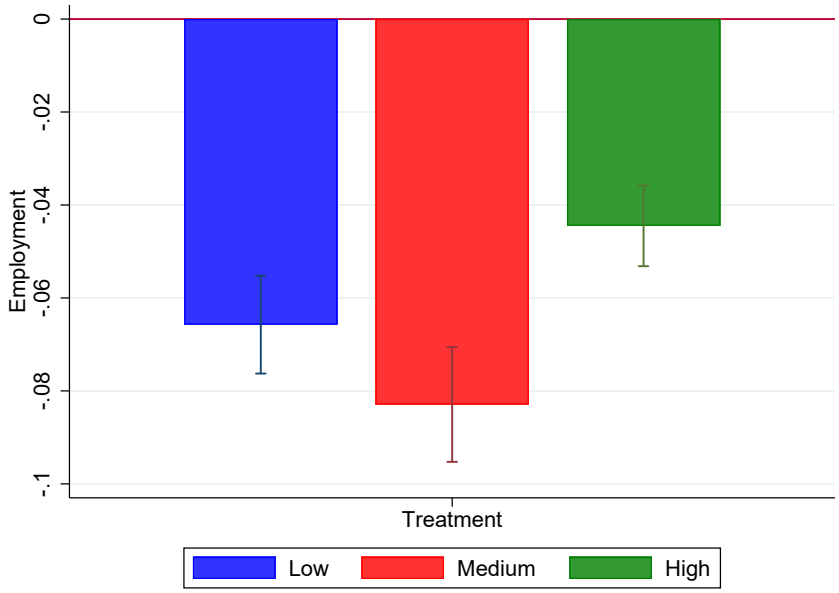
We also consider heterogeneity in the time between cohabitation and the first police report

Figure 5: Non-Monotonic Dynamic Decrease in Outside Options

(a) By Education Group



(b) By Earnings Group



Notes: Figure reports the stacked DiD estimates for the impact of cohabiting with an abuser on female employment rates in the two years following cohabitation for victims relative to their matched controls. For Panel A, college consists of all individuals with any post-secondary school degree, but excluding those who went to vocational tertiary schools. Note that the majority of Finnish college graduates also obtain a masters degree. Drop out consists of all individuals without a secondary degree (including vocational secondary degrees). High school consists of individuals whose highest degree is a academic secondary or vocational secondary degree. For Panel B, low refers to women whose pre-cohabitation earnings put them in the bottom tercile of the earnings distribution of all women who are in abusive relationships (including those with zero incomes). Medium (high) is defined similarly, but for women whose pre-cohabitation earnings put them in the middle (top) third of the earnings distribution. Standard errors are clustered at the individual level.

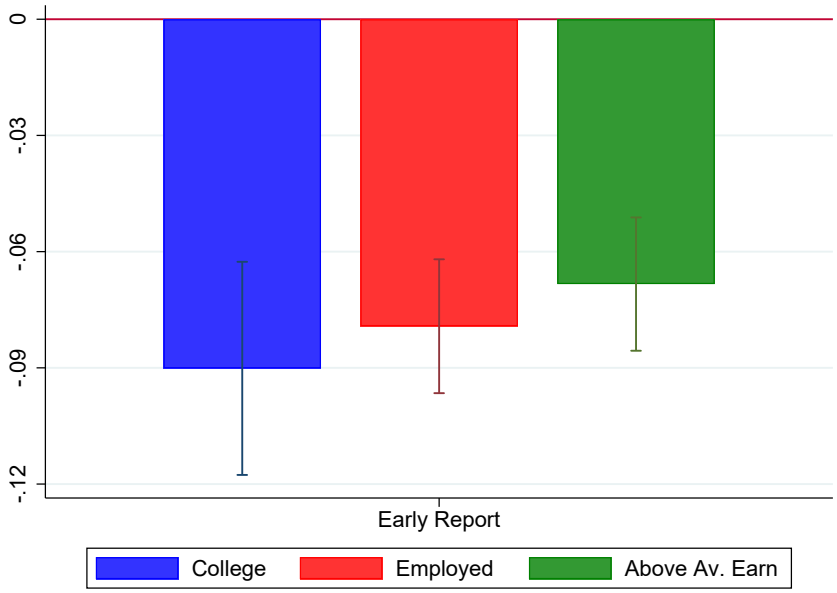
for domestic violence. We estimate the following linear probability model:

$$Y_i = \beta X_i + \epsilon_i \tag{4}$$

where Y_i is a binary variable equal to one if a police report for domestic violence is filed in the first two years of a woman i's relationship. X_i is the explanatory variable of interest, namely one of the following three options: education; pre-cohabitation employment; pre-cohabitation earnings.

Figure 6 shows that women in abusive relationships in which the first police report is filed in the first two years of a relationship are significantly less likely to be college educated and have significantly lower pre-cohabitation earnings and employment rates than those for whom police reports occur later in the relationship. The most economically empowered women who cohabit with abusers are those who do not file a police report for domestic violence during the relationship.

Figure 6: Time Until Physical Violence



Notes: Figure reports the coefficients and 95% confidence interval from equation 4 amongst the sample of victims who file police reports in their relationships with abusive men. The dependent variable is a binary variable that equals one if a police report for domestic violence is filed in the first two years of woman i's relationship. College is a dummy of whether the woman has a tertiary degree or not. Employment is a dummy indicating if the woman was employed before the relationship started. Above average earnings is a dummy indicating if a woman's earnings in the three years before cohabitation were below or above the median.

4 A Dynamic Model of Coercive Control and Physical Violence

Our empirical results demonstrate an immediate economic cost to women of cohabiting with a partner who will eventually appear in the police data as physically abusive. Our findings also suggest persistently abusive types of men: all women who cohabit with men identified in the police data as abusive experience declines in their labour market outcomes, whether or not a police report is filed. In contrast, women who cohabit with abusive men do not experience similar declines in labor market outcomes in their other relationships. Finally, our results are difficult to rationalize with a standard household bargaining model of violence. The magnitude of the decline in women's labor market outcomes is non-monotonic in her pre-cohabitation outside options while standard models would predict a monotonic relationship between exposure to violence (and with it labor market suppression) and her economic empowerment.

Model Overview Motivated by these results, we develop a dynamic model of abusive households that is characterized by both coercive control and physical violence. The model is able to generate non-monotonicity in outside options in the decline of a woman's labor market outcomes early in a relationship as well as differences in the timing of physical abuse between women with different levels of economic empowerment. In the model, there are two types of men: abusive (A) and non-abusive (N). Abusive men are endowed with violent urges and derive some positive utility from physical violence, while non-abusive men have no such violent urges. Women imperfectly observe a man's type before cohabitation. Over time, they can learn about whether their partner is abusive from their violent behavior.

Abusive men can suppress their violent urges partially by exercising coercive control or fully by behaving non-abusively. If abusive men fully suppress their violent urges, they can perfectly conceal their types by mimicking non-abusive type men. Being in a relationship with both abusive and non-abusive men can impose a "household tax" on female labor supply. The magnitude of the tax on female labor supply depends on men's choice between physical violence, coercive control, and non-abuse: the tax of physical violence $>$ coercive control $>$ non-abuse. We provide empirical evidence of a "general cohabitation" tax on female labor supply in non-abusive couples

in Appendix B. Consistent with the model assumptions, our first set of empirical results above and this section show that the tax on female labor supply in abusive couples is significantly larger on average.

Physical violence perfectly reveals a man as abusive. Coercive control does not perfectly reveal an abuser's type as non-abusive relationships can also impose household taxes on female labor supply. If women choose not to work in the first period, then her potential wage from working in the second period is lower. Women will leave the relationship if the value of being single exceeds the expected value of cohabitation given their belief about their partner's type. All else equal, we assume that abusive men prefer being in a relationship to being single. Therefore, abusive men have incentives to suppress their violent urges and conceal their type in the early periods of the relationship in favor of coercive control as this can make it more difficult for women to leave the relationship later given that coercive control leads to economic suppression through the household tax, which lowers the woman's potential income when single.

4.1 Set-Up

Preferences Abusive men receive utility from consumption and violent behavior. Specifically, the utility from physical violence (denoted A, when men do not suppress their violent urges), is higher than the utility from coercive control (S, when men partially suppress their violent urges). The utility from non-abuse (N, when men fully suppress their violent urges) is normalized to zero. We assume that a man's consumption is some fraction, $1 - \lambda$, of total household income. Household income is comprised of his own labor earnings ($w^m L^m$) and his spouse's ($w^f L^f$), in addition to some lump sum household benefit, B. B is a reduced form way of capturing economies of scale from cohabitation and other direct benefits of being in a relationship compared to being

single. Formally, the flow utility for abusive men (m) in a relationship (c) is:[11]

$$u_t^{cm} = (1-\lambda)\underbrace{\left(B + w_t^f L_t^f + w_t^m L_t^m\right)}_{\text{Total resources}} + \underbrace{(\alpha_A^m + \phi_{At}^m)A_t}_{\text{Violence utility}} + \underbrace{\alpha_S^m S_t}_{\text{Suppression utility}} + \underbrace{\theta_t}_{\text{Match shock}} \tag{5}$$

Women receive utility from consumption derived from their share, λ, of household income and get disutility from physical violence and labor supply. Her disutility from work depends on a standard effort cost, e, and a "household tax", τ. The flow utility for women (f) in a relationship is:

$$u_t^{cf} = \lambda\underbrace{\left(B + w_t^f L_t^f + w_t^m L_t^m\right)}_{\text{Total resources}} - \underbrace{(e_t^f + \tau_t)L_t^f}_{\text{Effort cost}} - \underbrace{\alpha A_t}_{\text{Violence disutility}} + \underbrace{\theta_t}_{\text{Match shock}} \tag{6}$$

When single, individuals simply consume the value of their labor income. The flow utility for single (s) women and men are for $j = \{f, m\}$:

$$u_t^{sj} = (w_t^j - e_t^j)L_t^j \tag{7}$$

We assume that for the "average" woman and abusive man, the ex-ante relationship preferences, before the realization of any match shocks, are such that for abusive men: Relationship $\succ$ Single. While for women: Relationship with non-abusive men $\succ$ Single $\succ$ Relationship with abusive men. The preference ranking indicates that abusive men have an expected positive cohabitation surplus, while women only have such a surplus when matching with non-abusive men. Cohabiting with an abuser will render the surplus negative because of the disutility of violence and the larger household tax that manifests as a suppression of her labor supply.

The Household Tax Being in a relationship imposes a household "tax", τ, on female labour supply, as we show in Appendix B. We can interpret τ as a gender norm in non-abusive relationships, i.e., men in general dislike women working more in the labour market and would like

[11]The period utility for non-abusive men (m) in a relationship is:

$$u_t^{cm} = (1-\lambda)\underbrace{\left(B + w_t^f L_t^f + w_t^m L_t^m\right)}_{\text{Total resources}} + \underbrace{\theta_t}_{\text{Match shock}}$$

Since the focus of the paper is women and abusive men's choices and behaviour, in the model we abstract from non-abusive men's problems.

women to do more household production, or as the result of economic control and sabotage in abusive relationships. τ is drawn from different distributions depending on the type of abuse (physical, coercive control, or non-abuse). We assume there is an overlap in τ distributions for men engaging in non-abusive behaviour and men engaging in coercive control. In particular, we assume a first-order stochastic dominance (FOSD) in the household tax distribution conditional on physical violence, coercive control, and non-abusive, i.e.,

$$\mathbb{E}(\tau|A) > \mathbb{E}(\tau|S) > \mathbb{E}(\tau|N)$$

The overlap in the τ distribution conditional on men's violent behaviour means that coercive control does not perfectly reveal a man's type because non-abusive men also have a positive probability of drawing a positive τ.

Learning A woman conditions her subjective belief about her male partners' type, $\tilde{\pi}$, on the basis of the realization of the household tax and any occurrence of physical violence. In particular, women update their belief about whether their partner is abusive using Bayes' rule:

$$\begin{aligned} \tilde{\pi}_t(\tau, A = 0) &= \frac{\mathbb{P}(\tau|A = 0)\tilde{\pi}_{t-1}}{\mathbb{P}(\tau)} \\ \tilde{\pi}_t(\tau, A = 1) &= 1 \end{aligned} \tag{8}$$

Note that coercive control is not directly observed by women, only the associated tax on her economic activity. Thus, updating will not be perfect if an abusive man suppresses their violent urges, managing to not be physically violent with their partner.

Wage Dynamics The female wage rate in the second period depends on her labor supply in the first period through human capital accumulation. In particular, female wage rates evolve as follows:

$$w_t^f = f(L_{t-1}^f) + \epsilon_t$$

where $f(.)$ is an increasing and concave function, capturing the effect of past work experience on wage growth. The term ϵ_t is an i.i.d wage shock.

These wage dynamics determine women's outside options and total household resources, thus affecting abusive men's intertemporal trade-off to suppress their violent urges. If abusive men choose physical violence over coercive control, there will be a larger tax on female labour supply in the current period and a lower wage rate in the next period through these wage dynamics. On the one hand, a lower wage rate or outside option in the next period will render women less likely to leave the relationship (suppression effect). On the other hand, a lower wage rate in the next period also implies lower total household resources (resources cost). Abusive men will thus take into account the dynamic suppression effect and resource cost when making the violence choice.[12]

4.2 Timing

We focus on the two-period version of the model in the main text as this is able to capture the primary dynamics present in the multi-period model. In the first period, individuals maximize their expected utility over the two periods, taking into account the dynamic impact of their choices on future payoffs. In the second (and final) period, individuals maximize their final-stage payoff based on the static benefits and costs of their choices. Within each period, we assume the following four stages of the game:

1. Match shock, θ_t, is realized and women decide whether to stay together or break up with a man, given their belief about whether their partner is abusive, $\tilde{\pi}_{t-1}$.

2. Male preferences for physical violence and coercive control are realized and abusive men choose the degree to suppress their violent urges, $v_t \in \{A_t, S_t, N_t\}$.

3. Conditional on a man's choice between physical abuse, coercive control, and non-abuse, the household tax, τ_t, is realized and women update their belief about their partner's type

[12]For simplicity, we assume that men's wage process and labour supply are exogenously given. The model can easily extend to incorporate men's endogenous wage process and labour supply choice. Doing so will not affect the main predictions of the model.

using Bayes' rule.

4. Women's wage shocks, ϵ_t, are realized and women make their labor supply decision.

4.3 Final period

We solve the two-period problem by backward induction given that behavior in the last period is determined only by static incentives. We start with the final decision in the second period for those in a relationship: the woman's labor supply decision. At this point, her effort costs have been realized as has the household tax. She will simply work iff:

$$\underbrace{\lambda w_2^f}_{\text{Marginal benefits of work}} > \underbrace{e_2^f + \tau_2}_{\text{Marginal costs of work}}$$

Abusive men choose the degree to which they will suppress their violent urges (i.e. choosing physical abuse, coercive control, or non-abuse) taking into account that their actions will affect their partner's labor supply, and with it their own consumption through the household budget constraint. The static benefits are measured by the utility benefits of physical violence over coercive control and non-abuse. The static costs are due to the larger household resource costs of physical violence compared with coercive control (and both compared with non-abuse) because of the larger household tax imposed on female labour supply. If the utility benefits from physical violence outweigh these resource costs, abusive men will not suppress their violent urges and choose physical violence over coercive control and non-abuse. Formally, he will choose physical violence over non-abuse and coercive control iff:

$$\alpha_A^m + \phi_{At}^m > (1-\lambda) w_2^f \left[\mathbb{P}(L_2^f | N_2) - \mathbb{P}(L_2^f | A_2) \right] \tag{9}$$

$$\underbrace{(\alpha_A^m + \phi_{A2}^m - \alpha_S^m)}_{\text{Static benefits}} > \underbrace{(1-\lambda) w_2^f \left[\mathbb{P}(L_2^f | S_2) - \mathbb{P}(L_2^f | A_2) \right]}_{\text{Static costs}} \tag{10}$$

where

$$\mathbb{P}(L_2^f | v) = \int f(\tau | v) \mathbb{P}(L_2^f | \tau, w_2^f) \, \mathrm{d}\tau \tag{11}$$

i.e., the probability of a woman working given the distribution of the household tax dictated by the abuse decision.

At the beginning of the final period, women compare their expected payoff to staying in the relationship compared to being single given their belief about whether their partner is abusive, $\widetilde{\pi}$. The value function associated with remaining in the relationship in the final period is:

$$V^{cf} = \widetilde{\pi} \sum_{v \in \{A,S,N\}} \mathbb{P}(v) \sum_j \mathbb{P}(L_2^f = j|v) u_2^{cf}(v) + (1 - \widetilde{\pi}) \sum_j \mathbb{P}(L_2^f = j|N) u_2^{cf}(N) \tag{12}$$

Note that we have suppressed the dependence of violence and labor supply probabilities, and utility, on w_2^f for ease of notation. The value function associated with a woman being single in the final period is:

$$V^{sf} = \mathbb{E}\left[(w_t^f - e_t^f) L_t^f\right] \tag{13}$$

A woman will remain cohabiting, $\kappa = 1$, if:

$$V^{cf} + \theta^f > V^{sf} \tag{14}$$

It is straightforward to derive the following comparative statics:

$$\frac{\partial \mathbb{P}(\kappa)}{\partial w_2^f} \leq 0, \quad \frac{\partial \mathbb{P}(\kappa)}{\partial \widetilde{\pi}} < 0 \tag{15}$$

That is, all else equal, women are more likely to break up with a man if the woman has a higher wage rate ("outside option") or if her belief about the man's abusive type is higher. If the woman has a higher wage rate, she will have a higher value of being single relative to being in a relationship because being in a relationship imposes a tax on her labour supply while being single is tax-free and thus she can personally retain more of the benefits from a wage increase. If the woman has a higher belief that the man is an abusive type, her expected payoff from the relationship will be lower because of a higher tax on her labour supply, lower total household resources as a result, and a higher probability of being exposed to violence.

These results also allow us to derive a formal result on the relationship between a woman's

outside option (w_2^f) and her exposure to physical violence in the later period.

Proposition 1. *The probability of physical violence in the final period ($\mathbb{P}(A_2)$) decreases as women's outside option (w_2^f) increases. This result follows from the following decomposition exercise from the formal model.*

$$\frac{\partial \mathbb{P}(A_2)}{\partial w_2^f} = \frac{\partial \mathbb{P}(\kappa)\mathbb{P}(A_t|\kappa)}{\partial w_2^f} = \underbrace{\frac{\partial P(\kappa)}{\partial w_2^f}\mathbb{P}(A_2|\kappa)}_{\textit{Breakup}} + \underbrace{\mathbb{P}(\kappa)\frac{\partial \mathbb{P}(A_2|\kappa)}{\partial w_t^f}}_{\textit{Within-Relationship}} < 0$$

There are two channels creating the negative relationship between a woman's outside option and the probability of physical violence: a breakup channel and a within-relationship channel. Higher outside options increase women's probability of breaking up with abusive men, i.e., $\frac{\partial \mathbb{P}(\kappa)}{\partial w_2^f} \leq 0$. Higher outside options also increase the static costs of physical violence and reducing its prevalence ($\frac{\partial \mathbb{P}(A_2|\kappa)}{\partial w_2^f} < 0$). We demonstrated that this result holds true in the data in Figure 6.

4.4 First period.

In the first period, men need to consider the dynamic benefits and costs of suppressing violent urges by choosing physical violence vs. coercive control and non-abuse. In particular, the violence choice in the first period will have a dynamic impact on future payoffs through: (1) its impact on female learning about men's types, which will affect the probability that women break up with men in the next period; (2) its impact on female labour supply in the current period and her wage rate, and labor supply, in the next period. This influences both total household resources but also the incentives for a woman to break up with a man. The following expression

characterizes whether abusive men will engage in physical violence in the first period:

$$
\begin{aligned}
&\underbrace{\alpha_A^m + \phi_{A1}^m - \alpha_S^m}_{\text{Static benefit}} \\
&+ \\
&\sum_{L_1^f=0}^{1} \underbrace{\mathbb{P}\left(L_1^f | A_1, w_1^f\right) \Delta V^{cm}(L_1^f)}_{\text{Dynamic resource cost of } A_1} \quad \underbrace{\mathbb{P}\left(\kappa | A_1, w_1^f\right)}_{\text{Suppression+Learning of } A_1} \\
&> \\
&\underbrace{(1-\lambda)\left[w_1^f \left(\mathbb{P}(L_1^f | v_1, w_1^f) - \mathbb{P}(L_1^f | A_1, w_1^f)\right)\right]}_{\text{Static cost}} \\
&+ \\
&\sum_{L_1^f=0}^{1} \underbrace{\mathbb{P}(L_1^f | v_1, w_1^f) \Delta V^{cm}(L_1^f)}_{\text{Dynamic resource cost of } v_1} \quad \underbrace{\mathbb{P}(\kappa | v_1, w_1^f)}_{\text{Suppression+Learning of } v_1}
\end{aligned}
\tag{16}
$$

for $v_1 = \{S, N\}$ and $\Delta V^{cm}(L_1^f) \equiv V^{cm}(L_1^f) - V^{sm}$ is the cohabitation surplus for men.

When an abusive man does not suppress their violent urges, and instead chooses to exercise either physical violence or coercive control in the first period, then this reduces the expected total household resources available to the man in the second period through a scarring effect on female wages (conditional on the couple remaining together in the second period). This comprises the dynamic resource cost of physical violence and coercive control. Physical abuse and coercive control also cause a woman to positively update her belief that their partner is abusive, increasing the risk of a breakup: the learning effect. However, conditional on the belief that one's partner is abusive, women are less likely to break up if their outside option is suppressed. Compared to physical violence, coercive control can suppress women's labour supply but at a lower level with smaller static and dynamic resource costs, and women only imperfectly learn about the men's type when men choose coercive control.

Based on the men's optimal choice of physical violence, coercive control, or non-abuse in the first period, we obtain the following proposition regarding the non-monotonic relationship between the probability of coercive control, physical violence, and non-abuse and women's outside options in the first period $t = 1$, i.e. her outside option at the start of cohabitation. Since physical violence and coercive control impose larger household taxes on female labour supply, Proposi-

tion 2 also implies that there is a non-monotonic relationship between the fall in women's labour supply and their outside options.

Proposition 2. *The probability of physical violence and coercive control in the first period can exhibit non-monotonicity by women's outside options (w_1^f). Specifically, both physical violence and coercive control are higher among women with median outside options and lower among women with low or high outside options.*

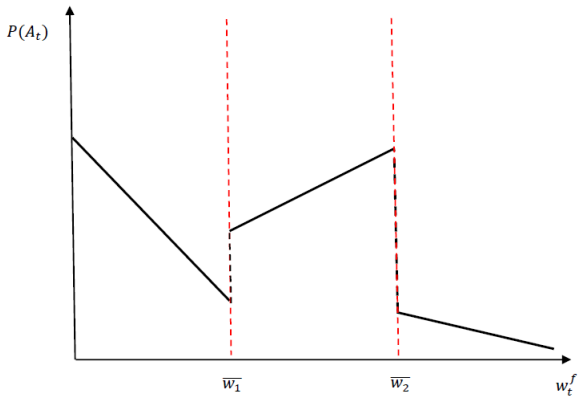
We leave a more detailed formal proof of Proposition 2 to the Appendix, and focus instead on providing intuition for this result here, which we showed holds true empirically in Figure 5. To help fix ideas, we define three levels of a woman's outside option: low outside options ($w_1^f < \bar{w_L}$), intermediate outside options ($w_1^f \in [\bar{w_L}, \bar{w_H}]$), and high outside options ($w_1^f > \bar{w_H}$). Using Equation (16), we can show the relationship between abusive men's violence behaviour and w_1^f. In particular, Figure (7) depicts the non-monotonic relationship arising between: (a) the probability of physical violence $\mathbb{P}(A_1)$ and women's outside option; (b) the probability of coercive control $\mathbb{P}(S_1)$ and women's outside options; (c) the probability non-abuse $\mathbb{P}(N_1)$ and women's outside options.

Low outside options ($w_1^f < \bar{w_L}$): When women have low outside options, all else equal they are unlikely to break up with abusive men. Abusive men thus have few incentives to exercise coercive control to suppress a woman's outside options further. To this end, the suppression and learning effects are dominated by other channels, i.e., static and dynamic resources costs and static utility benefits of physical violence. Thus, we see abusive men are less likely to choose coercive control and are more likely to choose physical violence or non-abuse. As the woman's wage increases up to $\bar{w}_L$, the static and dynamic costs of physical violence increase relative to non-abuse. Therefore, all else equal, our model predicts that physical violence decreases while non-abuse increases in this interval.

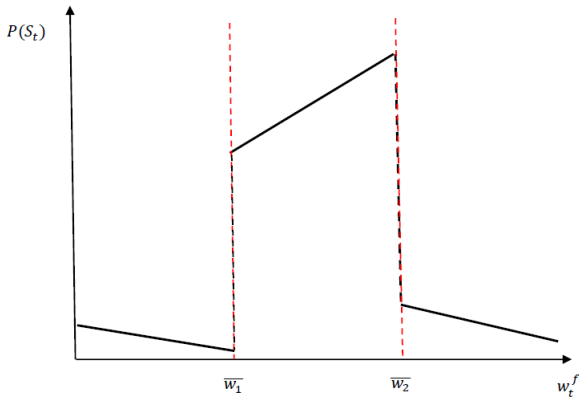
Intermediate outside options ($w_1^f \in [\bar{w_L}, \bar{w_H}]$): When women's outside options increase past a certain threshold $\bar{w_L}$, they are more likely to break up with abusive men because the value

Figure 7: Non-Monotonic Relationship between Violence level and Women Outside Options

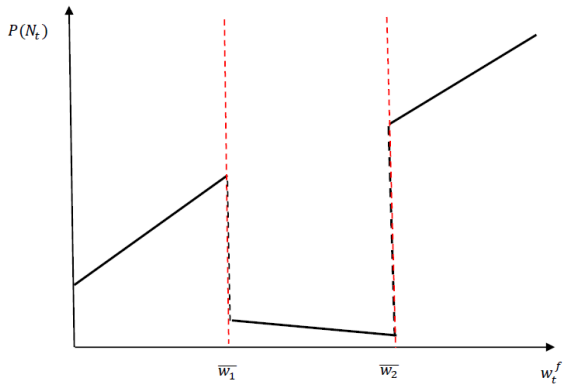
(a) Physical Violence and Women's Outside Options



(b) Coercive Control and Women's Outside Options



(c) Non-Abuse and Women's Outside Options



Notes: Figure displays the non-monotonic relationship between choices of violence level for physical violence in (a), coercive control in (b), and non-abus in (c) and women's outside options. These results are summarized in Proposition 2 and are implied by the optimal behavior of abusive men in the first period of the model.

of being single outweighs the value of cohabiting with an abuser. In this case, the suppression channels dominate the learning and resource cost channels, resulting in an increase in physical violence and coercive control as women's outside option increases. To be more specific, $\bar{w_L}$ is the wage threshold such that women are indifferent between cohabiting with an abusive man and breaking up with him. When $w_1^f < \bar{w_L}$, women will never break up with the abusive man, and when $w_1^f > \bar{w_L}$, the woman's probability of breaking up with an abusive man increases as her outside options increase. In response, abusive men switch to higher violence levels, including physical violence and coercive control to suppress the woman's outside options in order to keep her in the relationship. Therefore, the model predicts that when women's outside options reach a certain threshold, there is a structural break in abusive men's violence behaviour: the incidence of non-abuse plummets to a low level and the incidences of both physical violence and coercive control increase.

When choosing between physical violence and coercive control, abusive men will trade off the suppression effect vs. the learning effect. In particular, exercising physical violence will impose a larger tax on female labour supply and thus yield a larger suppression effect, making his female partner less likely to leave him. However, physical violence will also perfectly and immediately reveal the man's type, and this learning effect increases the probability of breakup. Given the multiple periods of the game, abusive men have a large incentive to partially suppress their violent urges and hide their type early in the relationship by choosing coercive control over physical violence. Therefore, compared to physical violence, coercive control has a higher incidence in the first period of the model when women have a median outside option.

High outside options ($w_1^f > \bar{w_H}$): When women's outside options are high enough $w_1^f > \bar{w_H}$, they will break up with abusive men for sure, no matter how much effort abusive men put into suppressing the women's labour supply. When women have high enough outside options such that they are certain to break up with abusive men in the future, the dynamic effect channels are dominated by the static effect channels. The problem reduces to a static problem as in the final period. Thus at the threshold $w_1^f = \bar{w_H}$, there is another structural break in the behavior of

abusive men. Specifically, abusive men have no incentives to use physical violence or coercive control to suppress the women's outside options. Instead, abusive men will trade off the utility gain from physical violence versus the resources costs of physical violence in order to decide between physical violence and non-abuse. Given women's high wages, it is possible for the resource costs of physical violence to dominate the utility gain from abuse. In this case, abusive men are more likely to fully suppress their violent urges by choosing non-abusive behaviour. It is worth noting that the level of non-abuse when women have very high outside options is much higher compared to the two other cases due to these resource concerns. That is, all else equal, when women have very high outside options, it is too costly for abusive men to conduct any abusive behaviour because it will impose large resource costs.

4.5 Equilibrium Concept

In the multi-period extension of the model, the problem can be defined recursively with all decisions based on payoff-relevant state variables $[L^f_{t-1}, \tilde{\pi}_{t-1}]$. In this case, the equilibrium concept is Markov perfect equilibrium. In particular, we focus on the unique subgame perfect equilibrium of the sequential stage game specified above. In equilibrium, abusive men will choose the violence level and women will choose their labour supply and break up decisions to optimize their expected utility across different periods.

5 Discussion

A large literature shows that when women's outside options increase, the amount of domestic violence observed in cross-sectional data decreases (Aizer, 2010; Anderberg *et al.*, 2016). This is often interpreted as the result of a change in women's bargaining power within the relationships. An important implication of our model is that increasing women's outside options may reduce observed domestic violence in cross-sectional data for another reason: women may be more likely to exit abusive relationships when their outside options increase, as they are no longer locked into a bad relationship. This "breakup" channel could occur in addition to a reduction in physical violence within existing relationships due to increased bargaining power. In this section, we

replicate the main results from Aizer (2010) and then explicitly test for this alternative breakup channel as a potentially important mechanism explaining this canonical result in the domestic violence literature.

Formally, we replicate Aizer (2010) by showing that when women's outside options exogenously increase, the prevalence of domestic violence decreases. We construct an index for labor demand for workers of gender g in region r with education e at time t as:

$$\bar{Y}_{rget} = \sum_j \gamma_{reg0j} Y_{\neg r,egtj} \tag{17}$$

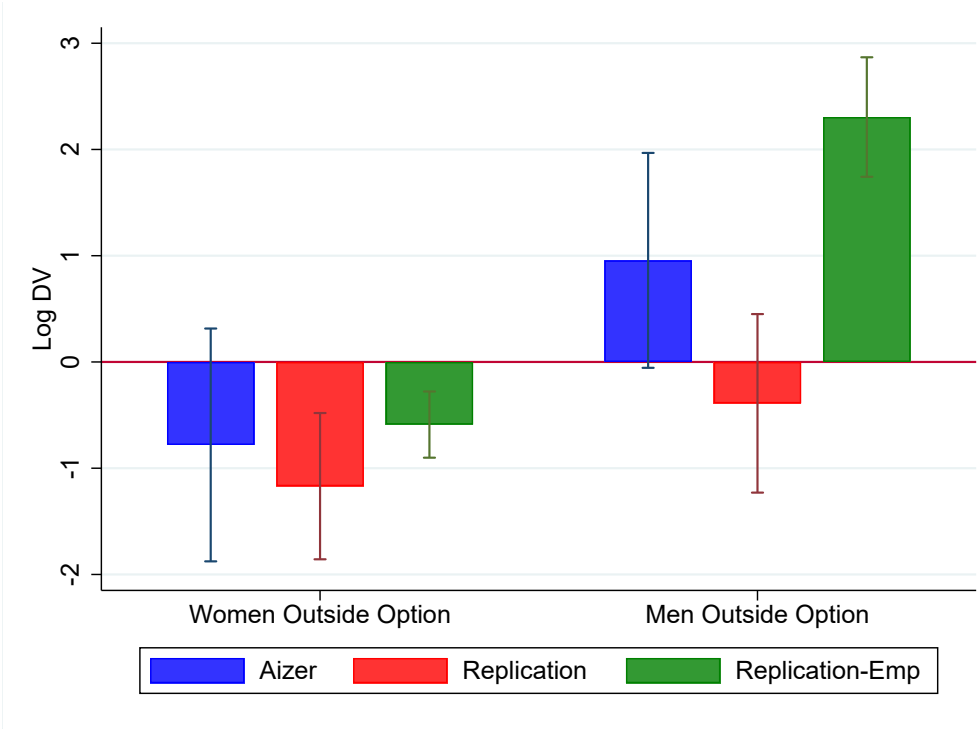
where j denote industries. We consider two measures of demand: average earnings and unemployment rates. We also consider employment rates as a measure of demand as wages and earnings are relatively rigid in Finland and so there is much greater variation in an index based on quantities compared with an index based on prices.

With our Bartik instrument in hand, we estimate the following regression:

$$\log DV_{ret} = \beta^f \bar{Y}_{rfet} + \beta^m \bar{Y}_{rmet} + \alpha_t + \gamma_e + \phi_r + \psi_{tr} + \epsilon_{ret}$$

We report results in Figure 8. The blue bar is the original estimated effects from Aizer (2010). The red bar shows that in our context as the earnings outside option for women goes up, there is a significant decrease in the number of police reports of domestic violence. Last, the green bar shows that as a women's employment outside options increases there is also a significant decrease in domestic abuse reported to the police. This is reassuring from a replicability standpoint, suggesting that this core result is robust across contexts and time periods. When it comes to changes in men's labor demand, the index based on earnings shows very little variation within markets over time and we estimate a zero effect on domestic violence rates. However, the index based on employment rates, which shows much greater variability, demonstrates the expected behavior: increases in men's outside options are associated with a higher prevalence of domestic violence.

Figure 8: Replication: Domestic Violence Decreases as Women's Outside Options Increase



Notes: Figure reports the regression coefficients and 95% confidence interval of the impacts of outside options on domestic violence, where outside options are defined using earnings ("Replication") and employment rates ("Replication-Emp"). The three estimates on the left are using women's outside options, while the three estimates on the right are using men's outside options. The "Aizer" coefficients are those reported in Table 4 of Aizer (2010).

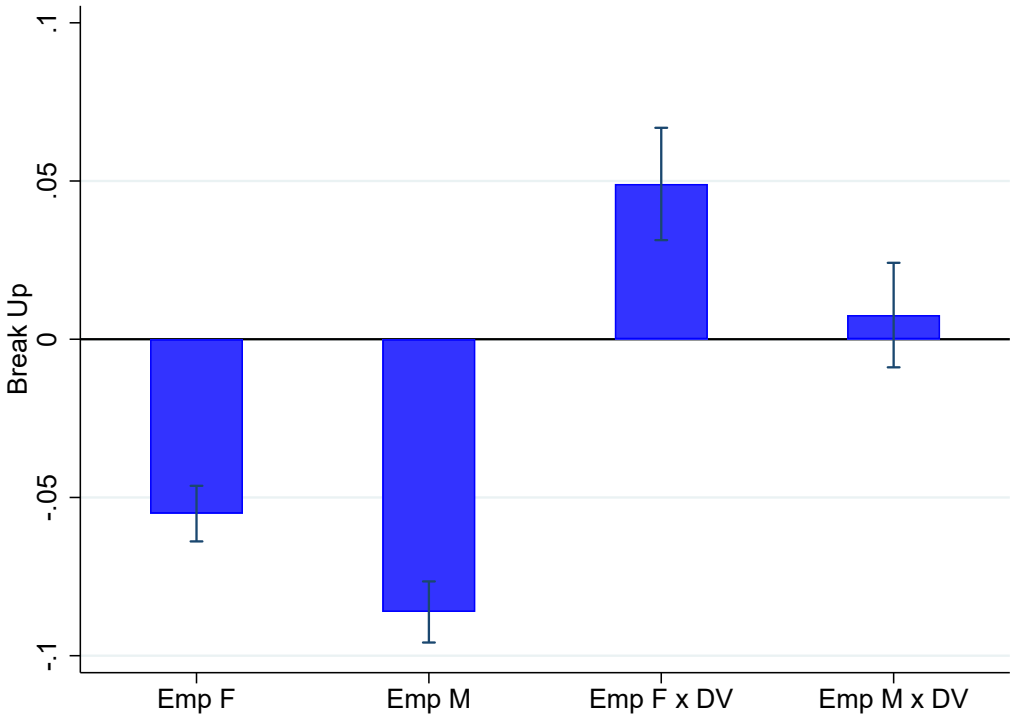
We now harness our unique panel data to test whether breakup plays a role in explaining this relationship in the data. To do so, we harness within-couple variation in the outside option of women and men over time. For our sample of abusive couples and their matched control observations, we estimate the following linear probability model:

$$BreakUp_{ijt} = \beta^f \bar{Y}^f_{it} + \alpha^f \bar{Y}^f_{it} \times DV_i + \beta^m \bar{Y}^m_{it} + \alpha^m \bar{Y}^m_{it} \times DV_i + \omega_i + \psi_t + \gamma_j + \epsilon_{ijt}$$

where DV_i is an indicator for whether a couple is abusive, ω_i is a couple fixed effect, ψ_t is a time fixed effect, γ_j is a time since cohabitation fixed effects, and $BreakUp_{ijt}$ is an indicator variable that equals one if a couple is not cohabiting at t and is zero otherwise.

Figure 9 gives the overall impact of a change in outside options on breakup probabilities for non-abusive women, non-abusive men, victims, and perpetrators. We find that the breakup of abusive relationships is a key outcome when women's outside options increase. While changes in

Figure 9: The Relationships Between Women's Outside Options and Relationship Breakup



Notes: Figure reports the regression coefficients and 95% confidence interval of the impacts of outside options on relationship breakup, estimating Equation 15 where outside options are instrumented using the Bartik approach described in the text. "Emp F" is the impact of an increase in women's employment outside options and whether women in non-abusive relationships breakup. "Emp F x DV" reports estimates of the impact of improved employment outside options for women in abusive relationships on breakup. Similarly for "Emp M" and "Emp M x DV". DV is an indicator equal to one if the women (or man) is in a relationship with one or more police reports for domestic violence.

outside options *decrease* the probability of breakup in non-abusive couples, increases in women's outside options in abusive couples lead to a statistically significant 5 percentage point increase in the probability the couple breaks up in a period. The breakup channel could, therefore, be a key driver in observed reductions in reported physical domestic violence previously documented in cross-sectional data that did not allow for an examination of breakup.

In addition to the implications for the existing literature, our results also have significant policy implications. First, the fact that women's economic outcomes are severely damaged by abusive relationships raises the importance of economic support and active labor market programs to encourage reattachment to employment that are tailored to the needs of domestic abuse victims. Moreover, the fact that increased outside options facilitates women's ability to exit abusive

relationships as shown in this section suggests that improving these women's outside options is a productive way to reduce domestic violence by allowing them to leave. Second, abusers suppress female labor supply across multiple relationships. This raises the importance of developing programs that change the behavior of these men given that it is impossible to prevent them from forming new relationships unless they are incarcerated. Further, it suggests that more active monitoring of the outcomes of women who form new relationships with known abusers might be justified.

6 Conclusion

In this paper, we provided the first estimates of the labor market impact of cohabiting with an abusive spouse. Women who form relationships with men who eventually become physically violent experience immediate, large, and persistent reductions in their labor supply after beginning their relationships with these men. These women do not experience these reductions in their labour supply in their other relationships. In contrast, all women who form relationships with a man who has been reported to police for abuse experience large declines in their labour supply, even if a given woman does not formally report abuse herself.

Heterogeneity in the magnitude of the decline of victims' economic outcomes cannot be rationalized by a standard household bargaining model of violence. We find that the decline in women's economic outcomes upon cohabiting with an abusive spouse is non-monotonic in their outside option. Women with "intermediate" levels of education and pre-cohabitation earnings suffer greater falls in employment rates and earnings than the least and most economically empowered women. This finding is hard to reconcile with a static model of exposure to physical violence. Further, women who report physical violence closer to the start of the relationship have the lowest economic outside options; victims with a first police report within two years of cohabitation are significantly less likely to have a college degree and their pre-cohabitation employment rates are 5.2 p.p and lower than women who first report violence later into a relationship.

We introduced a new dynamic model of abuse to rationalize our main findings. A combina-

tion of three features makes our framework novel. First, we allow for abusers to engage in acts of coercive control as well as physical violence for both strategic and expressive motivations. Second, our model is dynamic and the abuser's incentive to suppress an urge for violence can vary across the lifetime of the relationship. Third, we go beyond a within-relationship analysis to directly include the decision to break up or not in the model. While there are a small number of contributions that include a subset of these mechanisms, there is no work that encompasses all of these channels. Our model is able to generate non-monotonicity in the relationship between a woman's outside options and her labor supply decline as well as differences in the timing of physical violence by a woman's economic empowerment, consistent with our empirical results.

Our model highlights that dynamic incentives relating to breakup risk play a key role in understanding the dynamics of abusive households. Higher outside option women experience a lower prevalence of violence because they are less exposed within a relationship (given the high resource cost of abusing these women) and because they are more likely to break up with abusive men. We explore the significance of the breakup channel directly with our unique panel data. Increases in women's outside options are associated with lower domestic violence and much greater rates of breakup amongst abusive couples. These results suggest a need to include economic support to exit abusive matches as a key policy lever in reducing the prevalence of domestic violence.

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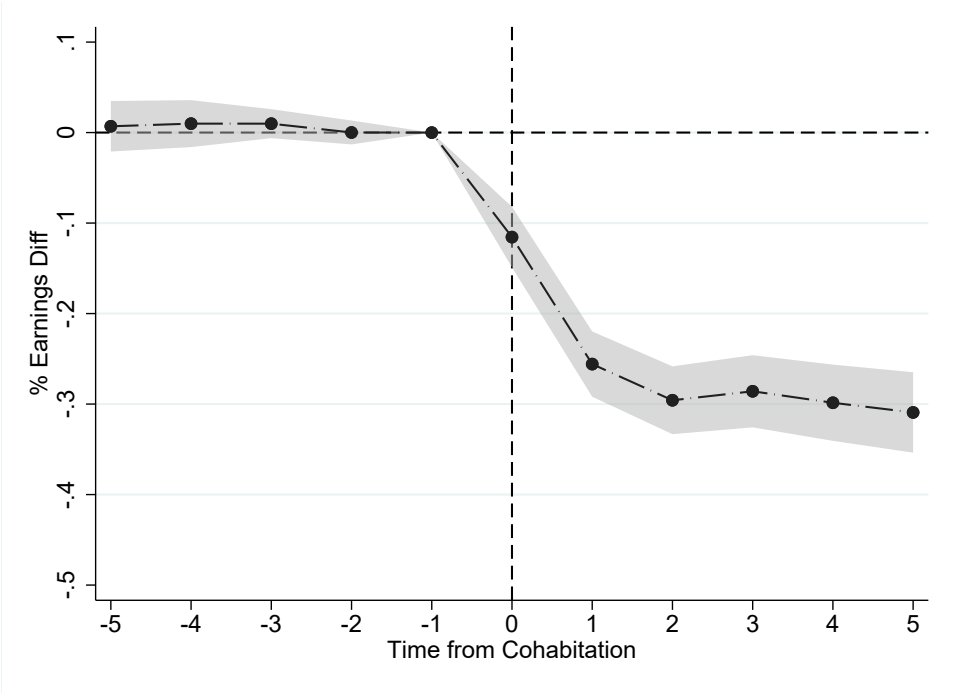
Online Appendix

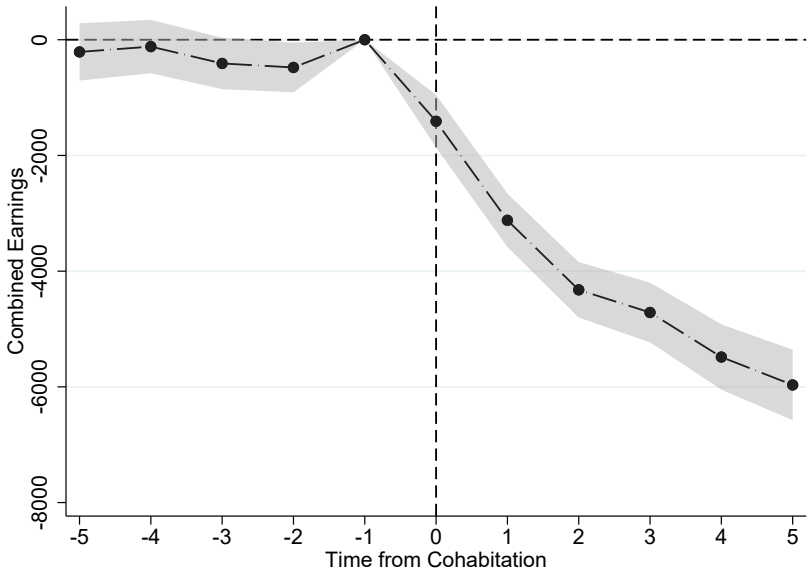
A Additional Exhibits

Figure A.1: Impact of Cohabitation with Abusive Partner on Earnings Relative to Pre-Cohabitation Outcomes



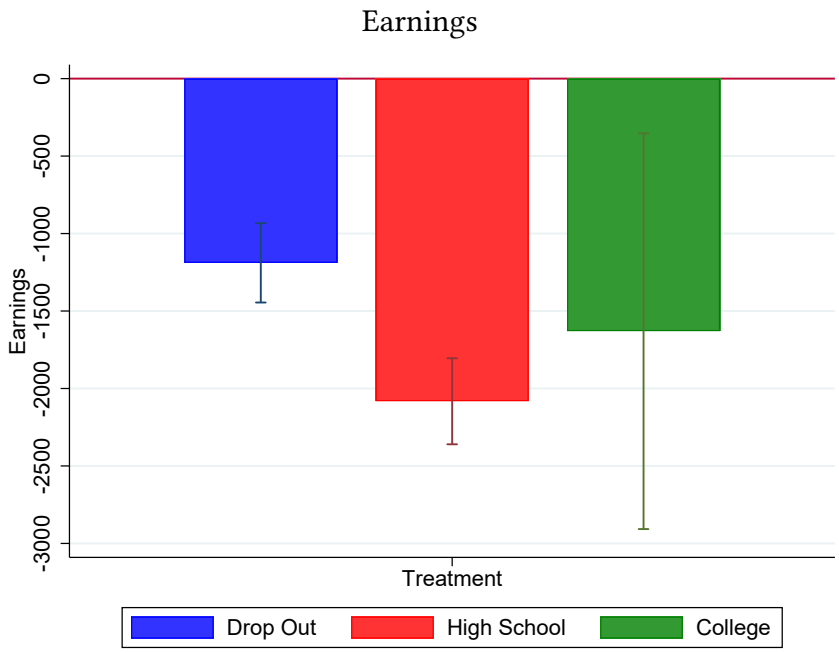
Notes: Figure reports estimated impacts of cohabiting with a partner where there will eventually be a police report on earnings of the female victim. Earnings is the earnings in the post period divided by average earnings in the pre-cohabitation period. The estimates use the matched control to identify effects 5 years before and 5 years after cohabitation, estimating equation 1, and with all estimates relative to the year before cohabitation which is omitted. Year 0 denotes the year at which cohabitation began. Earnings are the sum of all taxable labor earnings during the preceding calendar year. This includes both wage and salary income, but also self-employment income, and is deflated to 2013 euros. Standard errors are clustered at the individual level.

Figure A.2: Household Income Impact of Cohabiting with an Abusive Partner



Notes: Figure reports estimated impacts of cohabiting with a partner where there will eventually be a police report on total income in the households where female victims reside. The estimates use the matched control couple to identify effects 5 years before and 5 years after cohabitation, estimating equation 1, and with all estimates relative to the year before cohabitation which is omitted. Year 0 denotes the year at which cohabitation began. Combined earnings on the y-axis are the sum of both partner's total taxable labor earnings during the preceding calendar year. This includes both wage and salary income, but also self-employment income, and is deflated to 2013 euros. Standard errors are clustered at the couple level.

Figure A.3: Non-Monotonic Dynamic Decrease in Outside Options: Earnings



Notes: Figure reports the stacked DiD estimates for the impact of cohabiting with an abuser on female employment rates in the two years followinc cohabitation for victims relative to their matched controls. Standard errors clustered at the individual level.

Table A.1: Additional Robustness Checks

	(1) Main	(2) Ex. Δ Fertility	(3) Employed $t = 0$
Panel A: Employment			
Abusive	-0.0638***	-0.0637***	-0.0463***
	(0.0029)	(0.0039)	(0.0032)
Observations	814364	594022	461099
Panel B: Relative Earnings			
Abusive	-0.2566***	-0.2295***	-0.1581***
(0.0152)	(0.0203)	(0.0169)	
Observations	647417	468856	429360
Fixed effects			
Year	✓	✓	✓
Time since cohabit $\times$ Match	✓	✓	✓

Notes: Table reports difference-in-differences estimates from Equation (1) collapsed into a pre- and post-period. Data is from police reports linked to FLEED register data. The counterfactual observations are given by victims' matched controls in columns (1)-(3). The sample is restricted to those with no change in completed fertility between $t-1$ and $t-2$ in column (2) and those who were employed at $t = 0$ in column (3). Column (1) gives our primary specification. Standard errors are clustered at the individual level.

B General Cohabitation Tax

We have shown that cohabitation with an abusive partner imposes large labor market costs on female victims. Is there a "cohabitation tax" in general for women where their incomes and employment decline at the start of a relationship? To explore this possibility, we compare outcomes of women in non-abusive relationships before versus after cohabitation, using a research design equivalent to the "child penalty" literature. Formally we estimate the following equation:

$$Y_{its} = \sum_{j=-5, j\neq -1}^{5} \delta_j \mathbf{I}[j = t] + \beta_k + \gamma_s + \epsilon_{its} \tag{18}$$

Where Y_{it} is the outcome variable (annual earnings or end-of-year employment status) for individual i in event time t, and in calendar year s. The vector $\mathbf{I}[j = t]$ includes indicators for the time since event (where the event here is the first year of cohabitation). We leave out the indicator for event time -1, so the coefficients δ_j capture how outcomes evolve in different time periods $j = t = -5, -4, ..., 4, 5$ relative to the year prior to cohabitation ($t = -1$). β_k is a fixed effect for age, and γ_s is fixed effect for calendar year s. By including fixed effects for time and year we control for life-cycle trends and year shocks.

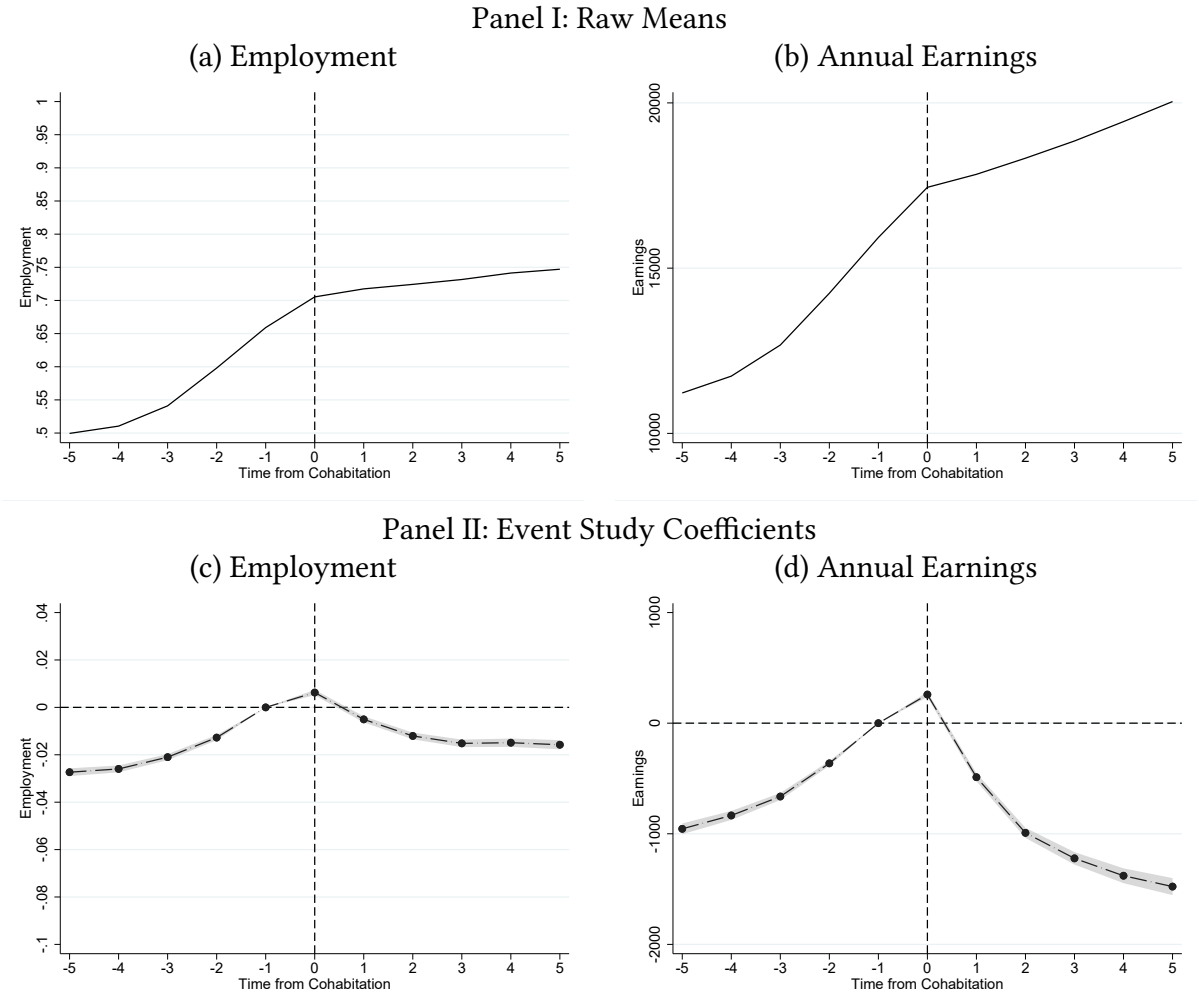
We report results in Figure B.4. The raw mean graphs (a) and (b) show growth in earnings and employment up until cohabitation. At cohabitation, there is a slope change, indicating a flattening out of employment and earnings for women upon cohabitation. However, unlike women in abusive couples, there is no decrease in earnings or employment. This already suggests stark differences in abusive versus non-abusive relationships in terms of total economic suppression.

Panels (c) and (d) report the impact on employment and earnings from equation 18 where we include calendar year and age fixed effects to control for earnings and employment changes over time and by age. We find that cohabitation results in a 2 percentage point employment drop for women *in general* by five years after cohabitation. The pre-trends indicate that earnings and employment were growing quite quickly prior to cohabitation. After cohabitation, there is a decrease in earnings and employment growth, compared with women who are of a similar age

but are not yet cohabiting with a partner.

These results are consistent with an employment "cohabitation tax" for women in general of around 2 percentage points. Since our main estimates compare women who cohabit with abusive men versus those who cohabit with non-abusive men, this general cohabitation tax is differenced out, meaning that Figure 2 shows the negative impact of cohabitation on female employment is 6.4 p.p. *larger* for women in abusive relationships.

Figure B.4: General Cohabitation Tax: Employment and Earnings



Notes: Panel I reports the raw means for employment and earnings of women 5 years prior and 5 years after cohabitation, excluding couples with a police report for domestic violence, i.e. excluding our "DV" couples. Panel II reports the impact of cohabiting with a partner on employment (c) and earnings (d) of women in general, estimating equation 18. The estimates compare women's outcomes after versus before cohabitation with the year before cohabitation relative to the year before cohabitation (the reference year which is omitted) and including year and age fixed effects. Employment is measured at the end of the year. Standard errors are clustered at the individual level.

C Data Appendix

C.1 Details on Main Data Sets Used

Police Data To identify which couples are "domestic violence" couples amongst all cohabiting couples, we leverage the police data we obtained which includes every single recorded offense in the police information system (PATJA) from 2006-2019. This data contains a number of useful variables.

First, and crucially for our analysis in this paper, we observe a unique case number, along with unique victim and perpetrator identifying numbers. We use these identifiers to link the police and labor market data as we describe below and identify perpetrators and victims who are also cohabiting couples.

Additionally, the police data indicates the type of offense (6-digit classification), whether the case has been reported to the prosecutor, whether the case is solved, and the age, gender, and location of the perpetrator and victim.

Labor Market and Demographics Data We obtain data on labor market outcomes and demographic details from the Finnish Employer-Employee linked data. For earlier years this data is known by the moniker "FLEED" and for later years (2017-2020), we use the FOLK modules which are identical, but formatted slightly differently. The FLEED data includes every person living in Finland from the ages 15 to 70, including both those who are employed and those who are unemployed.

This data contains many of our key outcomes of interest. Employment is an indicator taking value 1 if the individual was observed as employed in a reference week in December. Earnings are the sum of all taxable labor market earnings, including salary, wages, and self-employment earnings. This data also contains information on cohabitation status, which we use to construct our cohabiting couples.

C.2 Linking the Data Sets

To construct the panel data used in this paper, we link the above data sets together to obtain rich information on both DV and non-DV couples. For both the victim and perpetrator in the police data, we observe unique national identifying numbers. We use these numbers to link each individual in the police data to the FLEED and FOLK data. Because these numbers are unique, the linking is perfect, i.e. we never have to worry about "false" links unlike fuzzier matching techniques in other settings that rely on names. The links are also complete since the only way we would fail to link an individual aged 15-70 in the tax data to the FLEED and FOLK data is if the individual died or moved out of Finland.

C.3 Identifying Domestic Violence

As described in Section 2, we identify cohabiting couples who experience domestic violence by using the same standard Statistics Finland applies when calculating the national statistics on domestic violence prevalence in Finland.

This entails two restrictions. First, we restrict to police reports where the victim and perpetrators either currently cohabit or were cohabiting at some point in the past 5 years. Second, we restrict to the same crime codes Statistics Finland uses to identify domestic violence cases.