

# The Cost of Crime and Violence in Five Latin American Countries

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**Abstract** This paper provides evidence on the costs imposed by crime and violence in five Latin American countries: Chile, Costa Rica, Honduras, Paraguay and Uruguay. Crime and violence stand out as one of the major social challenges to be dealt with in Latin America. However, the incidence of crime (and thus its social and economic impact) varies among countries. Based on a common theoretical framework across all five countries, we use a costs-accounting methodology and find that the cost of criminality varies from a striking 10.5 % of GDP in Honduras to a moderate 2.5 % in Costa Rica. Also, by quantifying the different components of the cost equation separately, we provide insight on which felonies are more costly and which agents are burdened most heavily by these costs.

**Keywords** Costs · Crime and violence · Development · Latin America

## Introduction

Despite the recent progress achieved in Latin America (LATAM) in terms of economic growth and poverty reduction, the region still has an important challenge to deal with in terms of the abatement of crime and violence. Homicide rates in LATAM tend to be

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much higher than in other regions. In fact, homicide has become epidemic in most Latin American countries according to the World Health Organisation's (WHO) classification. Also, as opposed to the trends verified in most other regions, LATAM has shown a persistent increase in criminality in the last decade (United Nations Development Programme [UNDP] 2013). As a result, criminal and violent acts are exerting important costs on Latin American societies.

According to opinion polls in LATAM criminality is the top concern of citizens in most of the countries and is also among the top policy priorities of governments in the region.<sup>1</sup> The estimation of the costs of crime and violence is the first step to both, inform the public debate and provide useful information for the evaluation of cost-effectiveness of alternative security policies. As argued by Savona and Vettori (2009), understanding harm and its dimensions is crucial in terms of providing policy-makers criteria to allocate limited resources devoted to crime abatement. It also provides private agents (mainly households and firms) insight on the harm imposed to them by crime occurrence so as to decide on what actions to take in order to minimize the risk of victimization. With this in mind, our goal in this article is to estimate the costs involving criminal activities in five Latin American countries: Chile, Costa Rica, Honduras, Paraguay and Uruguay.<sup>2</sup>

The comparison of the costs of crime and violence between different countries can be misleading, among other reasons, as a result of the heterogeneous set of assumptions and methods to measure them in different studies. The analysis proposed here offers comparable results that are based on virtually the same methodological guidelines for five different Latin American countries. It also provides a theory-based empirical approach that can be easily adapted to fit other countries' availability of information.

The empirical analysis is carried out through an accounting exercise that consists of the adding up of different costs that are part of the total cost of crime according to a theoretical model. Some of these cost categories are public and others private. Expenditures computed are focused on crime prevention and abatement, healthcare provisions for victims, the value of stolen property, opportunity costs that emerge from time spent in prison by criminals and other intangible costs associated with behavioural changes, physical or psychological consequences from the existence of criminality, among others. The main difference between the empirical approach used in this paper and the approach commonly found in the existing literature (for example Brand and Price 2000), is that we rely on an economic model to identify the main sources of costs.

This allows us to advance on an empirical strategy that is consistent and comparable among the five selected countries, so that findings are sustained on a theoretical basis. Also, the methodology makes use of recently available international sources of information (such as the World Bank's Enterprise Survey) that allow cross-country common identification of different cost categories and identical measurement criteria. Such sources of information are not employed by previous studies (see evidence cited below) and may plausibly improve the quality of the estimates given that they involve more direct and accurate measurement of crime exposure (for instance, the Enterprise Survey collects data on the value of property lost by firms as a consequence of theft).

<sup>1</sup> According to Latinobarometro (2013) in 12 of the 18 LATAM countries covered by their polls the main problem of the country in 2013 was criminality.

<sup>2</sup> Given that this analysis was carried out in the context of an Inter-American Development Bank's research project, the choice of the sample of countries was made in agreement with the IDB. The main criteria for choosing these countries were: i. the need of generating this kind of estimations for the first time for most of these countries, ii. the availability of relatively comparable information for these countries and, iii. the fact that they are all relatively small countries.

There is some available evidence on the overall costs of criminality based on the accounting method. However, as was mentioned above, the results obtained through the accounting of costs that are not based in a unified methodological and theoretical framework may not be comparable. Brand and Price (2000) carry out a comprehensive quantification of the costs of crime and their different components for the UK, reaching an estimated 7 % of the gross domestic product (GDP). For the US, estimations by Anderson (1999) show a cost of 12 % of GDP. In more recent studies, Roper and Thompson (2006) estimate a cost of 6.5 % of GDP in New Zealand; Detotto and Vannini (2010) estimate that costs amount to 2.6 % of GDP in Italy; Czabański (2009) finds a cost of 5.1 % of GDP for Poland; and, finally, Alda and Cuesta (2011) find that the aggregated costs of crime in South Africa amounted to 7.8 % of GDP in 2007. In Latin America, Londoño and Guerrero (1999) quantify the costs of crime for six countries (Brazil, Colombia, El Salvador, Mexico, Peru and Venezuela), obtaining an overall cost of 14 % of GDP. Olavarria-Gambi (2007) presents cost estimation for Chile (2.1 % of GDP). Two other studies (IDB 1998; Rondon and Andrade 2003) provide estimations for two Latin American cities: Mexico City (4.2 % of GDP) and Belo Horizonte (4.1 % of GDP).

Soares (2009) carry out a review of the literature on welfare costs of crime and common violence. The survey focuses on economically motivated crimes and tries to rationalize in economic terms the estimates from the existing methodologies. The paper presents the methodologies usually applied to estimate particular aspects of the costs of crime (accounting, contingent valuation and other willingness-to-pay methods) and discuss some issues they fail to contemplate. In particular, the paper points out the need for a common conceptual framework in which to base the estimations. This is precisely one of the contributions of this paper. In addition, as far as we know, we are the first in generating country cost estimations for Costa Rica, Honduras, Paraguay and Uruguay.

The paper is structured as follows. In A Theoretical Framework, we explain the model that frames the empirical estimation of costs. Characterisation of the Countries Under Study puts into context the Latin American situation regarding criminality and also briefly describes socio-economic characteristics of the countries in our sample. Measuring the Costs of Crime details the methods and sources of information used to quantify each cost category. Results section presents the results of the empirical analysis. Conclusions and Policy Implications concludes and presents some policy implications.

## A Theoretical Framework

Soares (2009) provides a simple theoretical framework that can be used to identify in a comprehensive way the different costs associated to crime. The model derives two social loss functions: one associated to victims and the other to criminals.

In this framework, the potential victim maximises his or her utility by choosing the optimal amount of two goods: one that is liable to being stolen ( $c$ ) ( $c_n$  in a no crime scenario and  $c_c$  in a crime scenario) and one that is not ( $y$ ). In a no crime scenario, the utility function is:

$$U(c_n, y) = a \cdot \log(c_n) + y \quad (1)$$

and the budget constraint is:

$$p \cdot c_n + y = m \quad (2)$$

where  $p$  is the price of consumption goods ( $c_n$ ),  $m$  is the total income and  $a$  is a constant.

In a scenario of occurrence of crime, the utility incorporates the negative effects of the stolen goods and of intangible costs:

$$U(c_c, y) = a \cdot \log(c_c - x) + (y - g). \tag{3}$$

The budget constraint is:

$$p \cdot c_c + y + s + j = m, \tag{4}$$

$x$  is the amount of good  $c$  lost in case of victimisation (stolen or vandalised goods) and  $g$  is the subjective loss of welfare (due to intangible costs, such as psychological costs). Note that in a situation of crime the utility is affected negatively by the goods stolen  $x$  and by  $g$  (the intangible costs). If we assume that the probability of being victimised is increasing with respect to the consumption of good  $c$ , the optimal amount of good  $c$  consumed in a crime scenario  $c_c$  will be reduced with respect to the optimal level consumed in a no crime scenario  $c_n$  (see Soares 2009). The idea is that if by consuming  $c$  (for example going to cinema at night, using expensive clothing) individuals expose themselves to an increased probability of being victimised, the consumption will be reduced with respect to a situation where there is no crime. Consumption is also affected through the budget constraint that now includes the costs of crime prevention ( $s$ ) and crime punishment ( $j$ ) that the individuals pay directly by buying these services or indirectly by paying taxes.

Therefore the social loss associated to victims can be approximated by:

$$Lv = s + j + g + p \cdot x + p \cdot (c_n - c_c) \tag{5}$$

where  $Lv$  represents the social loss (associated to victims) as a result of crime. The first two terms ( $s + j$ ) account for the total expenditures by both public and private agents as a consequence of crime (security and justice services). The second two terms ( $g + p \cdot x$ ) reflect the costs to be faced by society in case of victimisation. These costs include the costs of the stolen property  $p \cdot x$  and the intangible costs  $g$ . The last term of the equation,  $p \cdot (c_n - c_c)$ , indicates the utility loss that comes from individuals' behavioural changes set to avoid victimisation. It represents the monetary value of the difference between the amount consumed in a no crime scenario ( $c_n$ ) and the magnitude consumed in case of victimisation ( $c_c$ ).

When it comes to criminals, the social loss  $Lc$  is formalised as follows:

$$Lc = e + d \tag{6}$$

where  $e$  is the effort that criminals put into their criminal activities (which is a loss from the social point of view) and  $d$  represents the social loss associated to the time that criminals spend at prison (both could be approximated by the value of the hours of work lost). Criminals that are in prison could be alternatively (in a situation of no criminality) working and providing goods for the society. Therefore in the absence of criminality the society would be enjoying a higher welfare coming from the goods and services that this labour force would be generating.

Note that implicitly we are assuming that the utility that criminals get from the stolen goods does not reduce the social loss associated to criminals (this implies that from the social point of view the utility that criminals get from stolen goods does not add to the social utility).

In this theoretical framework  $L = Lv + Lc$  is the total cost that criminality imposes on a society as a whole.

In the next sections we will estimate some of the components of cost of Eqs. (5) and (6).

## Characterisation of the Countries Under Study

### Crime and Violence in Latin America, in Context

The aim of this section is to briefly put into context the incidence of crime in LATAM comparing it with the situation in European and Asian countries.

Table 1 shows homicide rates for a sample of countries. The table highlights the existence of a significant heterogeneity within regions and gap between them, as well as different time trends. Homicide rates are notoriously higher in Latin American countries compared to those from Asia or Europe. While the latter had an average homicide rate of 2.1 per 100,000 people in 2012, this figure reached 4.7 in Asia and 23.9 in LATAM. Another striking feature is that there is no apparent convergence between European, Asian and LATAM regions. Even more, the gap between the Europe and LATAM appears to grow from 2006 to 2012, since the average homicide rate increases in LATAM and decreases in Europe. In LATAM, the highest homicide rates are located in Central America, especially in Honduras, El Salvador, Guatemala and Jamaica. These high rates of homicide are associated to drug trafficking in the region (Vilalta 2014). In South America, Venezuela and Colombia show the highest rates. This is mostly associated with drug dealing and internal conflict, where the *guerrillas*, by taking part in many violent abductions and homicides, have been largely responsible for this situation. As for Chile, its homicide rate is more similar to that of European countries.

Table 2 gives perspective on the material losses due to the existence of crime by presenting figures on annual losses faced by firms as a consequence of property crimes (that is theft, robbery, vandalism and arson). The average loss in LATAM is twice the average among European countries and Asia. As a result, LATAM appears to be suffering from considerably larger losses due to property crime (at least at firm level) than European and Asian countries. This reinforces the hypothesis that Latin American countries carry a big burden as a consequence of criminality. However, it is important to note that there is some variability in the figures among Latin American countries as well. In fact, while Uruguay's losses are similar to those borne by European or Asian countries, Brazil's and Honduras' figures are more than four times this average.

Table 3 presents robbery rates for the three regions and differences are noticeable as well: the Latin American average is more than four times larger than the European one and more than seven times that in Asian countries. Most of the European countries, with the exception of Belgium, Portugal, Spain and Italy show rates below 100 robberies per 100,000 people. On the other hand, only small Central American countries evidence such small rates. Every other Latin American country shows rates over 150 in 2012. In Asia most of the countries, with the exception of Maldives and Kazakhstan, show rates below 40 per 100,000 inhabitants.

Table 4 also reflects very different realities among regions in another dimension of crime: corruption. LATAM presents a much higher incidence of bribery (19.5 % of firms answer affirmatively when being asked about this felony) than European countries (10.6 %). However, the incidence of bribery in Asia appears to be more problematic than in LATAM.

### Socio-Economic Indicators of the Countries Under Study

The LATAM region is highly heterogeneous with respect to the level of development of its countries and this has an impact on the level of criminality, therefore it is important to show the socioeconomic differences among the countries under study: Chile, Costa Rica, Honduras, Paraguay and Uruguay. In order to do so, some basic statistics are presented in Table 5. Firstly, Chile is by far the one with the

**Table 1** Intentional homicide, rate per 100,000 people

Latin America			Europe			Asia		
Country	2006	2012	Country	2006	2012	Country	2006	2012
Aruba	9.9	3.9	Albania	3.0	5.0	Afghanistan	NA	6.5
Argentina	5.3	5.5	Armenia	2.6	1.8	Azerbaijan	2.2	2.1
Antigua & Barbuda	13.2	11.2	Austria	0.7	0.9	Bangladesh	2.9	2.7
Bahamas	18.2	29.8	Belarus	7.6	5.1	Bhutan	1.4	1.7
Belize	33.0	44.7	Belgium	2.1	1.6	Brunei	NA	2
Bolivia	6.3	12.1	Bulgaria	2.4	1.9	Cambodia	NA	6.5
Brazil	23.5	25.2	Croatia	1.6	1.2	China	1.4	1
Barbados	12.7	7.4	Czech Rep.	1.3	1.0	Hong Kong	0.5	0.4
Chile	3.6	3.1	Denmark	0.5	0.8	India	3.6	3.5
Colombia	36.8	30.8	Estonia	6.9	5.0	Japan	0.5	0.3
Costa Rica	8.0	8.5	Finland	2.3	1.6	Kazakhstan	11.4	7.8
Cuba	NA	4.2	France	1.4	1.0	Korea, Dem.R.	NA	5.2
Dominica	7.1	21.1	Georgia	7.3	4.3	Korea, Rep.	NA	0.9
Dominican R.	22.6	22.1	Germany	1.0	0.8	Kyrgyz Rep.	8.3	9.1
Ecuador	17.0	12.4	Greece	1.0	1.7	Lao PDR	NA	5.9
Grenada	11.6	13.3	Hungary	1.7	1.3	Macao	2.3	0.7
Guatemala	45.3	39.9	Iceland	0.0	0.3	Malaysia	NA	2.35
Guyana	20.0	17.0	Ireland	1.5	1.2	Maldives	NA	3.9
Honduras	44.3	90.4	Italy	1.1	0.9	Mongolia	13.1	9.7
Haiti	5.1	10.2	Latvia	5.8	4.7	Myanmar	NA	15.2
Jamaica	49.7	39.3	Lithuania	8.9	6.7	Nepal	2.5	2.9
St. Kitts & Nevis	34.1	33.6	Macedonia	2.2	1.4	Pakistan	6.2	7.7
St. Lucia	25.6	21.6	Moldova	7.1	6.5	Philippines	7.1	8.8
Mexico	9.3	21.5	Montenegro	1.9	2.7	Russian F.	9.6	11.2
Nicaragua	13.1	11.3	Netherlands	0.8	0.9	Singapore	0.4	0.2
Panama	10.8	17.2	Norway	0.7	2.2	Sri Lanka	10.2	3.4
Peru	11.2	9.6	Poland	1.3	1.2	Tajikistan	2.8	1.6
Puerto Rico	19.9	26.5	Portugal	1.5	1.2	Thailand	7.1	5.0
Paraguay	15.5	9.7	Romania	2.0	1.7	Turkey	4.6	2.6
El Salvador	64.4	41.2	Serbia	1.6	1.2	Turkmenistan	NA	12.8
Trinidad & Tobago	28.5	28.3	Slovak Rep.	1.6	1.4	Uzbekistan	NA	3.7
Uruguay	6.1	7.9	Slovenia	0.6	0.7	Vietnam	NA	3.3
St. Vincent & G.	11.9	25.6	Spain	1.1	0.8	Yemen, Rep.	4.3	4.8
Venezuela, RB	45.1	53.7	Sweden	1.0	0.7	Regional avg.	4.9	4.7
Regional avg.	20.9	22.3	Switzerland	0.8	0.6			
			Ukraine	6.3	4.3			
			UK	1.4	1.0			
			Reg. avg.	2.5	2.1			

In cases where 2006 was not available, 2007 is presented, where 2012 data was not available, the latest year is presented (after 2010)

Source: World Bank

NA not available

**Table 2** Firms' losses due to theft, robbery, vandalism and arson, as % of annual sales

Latin America			Europe			Asia		
Country	2004–2007 <sup>a</sup>	2010–2013	Country	2004–2007	2010–2013	Country	2004–2007	2010–2013 <sup>b</sup>
Argentina	1.3	0.6	Albania	0.0	0.0	Azerbaijan	0.2	0.2
Bolivia	0.9	0.8	Belarus	0.3	0.4	China	NA	0.0
Brazil	NA	2.5	Bulgaria	0.4	0.5	India	0.1	NA
Chile	0.6	0.8	Croatia	0.2	0.4	Kazakhstan	0.3	0.4
Colombia	0.7	0.3	Czech Rep.	0.8	0.4	Korea, Rep.	0.0	NA
Costa Rica	0.4	0.4	Estonia	0.5	0.9	Lao PDR	NA	0.6
Ecuador	0.9	1.0	Germany	0.5	NA	Mongolia	NA	0.6
El Salvador	2.6	1.6	Hungary	0.1	0.1	Nepal	NA	1.1
Guatemala	1.5	1.3	Latvia	0.6	0.3	Pakistan	0.4	0.4
Honduras	2.2	2.2	Lithuania	2.7	0.4	Philippines	NA	1.1
Jamaica	NA	0.4	Moldova	0.2	0.4	Russian Fed.	0.5	0.4
Mexico	0.7	1.4	Poland	0.3	0.5	Thailand	0.1	NA
Nicaragua	0.9	2.2	Portugal	0.2	NA	Tajikistan	0.3	0.5
Panama	0.5	0.3	Romania	0.2	0.3	Uzbekistan	0.0	0.1
Paraguay	0.9	1.3	Serbia	0.4	0.6	Vietnam	NA	0.3
Peru	0.4	0.6	Slovenia	0.3	0.4	Yemen, Rep.	NA	0.6
Uruguay	0.7	0.3	Spain	0.2	NA	Regional avg.	0.2	0.5
Regional avg.	1.0	1.1	Ukraine	0.5	0.6			
			Regional avg.	0.5	0.4			

Source: Enterprise Survey, World Bank

NA not available

<sup>a</sup> Except for Brazil where data are for 2009

<sup>b</sup> Except for Mongolia where data are for 2009

biggest population (17.6 million), followed by Honduras and Paraguay. Costa Rica and Uruguay are the smallest countries, with populations of around 4.9 and 3.4 million inhabitants respectively. In addition, Chile and Uruguay have the largest GDP per capita in the region; in fact, according to the World Bank classification both countries are classified as high income economies. Honduras, on the other hand, has a much lower level of income. With respect to poverty indicators, the pattern is similar to the one referring to GDP per capita, but in this case Uruguay shows better results than Chile. Regarding inequality, once again Uruguay shows the best results in the sample since it has the lowest Gini index, and on the opposite side is again Honduras.

Regarding recent dynamics, the countries under study have grown at an average rate slightly higher than 4 % per year during 2005–2013. Uruguay is the country that has grown the most (5.7 % average) and Honduras the least (3.8 %). Unemployment rates are quite low in average but there are differences in the education of the labour force, Honduras being the one with the lowest proportion of labour force with secondary education while Chile and Uruguay present the highest results (near 60 %). This is important given that non-qualified labour is probably subject to lower wages and thus associated with difficulties in satisfying basic needs merely through legal activities.

Consequently, it seems that better achievement in these dimensions (economic growth and development, poverty and inequality) are related with lower incidence of crime, possibly

**Table 3** Robbery rate, per 100,000 people

Latin America			Europe			Asia		
Country	2006	2012	Country	2006	2012	Country	2006	2012
Argentina	908.1	NA	Albania	5.2	10.3	Kazakhstan	82.8	124.5
Barbados	133.5	196	Austria	61.6	48.3	Kyrgyzstan	47.3	37.9
Bolivia	89.5	137.3	Belgium	215.5	254.0	Tajikistan	3.8	NA
Brazil	475.7	493.1	Bulgaria	37.7	40.6	Turkmenistan	2.9	NA
Chile	474.1	467.6	Croatia	33	36.9	Hong Kong	22.8	8.6
Colombia	125.3	173.2	Czech Rep.	46.6	32	Japan	4.0	2.9
Costa Rica	932.2	521.6	Denmark	48.7	53.4	Macao	NA	32.1
Dominican Rep.	NA	20.3	Estonia	76.2	35.4	Mongolia	17.8	19.7
Ecuador	375.5	NA	Finland	32.3	29.9	Korea, Rep.	10.3	5.3
El Salvador	91.8	87.7	Germany	64.1	58.8	Indonesia	NA	5.0
Grenada	48.4	84.4	Greece	22.3	53.9	Malaysia	81.4	NA
Guatemala	70.4	NA	Hungary	26.9	30.4	Philippines	8.4	27.9
Honduras	NA	226.6	Ireland	58.8	61.6	Singapore	20.5	5.5
Jamaica	74.5	100.1	Italy	120.5	102.9	India	1.6	2.6
Mexico	486.3	618.0	Latvia	102.3	45.8	Maldives	NA	287.2
Nicaragua	440.7	NA	Lithuania	134.1	63.5	Nepal	0.6	NA
Paraguay	149.6	224.4	Poland	92.1	43.7	Sri Lanka	NA	31.1
Peru	164.1	NA	Portugal	198.5	174.6	Armenia	8.8	10.4
Uruguay	266.3	454	Romania	18.5	14.7	Azerbaijan	2.7	2.7
Regional avg.	312.1	271.7	Serbia	38.4	39.7	Turkey	29.9	13.9
			Slovakia	29.5	17.9	United Arab Em.	11.4	0.5
			Spain	NA	206.6	Regional avg.	21.0	36.3
			Regional avg.	69.7	66.1			

The UN statistics differ considerably (1728 for 2012) with respect to the Eurostat statistics for the case of Belgium. We are using the Eurostat statistics for this case only

Source: United Nations Office on Drugs and Crime

NA not available

because generalised improvements in social wellbeing are effective means of preventing agents from committing crimes.

In sum, we have shown that LATAM is a region that is greatly affected by crime occurrence. This reveals the magnitude of the problem and prepares the ground for the monetary quantification of losses in the remainder of the paper. In addition, important differences exist between the countries under study in this paper, which may help in understanding the results that will be presented in the following sections.

## Measuring the Costs of Crime

In this section we describe the set of approaches, variables and sources of information used to estimate the monetary value of the different components of the loss functions. The main results will



**Table 4** Bribe payment, percentage of responses that were positive/affirmative

Latin America		Europe		Asia	
Country	2006	Country	2006	Country	2006
Argentina	13	Belgium	4	Afghanistan	46
Bolivia	36	Bulgaria	8	Bangladesh	39
Chile	10	Croatia	4	Cambodia	57
Colombia	22	Czech Republic	15	India	54
El Salvador	12	Denmark	1	Japan	1
Jamaica	12	Estonia	6	Kazakhstan	34
Mexico	33	Finland	1	Korea, Rep.	3
Paraguay	25	Greece	22	Kyrgyz Rep.	45
Peru	20	Hungary	12	Malaysia	3
Uruguay	3	Italy	5	Maldives	3
Venezuela	27	Latvia	19	Mongolia	45
Regional avg	19.4	Lithuania	26	Nepal	31
		Moldova	29	Pakistan	34
		Norway	3	Philippines	12
		Portugal	3	Sri Lanka	19
		Romania	17	Thailand	18
		Serbia	26	Turkey	21
		Slovakia	21	Vietnam	30
		Slovenia	6	Yemen, Rep.	74
		Spain	2	Regional avg	29.9
		Switzerland	7		
		Ukraine	6.3		
		United Kingdom	1.4		
		Regional avg	10.6		

Source: Global Corruption Barometer 2013, Transparency International

**Table 5** Socio-economic context, countries under study

	Chile (CH)	Costa Rica (CRI)	Honduras (HND)	Paraguay (PY)	Uruguay (UY)	Year
Population (in millions)	17.6	4.9	8.1	6.8	3.4	2013
GDP per capita (constant 2005 US dollars)	9729	5839	1577	1917	7809	2013
GDP (in million US dollars)	217,502	36,298	15,839	20,031	38,881	2010
GDP growth (%)	4.27	4.71	3.84	4.94	5.72	2005–2013 average
Poverty headcount ratio at national poverty line (% of population)	14.4	20.6	66.5	26.9	12.4	2011–2012
Inequality (GINI index)	50.8	48.6	57.4	48.0	41.3	2011–2012
Labour force with secondary education (%)	57	37	23.9	28.8	56.9	2011
Unemployment (% of total labor force)	6.4	7.8	4.4	4.9	6.5	2011–2012

Source: World Bank

be presented in the next section, while complementary results are shown in the [Appendix](#). As a consequence of availability of data, the base year for the estimations is 2010.

It is worth emphasising that we are considering costs to society as a whole. Therefore, voluntary transfers between agents are not relevant for cost quantification. However, non-voluntary transfers will be placed in a different category (a similar approach was adopted by Brand and Price 2000). This will have some practical implications, for example, the value of stolen goods will be considered a cost category, since it is a non-voluntary transfer. By contrast, payments by insurance companies to victims will be simply regarded as a transfer from one agent to another.

In what follows we present the approaches taken to quantify the different components of the Eqs. (5) and (6). As shown by these equations, total criminality costs come simply from the adding up of the individual subcomponents.

### The Cost of Crime Prevention and Punishment ( $s+j$ )

This category of cost is quantified separately for the private and public sector.

Public spending on crime prevention and punishment results from budget allocation to crime related programs. Thus, to approximate the dimension of this component one must identify the relevant budgetary headings. In this regard, the costs involved in crime prevention and public safety activities comes mainly (but not exclusively) from domestic law enforcement carried out by the Ministry of Interior. The punishment component is approximated by public expenditures on justice (hearings, prosecutions and other tribunal expenses related to crime) and budget allocation for reclusion centres. The main source of information for both items was the public budget of the different countries.

Private expenditures on crime prevention consist mostly of the purchase of goods and services provided by security companies. In Chile, Uruguay and Paraguay, sales figures for security companies come from Economic Activity Surveys. These sales approximate the total amount of resources that economic agents devote to crime prevention. We also decompose this amount between households' and firms' expenses. Firms' expenditures on security services can be estimated using the World Bank's Enterprise Survey (ES),<sup>3</sup> where companies declare the share of annual sales allocated to avoid victimisation. Costs faced by households, as well as other non-business agents (for example, national governments can also hire private security services; this is not considered in the public expenses detailed above), are computed as the difference between the total amount of sales by security companies and the security expenses by firms (that come from the Enterprise Surveys).<sup>4</sup> For Costa Rica and Honduras, security spending information comes from dedicated household and enterprise surveys and therefore includes all the security costs incurred by firms and households.

In line with the literature (see Brand and Price 2000), we also consider the costs of administration and production of crime related (mainly theft) insurance services as a direct cost of crime, since they are resources that could have been allocated to productive purposes in a no crime scenario. These are quantified as the difference between the premiums charged for theft insurance and accrued claims for the same concept (this difference is an approximation to

<sup>3</sup> The main features of the ES and other surveys employed in the analysis are discussed in section B of the [Appendix](#).

<sup>4</sup> It is important to note that this estimation is a lower bound that will be likely underestimating the total private cost that households face, because in addition to the expenditures on hiring security services they also incur in other expenditures, such as barbed wire, electrical fence, etc. that are not necessarily provided by security firms. Unfortunately we do not have information to estimate the security costs of goods or services that are not provided by security companies.

the remuneration of productive services devoted to this activity). Due to lack of data, we were only able to quantify this cost category for Uruguay.

Finally there are private costs associated with justice (mainly attorney fees). This information is only available for Uruguay, and is obtained by approximating the share of legal activities related to criminal offenses by the number of criminal cases initiated as a share of the total. We apply this share to law firms' total annual sales to quantify private expenses associated with crime punishment.

These last two items are relatively minor components of the total cost  $s+j$ .

### **The Monetary Value of Stolen Goods ( $p.x$ )**

The quantification of the cost of stolen goods is comprised of losses imposed on businesses and households (we do not have information for the public sector). The ES data on losses due to theft and vandalism was used to estimate this cost component for businesses, given that the survey asks firms to state the share of annual sales that were lost due to theft and vandalism. Since the ES does not cover all the economic sectors of the economy (primary activities are excluded) we assume that the ratio of stolen and vandalised goods to sales estimated for the surveyed firms also applied to the entire economy.

The estimated losses of households come from victimisation surveys, which provide insight on the frequency with which households and individuals have undergone theft and the items that were stolen. Then, a monetary value was imputed to the stolen items through different approaches (market prices surveys, victims' statements or/and information from insurance firms), depending on available data.

Finally, we include the costs due to corruption. The ES is the main source of information for the expenses incurred by firms as a consequence of informal payments to public officials with the objective of securing certain contracts.<sup>5</sup> Also, given the static nature of this analysis, we do not account for other costs imposed by corruption.<sup>6</sup> We do not have information for households.

### **Intangible Costs ( $g$ )**

We estimated the costs of injuries imposed on victims relying on the quality adjusted life years (QALY) approach (Dolan et al. 2005; Alda and Cuesta 2011) which synthesises individuals' losses in terms of health by assessing the number and quality of years of life lost due to injury (see Weinstein et al. 2009, for a brief introduction to these indicators).

The first step of this estimation was to use World Health Organisation (WHO) data on homicide victims' characteristics in order to estimate the cost of a homicide, and then we used the QALY losses of several injuries relative to a homicide to estimate the cost of different types of damages.

To approach the cost of a given homicide, we take the potential income that the deceased would have earned as a dependent worker (according to demographic characteristics) had he/she remained alive.

<sup>5</sup> It is worth noting that corruption measurements based on individuals' perceptions may be an unreliable approach, given that they imply taking a stand on a sensitive issue (see Kenny 2009).

<sup>6</sup> For instance, Alam (1990) shows that bribery has a negative impact on allocative efficiency.

With this in mind, the cost per homicide can be formulated as:

$$\sum_{i=D}^{i=E(D)} w_i, \quad (7)$$

where  $D$  is the age of the deceased,  $E(D)$  is life expectancy at age  $D$  and the term  $w_i$  reflects the income the individual would have received (according to characteristics) had he/she not been murdered. Given that such income is unobservable, we used the estimates that result from regressing labour income against the known characteristics of the deceased (sex and age) with household surveys data. This allows prediction of the expected annual income throughout the victim's life trajectory, according to their sex and age.

As for the intangible costs that result from other violent crimes, we considered the ratio between the discounted QALY losses—i.e. disability adjusted life years (DALY)—<sup>7</sup> of several injuries over that of a deceased person as a proxy for the intangible costs of the injured. Because of the lack of a QALY scale by type of crime especially designed for our sample of countries, we use the equivalences reported for the UK by Dolan et al. (2005). The authors provide estimates of QALY losses that derive from different violent acts, as a result of both physical and psychological trauma imposed on the victim.<sup>8</sup> The formula is the following:

$$g = \sum_{i=1}^n m_i \cdot b_i \cdot CF, \quad (8)$$

where  $g$  is the intangible cost of violent crimes (excluding homicides),  $CF$  is the estimated cost per death,  $b_i$  is the cost of a specific felony as a share of the cost of homicide,  $m_i$  is the number of crimes from category  $i$  committed in each country and  $n$  is the number of different types of crime.

### Opportunity Costs Due to Reclusion (d)

Estimates of the losses caused by criminals' imprisonment are based on the premise that inmates could have allocated their time to productive purposes were they not incarcerated. Therefore, we present the opportunity cost of the time spent in jail by prisoners. Similarly to the approach taken with regards to the quantification of intangible costs of homicide, we predict inmates' potential wages by using Mincer estimates obtained through household surveys. By taking predicted labour income and average years of prison sentences, we assess the monetary value of the time criminals spend in prison. Information on inmates' characteristics is only available for Chile and Uruguay (from the Prison Service for the former and from the National Census of Inmates for the latter), so we can only impute inmates' expected labour income and quantify this cost component for these two countries.

### Opportunity Costs Due to Effort Exerted in Criminal Activities (e)

Unfortunately we do not have enough information to estimate this component.

<sup>7</sup> The main difference between the QALY and the DALY approach is stated by Gold et al. (2002) as follows: "while the first are a measure of life expectancy (a good to be maximized), the latter are a measure of the gap that distances a person from full health (a bad to be minimized)".

<sup>8</sup> Emotional damage imposed on the victim's family may be an important consequence of homicides and injuries which is not directly considered in the quantification analysis.

**Table 6** Costs of crime prevention and punishment, as a percentage of GDP (2010)

Crime prevention and punishment	PY	UY	CH	CRI	HND
Total	2.45	2.27	1.21	1.04	2.53
Public expenditures	1.86	1.32	0.53	0.75	1.48
Prevention	1.07	1.01	0.27	0.10	0.75
Punishment	0.79	0.31	0.26	0.65	0.73
Private expenditures <sup>a</sup>	0.59	0.54	0.68	0.29	1.05

Source: Author's own estimations

<sup>a</sup> This component includes only prevention expenses (security services)

## Results

In this section we present the results, with special focus on bringing a comparative perspective between the five selected countries. In order to do so, all estimations will be presented as percentages of each country's GDP. However, they could be easily translated into US dollars, using the GDP figures presented in Table 5. We will first present the results according to the components of the loss functions in Eqs. (5) and (6). Then, we will also present the results following the well known Brand and Price taxonomy.

### Crime Prevention and Punishment ( $s+j$ )

Table 6 shows a comparative perspective on this cost category for the five selected countries. The amount of this cost varies considerably among countries. Honduras, Paraguay and Uruguay's total costs due to crime prevention and punishment add up to approximately twice as much as those of Chile and Costa Rica. However, it is worth noting that Chile's private expenses on security are the second highest in the selected sample. This level of expending could be explained by the low level of public resources devoted to fight crime. Thus, it appears that in Chile crime prevention and punishment are mostly sustained (economically, at least) by the private sector. In the other four countries analysed it is the public sector that carries the biggest burden. One must keep in mind, however, that private sector costs exclude (due to data limitations) the justice component, and therefore estimates would be biased towards underestimating total private sector expenses. Below, in Table 7, we present an estimation of this component for the case of Uruguay.

When looking separately at the expenses carried out by the public sector, three different patterns stand out: while in Uruguay and Paraguay a considerably higher share of resources goes to crime prevention, Costa Rica's public expenditures are mostly devoted to punishment, and in Honduras and Chile the two components have approximately the same share in the composition of public

**Table 7** Additional crime prevention and punishment cost categories quantified only for Uruguay, as a percentage of GDP (2010)

Category of cost (as % of GDP)	UY
Insurance administration	0.35
Private legal aid	0.06

Source: Author's own estimations

**Table 8** Victimization costs, as a percentage of GDP (2010)

Victimization costs	PY	UY	CH	CRI	HND
Total	6.36	1.18	2.11	1.47	8.01
Health costs	1.25	0.30	0.36	0.26	0.40
Value of stolen property	2.74	0.85	1.73	1.13	6.14
Enterprises	2.52	0.60	1.55	0.57	4.56
Households	0.22	0.25	0.18	0.56	1.58
Corruption <sup>a</sup>	2.37	0.03	0.02	0.08	1.47

Source: Author's own estimations

<sup>a</sup>Results include solely costs incurred by enterprises

expenditures. This is important since the composition of public expenditures may partially reflect the position taken by the government in terms of crime fighting, where the stronger focus may be set either on prevention or on punishment.

Results regarding the costs of insurance administration (from the prevention component) and legal aid (from the punishment component) are only available for Uruguay (Table 7).

Crime related insurance administration costs are regarded as part of the costs involved in crime prevention, since they represent economic resources that could have been used with productive purposes in case criminality was not an issue to society. This item amounts to 0.35 % of Uruguay's GDP, which makes it the smallest item from the prevention category, but it is still a considerable figure.

Private expenditures in justice consist mainly of the acquisition of legal aid. Such expenses amount to a mere 0.06 % of GDP in Uruguay, making the public sector the main provider of criminal justice services.

### Victimization Costs ( $px+g$ )

Victimization costs are those faced by crime victims. An important distinction to be made regarding this component is between tangible and intangible costs: while the former includes the monetary costs of stolen goods as well as corruption costs derived from informal payments to officers from the public sector, the latter comprises all health costs imposed on victims of violent crime (both those derived from homicides and violent injuries). Table 8 summarises the results for this cost category.

A first striking feature in Table 8 is that this component shows the largest difference between countries. Whereas Honduras and Paraguay suffer from alarmingly high costs due to victimisation (8 and 6 % of GDP respectively), Uruguay, Chile and Costa Rica's figures amount to 1–2 % of GDP. This is partially the result of the lower incidence of crime in these countries shown in "A Theoretical Framework". When analysing intangible costs separately (health costs due to homicide and injuries), results show that Paraguay is the country that carries the biggest burden as a consequence of violent criminal acts. On the other hand, Honduras, where victimisation costs are the highest, appears to suffer mainly from losses due to property crime, given that it is the tangible component that imposes the largest damage to society. The intangible component is similar to that of Chile, Costa Rica and Uruguay. The dominance of tangible costs over intangible costs holds for each one of the five selected cases.

When comparing the costs faced by either households or firms due to property theft, results show that, in every case, the latter are the most affected. The largest gap between costs faced by

**Table 9** Losses as a consequence of criminals' reclusion, as a percentage of GDP (2010)

Criminal losses	UY	CHL
Opportunity costs due to reclusion	0.11	0.07

Source: Author's own estimations

households and those faced by enterprises is found in Chile, where enterprises spend almost ten times more than households. The opposite happens in countries such as Costa Rica, where losses faced by households and firms are quite similar. Also, as shown in Table 4, corruption levels vary deeply among Latin American countries. This has an impact on the composition of criminality costs. Countries with very low incidence of corruption, such as Uruguay and Chile, suffer from small losses as a result of this felony; while firms in Paraguay and Honduras appear to be going through considerable expenses due to corruption and bribery. Of course this can also have important negative impacts on the economic activity since these payments are an important burden to enterprises operating in these countries.

#### Opportunity Costs Due to Reclusion (d)

As mentioned above, social losses associated to criminality can be approximated through the opportunity costs that arise from criminals spending time in prison (this means production losses because they assuredly cannot be productively employed in the labour market). Unfortunately, as mentioned before, due to lack of information it was only possible to quantify this cost category for Chile and Uruguay (Table 9).

The estimated figures for both countries represent a small proportion both of the GDP and of the total estimated costs of crime and violence. However, this cost component is possibly underestimated due to two main reasons (both of them resulting from data restrictions): firstly, we did not include the costs associated to minors spending time in prison (however, due to their age, it is unlikely that they would be employed); secondly, we did not take into account the time

**Table 10** Overall costs of crime, as a percentage of GDP, 2010

Category of cost (as % of GDP)	PY	UY	CH	CRI	HND
In anticipation of crime	1.66	1.55	0.95	0.40	1.80
Private safety expenditures	0.59	0.54	0.68	0.29	1.05
Public safety and prevention expenditures	1.07	1.01	0.27	0.10	0.75
As a consequence of crime	6.36	1.18	2.11	1.47	8.01
Value of stolen property	2.74	0.85	1.73	1.13	6.14
Enterprises	2.52	0.60	1.55	0.57	4.56
Households	0.22	0.25	0.18	0.56	1.58
Corruption	2.37	0.03	0.02	0.08	1.47
Homicides and injuries	1.25	0.30	0.36	0.26	0.40
In response to crime	0.79	0.31	0.26	0.65	0.73
Public expenditure in prosecution, prison service and rehabilitation	0.79	0.31	0.26	0.65	0.73
Total	8.81	3.04	3.32	2.52	10.54

Source: Author's own estimations

**Table 11** Cost estimations in other studies for Latin American countries (as % of GDP)

Paper	Year and unit of analysis	Total cost
IDB (1998)	Mexico City, Mexico (1995)	4.2 %
Rondon and Andrade (2003)	Belo Horizonte, Brazil (1999)	4.1 %
Londoño and Guerrero (1999)	Brazil, Colombia, El Salvador, Mexico, Peru and Venezuela (1990's)	14.2 %
Olavarria-Gambi (2007)	Chile (2002)	2.1 %

Each paper uses different methodologies; therefore their results are not directly comparable

Source: own elaboration based on information presented in the papers

and effort spent by criminals in planning and executing felonies (which would be the component denoted as  $e$  in the loss function).

### Summary of the Findings

In this subsection we summarise all costs previously estimated following Brand and Price's classification. Table 10 shows the overall costs of criminality in the five surveyed countries, distinguishing costs according to whether they take place in anticipation, as a consequence or in response to crime. For comparison purposes we are not including the costs that were not estimated for all the countries in the sample. These other costs can be seen in Tables 7 and 9.

Considering all five countries, it turns out that those with lower costs of criminality (Costa Rica, Chile and Uruguay) share some similar features, such as a more advanced institutional development and higher GDP per capita. On the other hand, Paraguay and Honduras suffer from greater transparency issues, as shown by costs associated to corruption. Another interesting point to highlight is that, with the exception of Uruguay, every other analysed country shows that the greatest share of costs is concentrated in the category *as a consequence* of crime. Within this category, the value of the stolen property and especially that from enterprises accounts for the greatest share of this cost. Additionally, except for Costa Rica, expenses *in response to crime* are the smallest compared to the other two categories.

However, one must be cautious when analysing jointly data from reported felonies and victimisation surveys. On the one hand, households and firms' propensity to admit victimisation during surveys may vary among countries (for instance, more developed countries may have better awareness of violence and its implications, so that people would be more prone to identify violent acts). On the other hand, data from administrative records may not be representative of actual crime occurrence in case there is under-reporting and under-recording of criminal acts. In particular, under-reporting is found to be negatively correlated to the seriousness of the felony, so that reporting rates are near 100 % for homicides, but much lower when it comes to theft.<sup>9</sup> As a consequence, different results among countries may hide different social behaviours when it comes to formally reporting or/and to declaring victimisation during a survey.

<sup>9</sup> Around 50 % in Uruguay, according to data from the victimisation survey.



It is worth highlighting the case of Uruguay where the greater efforts devoted to *anticipate* crime may be the cause of its lower criminality rates (as shown in [Characterisation of the Countries Under Study](#)). Also, it may be that, as a consequence of such low rates, Uruguay shows the lowest costs due to victimisation (that is costs *as a consequence of crime*). Even when criminality is an issue and the costs it imposes are not negligible, efforts made in Uruguay towards preventing criminal activities seem to be having a positive impact in terms of reducing its incidence and its consequences in terms of social welfare.

Before concluding this section, in Table 11 we present estimations generated in other papers for LATAM. Even though, as discussed previously, they are not directly comparable with our estimations, nonetheless they can provide useful information for other countries or cities in the region. The estimation of costs presented in these papers range from 2.1 to 14.2 % of the GDP of the unit of analysis (city, country or countries).

All four papers listed in the table use the accounting methodology without any theoretical framework. They estimate the total cost of crime and violence by adding up all the cost items that can be estimated given the available information in the respective country and time without understanding the conceptual differences of the different types of costs and without considering if all the relevant costs are included. The existence of a theoretical framework could help for example to avoid double counting of costs and also to identify which are the relevant costs to take into account.

Just to give a couple of examples of the problems of not having a conceptual framework, consider the following cases. The paper by Rondon and Andrade (2003) and the paper by IDB (1998) include as part of their estimations of costs the expenditure in some kind of insurance services. However, these are not costs for the society as a whole, since they are simply monetary transfers from the insured (individuals or companies) to the insurance companies. Another example is the paper by Olavarria-Gambi (2007). There is not even a single mention to the welfare costs of the changes in consumption behaviour as a consequence of crime. This happens because the accounting exercise is not framed in a theoretical model and is just the result of adding up an arbitrary number of cost items.

This process of arbitrarily adding up cost dimensions is what makes the results of these papers not comparable among them and with our paper. By contrast, our paper provides estimations that are fully comparable across the countries in our sample.

## Conclusions and Policy Implications

As shown by available statistics, crime and violence stand out as two of the major social challenges to be dealt with in the Latin American region. Information about the different costs that crime and violence cause can be a powerful input for systematic epidemiological monitoring processes and policy design and activation of demands for prevention and protection in the region.

With this in mind, this paper provides a comparative perspective of the economic burden imposed by crime in five Latin American countries. These estimations were carried out using a common theoretical framework that allows cross country comparison. Also, by quantifying the different components of the cost equation separately, we provide insight on which felonies are more costly and which agents carry the heaviest load. In addition to stirring public debate and demands, such information may come as useful in terms of policy making. For example, it can allow

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<sup>0</sup> Around 50 % in Uruguay, according to data from the victimisation survey.

identifying which types of crimes are commanding the highest economic losses and therefore can guide investment of the scarce public resources in the region.

According to the estimates here provided, the cost of criminality varies from a striking 10.5 % of GDP in Honduras to a moderate 2.5 % in Costa Rica. As for countries in between, Paraguay is supporting the largest burden (with costs amounting to 8.8 % of GDP), mainly as a consequence of corruption and the property stolen from enterprises, while Uruguay and Chile's situation seems less alarming (3 and 3.3 % of GDP respectively).

When analysing cost categories separately, it appears that property crimes are the main source of cost for the countries considered in this paper, mainly as a consequence of the value of stolen goods. Such cost ranges from 6.1 % of GDP in Honduras to 0.8 % in Uruguay. Also, considering that security expenses (mainly from the private sector) are in general carried out with the purpose of preventing this sort of felony, this problem becomes even more substantial. Thus, measures aimed at preventing and combating such criminal acts may have non-negligible economic impacts. As for costs derived from bribery and corruption, they seem considerable in Honduras and Paraguay but they appear to be insignificant in Chile, Uruguay and Costa Rica. Violent felonies (those which result in homicide or injuries) also account for a considerable portion of criminality costs, especially in Paraguay.

The results found in the paper allow for some very general policy implications. First, those countries with higher level of development and welfare (high GDP per capita, low level of unemployment, high level of education, less inequality, etc.) are countries with lower level of criminality and lower levels of economic cost imposed by criminal activities. This is the case of Uruguay, Costa Rica and Chile in our sample. Therefore general welfare improving policies could have an indirect effect on the reduction of the costs imposed by crime. This in fact is supported by recent studies in LATAM that point out that conditional cash transfer policies reduces criminality (e.g. Chioda et al. 2012).

Second, in the case of Paraguay and Honduras corruption is a first order problem. Institutional reforms and policies addressed to the reduction of corruption will likely have in these countries not only a direct effect on the reduction of costs attributed to corruption but also probably an indirect effect through the reduction of impunity levels that could generate a reduction in other types of crimes and their costs.

Third, in the case of Chile and Honduras, the public expenditure on crime prevention and punishment is relatively low in comparison with the private costs on the same items. This requires, at least, a further analysis in order to assess to what extent this is showing that the public policy is leaving unattended areas where in principle the state should be present enforcing the law.

Fourth, the high costs that the stolen goods impose to firms in some countries (e.g. Honduras, Paraguay and Chile) with their likely impact on the competitiveness of firms, imply that this problem should not only be of concern to the interior ministries but also to the economy and finance ministries of the countries in the region.

Finally, the analysis here provided allows identification of certain information gaps regarding crime data and records in LAC. An interesting policy initiative would be to fill these gaps, in order to prevent crime statistics from being incomplete. Also, it might be desirable for national governments to advance on official and regular estimations of the costs of crime, so as to have better inputs for crime-abatement policy. In this regard, the accounting methodology framed in a theoretical model here proposed may provide initial guidelines for such quantifications.

Before concluding, it is worth emphasising some of the limitations of the results presented here, which should be taken into account when drawing conclusions from them. The analysis has been static in nature. Therefore, the dynamic effects of crime through the destruction and lower

accumulation of physical and human capital that affect economic activity have not been considered in the analysis. In addition, due to unavailability of data the costs that result from changes in citizens' behaviour as a consequence of the fear of crime were not estimated. These are two lines for future research. Furthermore, the accounting of losses and expenses carries some well known limitations. This method may lead to bias in case of omission of relevant information, mainly due to lack of data, or to double counting of some items, if not applied carefully.

A final consideration should be made regarding the usefulness and limitations of cost accounting for policymaking. Increases (decreases) in some components of individual costs do not necessarily mean an increase (decrease) in costs in a 'general equilibrium' scenario. In effect, for example, increased public budget allocated to prevention, which involves increased costs, would surely reduce the cost of private security and other tangible and intangible costs that result from victimisation. Greater police efficiency could lead to an increase in costs associated with the prison population but it could also lead to lower costs as a result of crime. Therefore, an adequate analysis of the effectiveness of alternative policy measures should consider 'general equilibrium' effects.

Future lines of research include the estimations of costs for other countries in the region, the use of new sources of information and the estimation of new items of costs.

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## Appendix

### Intermediate Estimations

In this section, we provide some examples of the intermediate results achieved when quantifying the different cost categories, so as to clarify how the methodology is applied. Additional information can be found in **Author's own estimations**.

**Table 12** Private expenditure in crime prevention and punishment: Uruguay

	Thousands USD	% of GDP
Crime prevention and punishment	237,849	0.60 %
Prevention		
Security companies' total sales	214,446	0.54 %
Enterprises	91,740	0.23 %
Households	122,706	0.31 %
Punishment		
Attorney's total fees	23,402	0.06 %

Source: Author's own estimations

**Table 13** Public expenditure in crime prevention and punishment: Uruguay

	Thousands USD	% of GDP
Crime prevention and punishment	518,187	1.31 %
Prevention	396,994	1.01 %
Interior Ministry: Maintenance of public order	380,653	0.97 %
Ministry of National Defence: Crime prevention and repression	16,341	0.04 %
Punishment	121,193	0.31 %
Interior Ministry: Administration of the prison system	80,189	0.20 %
Ministry of National Defence: Imprisonment	4152	0.01 %
National Institute for Children and Adolescents: Imprisonment	894	0.00 %
Ministry of Social Development: domestic violence programs and rehabilitation	674	0.00 %
Judiciary <sup>a</sup>	30,911	0.08 %
Attorney's General Office <sup>b</sup>	4374	0.01 %

Source: Author's own estimations

<sup>a</sup> Percentage of adolescent and criminal cases initiated on total

<sup>b</sup> Same criteria as in <sup>a</sup>

## Surveys Employed in the Estimations

### *The Enterprise Survey (World Bank)*

This survey is carried out by the World Bank. Based on stratified random sampling, it collects information from formal and private companies on business climate and various associated matters. The ES has been implemented in 135 countries on five continents, in many cases for several years. It surveys owners and senior managers of companies. Sample sizes vary depending on the country.

### *National Urban Survey of Public Safety-Chile (Interior Ministry)*

This is a survey with a probabilistic sampling with three-stage clustering, administered by the National Institute of Statistics of Chile, applied face to face, to people over 15 years old. In 2010, the survey was applied to 25,933 people, representing 11,593,139 inhabitants. Apart from providing information about general victimisation of households the survey provides data on the following crimes: burglary in the house, robbery by surprise on people, robbery with individual violence, theft, injury, theft of vehicles and theft from vehicles.

### *Victimisation Survey-Costa Rica (Demoscopia)*

The survey applied stratified random sampling, with multistage selection, distributed proportionally to the population size of the regions of the country, with a maximum

**Table 14** Costs of homicides and injuries: Uruguay

Offence	Discounted QALY loss	Cost as a share of homicide	Cost per offence	Number of offences	Annual cost (USD)
Homicide	17.791	100.00 %	241,019	203	48,926,906
Serious injury	0.191	1.07 %	2588	519	1,342,926
Domestic violence	0.191	1.07 %	2588	15,277	39,529,634
Minor injury	0.031	0.17 %	420	325	136,489
Other injuries	0.031	0.17 %	420	7633	3,205,592
Others against people	0.031	0.17 %	420	2021	848,749
Common assault	0.007	0.04 %	95	101,352	9,611,291
Other against property	0.007	0.04 %	95	21,049	1,996,093
Rape (includes attempts)	0.561	3.15 %	7600	311	2,363,603
Attempted homicide	0.561	3.15 %	7600	105	798,001
Sexual assault	0.16	0.90 %	2168	804	1,742,719
Theft	0.028	0.16 %	379	15,088	5,723,228
Total cost					116,225,232
% of GDP					0.30 %

Source: Author's own estimations

error of  $\pm 2.8$  % and a confidence range of 95 %. The sample included 1200 households representative of 1,266,418 households and 2,327,400 people in the Costa Rican population.

**Table 15** Value of stolen property: Uruguay

Stolen item	Number	Price (USD)	Total cost (Thousands USD)
Car	3606	9990	36,020
Motorcycle	49,757	599	29,804
Bicycle	44,709	120	5365
Television	39,661	290	11,502
DVD player	31,729	42	1333
Audio player	41,104	62	2548
Camera	22,355	89	1990
Computer	18,028	599	10,799
CDs	21,634	10	216
Total			99,577

Source: Author's own estimations

**Table 16** Opportunity costs due to reclusion: Uruguay

Total inmates in 2010	8492
Inmates admitted in 2010	3220
Average sentence (years)	2.64
Average wage (inmates)	8779
Cost per inmate	277,828
Total cost (USD)	44,598,087
% of GDP	0.11 %

Source: Author's own estimations

*Victimisation survey-Honduras (Demoscopia)*

This survey applied stratified random sampling, with multistage selection, proportionally distributed in 16 departments and their respective municipalities. The sample size is 1111 households. The maximum sampling error is 2.99 %, with a confidence range of 95 %.

**National Victimisation Survey-Paraguay (General Directorate of Statistics, Surveys and Censuses)**

The methodology used was based on the International Victimization Survey of the United Nations Interregional Crime and Justice Research Institute (UNICRI) and the United Nations Office on Drugs and Crime (UNODC) and was conducted under an interagency cooperation agreement between the Ministry of Interior, the Secretariat of Women's Affairs of the Office of the President, the UNDP, the United Nations Fund for the Development of Women and the Spanish Agency for International Cooperation for Development, besides the General Directorate of Statistics, Surveys and Censuses. The sample is obtained by random selection of households, whereas answers are provided by any member of the household over 15 years old. The survey, whose sample size is 3500 households, is representative of the 15 departments and of both rural and urban areas.

*Victimisation Survey-Uruguay (Interior Ministry)*

The universe is defined as all persons aged 17 years living in towns with more than 1000 inhabitants. A multistage probability sample of 1700 cases was used, stratified by geographical area. A random sample of these characteristics has a maximum error margin of +/- 2.4 % within a confidence range of 95 %.

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