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Miguel De Iruarrizaga T.

PONTIFICIA UNIVERSIDAD CATOLICA DE CHILE
INSTITUTO DE ECONOMIA
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De Iruarrizaga, Tagle, Miguel

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Miguel de Iruarrizaga Tagle

Comisión

Hugo Silva
Kenzo Asahi

Santiago, Diciembre de 2020

Next Station: Crime.
Impact of the Expansion of Santiago's Subway Network on Criminal Activity*

Miguel de Iruarrizaga†
Instituto de Economía
Pontificia Universidad Católica de Chile

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Abstract *This thesis explores the effect of a subway network expansion on different crime outcomes. During the mid-2000s Santiago's (Chile) subway system grew by nearly 50%. I use Difference in Differences and Event Study approaches, and a novel dataset that looks at both the location of crimes and the offender's home address. I find that people living near the new stations committed fewer property crimes after they opened. Larceny falls around 45%, three to five years after the inaugurations. I also find a smaller negative effect on violence-related crimes. Exploring different mechanisms, I find that the Metro expansion helped reduce commuting time, and to increase wages and working hours. This set of results could imply that better connectivity helps reduce criminal activity by creating better job opportunities.*

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†Comments at mdeiruarrizaga1@uc.cl.

1 Introduction

Public transport accessibility is of great relevance to several topics, from employment to real estate value, from education to well-being, especially in developing countries where the transport infrastructure is commonly poor (Zarate, 2020). Recent studies have shown that the welfare gains of better transport go beyond, are larger and more complex than just commuting-time savings (Tsivanidis, 2019). Using the context of a subway expansion in a developing country, this thesis aims to study the impact of public transport accessibility on crime and the choice to engage in it.

Between the years 2004 and 2006, the Santiago's subway system, the capital of Chile, also known as "Metro", grew at an astonishing rate. Forty new stations were inaugurated, including a 24 km new line, with 21 stations being inaugurated in November 2005 (before 2004, there were 51 stations). This expansion meant that many people who lived in the city's periphery were now better connected to the center. I intend to use this shock in connectivity to address the question of how does the opening of a Metro station in a peripheral district affect criminal activity.

Following a "Rational Choice Perspective" model of criminal activity (Becker, 1968; Clarke and Cornish, 1987; Brantingham and Brantingham, 1993), one could predict many different effects on crime of a shock in connectivity. Intuitively, a new subway line changes many of the factors one would take into consideration at the moment of committing an offense. The monetary cost of going to offend, the travel time, the difficulty of finding a legal job or how many people are walking nearby are examples of those factors. Depending on which and how much these different factors change, there could be different effects on criminal activity.

One possible change in criminal behavior follows the "journey to crime" hypothesis. If people are already engaging in illegal activities, they could use the Metro system to get to better "bounties" like financial districts or high-income suburban neighborhoods. There is some anecdotal evidence of this (Brantingham et al., 1991; Smith and Clarke, 2000), but empirical evidence points in the other direction (Ihlanfeldt, 2003; Ligett et al., 2003).

Another possibility is that new Metro Stations act as "Crime attractors", a concept used by Brantingham and Brantingham (1995) to refer to *"places, areas, neighborhoods, districts which create well-known criminal opportunities to which (...) criminal offenders are attracted"*. For this hypothesis, the evidence is not conclusive. Ihlanfeldt (2003) found that rail access increased crime in poor neighborhoods, and decreased it in suburban ones in Atlanta. There is also evidence that light rail expansions do not attract crime (Liggett et al., 2003) or only in a short period but not in the long run (Poister, 1996). For the Chilean case, Dominguez and Asahi (2020), using instrumental variables and fixed effects models, find that the 2004-05 inaugurations of Santiago's Metro caused a rise in larceny crimes committed near the new subway stations (but not in other forms of crimes) within one year after their opening.

On the other hand, better public transport could help lower criminal activity. There is strong evidence that better connectivity generates better job opportunities and wages (Holzer et al., 2003; Gibbons and Machin, 2005; Zarate, 2020). A "rational choice perspective" model would

predict a fall in criminal activity as the opportunity cost rises, leaning the scale from the "illegal job market" towards the legal one. Billings et al. (2011) provide evidence that property crimes[1] decreased after the Charlotte line was announced and started operating. Ihlanfeldt (2002) finds that job access explains 21% of property crime difference between black and white neighborhoods, and Ihlanfeldt (2007) that better job access can reduce drug-related crimes. I will refer to this as the "job opportunity" hypothesis.

Besides property crimes, I also study violent crimes, like injuries and intrafamily violence (IFV), the latest also referred to as domestic violence. It could be argued that these crimes are different from property ones, for the motivation (at least explicitly) is not monetary. For example, many argue that IFV is motivated by emotions or loss of control (Card, 2011). However, a rational framework can be applied to model this kind of behavior, and the same mechanisms behind the "job opportunity" (higher wages, less commuting time) could explain this particular offense's changes for both rational and emotional models. Longer commuting times have been found to increase stress (Evans and Wener, 2006), reduce spouses' employment[2] (Carta and Philippis, 2018), and reduce time dedicated to sleep and physical activities (Christian, 2012). There is strong evidence that women's employment decreases domestic violence against them (Bowlus and Seitz, 2006; Tauchel et al., 1991; Aizer, 2010); and that psychological stress is involved in the loss of control or of predictability (Sapolsky, 1994), which is associated with domestic violence. To the best of my knowledge, this is the first work to study the direct link between better transport connectivity and family violence.

The main identification problem in the crime literature reviewed above is that all of these forces could be working simultaneously. A new subway station can change, in different directions, the decision-to-offend of the people living near it and of those who don't, but can go there. For example, an increase in crimes committed near the stations could lead to the belief that the "job opportunity" hypothesis does not apply, when it could be that the crime committed by neighbors of the station falls, while criminal activity from other parts of the city is being attracted instead. So, it is relevant to identify crimes that are committed near the stations and crimes committed by people living near them.

The literature review above looks only at crimes committed at a place and not the offender's "journey to crime". Therefore they only observe the aggregated effect and cannot disentangle the different forces behind it and measure their magnitudes. Having access only to data on the places where the crimes are committed can limit the scope of crime analysis and its mechanisms. To overcome this problem, it is useful to use the home address of the offender. Iwanski et al. (2011) and Reid et al. (2014) develop a Criminal Movement Model (CriMM). With knowledge of offenders' home locations and the locations of major attractors (in this case, shopping centers) for Vancouver, the authors found that most crimes are committed in the route that offenders are likely to take when traveling from their home to an attractor. Similar results are found by

[1] Property crime is a category of crime, usually involving private property, which objective is to obtain money, property, or some other benefit. It includes, among other crimes, burglary, larceny, theft, motor vehicle theft, and shoplifting.

[2] for men

Frank et al. (2011). However, the question of how public transport affects crime is not discussed because it is not the purpose of these studies.

Using a novel data set, which includes the home address of the alleged perpetrator(s) of the crimes, this thesis contributes to the existing literature by looking at the changes in crimes committed by people living near the new stations. By doing this, I can look at the effect of the subway expansion on the decision to offend, testing the "job opportunity" hypothesis without any attraction effects.

Using Difference in Differences and Event Study approaches with fixed effects, I estimate the causal effect of the new Metro stations on criminal activity. My findings suggest that, first, better public connectivity caused a drop in crimes committed by people living near the new stations, mostly for larceny. Larceny falls around 45% three to five years after the inaugurations. Secondly, I find smaller but significant reductions of other property crimes (robbery, vehicle theft and burglary), although not as consistently as with larceny. Third, there is evidence of a reduction in violent crimes, injuries and IFV, although much weaker that property crimes. The effects for all six types of crime are stronger the closer the people live to the new stations. My results are robust to different specifications and parameters. Using different Government surveys and Census data, I find suggestive evidence that these findings could be due to better job opportunities and lower commuting times.

The remainder of the paper is organized as follows: Section 2 outlines the context and background of the 2000's Metro expansion. Section 3 discusses the theoretical framework. Section 4 introduces the data. Section 5 presents the empirical strategy, while Section 6 presents and discusses the results and some robustness checks. Section 7 presents the concluding remarks.

2 Background

2.1 Santiago's Public Transport System

Santiago's subway system, or Metro, is an essential part of the city and its transport network. In 2001, 46 percent of the motorized trips were made by bus and 12 percent by subway (Asahi, 2006). The subway network covered the city's densest part in terms of population and was a fast and reliable transport system. Even though the bus network covered Santiago as a whole, the subway system did not serve the metropolitan periphery. At that moment, the subway transported an average of half a million passengers daily (Metro, 2010) in a city with a population of around 5 million. Metro is organized in "Líneas", lines, each having a number as its name.

In May 2001, the Chilean government announced the construction of subway Line 4, a 24-km subway line running from near Santiago's business district to one of the most excluded and poorest neighborhoods in the south of the city. Before this, the Metro was composed of 52 stations in 3 lines (1, 2 and 5). Line 4 was inaugurated in two phases; the first in November 2005 and the second in March 2006. Before this date, many citizens living in Santiago's most

unserviced areas in the southeast of the city (Puente Alto) had more than four-hour round trip commutes each day to get to jobs and schools in the central business district and the wealthier part of the city (Providencia and Las Condes) located in the north eastern part of the city (Asahi, 2006). Figure 1 illustrates the map of Santiago and Metro. In November 2005 there was also a small expansion on Line 2,[3] and a 14-km extension of Line 5 was announced. This extension was inaugurated in February 2011. With this new route, the Metro network exceeded 100 km in length, consolidating itself as the second-largest in Latin America (Metro, 2010). Figure 2 shows the official map of Metro in 2011.

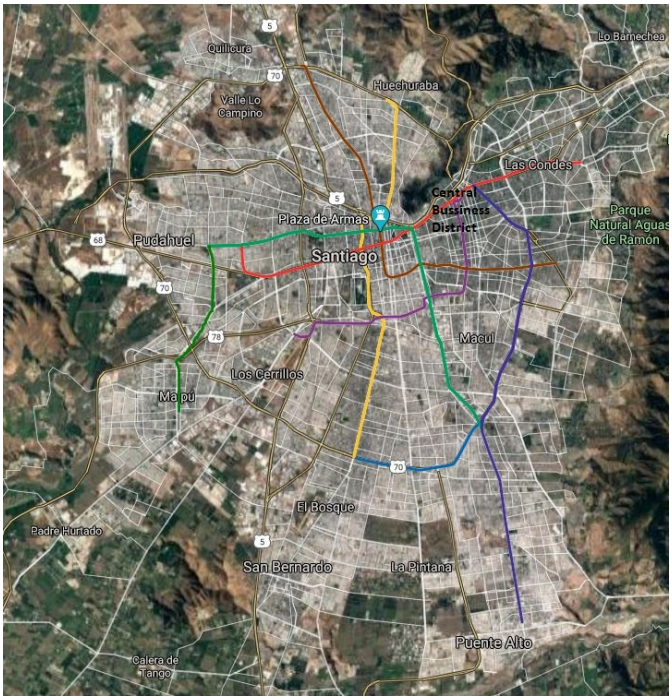

Figure 1: Metro and Santiago. *Source:* Google Maps

After 2006, the Metro had 92 stations and five lines (1, 2, 4, 4A, 5), 60% more stations than just three years earlier; and passed from near 40 km of lines to 94 km. 21 of those opened their doors on November 2005, the greatest expansion of Santiago's subway network since the 1970s, which implied a notorious increase in urban transport accessibility. The Metro passed from nearly 200 million passengers a year in the early 2000s to 620 million in 2010.[4] Figure 3 illustrates the expansion of Metro.

[3] A detail of the 2005-2010's expansions can be seen in Tables A17-A20 in Appendix A

[4] Part of this jump is due to "Transantiago", the new operating system that, controversially, unified subway and bus services in 2007.

Figure 2: Map of Metro in 2011. *Source:* Metro

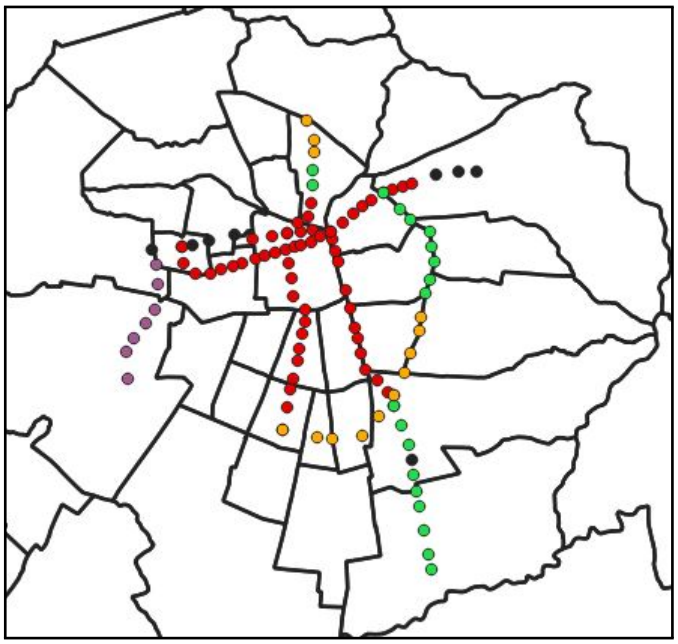

Figure 3: Metro Expansion.
Each dot represents a Metro Subway Station. Red dots are those stations inaugurated before 2005, green those that opened in 2005, yellow those that opened in 2006, black those inaugurated in 2009 and 2010, and purple the 2011 extension. Black lines are Municipalities' boundaries.

2.2 Crime in Santiago

The Chilean context is particularly interesting for crime studies. Chile has the 4th biggest homicide and robbery rates of OCDE countries (crimes per 100,000 people), the last one being around four times the USA rate (Cowen, 2010). On the other hand, Chile has the lowest homicide rate of Latin American Countries (UNODC, 2019). That makes Santiago, Chile's biggest city, an intermediate point between rich low-crime (OCDE) and poor high-crime (Latin America) countries.

Table 1 presents the number of crimes per category for each year of the dataset. Of all property crimes, Larceny is the most committed crime. We can also see a rising pattern in almost all crimes from 2005 to 2009, and a small drop in 2010. There could be a concern that these patterns affected my estimation. However, the empirical strategy explained in Section 5 solves this issue.

Table 1: Number of crimes

	Year						
Crime Category	2005	2006	2007	2008	2009	2010	Total
Robbery	3,074	5,235	5,098	4,724	5,108	4,206	27,445
Larceny	4,774	23,154	28,515	29,409	33,210	28,745	147,807
Vehicle theft	639	649	1,073	942	1,291	1,248	5,842
Burglary	1,329	2,644	2,491	2,546	2,864	2,632	14,506
Injuries	5,241	8,072	8,339	11,002	12,819	13,431	58,904
Intrafamily Violence	3,013	9,850	12,913	19,058	21,087	20,935	86,856
Total	18,070	49,604	58,429	67,681	76,379	71,197	341,360

Source: Carabineros de Chile

3 Theoretical model

Brantinham and Brantingham (1993) explain that *"crime do not occur randomly nor uniformly in time or space or society. Choices are made and actions follow choices. (...) people who commit crime spend most of their time engaged in noncriminal behavior."* The decision to commit a crime depends on rational decision making, and anyone is a potential offender.[5]

In order to answer the question of how criminal behavior changes after a shock in transport connectivity, I follow a Rational Choice Model (Becker, 1968; Clarke and Cornish, 1987). It assumes that offenders, potential victims, and law enforcement authorities are rational individuals who interact in a 'market for offenses,' where a potential offender i will engage in criminal activity of type c, if the expected benefits of committing a crime $U_i(W_c)$ are greater than the costs. Following Freeman (1999), a person i commits a crime of type c if:

[5] Although the reader may immediately think "not me", remember the last time you drove past the speed limit.

$$(1-p)U_i(W_c) - pU_i(S) > U_i(W_l) \tag{1}$$

Where p is the probability of getting caught, S the cost of punishment and W_l the wages of a legal job.[6]

The expansion of the public transport system, in this case, the Metro, can affect several of the parameters on the equation above. W_l could rise, as a consequence of better connectivity to the city's center, or maybe the Metro generates new business opportunities, even as simple as selling candy or singing in the wagons. In this model, these activities are a substitute to crime, as both are time consuming. The rise in its returns represents an increase in the opportunity cost of engaging in criminal activity, therefore a fall in crime would be expected. On the other hand, W_c could rise. First, the same way the Metro attracts business opportunities and people, it provides opportunities to rob them. In second place, it could decrease the costs of crime, for example in time travelled to offend, which would in turn increase crime.

This changes won't be the same for every person or every crime. For example, an agent who is engaged in big and heavily sanction crimes (as burglary or vehicle theft) isn't choosing his activity "on the margin". In other words, it would require significant changes in the returns of crimes and legal activities for him to migrate to the legal market. One would expect to see changes in someone who is marginally choosing crime over other activities, or vice versa.

The theory above suits well for property crimes (theft, robbery, burglary and so on) but for violent crimes (assault, rape, murder) it's less clear. In the case of intrafamily violence, economists have also follow a Rational Choice Model, interpreting family violence as instrumental behavior (Tauchen et al., 1991; Bowlus and Seitz, 2006), or as a behavior liked by men and that women tolerate in return of higher transfers (Azier, 2010). An extension of these models is present by Card (2011), where there is a probability for couples to have interactions that scale to violence, and that this can be triggered by emotional cues (in that study, NFL results).

Following those works, I propose an expansion of the model above for violent crimes (injuries and, specially, IFV). A person will engage in violent behavior if it's gains are greater than the cost, but depending now of a factor v, which represents the proclivity to violence of i, and depends of rational things (income, for example) and irrational emotional cues (like a NFL loss). Now, an individual i will commit domestic violence if:

$$v_i((1-p)U_i(W_c)) - pU_i(S) > 0 \tag{2}$$

I predict that a positive shock in transport connectivity should decrease IFV and injuries crimes, by two possible mechanisms. First, for IFV, if better connectivity generates better job opportunities for women, their bargain power inside their relationships would enhance (Aizer, 2010),

[6]Here I understand legal both as formal and informal activities that not represent a theft or violent crimes. This because, for example, selling food on the street or singing in Metro's wagons are also illegal, but for the proposed framework I consider them legit activities.

rising p or S.[7] Second, better connectivity is predicted to generate better life conditions, economic situation and less commuting time, which could generate a decrease in v.

The first model presented in equation (1) predicts that a positive connectivity shock, as the Metro expansion, could either produce an increase or decrease in property crimes, depending of which effect is bigger, a higher opportunity cost (better job opportunities) or higher rewards to crime. The extended model, on equation (2), predicts a fall in violence-type crimes, although it should be a smaller effect. To test this predictions I use administrative data of criminal activity in Santiago, Chile; which I describe in the following section, and present a empirical strategy in section 5.

4 Data

4.1 Crime Data

In order to answer if more or less crimes are committed after a shock in public transport connectivity, I use a novel dataset that consists of geo-referenced administrative data from Chilean centralized police agency's (Carabineros de Chile) records between 2005 and 2010. I have detailed information about 341,538 crime incidents (day, time, place geocoded location), and also the geocoded address of the alleged perpetrator (accused or arrested, from know on the "participant") for the said period in Santiago, Chile's biggest city and capital. Having both the crime's location and the offender's home address will allow me to shed some light on the mechanisms behind the relation between public transport and crime. To group these crimes, I generate a geographical grid made of squares of 250x250 meters. Then I calculate the distance between each grid square's centroid to the nearest metro station for each period. Different sizes of squares are used as robustness checks.

The crime variables are constructed following Dominguez and Asahi (2020) and the classification of crimes that uses the 'Subsecretaría de Prevención del Delito',[8] generating six broad types of crime. Property crimes are classified as the following: Robbery is identified as robbery with violence ('Robo con violencia o intimidación') and others thefts with violence ('Otros robos con fuerza'); larceny as thefts by surprise ('Robo por sorpresa') and larcenies ('hurtos'); Vehicle theft as thefts of motorised vehicles ('Robo de vehículo motorizado ') or thefts of objects from a vehicle ('Robo de objetos de o desde vehículo'); and burglary as those thefts in either a inhabited or uninhabited place ('Robo en lugar habitado' and 'Robo en lugar habitado'). Violent crimes are classified into two categories: injuries, including minor, less serious, serious and very serious injuries, homicide and rape ('Lesiones menos graves, graves o gravisimas', 'Lesiones leves', 'homicidios' and 'violaciones'); and Intrafamily violence (IFV) as any intrafamily violence ('violencia intrafamiliar, VIF') against a woman, man, child or elderly person.

[7] Higher probability to denounce could translate into more crimes being reported but not having a deterrent effect, which would generate a rise in IFV in our data

[8] Organism responsible for the preparation, coordination, execution, and evaluation of public policies aimed at preventing crime; in addition to rehabilitating and socially reintegrating violators of Chilean laws.

In Table 2 we can see the average number of crimes (by type) per grid square. The most common offense is Larceny, followed by IFV.

Table 2: Average Number of crimes per 250x250 Grid

Section A: All						
	Year					
Crime Category	2005	2006	2007	2008	2009	2010
Robbery	0.598	0.747	0.683	0.613	0.636	0.530
Larceny	0.923	3.220	3.726	3.695	4.070	3.604
Vehicle Theft	0.129	0.095	0.145	0.122	0.163	0.160
Burglary	0.257	0.382	0.340	0.327	0.360	0.337
Injuries	0.963	1.130	1.083	1.381	1.548	1.676
Intrafamily Violence	0.503	1.325	1.596	2.388	2.602	2.582
Section B: Treat and Control groups only						
	Year					
Crime Category	2005	2006	2007	2008	2009	2010
Robbery	0.612	0.826	0.729	0.601	0.537	0.436
Larceny	1.120	3.892	4.768	4.237	4.551	4.029
Vehicle Theft	0.105	0.089	0.194	0.110	0.176	0.123
Burglary	0.219	0.334	0.323	0.372	0.358	0.284
Injuries	0.802	0.670	0.834	1.040	1.242	1.389
Intrafamily Violence	0.569	1.027	1.046	1.981	2.426	2.643

Notes: *Source: Carabineros de Chile.* Average number of crimes is calculated using a 250x250 meters square geographic grid. Treated and Control groups are defined according to the distance between each grid's centroid and it's nearest Metro Station. Section 5 of this paper provides a detailed explanation on both the grid and the groups used.

When using administrative police data, one common concern is that we're looking at crimes reported, instead of crimes actually committed, which could bias any results if the victims' probability of denouncing a crime changed. The empirical strategy proposed in the next section intends to resolve this and others inference challenges.

4.2 Additional Data

I use the 2002 Chilean census to calculate, in an alternative specification, the crimes per 100,000 people.[9] I calculate this rate at both "Zona Censal" (census zone) and "Manzana Censal" (census block) level. The advantage of using the census is that I can control for other covariates, like population or socioeconomic measures.

Additionally, In Section 6, I use the 2002 and 2012 Census to look at the Metro's impact on

[9]This is the international standard measure for crime rates.

different outcomes, as the number of people changing their "Comuna" or the unemployment. The 2012 Census presented some methodological issues, especially of population coverage (INE, 2014). However, this problem is more relevant in rural areas and outside Santiago. The results derived from this database in my work should not be affected or biased by this and other problems of the 2012 census.

I also use the "Encuesta Origen Destino" (EOD), or Origin-Destination Survey, for the years 2001 and 2012, to see the impact of the Metro on the commuting time. The EOD is developed by the "Programa de Vialidad y Transporte Urbano" (SECTRA), or The Urban Roads and Transportation Program, dependent of the Ministry of Transportation and Telecommunications. It is used to support the formulation of infrastructure plans, transport policies and projects that improve people's mobility conditions in Santiago (SECTRA, 2012).

Lastly, I use a detailed individual panel dataset called "Panel CASEN", or National Socioeconomic Characterization Survey, carried out by the Ministry of Social Development. The Casen Panel dataset is a follow-up of the 1996 cross-section Casen survey, with follow-ups on 2001 and 2006. Unlike the classic cross-section Casen, on the Casen Panel the survey was applied to the same sample of households or individuals across time. This allows me to distinguish the effect the Metro had on people living near it before and after, from compositional effects. This Longitudinal survey has information about individuals' schooling, health, demographic characteristics, housing, income, and working hours. The main concern about this dataset is that it's analyzed at Municipality level, so the results must be interpreted with caution.

5 Empirical strategy

This section discusses the method used for quantifying the impact of Santiago's Metro expansion on different criminal outcomes. First, I describe the geographical unit of analysis, then I present the strategies used to find a causal effect.

5.1 Geographical Unit

The outcome of interest in this work is the number of crimes commited by people living in a given geographical unit. Chile's smallest administrative unit are "Comunas" or Municipality. Chile is divided in 346 Comunas, with 40 in the Santiago Metropolitan area. Therefore, using a municipality level aggregation would not provide enough observations. Other options could be the Census administrative units mentioned in Section 3: Zone or Block level. With the Zone level there is a similar problem as with municipality, as the number of observations would be too small. On the other hand, the area size of the census' blocks is, in many cases, too small so the number of crimes per block would be zero too often. However, this units are used to provide robustness to my main results.

To group the crimes, I generate a grid made of squares of 250x250 meters. This size is big enough to capture a sufficient number of crimes, and small enough to allow to discriminate

between those located at "walking distance" from the Metro system and those that are not. I calculate the distance between each grid square's centroid to the nearest metro station for each period.

Using a grid has the disadvantage that not many covariates can be straightforwardly included in the regressions. In an alternative specification, I use Census units to include population data to the equation. In Section 6, I show that the results are very similar. The advantage of using a grid is that it allows for checking if the results are robust to different sizes. I provide robustness checks using 200x200 and 300x300 meters squares in Section 6, and show that the results are not driven by the grid's size. Figure A1 in Appendix A shows an example of the geographical grid used.

As this work aims to disentangle the effects of the attraction of crime from the decision to offend, I estimate the effect from the participant view. When looking at the problem from the "participant view", I measure the number of crimes committed by residents of any grid square, not the number of crimes committed in those grid squares (which would be the "crime point of view"). One would expect that the crime and the participant's home are (mostly) in different grid squares. In Figure A2 in Appendix A, we can see the distribution of the distance between the crime and the participant's home, depending on the crime. It is clear that for most of the crimes the location of the offense and it's perpetrator home are more tan 250 meters apart.

In the next subsections I present the two empirical strategies used in this thesis. First, I propose a difference in difference with fixed effects. Later, I expand this model to include the 2006 inaugurations, using a Event Study approach.

5.2 Difference in Differences

Section 2 argues that the Santiago's Metro expansion could have either a positive or a negative effect on the individuals choice to engage in criminal activities. A first approach would be to estimate a simple OLS model:

$$y_i = \alpha + \beta Metro_i + \epsilon_i \tag{3}$$

Where y_i represents a crime outcome for a geographical unit i, and $Metro_i$ a dummy that represents whether i it is affected by the expansion. An endogeneity problem arises from the equation (3), as there could be unobserved characteristics that could be correlated both with the outcome of interest and the proximity to the subway network and it expansion, biasing the results. This because subway lines are not randomly distributed across the city, as rather built following it main arteries, which have a higher transit of people and goods. One possible way to solve this problem is to use a fixed effect model that accounts for all the unobserved characteristics that are either time or geographic invariant. Another possible solution is to use a difference in differences model, in order to compare the changes in crime of the "treated" population with the changes of the population that remain non-affected, isolating the effect from pre-existing differences between those populations.

In order to find a causal effect of improved accesibility on crime, I exploit the panel data using

a difference-in-difference approach with fixed effects, similar to the one used by Billings et al. (2011) and Ligget et al. (2003).[10] The main DID model is shown in equation (4):

$$y_{it} = \alpha Metro_i + \sum_{t=1}^{6} \beta_t Metro_i * Year_t + X_{it} + \phi_t + \delta_i + \epsilon_{it} \tag{4}$$

Where y_{it} is the outcome for a grid square i in the year t. The main outcome is the number of crimes for six different categories: robbery, larceny, burglary, car theft, injuries and IFV, committed by people living in a grid square i in the year t. The main focus is on the crimes that our theoretical framework predicts to being more susceptible to change, larceny crimes. Additionally, I use as outcome the distance between the location where a crime was committed and the home address of the participant. $Year_t$ acts as an indicator function for every year. X represents a set of controls. In the main specification, I include the baseline level of crime for grid i interacting with the year dummy. ϕ_t and δ_i are year and grid fixed effects, respectively. ϵ_{it} represents the term of error. Following the spirit of Abadie et al. (2017), I cluster the errors by distance to each grid's nearest station, using two kilometers wide intervals.[11]

$Metro_i$ is a dummy equal to one for those grids i that were in a "walking distance" from a Metro station after the 2005 inaugurations and that were not before.[12] Therefore, I will call this group "treated" by the Metro. The "walking" distance is defined as 2 kilometers because is approximately the distance the average person walks in 20 minutes. Above that threshold, is is reasonable to assume that most of the people would use another means of transportation than walking to the metro. Also, in our data set, 20% of our observations are at 2 kilometers or less from the new stations.

$Metro_i$ is equal to zero for the control group, those grids that were not within walking distance neither before nor after the inaugurations. I consider not being in walking distance when it is between 3 and 5 kilometers, leaving a "buffer zone" of 1 kilometer between treated and control groups. Given that one would expect that the treatment effect is continuous, it would be unreasonable to expect a sharp cutoff. I provide evidence of the robustness of my results to other walking and buffer distances.

Given that more stations were added to the system between 2006 and 2010, I exclude all grids that, using the same criteria explained above, can be considered "treated" by these new stations. The reason for this is that those grids experienced connectivity shocks after 2005, and therefore would not be a clean control group. In the next subsection I extend this model to include the 2006 stations.

[10] The approach also has similarities with the one used by Asahi (2016) and Dominguez and Asahi (2020)

[11] In Appendix B I provide the results for the main tables using robust standard errors and show that my results are actually stronger without clustering. Therefore, the significance of my results is not driven by the clustering level, but rather a conservative lower bound.

[12] I exclude those grids that were near existing Metro stations before 2005 because they are already connected to the subway system and therefore would not experience a connectivity shock from a new station, or at least not in the same magnitude.

5.3 Event Study

In order to include the 13 stations inaugurated throughout 2006, I extend the model described in equation (4) towards an Event Study strategy.

$$y_{it} = \alpha Metro_i + \sum_{t=0}^{4} \beta_t Metro_i * T_t + X_{it} + \phi_t + \delta_i + \epsilon_{it} \tag{5}$$

Where T_t is an indicator function for every year after each inauguration (and one before). The difference from equation (4) is that, given that now we are comparing 34 stations that opened in 4 different periods, t now refers to an anniversary year rather than a calendar year. As seen in Tables A18 and A19 in Appendix A, there are 4 groups of inaugurations: 21 new stations on November 25-30 2005, 4 on March 2 2006, 6 on August 16 2006 and 3 on December 21 2006. The same definition for $Metro$ is used, excluding all grids that are "treated" by stations that opened before 2005 or after 2006. Grid squares that belong to the treated or control groups according to the distances to two or more groups of stations are also excluded. The rest of the parameters remain the same as explained in equation (4).

The main concern we have at this moment is whether the effect we find is actually the effect of the connectivity shock. Both empirical approaches solve this identification problem, as we compare the effect of the new metro stations within geographical unit across the time, and within any year across different units. Therefore, any difference in crime levels (or other characteristics) between the treated and control groups would not bias my results. The same for temporal shocks affecting both groups. Next, I propose some alternative specifications that follow the same principle.

5.4 Alternative Specifications

As the international standard measure for crime rates is crimes per 100,000 people, I use the Chilean 2002 census' geographic units instead of the square grid, to calculate this. This specification is shown in equation (6):

$$y_{ct} = \alpha Metro_c + \sum_{t=1}^{6} \beta_t Metro_c * Year_t + X_{ct} + \phi_t + \delta_c + \epsilon_{ct} \tag{6}$$

Where y_{ct} is the number of crimes per 100,000 people in the period t for the census unit c, which can be Census Zone or Census Block. X_{ct} is a vector of covariates interacted with the $Year_t$ indicator. For Census Block I control for population and the percentages of people of the top and bottom socioeconomic group defined in the census. For Census Zone I control for population.

I also test an alternative model, following Gibbons and Machin (2005), that includes the change in the distance to the Metro interacting with the "walking distance" dummy, shown in Equation

(7):

$$y_{it} = \alpha Metro_i + \sum_{t=1}^{6} \beta_t \Delta dist_i * Metro_i * Year_t + X_{it} + \phi_t + \delta_i + \epsilon_{it} \quad (7)$$

The change in distance $\Delta dist_i$ is the only difference with the model presented in equation (4). This specification allows me to study the heterogeneity of the effect among the "treated" zones.

Both alternative specifications are tested for the Difference in Difference and Event Study models.[13]

5.5 Parallel Trends

The central assumption in a difference in differences model is that the measured outcomes' trends follow a similar pattern or tendency, better known as "parallel trends". Despite differences in levels of crime before 2006, looking at the pre-trends allows us to assume that, in the absence of the Metro expansion, the changes in criminal activity over the years would not have been systematically different over the different neighborhoods, and therefore, any difference between the changes between them can be interpreted as a causal effect of the public transport shock. If this assumption does not hold, the results could be partly due to a difference in the previous characteristics and behavior between the different groups.

To test this assumption, I evaluate the behavior of crimes before November 30, 2005 (when the new stations opened). Given that I have data since January 1, I aggregate the data by trimesters and check the parallel trends assumption both visually and doing a falsification test. As I have fewer crimes per grid, I also group the crimes in two categories: property crimes (robbery, larceny, burglary, and vehicle theft) and violent crimes (injuries and IFV). I also check the trends for the total of crimes Figures 4 and 5 illustrate the trends, and they appear to satisfy the assumption. Figure A4 in the Appendix illustrates the trends for the average distance between the crime's location and the offender's home.

[13] Therefore, the parameter $Year_t$ corresponds to a calendar year or an anniversary year, respectively.

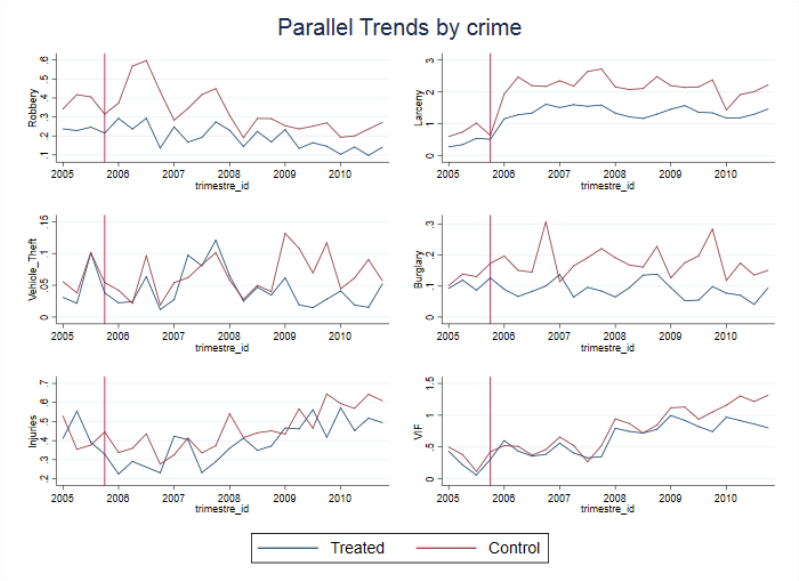

Figure 4: Trends in crimes, by category

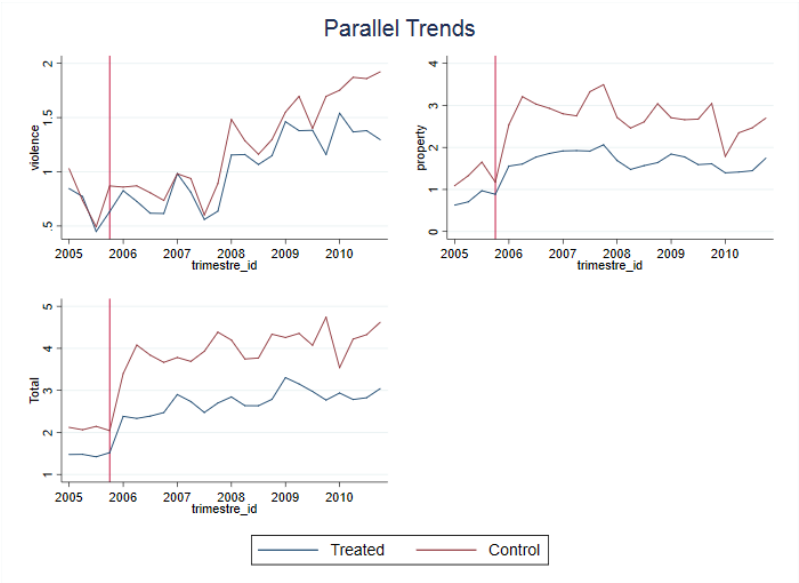

Figure 5: Trends in crimes, by type and total

For the falsification test, I run the same model presented before, but instead of using year dummies, I use trimester dummies. If the pre-trends are parallel, the coefficient of the interaction between treatment and trimester should be statistically equal to zero. Table 3 shows this test results, and I find no evidence against the "parallel trends" assumptions. In Table A1 in Appendix A I show the result of the falsification test for the group variables (property, violence and total crimes), and in Table A2 the results for the test using the Event Study Strategy, at a

bimester level.

Table 3: Parallel Trends: Falsification Test.
Difference in Difference, 2005 Inaugurations

	Robbery	Larceny	Vehicle Theft	Burglary	Injuries	IFV
	(1)	(2)	(3)	(4)	(5)	(6)
Metro*2005trim2	-0.117	0.075	0.025	-0.024	0.386	-0.072
	(0.264)	(0.090)	(0.041)	(0.136)	(0.248)	(0.101)
Metro*2005trim3	-0.139	0.094	0.083	-0.062	0.293	-0.012
	(0.242)	(0.175)	(0.069)	(0.108)	(0.292)	(0.122)
Metro*2005trim4	-0.045	0.252	0.044	-0.069	0.028	0.092
	(0.201)	(0.161)	(0.036)	(0.089)	(0.230)	(0.130)
N	522	522	522	522	522	522
R^2	0.398	0.533	0.330	0.377	0.349	0.443

Notes: Robust standard errors are clustered by distance to each grid's nearest station, using two kilometers wide intervals, and reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. IFV stands for Intrafamily violence. Grid and Trimester Fixed Effects included. Metro is a dummy representing being in "walking distance" of the new stations. Is equal to one for the grid squares that were less than 2 km. from a Metro station inaugurated on 2005, and zero for those that were between 3 and 5 km. All grids that were less than 3 km from a Metro station inaugurated before or after 2005 are excluded.

As noted in Section 4, one possible problem could be changes in the victims' propensity to report a crime. The benefit of the models I propose it's that, as long as the change does not correlate with the Metro expansion, it won't bias our analysis. Nevertheless, I'm not aware of a proper way to test for changes in the probability to denounce, so this must be taken into consideration when discussing the results. Especially for IFV, because the probability to denounce can play an important role, as noted in Section 2.

Another valid concern is that the effect found would correspond to a information shock rather that a connectivity one. However, this is not a problem in my framework, as the new stations inaugurated in 2005 were announced before the first year of my dataset. Therefore, any effect found would correspond to the station being opened and used, not of it being announced. Nevertheless, this could be the case of the stations that were announced during the period of time studied (2005-2010) but built afterwards. To solve this, I exclude from both treated and control groups the observations near those stations (using the same criteria explained before). In Section 6.3, I use the stations announced on 2005 and inaugurated on 2011 to analyse possible mechanisms behind the results.

6 Results

In this section I discuss the results for the Difference in Difference and Event Study specifications. The results for the Difference in Differences model using the 2005 inaugurations are shown in Table 4. We can see a very strong and significant drop in most property crimes three to five years post the inauguration of the stations, which follows the predictions made in the theoretical model. We can also see a negative and statistical significant drop in violent crimes, specially IFV, 5 years post the openings.

Table 4: Main Specification - Difference in Differences: 2005 Inaugurations

	Dependent Variable: Number of crimes					
	Robbery	Larceny	Vehicle Theft	Burglary	Injuries	IFV
	(1)	(2)	(3)	(4)	(5)	(6)
Metro*2006	-0.475	-0.902	-0.071*	-0.305***	-0.258	-0.180
	(0.393)	(0.693)	(0.039)	(0.058)	(0.190)	(0.257)
Metro*2007	-0.376	-1.403	-0.013	-0.217**	-0.123	-0.315
	(0.269)	(0.910)	(0.087)	(0.096)	(0.206)	(0.274)
Metro*2008	-0.256	-1.900**	-0.040	-0.248**	-0.280	-0.258
	(0.182)	(0.799)	(0.063)	(0.101)	(0.247)	(0.446)
Metro*2009	-0.320*	-1.950**	-0.279***	-0.408***	-0.164	-0.571
	(0.158)	(0.848)	(0.067)	(0.095)	(0.204)	(0.476)
Metro*2010	-0.432***	-1.793**	-0.149**	-0.315***	-0.449*	-1.155**
	(0.144)	(0.715)	(0.069)	(0.094)	(0.231)	(0.520)
N	2879	2879	2879	2879	2879	2879
R^2	0.597	0.820	0.381	0.505	0.502	0.582

Notes: Robust standard errors are clustered by distance to each grid's nearest station, using two kilometers wide intervals, and reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. IFV stands for Intrafamily violence. Grid and Year Fixed effects included. Crime baseline-level controlled. Metro is a dummy representing being in "walking distance" of the new stations. Is equal to one for the grid squares that were less than 2 km. from a Metro station inaugurated on 2005, and zero for those that were between 3 and 5 km. All grids that were less than 3 km from a Metro station inaugurated before or after 2005 are excluded.

The decrease in larceny crimes is particularly strong, both in coefficient and significance (second column). For the first two years we can observe a negative, yet not statistically significant, effect on crime. Three to five years after the stations opened, we see a effect of about 1.8-1.9 less larceny crimes committed by people living in those grids by year, statistically significant . Considering an average of around 4 crimes per grid,[14] this represents near a 45% drop. This suggest that there is a long-term mechanism behind these results. The second strongest result is from robbery crimes, with a decrease of 0.432 crimes committed by people living in those grids near the new stations five years after they opened. Considering an average of 0.7, this represents more than a 50% drop. For the first four years there is also a decline, although smaller in size

[14] See Table 2

and not significant. The negative coefficients for the first years on property crimes suggest that there is not a positive effect due to a rise in the number of potential victims near the stations. For the violence-type crimes, the most relevant finding is a 1.15 offense reduction (equivalent to a 40%) on year 2010 for domestic violence, 5 years after. Talking about IFV is important to consider the propensity to denounce. The model and existing literature presented suggest that a connectivity shock, as the Metro's stations opening, could increase the propensity to denounce; therefore my results would be biased towards an increase in IFV, which would make my results an upper bound. Table A3 in the appendix show the same specification, but using the logarithm of the number of crimes. This way the coefficients can be interpreted as a semi-elasticity or a percentage change. However, using logs has the problem of losing all observations that are equal to zero. Figure A3 in the Appendix show the observations' distribution, and we reveals that many grids have zero crimes, larceny being the less affected. The results reported in the Appendix support the findings discussed above, where we can see a negative effect of the metro stations on most of the crimes, and of a similar magnitude. Most importantly, the estimated effect on larceny using the log specification is between 45-50%.

Table 5: Main Specification - Event Study: 2005 & 2006 Inaugurations

	Dependent Variable: Number of crimes					
	Robbery	Larceny	Vehicle Theft	Burglary	Injuries	IFV
	(1)	(2)	(3)	(4)	(5)	(6)
Metro*T1	-0.332	-1.237	-0.057	-0.014	-0.446***	-0.107
	(0.272)	(0.912)	(0.047)	(0.114)	(0.158)	(0.199)
Metro*T2	-0.222	-2.523*	0.125	-0.054	-0.223	-0.106
	(0.207)	-1.319	(0.084)	(0.104)	(0.190)	(0.338)
Metro*T3	-0.120	-2.366**	0.079	-0.167	-0.481*	-0.113
	(0.164)	-1.019	(0.100)	(0.120)	(0.250)	(0.467)
Metro*T4	-0.262**	-2.307*	-0.046	-0.177	-0.214	-0.048
	(0.113)	-1.216	(0.105)	(0.126)	(0.259)	(0.502)
N	3,531	3,531	3,531	3,531	3,531	3,531
R^2	0.629	0.828	0.424	0.532	0.580	0.640

Notes: Robust standard errors are clustered by distance to each grid's nearest station, using two kilometers wide intervals, and reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. IFV stands for Intrafamily violence. T refers to the number of years after the inauguration. Grid and anniversary year Fixed Effects included. Crime baseline-level controlled. Metro is a dummy representing being in "walking distance" of the new stations. Is equal to one for the grid squares that were less than 2 km. from a new Metro station, and zero for those that were between 3 and 5 km. All grids that were less than 3 km from a Metro station inaugurated before 2005 or after 2006 are excluded.

Table 5 shows the results for the Event Study model, using as treatment the 2005 and 2006 Metro expansions. Similarly to the previous results, we see a negative effect on most type of crimes for every year after each openings, although the effect is statistically significant only for robbery, injuries and larceny. The effect on larceny crimes committed by people living near the

new stations is the most notable one, and of a slightly larger magnitude that the one in Table 4. As I only have data until 2010, I can provide results up to four years after the inaugurations. We can see, from 2 to 4 years after, a reduction of more than 2 larceny offenses per grid (equivalent to a 45%). The results for robbery are smaller than those found on Table 4, but keep being negative and statically significant. The main difference between these two sets of results are on violent crimes, as in this model the reduction on domestic violence (column 6) is no longer significant at the 5 percent level, and the effect on injuries is now larger and stronger. This suggests that the effect on violence-type crimes was not homogeneous among different groups of stations, unlike property crimes. Table A4 in Appendix A shows the same specification, but using the logarithm of the number of crimes. The results reported in there support the findings discussed, with an estimated effect on larceny of a 28-34% reduction, slightly smaller that the ones reported on Table 5.

The results of the main specifications show a considerable reduction of the number of crimes committed by people living at a walking distance of Metro's new stations in a medium and long term after their opening. The magnitude of these findings is not so different (although higher) from those found by Billings et al. (2011) for the South Line Light Rail new stations in Charlotte, NC, USA. They find a 25%, 26.3% and 32.4% decrease on larceny, burglary and robbery respectively.

The results imply that the connectivity shock of the Metro expansion affected the choice-to-offend process in a deterrent way. As I discuss on the next subsection, there is evidence that supports the "job opportunity" explanation of this reduction. First, I provide robustness checks for my results.

6.1 Robustness checks

6.1.1 Alternative Specifications

To provide additional evidence, I also look at the crime rate (crimes per 100,000 ppl.) as an alternative measure. To do this, I use the 2002 Chilean census at both zone and block level. The first has the advantage of being bigger in area and therefore, more representative, while the second provides a much bigger number of observations. Table A5 in the Appendix provides some descriptive stats.

Table 6 shows the results of the Difference in Differences Model at "Zona censal" level. As explained in Section 5, the number of observations is smaller than optimal (falls from 2879 to 304), and as a consequence of that we lose the significance of the effects. Tables A6 in the appendix show the results for the Event Study strategy at Zone level. Again, we see a reduction on the significance of the results, but still significant and negative for larceny, with over a 100 crimes per 100,000 ppl. decrease.

Table 6: Alternative Specification: Crimes per 100,000 ppl. at census Zone (ZC)
Difference in Differences, 2005 Inaugurations

	Dependent Variable: crimes per 100,000 ppl.					
	Robbery	Larceny	Vehicle Theft	Burglary	Injuries	IFV
	(1)	(2)	(3)	(4)	(5)	(6)
Metro*2006	-3.500	85.132	-1.039	-22.951	-11.541	67.610*
	(42.147)	(75.277)	(5.936)	(13.932)	(20.211)	(34.451)
Metro*2007	17.524	95.776	16.624	-0.519	0.386	-1.637
	(25.957)	(104.187)	(12.432)	(13.131)	(17.142)	(40.182)
Metro*2008	-1.883	-72.681	8.982	-11.436	9.557	-15.241
	(23.083)	(100.283)	(8.112)	(12.071)	(23.615)	(94.106)
Metro*2009	9.487	49.892	-32.438**	-36.825**	19.453	-20.042
	(22.186)	(128.072)	(12.761)	(13.306)	(34.235)	(80.890)
Metro*2010	-18.221	-24.087	2.908	-9.097	43.958	-54.128
	(17.336)	(90.516)	(8.860)	(17.548)	(25.760)	(89.314)
N	304	304	304	304	304	304
R^2	0.848	0.936	0.704	0.733	0.780	0.866

Notes: Robust standard errors are clustered by distance to each grid's nearest station, using two kilometers wide intervals, and reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. IFV stands for Intrafamily violence. ZC stands for "Zona Censal", a chilean census's geographic unit. Zone and anniversary year Fixed effects included. Crime baseline-level controlled, and baseline population and working population controls included. Metro is a dummy representing being in "walking distance" of the new stations. Is equal to one for the census zones that were less than 2 km. from a Metro station inaugurated on 2005, and zero for those that were between 3 and 5 km. All zones that were less than 3 km from a Metro station inaugurated before or after 2005 are excluded.

Table 7 presents the Difference in Differences results at "manzana" level. It must be noted that, as seen in Table A5 in the Appendix, the smaller size of this unit makes that the average crimes per 100,000 enormously high and very dispersed. To address this problem, I use the block population as a weight in the regression, solving it at least partially. We see the same pattern of results as in Table 5, with the main specification, but in this case, much higher in level, due to the issue just discussed. Table A7 in the appendix show the results for the Event strategy at Block level, showing similar results.

Table 7: Alternative Specification: Crimes per 100,000 ppl. at census Block (MC)
Difference in Differences, 2005 Inaugurations

	Dependent Variable: crimes per 100,000 ppl.					
	Robbery	Larceny	Vehicle Theft	Burglary	Injuries	IFV
	(1)	(2)	(3)	(4)	(5)	(6)
Metro*2006	-262.242	-426.119	21.700	-41.325	-98.098	52.806
	(158.314)	(337.757)	(37.996)	(53.412)	(91.030)	(101.262)
Metro*2007	-149.039	-727.037*	112.099**	-38.818	112.271	-161.923
	(96.135)	(383.301)	(54.160)	(72.247)	(88.829)	(104.499)
Metro*2008	-139.463	-1227.679***	50.507	8.105	-143.354*	-43.932
	(84.536)	(432.159)	(48.087)	(79.862)	(81.402)	(176.510)
Metro*2009	-179.214**	-1252.836***	-44.616	-96.451	14.579	-203.746
	(86.187)	(407.752)	(37.429)	(74.365)	(126.446)	(198.108)
Metro*2010	-199.301***	-862.575**	-6.702	-34.866	-87.442	-554.876*
	(72.204)	(326.763)	(37.698)	(53.155)	(101.789)	(275.533)
N	6551	6551	6551	6551	6551	6551
R^2	0.482	0.660	0.456	0.405	0.457	0.543

Notes: Robust standard errors are clustered by distance to each grid's nearest station, using two kilometers wide intervals, and reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. IFV stands for Intrafamily violence. MC stands for "Manzana Censal", a chilean census's geographic unit. Block and anniversary year Fixed effects included. Crime baseline-level controlled, and baseline population and socioeconomic controls included. Block population used as weight. Metro is a dummy representing being in "walking distance" of the new stations. Is equal to one for the census blocks that were less than 2 km. from a Metro station inaugurated on 2005, and zero for those that were between 3 and 5 km. All blocks that were less than 3 km from a Metro station inaugurated before or after 2005 are excluded.

Lastly, I test an alternative specification, following Gibbons and Machin (2005), interacting the distance change with the treatment dummy, for the 2005 inaugurations. The results are reported in Table 8. I find that, for the treated units, reducing in one kilometer the distance to the subway meant near a 5% reduction in larceny three to five years after. Similar reductions in crime can be seen in robbery and violent crimes. This shows that, even among the treated group, there is a heterogeneous effect of the connectivity shock on crime, with a stronger effect on those closer to the metro. The results for the same specification for the Event Study can be seen on Table A8 on the appendix, with similar although weaker findings.

Table 8: Gibbons and Machin (2005) Specification - Difference in Differences: 2005 Inaugurations

	Dependent Variable: Number of crimes					
	Robbery	Larceny	Vehicle Theft	Burglary	Injuries	IFV
	(1)	(2)	(3)	(4)	(5)	(6)
$\Delta dist$*Metro*2006	-0.047	-0.100	-0.007	-0.033***	-0.029	-0.023
	(0.046)	(0.080)	(0.005)	(0.008)	(0.022)	(0.030)
$\Delta dist$*Metro*2007	-0.036	-0.165	0.002	-0.023*	-0.015	-0.043
	(0.033)	(0.105)	(0.010)	(0.012)	(0.023)	(0.031)
$\Delta dist$*Metro*2008	-0.029	-0.228**	-0.002	-0.026*	-0.036	-0.037
	(0.022)	(0.092)	(0.007)	(0.013)	(0.028)	(0.050)
$\Delta dist$*Metro*2009	-0.035*	-0.238**	-0.031***	-0.044***	-0.020	-0.077
	(0.019)	(0.099)	(0.009)	(0.012)	(0.024)	(0.055)
$\Delta dist$*Metro*2010	-0.048***	-0.217**	-0.015*	-0.035***	-0.055*	-0.137**
	(0.017)	(0.084)	(0.009)	(0.012)	(0.028)	(0.060)
N	2879	2879	2879	2879	2879	2879
R^2	0.596	0.820	0.381	0.504	0.502	0.582

Notes: Robust standard errors are clustered by distance to each grid's nearest station, using two kilometers wide intervals, and reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. IFV stands for Intrafamily violence. $\Delta dist$ represents the change in distance before and after the inauguration. Grid and Year Fixed effects included. Crime baseline-level controlled. Metro is a dummy representing being in "walking distance" of the new stations. Is equal to one for the grid squares that were less than 2 km. from a Metro station inaugurated on 2005, and zero for those that were between 3 and 5 km. All grids that were less than 3 km from a Metro station inaugurated before or after 2005 are excluded.

Overall, I find that, across different specifications, the expansion of Santiago's subway system had a negative effect on crimes committed by people living near the new stations in the following years. These results provide evidence that the larceny-type crimes were significantly reduced, especially three to five years after the inaugurations. They also show that other crimes, like robbery or crimes of violence, were significantly reduced.

In the next subsections, I provide some robustness exercises in order to check that my results are not driven by the parameters chosen for grid size or walking distance.

6.1.2 Grid Size

First, I replicate both main specifications for a 300x300 meters square grid. It is important to note that the bigger the size, the smaller the number of observations, especially of the treated group. The treatment is build using the distance from the grid's centroid to the subway station, so a bigger grid means a bigger distance and therefore less grids qualifying as "treated". The result for the Difference in Differences is shown in Table 9. We can see that the results are very similar to their equivalent in 250x250 crimes. There is a smaller statistical significance, probably due to a smaller number of observations. Table A9 shows the results for the Event Study approach, with similar results.

Table 9: Rob. Check: 300x300 Grid Size - Difference in Differences: 2005 Inaugurations

	Dependent Variable: Number of crimes					
	Robbery	Larceny	Vehicle Theft	Burglary	Injuries	IFV
	(1)	(2)	(3)	(4)	(5)	(6)
Metro*2006	-0.481	-0.902	-0.064	-0.376***	-0.247	-0.004
	(0.380)	(0.961)	(0.050)	(0.105)	(0.206)	(0.372)
Metro*2007	-0.364	-1.039	-0.002	-0.245**	-0.041	-0.194
	(0.268)	(1.172)	(0.079)	(0.100)	(0.257)	(0.348)
Metro*2008	-0.181	-1.930*	-0.008	-0.305***	-0.121	-0.005
	(0.191)	(1.120)	(0.074)	(0.103)	(0.306)	(0.589)
Metro*2009	-0.256	-1.701	-0.325***	-0.482***	-0.075	-0.275
	(0.152)	(1.224)	(0.093)	(0.113)	(0.240)	(0.667)
Metro*2010	-0.474**	-1.801*	-0.160**	-0.358***	-0.470	-0.844
	(0.173)	(1.028)	(0.064)	(0.101)	(0.312)	(0.618)
N	2208	2208	2208	2208	2208	2208
R^2	0.618	0.843	0.397	0.518	0.571	0.644

Notes: Robust standard errors are clustered by distance to each grid's nearest station, using two kilometers wide intervals, and reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. IFV stands for Intrafamily violence. Grid and Year Fixed effects included. Crime baseline-level controlled. Metro is a dummy representing being in "walking distance" of the new stations. Is equal to one for the grid squares that were less than 2 km. from a Metro station inaugurated on 2005, and zero for those that were between 3 and 5 km. All grids that were less than 3 km from a Metro station inaugurated before or after 2005 are excluded.

My results are also robust to the use of a smaller grid, of 200x200 meters. Table 10 shows the result for the DD model. Even though the effects appear to be smaller, it must be taken into account that the smaller the grid size, smaller the number of crimes that fall into it. Therefore, the difference in effect size (although small) can be attributed to that issue. Table A10 shows the results for the Event Study approach, with similar results.

Table 10: Rob. Check: 200x200 Grid Size - Difference in Differences: 2005 Inaugurations

	Dependent Variable: Number of crimes					
	Robbery	Larceny	Vehicle Theft	Burglary	Injuries	IFV
	(1)	(2)	(3)	(4)	(5)	(6)
Metro*2006	-0.336	-0.263	-0.040	-0.260***	-0.342**	-0.175
	(0.202)	(0.536)	(0.024)	(0.052)	(0.137)	(0.169)
Metro*2007	-0.320**	-0.758	0.008	-0.160**	-0.139	-0.270
	(0.156)	(0.603)	(0.049)	(0.064)	(0.133)	(0.176)
Metro*2008	-0.164	-1.195**	-0.022	-0.196***	-0.237	-0.384
	(0.114)	(0.492)	(0.036)	(0.069)	(0.149)	(0.299)
Metro*2009	-0.317***	-1.362**	-0.159***	-0.320***	-0.268**	-0.439
	(0.093)	(0.527)	(0.035)	(0.062)	(0.128)	(0.307)
Metro*2010	-0.314***	-1.193**	-0.092***	-0.251***	-0.471***	-0.909***
	(0.093)	(0.541)	(0.034)	(0.060)	(0.111)	(0.286)
N	5285	5285	5285	5285	5285	5285
R-sq	0.553	0.771	0.344	0.444	0.439	0.518

Notes: Robust standard errors are clustered by distance to each grid's nearest station, using two kilometers wide intervals, and reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. IFV stands for Intrafamily violence. Grid and Year Fixed effects included. Crime baseline-level controlled. Metro is a dummy representing being in "walking distance" of the new stations. Is equal to one for the grid squares that were less than 2 km. from a Metro station inaugurated on 2005, and zero for those that were between 3 and 5 km. All grids that were less than 3 km from a Metro station inaugurated before or after 2005 are excluded.

6.1.3 Walking Distance

A second exercise is to check if the "walking" distance parameter may drive my results. My main specifications use a 2 kilometers threshold to define the treatment, and a 1 kilometer buffer zone, therefore control units are those with distance above 3 km and below 5 km from the metro stations. I provide 6 alternative specifications, by changing the size of the treatment distance, the size of the buffer zone and keeping the symmetry between treated and control groups. I use a "walking" or treatment distance of 1 and 0.5 km., additionally to the original 2 km.

Table 11: "Walking" and Buffer Distances Robustness Check: Larceny Crimes.

	Dependent Variable: Number of crimes						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Section A: Difference in Differences, 2005 Inaugurations							
Metro*2006	-0.902	-0.642	-1.084**	-1.622**	-1.554**	-0.700	-0.284
	(0.693)	(0.462)	(0.501)	(0.711)	(0.623)	(0.559)	(0.620)
Metro*2007	-1.403	-2.054**	-1.476*	-1.755	-1.973**	-1.804**	-1.187
	(0.910)	(0.867)	(0.783)	(1.105)	(0.883)	(0.841)	(0.796)
Metro*2008	-1.900**	-2.293***	-1.743**	-2.599**	-2.426***	-2.025***	-1.579**
	(0.799)	(0.632)	(0.688)	(1.102)	(0.814)	(0.659)	(0.645)
Metro*2009	-1.950**	-2.067***	-2.767***	-2.437**	-2.746***	-3.108***	-2.482***
	(0.848)	(0.556)	(0.872)	(1.105)	(0.867)	(0.804)	(0.894)
Metro*2010	-1.793**	-2.392***	-2.234***	-2.283**	-2.688***	-2.309***	-1.811**
	(0.715)	(0.319)	(0.780)	(0.954)	(0.737)	(0.589)	(0.665)
N	2879	2013	2198	1239	1986	1019	1666
R^2	0.82	0.788	0.823	0.846	0.834	0.807	0.833
Section B: Event Study, 2005 & 2006 Inaugurations							
Metro*T1	-1.126	0.641	-1.157	-1.565*	-1.323*	-0.727	-1.329
	(0.939)	(1.200)	(0.882)	(0.820)	(0.751)	(0.710)	(0.956)
Metro*T2	-2.087	0.060	-1.929	-2.383*	-1.871*	-2.740***	-2.720**
	(1.270)	(1.181)	(1.213)	(1.215)	(1.059)	(0.985)	(1.325)
Metro*T3	-2.182**	-0.902	-1.901	-2.334*	-1.924**	-2.799***	-2.637**
	(1.042	(0.998)	(1.133)	(1.205)	(0.893)	(0.890)	(1.220)
Metro*T4	-2.171*	-0.743	-2.219	-2.347*	-2.234**	-3.012**	-2.749*
	(1.274)	(1.253)	(1.424)	(1.336)	(1.038)	(1.319)	(1.618)
N	3365	2320	3182	1425	2256	1408	2208
R^2	0.827	0.806	0.808	0.858	0.842	0.838	0.819
Treatment (km)	2.0	2.0	1.0	1.0	1.0	0.5	0.5
Buffer (km)	1.0	2.0	1.0	2.0	2.0	1.5	1.5
Control (km)	2.0	2.0	1.0	1.0	2.0	0.5	1

Notes: Robust standard errors are clustered by distance to each grid's nearest station, using two kilometers wide intervals, and reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. T refers to the number of years after the inauguration. Grid and Year Fixed effects included. Crime baseline-level controlled. Metro is a dummy representing being in "walking distance" of the new stations. Is equal to one for the grid squares that were in the Treatment zone from a new Metro station, and zero for those that were on the control zone (after the buffer distance from the station). All grids that were less than Treatment+Buffer distance from an old Metro station (or posterior to the period studied) are excluded.

Table 11 presents the results for these specifications (along with my main result in column 1) for larceny. Tables A11 to A15 in Appendix do the same for the other 5 crime categories. Section A shows the results for the Difference in Differences model, and Section B for the Event Study one. We can see that my results are robust to almost every specification, with small changes

in some magnitudes. We can also conclude that the effect is bigger the closer we get to the stations, which makes sense with a continuous influence of the proximity to the metro system on crime, the reason for the implementation of the buffer zone in this model. It also shows that the results of using a 2 kilometers "walking distance" can be considered as a lower bound, with the effect being bigger at smaller distances.

6.2 Mechanisms

In this subsection I explore possible mechanisms behind the drop in crimes committed after the connectivity shock.

6.2.1 Commuting Time

The theoretical model discussed in Section 3 proposed that one of the first drivers of the change in the decision to offend is the change in commuting time. Less commuting time means a smaller alternative cost of working in the legal sector. It also implies less stress, relevant in violent crimes. I estimate the effect of the Metro on the commuting time using the EOD Survey between 2001 and 2012, with a simple DID model shown in equation (8).

$$y_{it} = \alpha Metro_i + \beta Metro_i * Post_t + \phi_t + \delta_i + \epsilon_{it} \tag{8}$$

Where y_{it} is the average commuting time (in minutes) for a EOD-Zone i for a year $t \in \{2001,2012\}$, $Metro_i$ is defined as in the main specification, and $Post_t$ is a dummy equal to one for the year 2012. Zone and year fixed effects included. Even though the EOD time period is longer than the one studied for crimes, there are, at the best of my knowledge, no other major connectivity shocks relevant to the city area studied, apart from the 2005-2006 Metro inaugurations. The results for this model are presented on Table 12.

Table 12: Mechanisms I: Commuting Time

	Commuting Time		
	Total	Private	Public
	(1)	(2)	(3)
Metro*Post	-0.366	-0.448	4.130*
	(1.472)	(2.551)	(2.128)
N	208	204	202
R^2	0.712	0.571	0.670

Notes: Robust standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Data of commuting time is from the EOD Survey from the years 2002 and 2012. Time is measured in minutes. Observations are grouped at EOD-zone level. EOD-Zone and year fixed effect included. Metro is a dummy representing being in "walking distance" of the new stations. Is equal to one for the zones that were less than 2 km. from a Metro station inaugurated on 2005-2006, and zero for those that were between 3 and 5 km from them. All zones that were less than 3 km from a Metro station inaugurated before or after this period are excluded. Post is a dummy equal to one for 2012 and to zero for 2001.

We see in column (1) a negative, yet not statistically significant, effect on total travel time. In column (3) we can see a rise in time spent on public transport, which includes, but not exclusively, the use of Metro. I use the measure of public transport as a whole because on 2007 the subway and bus systems unified into one, "Transantiago". This means that there could be synergies between both kinds of public transportation after a connectivity shock. Although one could have expected a reduction on the time on public transport because of the subway expansion, being closer to the Metro System could generate a positive effect on distance, as more people can now use it. Also, if there is a positive effect on employment, more people may be using public transport to go to work (assuming they were not travelling at all before). Therefore, the small effect found on commuting time may be due to this two forces: more people using the public transport system or travelling further away on one hand, and a reduction in duration for a given journey between before and after the Metro expansion on the other.

6.2.2 Labor Market

One possible explanation of the reduction of property crimes is that the people living near the new stations shift towards legal means of work. To test this hypothesis, I look at the effect on the Labor Market. I use the Casen Panel to look for effects on employment, working hours and income. I estimate this effects with a simple OLS model, where the dependent variable is the change in those three variables between 2002 and 2006, for each individual. Employment is a dummy equal to one if the individual have a job, working hours is the number of hours worked in a month, and income is measured in 2001 US dollars.

Table 13 show the results for these estimations, both for the general population and only for women. Columns (1) and (2) show a positive effect on employment on the overall population, and a slightly stronger one for women. In columns (3) and (4) I find a positive effect on the

hours worked, although now it is not significant for women. I also find a positive effect on the Work Income for Women.

Even though this results must be interpreted with caution, given that the "treatment" is assigned at municipality level, I find that the evidence points towards better opportunities in the labor market. More employment could be a sign of people changing crime for formal jobs. This would explain the reduction in larceny (and also robbery) crimes, backing the "job opportunity" hypothesis. The effect on working hours could have the same interpretation, but now also for individuals working part-time or informally. The particularly positive effect on women income and employment could also explain the reduction in IFV crimes.

Table 13: Mechanisms II: Job Opportunities

	Δ Employment		Δ Hours Worked		Δ Work Income	
	All	Women	All	Women	All	Women
	(1)	(2)	(3)	(4)	(5)	(6)
Metro	0.302***	0.315**	56.812*	28.989	-13.403	216.313*
	(0.065)	(0.132)	(28.583)	(33.598)	(55.643)	(108.714)
N	1751	967	1503	865	2248	1223
R^2	0.422	0.389	0.357	0.331	0.221	0.452

Notes: Robust standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Data is from the Casen Panel from the years 2002 and 2006. Observations are grouped at Comuna level. Work Income is measured in 2001 US dollars. Δ refers to the change between 2006 and 2002 for each individual. Metro is a dummy representing being in "walking distance" of the new stations. It is equal to one for the municipalities which centroids were less than 2 km. from a Metro station inaugurated on 2005-2006, and zero for those that were between 3 and 5 km from them. All Municipalities that were less than 3 km from a Metro station inaugurated before or after this period are excluded. Treated Municipalities are Recoleta, La Florida and Puente Alto. The control group is composed by Las Condes, La Reina, Peñalolen, La Granja, La Pintana, San Ramón, El Bosque, Lo Espejo, Cerrillos, Pudahuel, Cerro Navia and Renca. Years of education, age, baseline income, health, change in distance to Metro and municipality controls included.

As the Panel Casen is grouped at municipality level, I also use the chilean census and the EOD survey to add some robustness to the mechanisms behind my results, using a similiar DID model as the one presented on equation (8). Table 14 shows the results. I use the census question about having a job to calculate the unemployment rate for a census zone. I find a small but positive rise in unemployment, contrary to the results explained above (column 1). I also take advantage of the fact that the EOD asks for income, and calculate the average work income for EOD zone. I find an increase in the average income of 22% (column 3), which is similar to the one reported using the Casen.

Lastly, there is the possibility that my results are driven by a change in the composition of the people living in the surroundings of the Metro, rather than an effect on their behaviour. The use of the longitudinal survey on the Casen Panel ensures that the results reported in

Table 14 are not driven by a composition change, as we look at the same individuals. I also use the census to see if there was a change in the number of people that reported living in a different municipality 5 years before. Column (2) of Table 14 shows that there is no evidence of a composition change, at least at municipality level. Additionally to this evidence, Chile's historic public housing policy makes it harder to change neighborhoods. From the late 1970's, the Chilean government provided housing through vouchers for ownership. Between 1976 and 2007, 67 per cent of dwellings built were publicly subsidised. (Simian, 2010). Most of low-income households' subsidised housing was located on the metropolitan periphery, where the 2005-2006 Metro stations arrived. The voucher prohibits re-selling or subletting the dwelling for at least 5 years, so we can consider that at least a portion of these households' locations are fixed in time. Simian (2010) explains that there is an "immobilizing effect of the housing policy in Chile", as the housing mobility has decreased and that precisely the households that move less are those that had been beneficiaries of this housing policy.

Table 14: Mechanisms III: Additional Findings

	Unemployment	Δ Comuna	Log(Income)
	(1)	(2)	(3)
Metro*Post	0.008**	0.018	0.216**
	(0.003)	(0.011)	(0.095)
N	440	440	208
R^2	0.932	0.833	0.925
Data	2012-2002 census		2012-2001 EOD

Notes: Robust standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Δ Comuna represents the number of people that reported living in a different municipality 5 years before each census. This question is used in other works as a proxy of mobility (Simian, 2010). Income is measured in UF ("Unidad de Fomento), a unit of account used in Chile, readjusted according to inflation. Metro is a dummy representing being in "walking distance" of the new stations. Is equal to one for the zones that were less than 2 km. from a Metro station inaugurated on 2005-2006, and zero for those that were between 3 and 5 km from them. All zones that were less than 3 km from a Metro station inaugurated before or after this period are excluded. Post is a dummy equal to one for 2012 and to zero for 2002-2001. Columns 1-2: Data of Employment and change of municipalities are from the 2012 and 2002 Census. Census Zone and Year fixed effects included. Column 3: Data of income is from the EOD Survey from the years 2001 and 2012. Observations are grouped at EOD-zone level. EOD-Zone and year fixed effect included.

6.2.3 Distance to crime

Additionally, I mentioned that one possible effect of the Metro expansion was that it would be used to engage in criminal activities. Table 15 shows the change in the average distance between the crime location and the participant's home for the DID model. For larceny and robbery, I find a fall in this distance, of around 1 km. These results provide some evidence against this "journey

to crime" hypothesis, for distance would rise if criminals were using the Metro to offend. This pattern could suggest that there is a reallocation of theft towards the proximity's of the station (as we're looking at people that live near the new stations). Other possible explanation could be that the connectivity deterrent-effect is stronger for those people committing longer distance crimes. Nevertheless, the first hypothesis is more consistent with the existing literature and the theoretical model proposed in Section 3. Table A16 in Appendix A shows the results for the Event Study approach, with similar results.

Table 15: Change in Average Crime-Offender's Home Distance (km)
Difference in Differences, 2005 Inaugurations

	Dependent Variable: Crime-offender's home distance (km)					
	Robbery	Larceny	Vehicle Theft	Burglary	Injuries	IFV
	(1)	(2)	(3)	(4)	(5)	(6)
Metro*2006	-1.045**	-1.928***	-0.453	-5.104**	0.795	-0.034
	(0.490)	(0.434)	-1.574	-1.735	(0.533)	(0.198)
Metro*2007	-0.018	-2.729***	-1.606	0.305	-0.662	-0.266
	(0.514)	(0.243)	-2.474	-2.110	(0.929)	(0.300)
Metro*2008	-3.099***	-2.573***	.	-2.538***	-0.339	0.010
	(0.642)	(0.448)	.	(0.626)	(0.827)	(0.259)
Metro*2009	-0.593	-1.881***	-1.259	-2.200	0.588	-0.051
	(0.753)	(0.371)	-1.049	-1.804	(0.928)	(0.234)
Metro*2010	-2.817***	-2.329***	0.295	-0.661	-0.792	0.624***
	(0.929)	(0.408)	(0.902)	(0.738)	(0.633)	(0.191)
N	466	1328	63	172	885	973
R^2	0.546	0.529	0.77	0.65	0.518	0.649

Notes: Robust standard errors are clustered by distance to each grid's nearest station, using two kilometers wide intervals, and reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. IFV stands for Intrafamily violence. Grid and Year Fixed effects included. Average distance baseline-level controlled. Average distance measured in kilometers. Metro is a dummy representing being in "walking distance" of the new stations. Is equal to one for the grid squares that were less than 2 km. from a Metro station inaugurated on 2005, and zero for those that were between 3 and 5 km. All grids that were less than 3 km from a Metro station inaugurated before or after 2005 are excluded.

The results review above suggest that the Metro's negative effect on crime could be due to a positive effect on the Labor Market, as I find evidence of a rise in employment, working hours and income. I also provide evidence that my results are not caused by a composition effect. Lastly, I find evidence against the hypothesis that the Metro system would be used to commit crimes in other parts of the city.

6.3 2011 Line extension

On November 30 2005, 7 new stations were announced, as an extension of the Line 5, connecting another low-income and peripheral district (Maipú) to the city center. The construction work began on January 2007, and the stations opened their doors on 2011. Both the announcement and the construction can affect the level of crime around the new stations, which means that it isn't a clean placebo, and it can not be used as a falsification test. Nevertheless, using the same Difference in Differences strategy as before for these stations, I can provide some insight to the effects of the announcement (and construction) of this line on crime. Table 18 shows the effect of the future line. We see strong and significant negative effects for most crimes, and of similar magnitudes as those found for the main specification of this thesis.

Table 16: Future Line Announcement Effect on Crime

	Dependent Variable: Number of crimes					
	Robbery	Larceny	Vehicle Theft	Burglary	Injuries	IFV
	(1)	(2)	(3)	(4)	(5)	(6)
$Metro_{Future}$*2006	-0.558**	-0.910	0.014	-0.190*	-0.748***	-0.834*
	(0.242)	(0.609)	(0.052)	(0.107)	(0.227)	(0.410)
$Metro_{Future}$*2007	-0.253*	-1.279*	-0.029	-0.264*	-0.841**	-1.080*
	(0.128)	(0.723)	(0.067)	(0.144)	(0.308)	(0.618)
$Metro_{Future}$*2008	-0.422**	-1.589*	-0.087	-0.260	-0.597**	-1.378**
	(0.178)	(0.787)	(0.074)	(0.162)	(0.247)	(0.634)
$Metro_{Future}$*2009	-0.355	-1.820**	-0.042	-0.143	-0.950**	-1.183*
	(0.207)	(0.822)	(0.045)	(0.132)	(0.349)	(0.565)
$Metro_{Future}$*2010	-0.365*	-1.791**	-0.032	-0.300**	-1.334**	-1.703**
	(0.183)	(0.839)	(0.068)	(0.136)	(0.520)	(0.711)
N	2989	2989	2989	2989	2989	2989
R^2	0.585	0.748	0.390	0.520	0.606	0.691

Notes: Robust standard errors are clustered by distance to each grid's nearest station, using two kilometers wide intervals, and reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. IFV stands for Intrafamily violence. Grid and Year Fixed effects included. Average distance baseline-level controlled. $Metro_{Future}$ is a dummy representing being in "walking distance" of the announced line in 2005. Is equal to one for the grid squares that were less than 2 km. from a Metro station announced on 2005, and zero for those that were between 3 and 5 km. All grids that were less than 3 km from an existing Metro station, or that opened between 2005-2010, are excluded.

These results provide several valuable insights. First, that the announcement and construction of a new Metro Line have a negative effect on crime. This could be due to various reasons. First, the construction firms could hire locally (o generate another jobs indirectly), which would rise the opportunity cost of criminal activities. Secondly, the announcement could have made house values rise, which would be a positive income shock for the families, or generate a reallocation before the inaugurations of the stations. Third, if these findings are generalized, the results found for the stations that began operating on November 2005 are even more notable. I found

that Larceny crimes fall after the stations opened compared to the year before (and compared to the change in other units). This would mean that the new Metro line generated a fall in crime before the stations opened, and another fall after.

Lastly, these results need to be interpreted also as a call of caution to the analyses of my previous findings. There could be that the fall in crime reported for the 2005-2006 inaugurations are driven by an omitted variable that is also driving the findings for the Maipú extension. It could be that something else happened in the years 2006-2010 that made the people living near the big arteries of the city (where the Metro lines run) commit less crimes, and not because of the connectivity shock of the new stations. One possible explanation is that on 2007 the public transport system changed, as the bus and subway operations unified under the "Transantiago" model. This made the use of Metro more attractive and altered the way people travelled inside the city. However, if the "Transantiago" is driving my results, it would reinforce the message that accessibility significantly affects crime. At the best of my knowledge, there is no other clear phenomenon that could cause the reduction in crime. In this work I try to prove that there is indeed a causal effect of the Metro extension on crime, but this asseveration must always be interpreted with caution. The results for the future Metro Line can be used both in favor or against my general conclusions.

7 Conclusion

This thesis has explored the effect of a public transport connectivity shock on crime, taking advantage of the fact that Santiago's subway (Metro) expanded considerably in 2005 and 2006. I use Difference in Differences and Event Study approaches to look at changes in the number of crimes committed by people living near the new stations, thanks to a novel dataset that includes both the location of crimes and the offender's home address. In this way this thesis contributes to the existing literature by testing the "job opportunity" hypothesis and separate it from other effects the Metro could have on crime, like attracting outside criminals.

I find that, across different specifications and measures, the number of crimes committed by people living at "walking distance" of the new stations falls significantly after they started operating. The most notable effect is on larceny crimes three to five years after the stations opened. I find an effect of about 1.8-2.3 fewer larceny crimes committed by people living in those grids per grid per year, representing approximately a 45% statistically significant reduction. The impacts on other property crimes (robbery, vehicle theft, burglary) are weaker across different specifications, but there is evidence of a reduction in these crimes' incurrence. I also present evidence of a reduction in violent crimes (injuries and intrafamily violence) committed by people living near the new stations. These effects are stronger as the closer for individuals living closer to the stations.

The literature and theoretical framework suggest that the reduction in the costs of accessing the (legal) labor market could be the a relevant mechanism behind the effect of Metro on crime. Using different government surveys and census, I find evidence that the Metro expansion pos-

itively affected employment, working hours, and salaries, especially for women. These findings suggest that my results for crime outcomes are coherent with a "job opportunity" hypothesis. Better connectivity would improve access to the labor market and increase the opportunity cost of offending.

Nevertheless, some qualifications are needed to interpret the results. First, it is difficult to distinguish between an effect on the same individuals across time and a compositional effect. I provide suggestive evidence that this would not be the case for my results, but the point remains. Second, there could be some changes in the proclivity to denounce crimes that could confound my findings. However, better connectivity should lead to an increase in denouncing rates, which implies that my results could be interpreted as a lower bound (in absolute terms). Third, I run a test using a line announced on 2005 but inaugurated on 2011, and find results that are similar to those found for the 2006 inauguration. This could imply that there is something else happening on the main arteries of the city that is confounding my results. However, it could also be that the construction of the subway improves job opportunities for those living nearby.

My findings have important policy implications. Even though the main objective of the public transport infrastructure is not to reduce criminality, this thesis contributes to a growing literature that argues that the welfare gains of better transport go well beyond than just commuting-time savings. This is relevant when assessing the social impact of better public transport. My results also provide interesting input for crime-deterrent policies, as they show that job-related policies may be an efficient way to reduce crime, at least for crimes of low-commitment like larceny.

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9 Appendix A

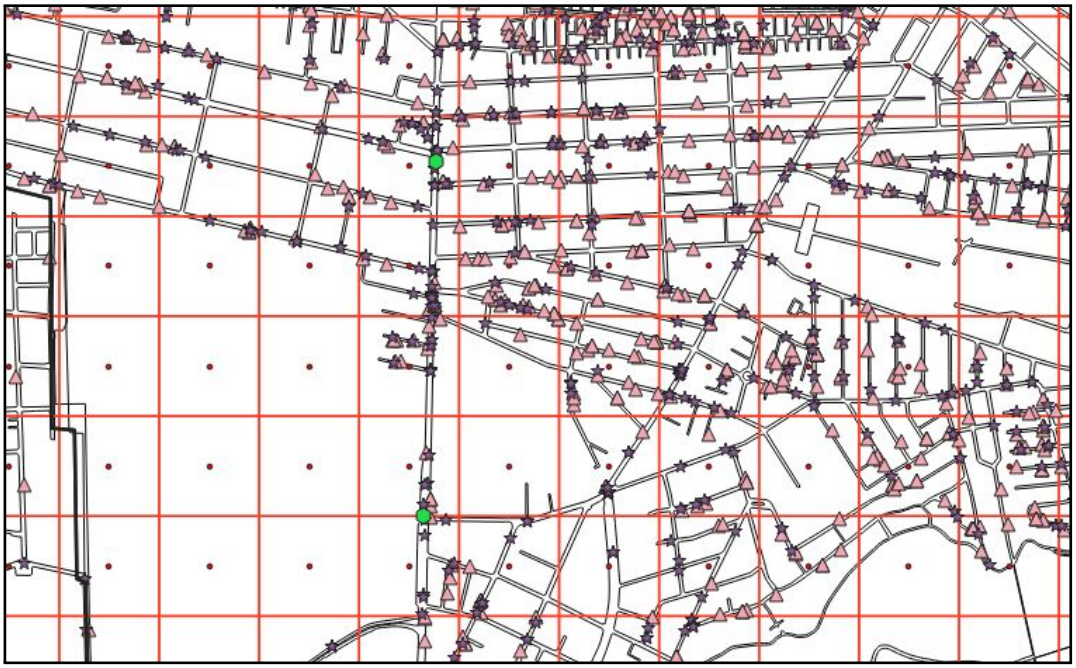

Figure A1: Example of grid

The red lines represent the 250x250 meters grid, red points representing their centroids. Metro stations are represented as green hexagons. Crime locations are represented as purple stars, and criminal addresses as pink triangles.

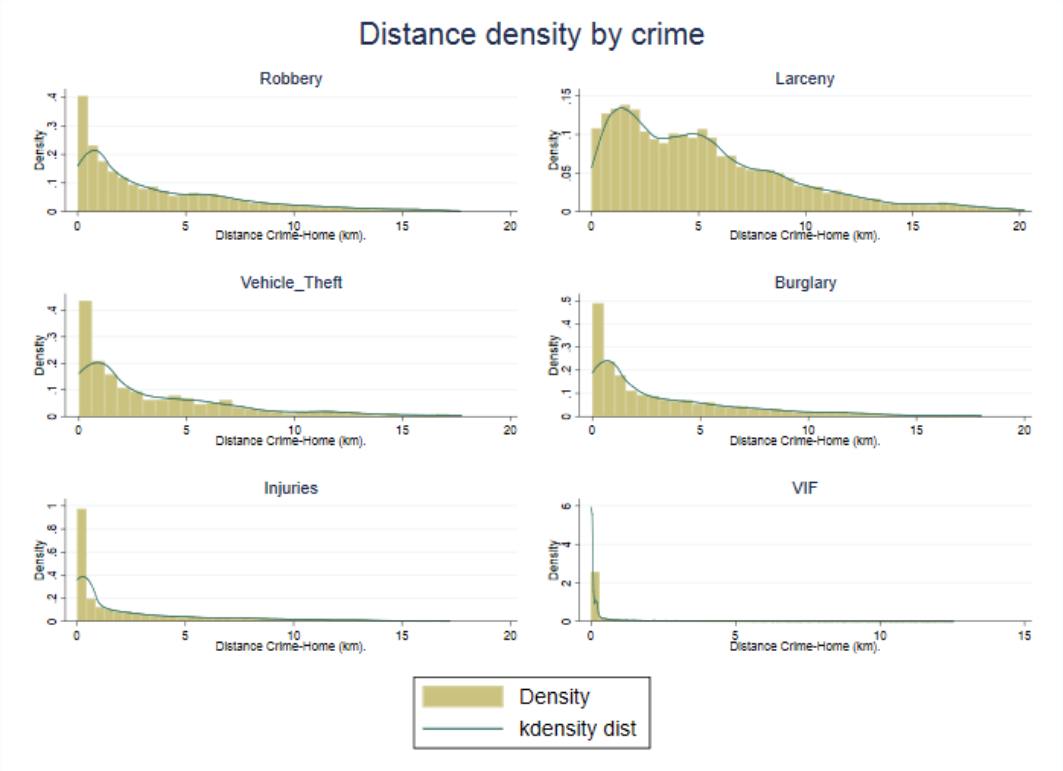

Figure A2: Histogram and Kernel density of crime-home distance by crime, without 1% outlier

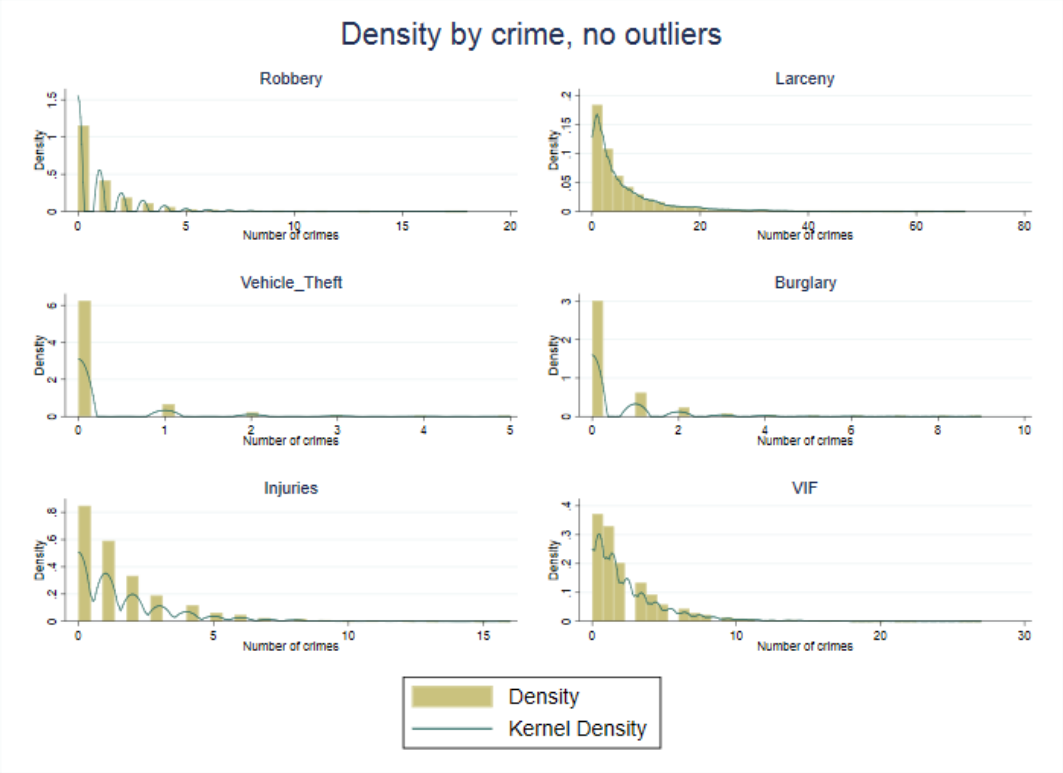

Figure A3: Histogram and Kernel density by crimes, without 1% outlier (250x250 grid, Event Study, by year)

Figure A4: Trends in average distance between the crime's location and the offender's home (in km.)

Table A1: Parallel Trends: Falsification Test II
Difference in Differences, 2005 Inaugurations

	Distance	Property	Violence	Total
	(1)	(2)	(3)	(4)
Metro*2005trim2	0.156	-0.041	0.314	0.273
	(0.670)	(0.292)	(0.247)	(0.260)
Metro*2005trim3	0.761	-0.024	0.281	0.257
	(0.760)	(0.387)	(0.331)	(0.411)
Metro*2005trim4	-0.113	0.183	0.119	0.302
	(0.574)	(0.312)	(0.207)	(0.388)
N	522	522	522	522
R^2	0.439	0.544	0.430	0.554

Notes: Robust standard errors are clustered by distance to each grid's nearest station, using two kilometers wide intervals, and reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. IFV stands for Intrafamily violence. Grid and Trimester Fixed Effects included. Metro is a dummy representing being in "walking distance" of the new stations. Is equal to one for the grid squares that were less than 2 km. from a Metro station inaugurated on 2005, and zero for those that were between 3 and 5 km. All grids that were less than 3 km from a Metro station inaugurated before or after 2005 are excluded.

Table A2: Parallel Trends: Falsification Test
Event Study, 2005 & 2006 Inaugurations

	Robbery	Larceny	Vehicle Theft	Burglary	Injuries	IFV
	(1)	(2)	(3)	(4)	(5)	(6)
Metro*bim1	0.040	-0.208	-0.027	0.049	-0.023	-0.117
	(0.108)	(0.229)	(0.048)	(0.050)	(0.100)	(0.141)
Metro*bim2	-0.149**	-0.221	-0.039	0.029	0.051	-0.225**
	(0.068)	(0.276)	(0.027)	(0.040)	(0.084)	(0.093)
Metro*bim3	-0.089	-0.400	0.002	0.098	0.058	-0.079
	(0.091)	(0.388)	(0.027)	(0.086)	(0.102)	(0.076)
Metro*bim4	-0.161	-0.392	-0.027	0.070	-0.024	0.098
	(0.121)	(0.477)	(0.033)	(0.051)	(0.052)	(0.150)
N	1,384	1,384	1,384	1,384	1,384	1,384
R^2	0.439	0.568	0.423	0.426	0.479	0.493

Notes: Robust standard errors are clustered by distance to each grid's nearest station, using two kilometers wide intervals, and reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. IFV stands for Intrafamily violence. Grid and Bimester Fixed Effects included. Metro is a dummy representing being in "walking distance" of the new stations. Is equal to one for the grid squares that were less than 2 km. from a Metro station inaugurated on each period for 2005-2006, and zero for those that were between 3 and 5 km. All grids that were less than 3 km from a Metro station inaugurated before or after this period are excluded. *Bim* represents the Bimester of the anniversary year before the inauguration, with *bim*4 the last one before the opening.

Table A3: Log Specification - Difference in Differences: 2005 Inaugurations

	Dependent Variable: Log(Number of crimes)					
	Robbery	Larceny	Vehicle Theft	Burglary	Injuries	IFV
	(1)	(2)	(3)	(4)	(5)	(6)
Metro*2006	-0.315	-0.260	-0.040	-0.421***	-0.012	-0.065
	(0.287)	(0.197)	(0.191)	(0.140)	(0.086)	(0.104)
Metro*2007	-0.355*	-0.268	0.023	-0.233	-0.002	-0.063
	(0.170)	(0.215)	(0.158)	(0.190)	(0.119)	(0.127)
Metro*2008	-0.230	-0.437**	-0.090	-0.097	-0.101	-0.140
	(0.188)	(0.182)	(0.118)	(0.125)	(0.111)	(0.125)
Metro*2009	-0.314*	-0.503***	-0.461***	-0.439**	-0.040	-0.126
	(0.150)	(0.139)	(0.137)	(0.172)	(0.087)	(0.119)
Metro*2010	-0.341**	-0.454**	-0.323*	-0.307	-0.161**	-0.332**
	(0.159)	(0.164)	(0.176)	(0.202)	(0.076)	(0.154)
N	815	2179	176	452	1374	1779
R^2	0.619	0.774	0.587	0.520	0.502	0.625

Notes: Robust standard errors are clustered by distance to each grid's nearest station, using two kilometers wide intervals, and reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. IFV stands for Intrafamily violence. Grid and Year Fixed effects included. Crime baseline-level controlled. Metro is a dummy representing being in "walking distance" of the new stations. Is equal to one for the grid squares that were less than 2 km. from a Metro station inaugurated on 2005, and zero for those that were between 3 and 5 km. All grids that were less than 3 km from a Metro station inaugurated before or after 2005 are excluded. All zero-value observations are reported as missing values.

Table A4: Log Specification - Event Study: 2005 & 2006 Inaugurations

	Dependent Variable: Number of crimes					
	Robbery	Larceny	Vehicle Theft	Burglary	Injuries	IFV
	(1)	(2)	(3)	(4)	(5)	(6)
Metro*T1	-0.236*	-0.179	-0.179	0.168	-0.131	-0.067
	(0.134)	(0.123)	(0.158)	(0.143)	(0.081)	(0.084)
Metro*T2	-0.197*	-0.260*	-0.068	0.054	-0.128	-0.013
	(0.096)	(0.151)	(0.132)	(0.112)	(0.077)	(0.122)
Metro*T3	-0.085	-0.283**	-0.022	0.079	-0.185*	-0.040
	(0.099)	(0.139)	(0.139)	(0.105)	(0.096)	(0.142)
Metro*T4	-0.115	-0.340**	-0.222	0.020	-0.097	0.047
	(0.089)	(0.159)	(0.135)	(0.134)	(0.092)	(0.125)
N	1,413	2,906	311	742	2,086	2,464
R^2	0.612	0.809	0.577	0.535	0.568	0.646

Notes: Robust standard errors are clustered by distance to each grid's nearest station, using two kilometers wide intervals, and reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. IFV stands for Intrafamily violence. T refers to the number of years after the inauguration. Grid and anniversary year Fixed Effects included. Crime baseline-level controlled. Metro is a dummy representing being in "walking distance" of the new stations. Is equal to one for the grid squares that were less than 2 km. from a new Metro station, and zero for those that were between 3 and 5 km. All grids that were less than 3 km from a Metro station inaugurated before 2005 or after 2006 are excluded. All zero-value observations are reported as missing values.

Table A5: Average Crime Rate (per 100,00 people).

Section A: Zona Censal (Census Zone)					
	T (Anniversary Year)				
Crime Category	0	1	2	3	4
Robbery	94.10	134.37	116.89	112.60	97.67
Larceny	288.07	627.43	764.21	741.09	777.75
Vehicle Theft	15.36	15.04	30.70	27.48	30.80
Burglary	38.58	51.96	47.82	52.94	60.75
Injuries	116.73	132.15	172.43	216.69	255.34
Intrafamily Violence	124.28	172.79	258.89	374.94	373.61
Number of Zones	94	95	95	95	95
Section B: Manzana Censal (Census Block)					
	T (Anniversary Year)				
Crime Category	0	1	2	3	4
Robbery	1177.92	1191.19	1141.50	879.67	800.68
Larceny	3505.02	5543.00	6529.84	5647.59	5718.62
Vehicle Theft	194.79	130.24	300.73	183.81	236.19
Burglary	377.49	450.73	333.28	373.55	524.42
Injuries	1437.45	1377.36	1410.98	1741.18	1943.69
Intrafamily Violence	1419.93	1664.84	2048.14	2967.31	3155.86
Number of Blocks	1,472	2,095	2,404	2,536	2,616

Notes: "Zona Censal" and "Manzana Censal" are chilean census's geographics unit. T refers to the anniversary years after the nearest new station's inauguration.

Table A6: Alternative Specification: Crimes per 100,000 ppl. at census Zone (ZC)
Event Study, 2005 & 2006 Inaugurations

	Dependent Variable: crimes per 100,000 ppl.					
	Robbery	Larceny	Vehicle Theft	Burglary	Injuries	IFV
	(1)	(2)	(3)	(4)	(5)	(6)
Metro*T1	13.410	-4.111	4.352	19.590	-30.084	-4.858
	(17.822	(44.531)	(5.972)	(16.653)	(30.589)	(27.301)
Metro*T2	28.500*	-149.649*	30.001***	15.681	-1.621	-39.189
	(16.612)	(83.060)	(7.946)	(15.130)	(20.878)	(55.976)
Metro*T3	13.101	-136.738*	19.869*	8.204	-38.247	-82.216
	(17.528)	(72.265)	(9.824)	(15.775)	(25.165)	(96.400)
Metro*T4	-11.216	-120.851	11.464	4.033	-29.023	48.187
	(19.911)	(90.477)	(13.298)	(16.154)	(53.449)	(54.809)
N	474	474	474	474	474	474
R^2	0.676	0.860	0.483	0.542	0.546	0.694

Notes: Robust standard errors are clustered by distance to each grid's nearest station, using two kilometers wide intervals, and reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. IFV stands for Intrafamily violence. ZC stands for "Zona Censal", a chilean census's geographic unit. T refers to the number of years after the inauguration. Zone and anniversary year Fixed effects included. Crime baseline-level controlled, and baseline population and working population controls included. Metro is a dummy representing being in "walking distance" of the new stations. Is equal to one for the census zones that were less than 2 km. from a new Metro station, and zero for those that were between 3 and 5 km. All zones that were less than 3 km from a Metro station inaugurated before 2005 or after 2006 are excluded.

Table A7: Alternative Specification: Crimes per 100,000 ppl. at census Block (MC)
Event Study, 2005 & 2006 Inaugurations

	Dependent Variable: crimes per 100,000 ppl.					
	Robbery	Larceny	Vehicle Theft	Burglary	Injuries	IFV
	(1)	(2)	(3)	(4)	(5)	(6)
Metro*T1	-295.799**	-514.750	53.719**	28.232	-219.762***	104.046
	(118.190)	(416.017)	(25.230)	(110.933)	(73.547)	(132.080)
Metro*T2	-242.814***	-1610.177***	183.423***	21.580	86.848	-41.431
	(85.137)	(484.108)	(53.456)	(81.298)	(154.527)	(163.346)
Metro*T3	-308.300***	-1351.118***	192.452***	-37.029	-136.710	21.796
	(111.360)	(376.576)	(58.736)	(62.487)	(137.856)	(207.652)
Metro*T4	-366.118***	-1558.886***	97.539*	-45.338	103.485	7.780
	(105.826)	(495.361)	(56.645)	(109.031)	(187.347)	(193.384)
N	10280	10280	10280	10280	10280	10280
R^2	0.490	0.673	0.389	0.410	0.455	0.576

Notes: Robust standard errors are clustered by distance to each grid's nearest station, using two kilometers wide intervals, and reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. IFV stands for Intrafamily violence. MC stands for "Manzana Censal", a chilean census's geographic unit. T refers to the number of years after the inauguration. Block and anniversary year Fixed effects included. Crime baseline-level controlled, and baseline population and socioeconomic controls included. Block population used as weight. Metro is a dummy representing being in "walking distance" of the new stations. Is equal to one for the census blocks that were less than 2 km. from a new Metro station, and zero for those that were between 3 and 5 km. All blocks that were less than 3 km from a Metro station inaugurated before 2005 or after 2006 are excluded.

Table A8: Gibbons and Machin (2005) Specification - Event Study: 2005 & 2006 Inaugurations

	Dependent Variable: Number of crimes					
	Robbery	Larceny	Vehicle Theft	Burglary	Injuries	IFV
	(1)	(2)	(3)	(4)	(5)	(6)
$\Delta dist$*Metro*T1	-0.043	0.005	-0.007	-0.011	-0.060***	-0.032*
	(0.030)	(0.088)	(0.005)	(0.009)	(0.020)	(0.019)
$\Delta dist$*Metro*T2	-0.035	-0.022	0.002	-0.012	-0.063***	-0.097***
	(0.025)	(0.102)	(0.010)	(0.010)	(0.020)	(0.024)
$\Delta dist$*Metro*T3	-0.033**	-0.108	-0.007	-0.014	-0.107***	-0.076*
	(0.016)	(0.080)	(0.008)	(0.014)	(0.019)	(0.039)
$\Delta dist$*Metro*T4	-0.033**	-0.098	-0.027***	-0.020*	-0.074***	-0.050
	(0.014)	(0.096)	(0.008)	(0.011)	(0.024)	(0.049)
N	3531	3531	3531	3531	3531	3531
R^2	0.628	0.825	0.425	0.531	0.582	0.641

Notes: Robust standard errors are clustered by distance to each grid's nearest station, using two kilometers wide intervals, and reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. IFV stands for Intrafamily violence. T refers to the number of years after the inauguration. $\Delta dist$ represents the change in distance before and after the inauguration. Grid and Year Fixed effects included. Crime baseline-level controlled. Metro is a dummy representing being in "walking distance" of the new stations. Is equal to one for the grid squares that were less than 2 km. from a new Metro station, and zero for those that were between 3 and 5 km. All grids that were less than 3 km from a Metro station inaugurated before 2005 or after 2006 are excluded.

Table A9: Rob. Check: 300x300 Grid Size - Event Study: 2005 & 2006 Inaugurations

	Dependent Variable: Number of crimes					
	Robbery	Larceny	Vehicle Theft	Burglary	Injuries	IFV
	(1)	(2)	(3)	(4)	(5)	(6)
Metro*T1	-0.361	-1.663	-0.084	-0.046	-0.601***	-0.012
	(0.285)	-1.101	(0.060)	(0.180)	(0.196)	(0.285)
Metro*T2	-0.346	-3.075*	0.134	-0.022	-0.291	0.049
	(0.241)	-1.651	(0.108)	(0.134)	(0.222)	(0.460)
Metro*T3	-0.185	-2.861**	0.135	-0.215	-0.500	0.095
	(0.196)	-1.313	(0.144)	(0.148)	(0.310)	(0.647)
Metro*T4	-0.360***	-2.795*	-0.095	-0.213	-0.285	0.315
	(0.129)	-1.656	(0.143)	(0.169)	(0.321)	(0.693)
N	2578	2578	2578	2578	2578	2578
R^2	0.674	0.839	0.458	0.563	0.632	0.698

Notes: Robust standard errors are clustered by distance to each grid's nearest station, using two kilometers wide intervals, and reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. IFV stands for Intrafamily violence. T refers to the number of years after the inauguration. Grid and anniversary year Fixed Effects included. Crime baseline-level controlled. Metro is a dummy representing being in "walking distance" of the new stations. Is equal to one for the grid squares that were less than 2 km. from a new Metro station, and zero for those that were between 3 and 5 km. All grids that were less than 3 km from a Metro station inaugurated before 2005 or after 2006 are excluded.

Table A10: Rob. Check: 200x200 Grid Size - Event Study: 2005 & 2006 Inaugurations

	Dependent Variable: Number of crimes					
	Robbery	Larceny	Vehicle Theft	Burglary	Injuries	IFV
	(1)	(2)	(3)	(4)	(5)	(6)
Metro*T1	-0.297	-1.123*	-0.033	-0.027	-0.333***	-0.124
	(0.179)	(0.640)	(0.033)	(0.100)	(0.102)	(0.131)
Metro*T2	-0.238	-1.985**	0.079	-0.019	-0.182	-0.167
	(0.149)	(0.851)	(0.059)	(0.079)	(0.138)	(0.238)
Metro*T3	-0.129	-1.845**	0.045	-0.130	-0.316	-0.199
	(0.109)	(0.679)	(0.066)	(0.090)	(0.205)	(0.326)
Metro*T4	-0.257***	-1.910**	-0.032	-0.157	-0.210	-0.135
	(0.080)	(0.829)	(0.079)	(0.098)	(0.183)	(0.365)
N	4886	4886	4886	4886	4886	4886
R^2	0.611	0.806	0.420	0.464	0.519	0.594

Notes: Robust standard errors are clustered by distance to each grid's nearest station, using two kilometers wide intervals, and reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. IFV stands for Intrafamily violence. T refers to the number of years after the inauguration. Grid and anniversary year Fixed Effects included. Crime baseline-level controlled. Metro is a dummy representing being in "walking distance" of the new stations. Is equal to one for the grid squares that were less than 2 km. from a new Metro station, and zero for those that were between 3 and 5 km. All grids that were less than 3 km from a Metro station inaugurated before 2005 or after 2006 are excluded.

Table A11: "Walking" and Buffer Distances Robustness Check: Robbery Crimes.

	Dependent Variable: Number of crimes						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Section A: Difference in Differences, 2005 Inaugurations							
Metro*2006	-0.475	-0.308	-0.532*	-0.664	-0.455	-0.500**	-0.631***
	(0.393)	(0.263)	(0.298)	(0.558)	(0.321)	(0.210)	(0.216)
Metro*2007	-0.376	-0.371	-0.315*	-0.454	-0.511**	-0.350**	-0.232
	(0.269)	(0.235)	(0.174)	(0.348)	(0.231)	(0.155)	(0.167)
Metro*2008	-0.256	-0.401**	-0.428*	-0.350	-0.451**	-0.524**	-0.389*
	(0.182)	(0.176)	(0.215)	(0.251)	(0.169)	(0.223)	(0.192)
Metro*2009	-0.320*	-0.419**	-0.442**	-0.262	-0.405**	-0.615***	-0.560***
	(0.158)	(0.156)	(0.193)	(0.226)	(0.163)	(0.190)	(0.181)
Metro*2010	-0.432***	-0.479***	-0.356**	-0.352**	-0.513***	-0.277*	-0.245*
	(0.144)	(0.148)	(0.134)	(0.142)	(0.135)	(0.141)	(0.124)
N	2879	2013	2198	1239	1986	1019	1666
R^2	0.597	0.56	0.578	0.662	0.629	0.662	0.58
Section B: Event Study, 2005 & 2006 Inaugurations							
Metro*T1	-0.266	-0.040	-0.419	-0.618	-0.359	-0.552**	-0.668*
	(0.280)	(0.186)	(0.334)	(0.424)	(0.217)	(0.204)	(0.360)
Metro*T2	-0.123	-0.005	-0.238	-0.478*	-0.366**	-0.317	-0.279
	(0.200)	(0.190)	(0.205)	(0.246)	(0.172)	(0.260)	(0.254)
Metro*T3	-0.061	-0.028	-0.434*	-0.434***	-0.366***	-0.584**	-0.472*
	(0.159)	(0.191)	(0.245)	(0.150)	(0.124)	(0.256)	(0.252)
Metro*T4	-0.208*	-0.126	-0.463**	-0.412***	-0.310***	-0.842***	-0.683***
	(0.108)	(0.151)	(0.215)	(0.135)	(0.112)	(0.234)	(0.206)
N	3365	2320	3182	1425	2256	1408	2208
R^2	0.626	0.588	0.608	0.657	0.642	0.722	0.619
Treatment (km)	2.0	2.0	1.0	1.0	1.0	0.5	0.5
Buffer (km)	1.0	2.0	1.0	2.0	2.0	1.5	1.5
Control (km)	2.0	2.0	1.0	1.0	2.0	0.5	1

Notes: Robust standard errors are clustered by distance to each grid's nearest station, using two kilometers wide intervals, and reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. T refers to the number of years after the inauguration. Grid and Year Fixed effects included. Crime baseline-level controlled. Metro is a dummy representing being in "walking distance" of the new stations. Is equal to one for the grid squares that were in the Treatment zone from a new Metro station, and zero for those that were on the control zone (after the buffer distance from the station). All grids that were less than Treatment+Buffer distance from an old Metro station (or posterior to the period studied) are excluded.

Table A12: "Walking" and Buffer Distances Robustness Check: Vehicle Theft Crimes.

	Dependent Variable: Number of crimes						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Section A: Difference in Differences, 2005 Inaugurations							
Metro*2006	-0.071*	-0.070*	-0.027	-0.083	-0.114***	-0.055	-0.072
	(0.039)	(0.035)	(0.031)	(0.070)	(0.041)	(0.056)	(0.048)
Metro*2007	-0.013	-0.015	-0.169*	-0.112	-0.158**	-0.252**	-0.229**
	(0.087)	(0.084)	(0.083)	(0.116)	(0.068)	(0.104)	(0.085)
Metro*2008	-0.040	-0.081	-0.158**	-0.075	-0.124*	-0.194***	-0.236***
	(0.063)	(0.097)	(0.069)	(0.066)	(0.064)	(0.065)	(0.065)
Metro*2009	-0.279***	-0.252***	-0.137**	-0.239**	-0.347***	-0.147***	-0.200***
	(0.067)	(0.087)	(0.066)	(0.108)	(0.068)	(0.028)	(0.066)
Metro*2010	-0.149**	-0.071	-0.139**	-0.213	-0.222***	-0.165***	-0.200***
	(0.069)	(0.041)	(0.062)	(0.131)	(0.068)	(0.052)	(0.059)
N	2879	2013	2198	1239	1986	1019	1666
R^2	0.381	0.378	0.399	0.421	0.401	0.478	0.408
Section B: Event Study, 2005 & 2006 Inaugurations							
Metro*T1	-0.047	-0.007	-0.083	-0.133	-0.114**	-0.170***	-0.143***
	(0.049)	(0.046)	(0.051)	(0.085)	(0.045)	(0.055)	(0.046)
Metro*T2	0.158*	0.189*	-0.115	-0.039	-0.010	-0.309***	-0.221***
	(0.081)	(0.089)	(0.080)	(0.084)	(0.069)	(0.089)	(0.077)
Metro*T3	0.105	0.103	-0.176	-0.072	-0.071	-0.252*	-0.191
	(0.100)	(0.112)	(0.112)	(0.096)	(0.060)	(0.146)	(0.120)
Metro*T4	-0.001	-0.028	-0.114	-0.145	-0.136*	-0.173	-0.156
	(0.100)	(0.079)	(0.127)	(0.085)	(0.074)	(0.155)	(0.130)
N	3365	2320	3182	1425	2256	1408	2208
R^2	0.425	0.398	0.417	0.492	0.466	0.446	0.422
Treatment (km)	2.0	2.0	1.0	1.0	1.0	0.5	0.5
Buffer (km)	1.0	2.0	1.0	2.0	2.0	1.5	1.5
Control (km)	2.0	2.0	1.0	1.0	2.0	0.5	1

Notes: Robust standard errors are clustered by distance to each grid's nearest station, using two kilometers wide intervals, and reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. T refers to the number of years after the inauguration. Grid and Year Fixed effects included. Crime baseline-level controlled. Metro is a dummy representing being in "walking distance" of the new stations. Is equal to one for the grid squares that were in the Treatment zone from a new Metro station, and zero for those that were on the control zone (after the buffer distance from the station). All grids that were less than Treatment+Buffer distance from an old Metro station (or posterior to the period studied) are excluded.

Table A13: "Walking" and Buffer Distances Robustness Check: Burglary Crimes.

	Dependent Variable: Number of crimes						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Section A: Difference in Differences, 2005 Inaugurations							
Metro*2006	-0.305***	-0.318***	-0.200***	-0.246**	-0.359***	-0.189**	-0.198**
	(0.058)	(0.046)	(0.068)	(0.110)	(0.059)	(0.090)	(0.093)
Metro*2007	-0.217**	-0.246**	-0.137*	-0.109	-0.267***	-0.167	-0.187*
	(0.096)	(0.099)	(0.080)	(0.139)	(0.098)	(0.106)	(0.095)
Metro*2008	-0.248**	-0.239*	-0.229**	-0.190*	-0.296***	-0.319***	-0.348***
	(0.101)	(0.131)	(0.094)	(0.103)	(0.083)	(0.076)	(0.091)
Metro*2009	-0.408***	-0.455***	-0.352***	-0.237*	-0.467***	-0.360***	-0.445***
	(0.095)	(0.122)	(0.099)	(0.126)	(0.085)	(0.120)	(0.122)
Metro*2010	-0.315***	-0.258***	-0.244***	-0.209	-0.320***	-0.298**	-0.334***
	(0.094)	(0.062)	(0.088)	(0.161)	(0.088)	(0.119)	(0.116)
N	2879	2013	2198	1239	1986	1019	1666
R^2	0.505	0.505	0.494	0.482	0.528	0.498	0.506
Section B: Event Study, 2005 & 2006 Inaugurations							
Metro*T1	0.021	0.022	-0.049	-0.197**	-0.158*	-0.130	-0.166*
	(0.113)	(0.153)	(0.087)	(0.087)	(0.093)	(0.103)	(0.094)
Metro*T2	-0.004	0.053	-0.110	-0.197*	-0.122	-0.250*	-0.206
	(0.099)	(0.155)	(0.126)	(0.110)	(0.082)	(0.140)	(0.140)
Metro*T3	-0.104	0.011	-0.202	-0.326**	-0.251**	-0.332***	-0.361**
	(0.114)	(0.113)	(0.121)	(0.130)	(0.112)	(0.119)	(0.135)
Metro*T4	-0.110	-0.143	-0.294**	-0.300**	-0.269***	-0.366**	-0.322*
	(0.122)	(0.162)	(0.120)	(0.105)	(0.090)	(0.161)	(0.161)
N	3365	2320	3182	1425	2256	1408	2208
R^2	0.514	0.521	0.563	0.442	0.496	0.61	0.596
Treatment (km)	2.0	2.0	1.0	1.0	1.0	0.5	0.5
Buffer (km)	1.0	2.0	1.0	2.0	2.0	1.5	1.5
Control(km)	2.0	2.0	1.0	1.0	2.0	0.5	1

Notes: Robust standard errors are clustered by distance to each grid's nearest station, using two kilometers wide intervals, and reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. T refers to the number of years after the inauguration. Grid and Year Fixed effects included. Crime baseline-level controlled. Metro is a dummy representing being in "walking distance" of the new stations. Is equal to one for the grid squares that were in the Treatment zone from a new Metro station, and zero for those that were on the control zone (after the buffer distance from the station). All grids that were less than Treatment+Buffer distance from an old Metro station (or posterior to the period studied) are excluded.

Table A14: "Walking" and Buffer Distances Robustness Check: Injuries Crimes.

	Dependent Variable: Number of crimes						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Section A: Difference in Differences, 2005 Inaugurations							
Metro*2006	-0.258	-0.368*	-0.415**	-0.317	-0.285	-0.068	-0.218
	(0.190)	(0.184)	(0.184)	(0.258)	(0.184)	(0.183)	(0.217)
Metro*2007	-0.123	-0.416*	-0.374*	-0.120	-0.227	-0.395	-0.385
	(0.206)	(0.202)	(0.208)	(0.260)	(0.211)	(0.265)	(0.267)
Metro*2008	-0.280	-0.775***	-0.905***	-0.324	-0.571**	-0.873***	-0.995***
	(0.247)	(0.168)	(0.273)	(0.298)	(0.254)	(0.252)	(0.279)
Metro*2009	-0.164	-0.455**	-0.801**	-0.139	-0.335	-0.992***	-1.023**
	(0.204)	(0.184)	(0.369)	(0.361)	(0.213)	(0.359)	(0.377)
Metro*2010	-0.449*	-0.648***	-1.115***	-0.641	-0.866***	-1.170***	-1.260***
	(0.231)	(0.123)	(0.301)	(0.401)	(0.222)	(0.358)	(0.337)
N	2879	2013	2198	1239	1986	1019	1666
R^2	0.502	0.504	0.496	0.524	0.541	0.504	0.513
Section B: Event Study, 2005 & 2006 Inaugurations							
Metro*T1	-0.389**	-0.265*	-0.311**	-0.832***	-0.626***	-0.385**	-0.386**
	(0.160)	(0.150)	(0.132)	(0.184)	(0.152)	(0.172)	(0.162)
Metro*T2	-0.208	-0.357	-0.166	-0.569**	-0.581***	-0.417**	-0.314*
	(0.186)	(0.208)	(0.150)	(0.208)	(0.146)	(0.196)	(0.163)
Metro*T3	-0.445*	-0.554***	-0.556*	-1.185***	-1.084***	-0.866***	-0.665**
	(0.260)	(0.163)	(0.279)	(0.358)	(0.253)	(0.317)	(0.285)
Metro*T4	-0.180	-0.182	-0.388	-0.851**	-0.646**	-0.616	-0.432
	(0.262)	(0.146)	(0.295)	(0.329)	(0.255)	(0.412)	(0.397)
N	3365	2320	3182	1425	2256	1408	2208
R^2	0.579	0.535	0.571	0.584	0.578	0.59	0.58
Treatment (km)	2.0	2.0	1.0	1.0	1.0	0.5	0.5
Buffer (km)	1.0	2.0	1.0	2.0	2.0	1.5	1.5
Control(km)	2.0	2.0	1.0	1.0	2.0	0.5	1

Notes: Robust standard errors are clustered by distance to each grid's nearest station, using two kilometers wide intervals, and reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. T refers to the number of years after the inauguration. Grid and Year Fixed effects included. Crime baseline-level controlled. Metro is a dummy representing being in "walking distance" of the new stations. Is equal to one for the grid squares that were in the Treatment zone from a new Metro station, and zero for those that were on the control zone (after the buffer distance from the station). All grids that were less than Treatment+Buffer distance from an old Metro station (or posterior to the period studied) are excluded.

Table A15: "Walking" and Buffer Distances Robustness Check: IntraFamily Violence Crimes.

	Dependent Variable: Number of crimes						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Section A: Difference in Differences, 2005 Inaugurations							
Metro*2006	-0.180	-0.491	-0.189	-0.201	-0.393	-0.706**	-0.617**
	(0.257)	(0.343)	(0.244)	(0.303)	(0.281)	(0.274)	(0.275)
Metro*2007	-0.315	-0.634**	-0.394*	-0.472	-0.579**	-0.632**	-0.547*
	(0.274)	(0.263)	(0.212)	(0.310)	(0.278)	(0.305)	(0.310)
Metro*2008	-0.258	-0.807**	-1.036**	-0.743	-0.910**	-1.896***	-1.711***
	(0.446)	(0.311)	(0.404)	(0.479)	(0.419)	(0.439)	(0.409)
Metro*2009	-0.571	-1.355**	-0.956**	-0.670	-1.090**	-1.832***	-1.634***
	(0.476)	(0.554)	(0.403)	(0.590)	(0.469)	(0.466)	(0.444)
Metro*2010	-1.155**	-1.688**	-1.003**	-1.182	-1.725***	-1.804***	-1.567***
	(0.520)	(0.651)	(0.397)	(0.829)	(0.522)	(0.435)	(0.428)
N	2879	2013	2198	1239	1986	1019	1666
R^2	0.582	0.626	0.644	0.576	0.602	0.627	0.661
Section B: Event Study, 2005 & 2006 Inaugurations							
Metro*T1	-0.071	-0.235	0.001	-0.432*	-0.486**	-0.305	-0.164
	(0.191)	(0.156)	(0.194)	(0.233)	(0.209)	(0.278)	(0.227)
Metro*T2	-0.032	-0.331	0.120	-0.717**	-0.748***	-0.073	0.210
	(0.329)	(0.288)	(0.290)	(0.311)	(0.234)	(0.382)	(0.344)
Metro*T3	0.031	-0.076	-0.483	-1.164*	-1.039**	-1.187**	-0.790*
	(0.467)	(0.456)	(0.413)	(0.561)	(0.399)	(0.499)	(0.412)
Metro*T4	0.226	0.507	-0.599	-0.821	-0.787	-1.565***	-1.208***
	(0.489)	(0.760)	(0.440)	(0.530)	(0.488)	(0.476)	(0.424)
N	3365	2320	3182	1425	2256	1408	2208
R^2	0.627	0.606	0.68	0.594	0.605	0.732	0.706
Treatment (km)	2.0	2.0	1.0	1.0	1.0	0.5	0.5
Buffer (km)	1.0	2.0	1.0	2.0	2.0	1.5	1.5
Control (km)	2.0	2.0	1.0	1.0	2.0	0.5	1

Notes: Robust standard errors are clustered by distance to each grid's nearest station, using two kilometers wide intervals, and reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. T refers to the number of years after the inauguration. Grid and Year Fixed effects included. Crime baseline-level controlled. Metro is a dummy representing being in "walking distance" of the new stations. Is equal to one for the grid squares that were in the Treatment zone from a new Metro station, and zero for those that were on the control zone (after the buffer distance from the station). All grids that were less than Treatment+Buffer distance from an old Metro station (or posterior to the period studied) are excluded.

Table A16: Change in Average Crime-Offender's Home Distance (km)
Event Study, 2005 & 2006 Inaugurations

	Dependent Variable: Crime-offender's home distance (km)					
	Robbery	Larceny	Vehicle Theft	Burglary	Injuries	IFV
	(1)	(2)	(3)	(4)	(5)	(6)
Metro*T1	-0.270	-0.998***	-0.651	-1.065	0.386	0.364**
	(0.357)	(0.317)	-1.445	(0.920)	(0.467)	(0.153)
Metro*T2	-0.821**	-1.352***	0.096	-1.107	0.305	0.194
	(0.315)	(0.362)	-1.774	(0.969)	(0.505)	(0.186)
Metro*T3	-1.115**	-1.397***	-1.152	-0.904	0.477	0.240
	(0.441)	(0.311)	-1.146	(0.783)	(0.642)	(0.159)
Metro*T4	-0.600	-1.272***	1.085	-1.306**	0.444	-0.241*
	(0.524)	(0.263)	(0.733)	(0.587)	(0.525)	(0.138)
N	979	2214	129	450	1524	1627
R^2	0.517	0.532	0.703	0.536	0.540	0.540

Notes: Robust standard errors are clustered by distance to each grid's nearest station, using two kilometers wide intervals, and reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. IFV stands for Intrafamily violence. T refers to the number of years after the inauguration. Grid and anniversary year Fixed Effects included. Average distance baseline-level controlled. Average distance measured in kilometers. Metro is a dummy representing being in "walking distance" of the new stations. Is equal to one for the grid squares that were less than 2 km. from a new Metro station, and zero for those that were between 3 and 5 km. All grids that were less than 3 km from a Metro station inaugurated before 2005 or after 2006 are excluded.

Table A17: Evolution of Metro 2004-2010

Year	Existing Stations	New Stations	Total
2004	52	6	58
2005	58	21	79
2006	79	13	92
2007	92	0	92
2008	92	0	92
2009	92	1	93
2010	93	8	101

Notes: New combinations on existing stations are consider new ones

Table A18: Metro stations inaugurated in 2005

Name	Line	Comuna	Combination
Cementerios	2	Recoleta	
Einstein	2	Recoleta	
Cristóbal Colón	4	Providencia, Las Condes	
Elisa Correa	4	Puente Alto	
Francisco Bilbao	4	Providencia, Las Condes, La Reina	
Grecia	4	Peñalolén, Ñuñoa, Macul	
Hospital Sótero del Río	4	Puente Alto	
Las Mercedes	4	Puente Alto	
Los Orientales	4	Peñalolén, Ñuñoa	
Los Quillayes	4	La Florida	
Plaza de Puente Alto	4	Puente Alto	
Plaza Egaña	4	La Reina y Ñuñoa	3
Príncipe de Gales	4	La Reina, Ñuñoa	
Protectora de la Infancia	4	Puente Alto	
Rojas Magallanes	4	La Florida	
Simón Bolívar	4	La Reina, Ñuñoa	
Tobalaba	4	Providencia, Las Condes	1
Trinidad	4	La Florida	
Vicente Valdés	4	La Florida	5
Vicente Valdés	5	La Florida	4
Vicuña Mackenna	4	La Florida	4A

Notes: Cementerios and Einstein were inaugurated on November 25, 2005. The rest were inaugurated on November 30, 2005.

Table A19: Metro stations inaugurated in 2006

Name	Line	Comuna	Combination
Las Torres	4	Peñalolén, Macul	
Los Presidentes	4	Peñalolén, Macul	
Macul	4	La Florida, Peñalolén, Macul	
Quilín	4	Peñalolén, Macul	
La Cisterna	4A	La Cisterna	2
La Granja	4A	La Granja	
San Ramón	4A	San Ramón	
santa Julia	4A	La Florida	
Santa Rosa	4A	San Ramón y La Granja	
Vicuña Mackenna	4A	La Florida	4
Dorsal	2	Recoleta	
Vespucio Norte	2	Recoleta	
Zapadores	2	Recoleta	

Notes: Las Torres, Los Presidentes, Macul and Quilin were inaugurated on March 2, 2006. The stations of the 4A line were inaugurated on August 16, 2006. Dorsal, Vespucio Norte and Zapadores were inaugurated on December 21, 2006.

Table A20: Metro stations inaugurated in 2009-2010

Name	Line	Comuna	Combination
San José de la Estrella	4	La Florida	
Hernando de Magallanes	1	Las Condes	
Los Dominicos	1	Las Condes	
Manquehue	1	Las Condes	
Blanqueado	5	Lo Prado, Quinta Normal	
Gruta de Lourdes	5	Quinta Normal	
Lo Prado	5	Lo Prado	
Pudahuel	5	Pudahuel, Lo Prado	
San Pablo	5	Lo Prado	1

Notes: San José de la Estrella was inaugurated on November 5, 2009. The stations of line 1 were inaugurated on January 7, 2010; the ones of line 5 on January 12, 2010.

10 Appendix B

Table B1: Main Specification - Difference in Differences: 2005 Inaugurations

	Dependent Variable: Number of crimes					
	Robbery	Larceny	Vehicle Theft	Burglary	Injuries	IFV
	(1)	(2)	(3)	(4)	(5)	(6)
Metro*2006	-0.475***	-0.902*	-0.071	-0.305***	-0.258*	-0.180
	(0.160)	(0.540)	(0.053)	(0.096)	(0.152)	(0.231)
Metro*2007	-0.376***	-1.403**	-0.013	-0.217**	-0.123	-0.315
	(0.139)	(0.548)	(0.063)	(0.090)	(0.150)	(0.239)
Metro*2008	-0.256**	-1.900***	-0.040	-0.248***	-0.280*	-0.258
	(0.126)	(0.527)	(0.055)	(0.091)	(0.163)	(0.251)
Metro*2009	-0.320**	-1.950***	-0.279***	-0.408***	-0.164	-0.571**
	(0.127)	(0.541)	(0.067)	(0.090)	(0.165)	(0.261)
Metro*2010	-0.432***	-1.793***	-0.149***	-0.315***	-0.449**	-1.155***
	(0.129)	(0.529)	(0.054)	(0.089)	(0.180)	(0.287)
N	2879	2879	2879	2879	2879	2879
R^2	0.597	0.820	0.381	0.505	0.502	0.582

Robust standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Notes: IFV stands for Intrafamily violence. Grid and Year Fixed effects included. Crime baseline-level controlled. Metro is a dummy representing being in "walking distance" of the new stations. Is equal to one for the grid squares that were less than 2 km. from a Metro station inaugurated on 2005, and zero for those that were between 3 and 5 km. All grids that were less than 3 km from a Metro station inaugurated before or after 2005 are excluded.

Table B2: Main Specification - Event Study: 2005 & 2006 Inaugurations

	Dependent Variable: Number of crimes					
	Robbery	Larceny	Vehicle Theft	Burglary	Injuries	IFV
	(1)	(2)	(3)	(4)	(5)	(6)
Metro*T1	-0.332**	-1.237***	-0.057	-0.014	-0.446***	-0.107
	(0.140)	(0.475)	(0.047)	(0.088)	(0.143)	(0.191)
Metro*T2	-0.222*	-2.523***	0.125**	-0.054	-0.223	-0.106
	(0.118)	(0.498)	(0.055)	(0.080)	(0.141)	(0.196)
Metro*T3	-0.120	-2.366***	0.079	-0.167*	-0.481***	-0.113
	(0.116)	(0.480)	(0.053)	(0.086)	(0.160)	(0.216)
Metro*T4	-0.262**	-2.307***	-0.046	-0.177**	-0.214	-0.048
	(0.116)	(0.496)	(0.057)	(0.082)	(0.156)	(0.237)
N	3,531	3,531	3,531	3,531	3,531	3,531
R^2	0.629	0.828	0.424	0.532	0.580	0.640

Robust standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Notes: IFV stands for Intrafamily violence. T refers to the number of years after the inauguration. Grid and anniversary year Fixed Effects included. Crime baseline-level controlled. Metro is a dummy representing being in "walking distance" of the new stations. Is equal to one for the grid squares that were less than 2 km. from a new Metro station, and zero for those that were between 3 and 5 km. All grids that were less than 3 km from a Metro station inaugurated before 2005 or after 2006 are excluded.

Table B3: Log Specification - Difference in Differences: 2005 Inaugurations

	Dependent Variable: Log(Number of crimes)					
	Robbery	Larceny	Vehicle Theft	Burglary	Injuries	IFV
	(1)	(2)	(3)	(4)	(5)	(6)
Metro*2006	-0.315**	-0.260*	-0.040	-0.421**	-0.012	-0.065
	(0.141)	(0.138)	(0.286)	(0.175)	(0.104)	(0.112)
Metro*2007	-0.355***	-0.268**	0.023	-0.233	-0.002	-0.063
	(0.132)	(0.136)	(0.224)	(0.181)	(0.100)	(0.116)
Metro*2008	-0.230*	-0.437***	-0.090	-0.097	-0.101	-0.140
	(0.125)	(0.136)	(0.283)	(0.167)	(0.099)	(0.111)
Metro*2009	-0.314**	-0.503***	-0.461*	-0.439**	-0.040	-0.126
	(0.129)	(0.135)	(0.260)	(0.170)	(0.093)	(0.106)
Metro*2010	-0.341**	-0.454***	-0.323	-0.307*	-0.161*	-0.332***
	(0.132)	(0.136)	(0.228)	(0.185)	(0.096)	(0.109)
N	815	2179	176	452	1374	1779
R^2	0.619	0.774	0.587	0.520	0.502	0.625

Robust standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Notes: IFV stands for Intrafamily violence. Grid and Year Fixed effects included. Crime baseline-level controlled. Metro is a dummy representing being in "walking distance" of the new stations. Is equal to one for the grid squares that were less than 2 km. from a Metro station inaugurated on 2005, and zero for those that were between 3 and 5 km. All grids that were less than 3 km from a Metro station inaugurated before or after 2005 are excluded. All zero-value observations are reported as missing values.

Table B4: Log Specification - Event Study: 2005 & 2006 Inaugurations

	Dependent Variable: Number of crimes					
	Robbery	Larceny	Vehicle Theft	Burglary	Injuries	IFV
	(1)	(2)	(3)	(4)	(5)	(6)
Metro*T1	-0.236**	-0.179**	-0.179	0.168	-0.131*	-0.067
	(0.096)	(0.077)	(0.195)	(0.121)	(0.074)	(0.079)
Metro*T2	-0.197**	-0.260***	-0.068	0.054	-0.128*	-0.013
	(0.086)	(0.075)	(0.178)	(0.116)	(0.073)	(0.080)
Metro*T3	-0.085	-0.283***	-0.022	0.079	-0.185**	-0.040
	(0.085)	(0.077)	(0.179)	(0.119)	(0.073)	(0.079)
Metro*T4	-0.115	-0.340***	-0.222	0.020	-0.097	0.047
	(0.087)	(0.076)	(0.165)	(0.112)	(0.071)	(0.078)
N	1,413	2,906	311	742	2,086	2,464
R^2	0.612	0.809	0.577	0.535	0.568	0.646

Robust standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Notes: IFV stands for Intrafamily violence. T refers to the number of years after the inauguration. Grid and anniversary year Fixed Effects included. Crime baseline-level controlled. Metro is a dummy representing being in "walking distance" of the new stations. Is equal to one for the grid squares that were less than 2 km. from a new Metro station, and zero for those that were between 3 and 5 km. All grids that were less than 3 km from a Metro station inaugurated before 2005 or after 2006 are excluded. All zero-value observations are reported as missing values.

Table B5: Alternative Specification: Crimes per 100,000 ppl. at census Zone (ZC)
Difference in Differences, 2005 Inaugurations

	Dependent Variable: crimes per 100,000 ppl.					
	Robbery	Larceny	Vehicle Theft	Burglary	Injuries	IFV
	(1)	(2)	(3)	(4)	(5)	(6)
Metro*2006	-3.500	85.132	-1.039	-22.951	-11.541	67.610
	(39.552)	(115.825)	(10.465)	(15.695)	(24.647)	(60.943)
Metro*2007	17.524	95.776	16.624	-0.519	0.386	-1.637
	(28.518)	(116.060)	(12.761)	(15.954)	(24.234)	(62.844)
Metro*2008	-1.883	-72.681	8.982	-11.436	9.557	-15.241
	(24.572)	(116.843)	(10.706)	(16.185)	(24.252)	(74.455)
Metro*2009	9.487	49.892	-32.438***	-36.825**	19.453	-20.042
	(29.972)	(134.044)	(11.337)	(17.720)	(32.813)	(65.385)
Metro*2010	-18.221	-24.087	2.908	-9.097	43.958	-54.128
	(26.300)	(109.109)	(11.374)	(20.739)	(30.794)	(73.317)
N	304	304	304	304	304	304
R^2	0.848	0.936	0.704	0.733	0.780	0.866

Robust standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Notes: IFV stands for Intrafamily violence. ZC stands for "Zona Censal", a chilean census's geographic unit. Zone and anniversary year Fixed effects included. Crime baseline-level controlled, and baseline population and working population controls included. Metro is a dummy representing being in "walking distance" of the new stations. Is equal to one for the census zones that were less than 2 km. from a Metro station inaugurated on 2005, and zero for those that were between 3 and 5 km. All zones that were less than 3 km from a Metro station inaugurated before or after 2005 are excluded.

Table B6: Alternative Specification: Crimes per 100,000 ppl. at census Block (MC)
Difference in Differences, 2005 Inaugurations

	Dependent Variable: crimes per 100,000 ppl.					
	Robbery	Larceny	Vehicle Theft	Burglary	Injuries	IFV
	(1)	(2)	(3)	(4)	(5)	(6)
Metro*2006	-262.242**	-426.119	21.700	-41.325	-98.098	52.806
	(118.650)	(416.815)	(47.824)	(92.221)	(126.372)	(187.495)
Metro*2007	-149.039	-727.037*	112.099*	-38.818	112.271	-161.923
	(113.634)	(392.352)	(66.707)	(85.824)	(124.939)	(179.251)
Metro*2008	-139.463	-1227.679***	50.507	8.105	-143.354	-43.932
	(104.125)	(392.098)	(54.139)	(86.944)	(125.984)	(195.238)
Metro*2009	-179.214*	-1252.836***	-44.616	-96.451	14.579	-203.746
	(101.058)	(399.393)	(52.086)	(85.876)	(139.048)	(197.329)
Metro*2010	-199.301*	-862.575**	-6.702	-34.866	-87.442	-554.876**
	(103.613)	(396.862)	(53.137)	(84.184)	(154.105)	(222.501)
N	6551	6551	6551	6551	6551	6551
R^2	0.482	0.660	0.456	0.405	0.457	0.543

Robust standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Notes: IFV stands for Intrafamily violence. MC stands for "Manzana Censal", a chilean census's geographic unit. Block and anniversary year Fixed effects included. Crime baseline-level controlled, and baseline population and socioeconomic controls included. Block population used as weight. Metro is a dummy representing being in "walking distance" of the new stations. Is equal to one for the census blocks that were less than 2 km. from a Metro station inaugurated on 2005, and zero for those that were between 3 and 5 km. All blocks that were less than 3 km from a Metro station inaugurated before or after 2005 are excluded.

Table B7: Alternative Specification: Crimes per 100,000 ppl. at census Zone (ZC) Event Study, 2005 & 2006 Inaugurations

	Dependent Variable: crimes per 100,000 ppl.					
	Robbery	Larceny	Vehicle Theft	Burglary	Injuries	IFV
	(1)	(2)	(3)	(4)	(5)	(6)
Metro*T1	13.410	-4.111	4.352	19.590	-30.084	-4.858
	(19.879)	(65.060)	(7.869)	(14.851)	(28.945)	(40.985)
Metro*T2	28.500	-149.649**	30.001***	15.681	-1.621	-39.189
	(20.069)	(70.279)	(9.130)	(13.060)	(26.664)	(42.532)
Metro*T3	13.101	-136.738**	19.869**	8.204	-38.247	-82.216
	(19.673)	(61.231)	(9.020)	(13.885)	(26.753)	(68.334)
Metro*T4	-11.216	-120.851*	11.464	4.033	-29.023	48.187
	(20.843)	(69.428)	(9.540)	(14.378)	(46.655)	(56.555)
N	474	474	474	474	474	474
R^2	0.676	0.860	0.483	0.542	0.546	0.694

Robust standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Notes: IFV stands for Intrafamily violence. ZC stands for "Zona Censal", a chilean census's geographic unit. T refers to the number of years after the inauguration. Zone and anniversary year Fixed effects included. Crime baseline-level controlled, and baseline population and working population controls included. Metro is a dummy representing being in "walking distance" of the new stations. Is equal to one for the census zones that were less than 2 km. from a new Metro station, and zero for those that were between 3 and 5 km. All zones that were less than 3 km from a Metro station inaugurated before 2005 or after 2006 are excluded.

Table B8: Alternative Specification: Crimes per 100,000 ppl. at census Block (MC)
Event Study, 2005 & 2006 Inaugurations

	Dependent Variable: crimes per 100,000 ppl.					
	Robbery	Larceny	Vehicle Theft	Burglary	Injuries	IFV
	(1)	(2)	(3)	(4)	(5)	(6)
Metro*T1	-295.799***	-514.750*	53.719	28.232	-219.762*	104.046
	(105.948)	(300.581)	(47.698)	(77.738)	(127.570)	(149.649)
Metro*T2	-242.814**	-1610.177***	183.423***	21.580	86.848	-41.431
	(100.255)	(291.620)	(51.050)	(74.074)	(128.986)	(149.763)
Metro*T3	-308.300***	-1351.118***	192.452***	-37.029	-136.710	21.796
	(100.938)	(303.681)	(50.214)	(72.797)	(133.257)	(156.875)
Metro*T4	-366.118***	-1558.886***	97.539*	-45.338	103.485	7.780
	(104.203)	(301.681)	(51.626)	(75.596)	(138.061)	(160.621)
N	10280	10280	10280	10280	10280	10280
R^2	0.490	0.673	0.389	0.410	0.455	0.576

Robust standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Notes: IFV stands for Intrafamily violence. MC stands for "Manzana Censal", a chilean census's geographic unit. T refers to the number of years after the inauguration. Block and anniversary year Fixed effects included. Crime baseline-level controlled, and baseline population and socioeconomic controls included. Block population used as weight. Metro is a dummy representing being in "walking distance" of the new stations. Is equal to one for the census blocks that were less than 2 km. from a new Metro station, and zero for those that were between 3 and 5 km. All blocks that were less than 3 km from a Metro station inaugurated before 2005 or after 2006 are excluded.

Table B9: Gibbons and Machin (2005) Specification - Difference in Differences: 2005 Inaugurations

	Dependent Variable: Number of crimes					
	Robbery	Larceny	Vehicle Theft	Burglary	Injuries	IFV
	(1)	(2)	(3)	(4)	(5)	(6)
$\Delta dist$*Metro*2006	-0.047**	-0.100	-0.007	-0.033***	-0.029	-0.023
	(0.020)	(0.065)	(0.007)	(0.012)	(0.018)	(0.027)
$\Delta dist$*Metro*2007	-0.036**	-0.165**	0.002	-0.023**	-0.015	-0.043
	(0.017)	(0.066)	(0.008)	(0.011)	(0.018)	(0.028)
$\Delta dist$*Metro*2008	-0.029*	-0.228***	-0.002	-0.026**	-0.036*	-0.037
	(0.015)	(0.063)	(0.007)	(0.011)	(0.019)	(0.029)
$\Delta dist$*Metro*2009	-0.035**	-0.238***	-0.031***	-0.044***	-0.020	-0.077**
	(0.015)	(0.065)	(0.008)	(0.011)	(0.019)	(0.031)
$\Delta dist$*Metro*2010	-0.048***	-0.217***	-0.015**	-0.035***	-0.055***	-0.137***
	(0.015)	(0.063)	(0.007)	(0.011)	(0.021)	(0.033)
N	2879	2879	2879	2879	2879	2879
R^2	0.596	0.820	0.381	0.504	0.502	0.582

Robust standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Notes: IFV stands for Intrafamily violence. $\Delta dist$ represents the change in distance before and after the inauguration. Grid and Year Fixed effects included. Crime baseline-level controlled. Metro is a dummy representing being in "walking distance" of the new stations. Is equal to one for the grid squares that were less than 2 km. from a Metro station inaugurated on 2005, and zero for those that were between 3 and 5 km. All grids that were less than 3 km from a Metro station inaugurated before or after 2005 are excluded.

Table B10: Gibbons and Machin (2005) Specification - Event Study: 2005 & 2006 Inaugurations

	Dependent Variable: Number of crimes					
	Robbery	Larceny	Vehicle Theft	Burglary	Injuries	IFV
	(1)	(2)	(3)	(4)	(5)	(6)
$\Delta dist$*Metro*T1	-0.043***	0.005	-0.007	-0.011	-0.060***	-0.032
	(0.015)	(0.060)	(0.006)	(0.009)	(0.015)	(0.022)
$\Delta dist$*Metro*T2	-0.035**	-0.022	0.002	-0.012	-0.063***	-0.097***
	(0.014)	(0.060)	(0.007)	(0.009)	(0.016)	(0.022)
$\Delta dist$*Metro*T3	-0.033**	-0.108*	-0.007	-0.014	-0.107***	-0.076***
	(0.013)	(0.059)	(0.006)	(0.010)	(0.018)	(0.025)
$\Delta dist$*Metro*T4	-0.033**	-0.098	-0.027***	-0.020**	-0.074***	-0.050*
	(0.013)	(0.060)	(0.006)	(0.009)	(0.018)	(0.027)
N	3531	3531	3531	3531	3531	3531
R^2	0.628	0.825	0.425	0.531	0.582	0.641

Robust standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Notes: IFV stands for Intrafamily violence. T refers to the number of years after the inauguration. $\Delta dist$ represents the change in distance before and after the inauguration. Grid and Year Fixed effects included. Crime baseline-level controlled. Metro is a dummy representing being in "walking distance" of the new stations. Is equal to one for the grid squares that were less than 2 km. from a new Metro station, and zero for those that were between 3 and 5 km. All grids that were less than 3 km from a Metro station inaugurated before 2005 or after 2006 are excluded.

Table B11: Rob. Check: 300x300 Grid Size - Difference in Differences: 2005 Inaugurations

	Dependent Variable: Number of crimes					
	Robbery	Larceny	Vehicle Theft	Burglary	Injuries	IFV
	(1)	(2)	(3)	(4)	(5)	(6)
Metro*2006	-0.481**	-0.902	-0.064	-0.376***	-0.247	-0.004
	(0.207)	(0.712)	(0.059)	(0.118)	(0.201)	(0.307)
Metro*2007	-0.364**	-1.039	-0.002	-0.245**	-0.041	-0.194
	(0.182)	(0.707)	(0.076)	(0.116)	(0.196)	(0.321)
Metro*2008	-0.181	-1.930***	-0.008	-0.305***	-0.121	-0.005
	(0.162)	(0.685)	(0.063)	(0.113)	(0.209)	(0.328)
Metro*2009	-0.256	-1.701**	-0.325***	-0.482***	-0.075	-0.275
	(0.171)	(0.737)	(0.074)	(0.120)	(0.221)	(0.353)
Metro*2010	-0.474***	-1.801***	-0.160**	-0.358***	-0.470**	-0.844**
	(0.167)	(0.684)	(0.068)	(0.113)	(0.233)	(0.382)
N	2208	2208	2208	2208	2208	2208
R^2	0.618	0.843	0.397	0.518	0.571	0.644

Robust standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Notes: IFV stands for Intrafamily violence. Grid and Year Fixed effects included. Crime baseline-level controlled. Metro is a dummy representing being in "walking distance" of the new stations. Is equal to one for the grid squares that were less than 2 km. from a Metro station inaugurated on 2005, and zero for those that were between 3 and 5 km. All grids that were less than 3 km from a Metro station inaugurated before or after 2005 are excluded.

Table B12: Rob. Check: 300x300 Grid Size - Event Study: 2005 & 2006 Inaugurations

	Dependent Variable: Number of crimes					
	Robbery	Larceny	Vehicle Theft	Burglary	Injuries	IFV
	(1)	(2)	(3)	(4)	(5)	(6)
Metro*T1	-0.361*	-1.663**	-0.084	-0.046	-0.601***	-0.012
	(0.189)	(0.670)	(0.065)	(0.115)	(0.195)	(0.304)
Metro*T2	-0.346**	-3.075***	0.134*	-0.022	-0.291	0.049
	(0.164)	(0.687)	(0.074)	(0.112)	(0.196)	(0.306)
Metro*T3	-0.185	-2.861***	0.135*	-0.215*	-0.500**	0.095
	(0.165)	(0.674)	(0.076)	(0.117)	(0.214)	(0.336)
Metro*T4	-0.360**	-2.795***	-0.095	-0.213*	-0.285	0.315
	(0.169)	(0.711)	(0.078)	(0.115)	(0.221)	(0.358)
N	2578	2578	2578	2578	2578	2578
R^2	0.674	0.839	0.458	0.563	0.632	0.698

Robust standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Notes: IFV stands for Intrafamily violence. T refers to the number of years after the inauguration. Grid and anniversary year Fixed Effects included. Crime baseline-level controlled. Metro is a dummy representing being in "walking distance" of the new stations. Is equal to one for the grid squares that were less than 2 km. from a new Metro station, and zero for those that were between 3 and 5 km. All grids that were less than 3 km from a Metro station inaugurated before 2005 or after 2006 are excluded.

Table B13: Rob. Check: 200x200 Grid Size - Difference in Differences: 2005 Inaugurations

	Dependent Variable: Number of crimes					
	Robbery	Larceny	Vehicle Theft	Burglary	Injuries	IFV
	(1)	(2)	(3)	(4)	(5)	(6)
Metro*2006	-0.336***	-0.263	-0.040	-0.260***	-0.342***	-0.175
	(0.089)	(0.316)	(0.029)	(0.058)	(0.096)	(0.131)
Metro*2007	-0.320***	-0.758**	0.008	-0.160***	-0.139	-0.270**
	(0.081)	(0.314)	(0.034)	(0.057)	(0.094)	(0.135)
Metro*2008	-0.164**	-1.195***	-0.022	-0.196***	-0.237**	-0.384***
	(0.076)	(0.302)	(0.030)	(0.056)	(0.098)	(0.141)
Metro*2009	-0.317***	-1.362***	-0.159***	-0.320***	-0.268***	-0.439***
	(0.077)	(0.305)	(0.032)	(0.057)	(0.101)	(0.147)
Metro*2010	-0.314***	-1.193***	-0.092***	-0.251***	-0.471***	-0.909***
	(0.073)	(0.306)	(0.030)	(0.055)	(0.108)	(0.158)
N	5285	5285	5285	5285	5285	5285
R-sq	0.553	0.771	0.344	0.444	0.439	0.518

Robust standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Notes: IFV stands for Intrafamily violence. Grid and Year Fixed effects included. Crime baseline-level controlled. Metro is a dummy representing being in "walking distance" of the new stations. Is equal to one for the grid squares that were less than 2 km. from a Metro station inaugurated on 2005, and zero for those that were between 3 and 5 km. All grids that were less than 3 km from a Metro station inaugurated before or after 2005 are excluded.

Table B14: Rob. Check: 200x200 Grid Size - Event Study: 2005 & 2006 Inaugurations

	Dependent Variable: Number of crimes					
	Robbery	Larceny	Vehicle Theft	Burglary	Injuries	IFV
	(1)	(2)	(3)	(4)	(5)	(6)
Metro*T1	-0.297***	-1.123***	-0.033	-0.027	-0.333***	-0.124
	(0.095)	(0.339)	(0.033)	(0.060)	(0.097)	(0.137)
Metro*T2	-0.238***	-1.985***	0.079**	-0.019	-0.182*	-0.167
	(0.085)	(0.344)	(0.039)	(0.056)	(0.099)	(0.135)
Metro*T3	-0.129	-1.845***	0.045	-0.130**	-0.316***	-0.199
	(0.084)	(0.329)	(0.038)	(0.060)	(0.107)	(0.152)
Metro*T4	-0.257***	-1.910***	-0.032	-0.157***	-0.210*	-0.135
	(0.084)	(0.345)	(0.039)	(0.058)	(0.111)	(0.163)
N	4886	4886	4886	4886	4886	4886
R^2	0.611	0.806	0.420	0.464	0.519	0.594

Robust standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Notes: IFV stands for Intrafamily violence. T refers to the number of years after the inauguration. Grid and anniversary year Fixed Effects included. Crime baseline-level controlled. Metro is a dummy representing being in "walking distance" of the new stations. Is equal to one for the grid squares that were less than 2 km. from a new Metro station, and zero for those that were between 3 and 5 km. All grids that were less than 3 km from a Metro station inaugurated before 2005 or after 2006 are excluded.

Table B15: Parallel Trends: Falsification Test.
Difference in Differences, 2005 Inaugurations

	Robbery	Larceny	Vehicle Theft	Burglary	Injuries	IFV
	(1)	(2)	(3)	(4)	(5)	(6)
Metro*2005trim2	-0.117	0.075	0.025	-0.024	0.386*	-0.072
	(0.182)	(0.227)	(0.057)	(0.110)	(0.215)	(0.150)
Metro*2005trim3	-0.139	0.094	0.083	-0.062	0.293	-0.012
	(0.211)	(0.288)	(0.070)	(0.104)	(0.196)	(0.141)
Metro*2005trim4	-0.045	0.252	0.044	-0.069	0.028	0.092
	(0.183)	(0.236)	(0.063)	(0.111)	(0.192)	(0.161)
N	522	522	522	522	522	522
R^2	0.398	0.533	0.330	0.377	0.349	0.443

Robust standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Notes: IFV stands for Intrafamily violence. Grid and Trimester Fixed Effects included. Metro is a dummy representing being in "walking distance" of the new stations. Is equal to one for the grid squares that were less than 2 km. from a Metro station inaugurated on 2005, and zero for those that were between 3 and 5 km. All grids that were less than 3 km from a Metro station inaugurated before or after 2005 are excluded.

Table B16: Parallel Trends: Falsification Test II
Difference in Difference, 2005 Inaugurations

	Distance	Property	Violence	Total
	(1)	(2)	(3)	(4)
Metro*2005trim2	0.156	-0.041	0.314	0.273
	-1.064	(0.295)	(0.239)	(0.342)
Metro*2005trim3	0.761	-0.024	0.281	0.257
	(0.856)	(0.338)	(0.226)	(0.356)
Metro*2005trim4	-0.113	0.183	0.119	0.302
	(0.911)	(0.291)	(0.213)	(0.322)
N	522	522	522	522
R^2	0.439	0.544	0.430	0.554

Robust standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
Notes: IFV stands for Intrafamily violence. Grid and Trimester Fixed Effects included. Metro is a dummy representing being in "walking distance" of the new stations. Is equal to one for the grid squares that were less than 2 km. from a Metro station inaugurated on 2005, and zero for those that were between 3 and 5 km. All grids that were less than 3 km from a Metro station inaugurated before or after 2005 are excluded.

Table B17: Parallel Trends: Falsification Test
Event Study, 2005 & 2006 Inaugurations

	Robbery	Larceny	Vehicle Theft	Burglary	Injuries	IFV
	(1)	(2)	(3)	(4)	(5)	(6)
Metro*bim1	0.040	-0.208	-0.027	0.049	-0.023	-0.117
	(0.100)	(0.238)	(0.043)	(0.068)	(0.108)	(0.110)
Metro*bim2	-0.149	-0.221	-0.039	0.029	0.051	-0.225**
	(0.092)	(0.223)	(0.037)	(0.068)	(0.111)	(0.101)
Metro*bim3	-0.089	-0.400*	0.002	0.098	0.058	-0.079
	(0.092)	(0.220)	(0.029)	(0.066)	(0.097)	(0.101)
Metro*bim4	-0.161*	-0.392	-0.027	0.070	-0.024	0.098
	(0.092)	(0.252)	(0.039)	(0.066)	(0.092)	(0.105)
N	1,384	1,384	1,384	1,384	1,384	1,384
R^2	0.439	0.568	0.423	0.426	0.479	0.493

Robust standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
Notes: IFV stands for Intrafamily violence. Grid and Bimester Fixed Effects included. Metro is a dummy representing being in "walking distance" of the new stations. Is equal to one for the grid squares that were less than 2 km. from a Metro station inaugurated on each period for 2005-2006, and zero for those that were between 3 and 5 km. All grids that were less than 3 km from a Metro station inaugurated before or after this period are excluded. *Bim* represents the Bimester of the anniversary year before the inauguration, with *bim*4 the last one before the opening.