

# A Dynamic Analysis of Organized Crime in Jamaica

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## ABSTRACT

*The impact of the reform efforts of the 1990s, as well as the rapid process of globalization, all resulted in far reaching changes in the structure of the Jamaican economy. With these changes, the existing planning and economic models became increasingly limited in scope as they could not adequately reflect the new structural reality. In March 2006, the Government of Jamaica engaged the Millennium Institute to assist it in development of a modern planning tool with the capability to integrate the economic, environmental and social elements. An important component of the model is the sector for organized crime behaviour in Jamaica. The purpose of this paper is to explain the development of the organized crime sector within the T-21 Jamaica model and demonstrate the possible utility of system dynamics in facilitating discussions on public policy.*

## **Introduction**

Jamaica, a land of natural beauty and heart-felt hospitality is known internationally on a scale that belies its relatively small size. This is particularly the case, with its contributions to the world of music and athletics. Another feature of the island known globally, that speaks more to notoriety than fame, is the country's battle with violent crime. Even while considering the internal strife of Ireland, the drug wars of Colombia and the civil unrest of various South African states, Jamaica held the dubious honour of "The Murder Capital of the World" in 2006 (Lalah 2006).

The statistics bear out this difficult truth. While the overall crime rate for Jamaica has been downward trending for the last 10 years, the murder rate has risen sharply over that same time period. Indeed, for many Jamaicans the murder rate is synonymous with the real crime rate and is the best indicator of the crime problem for the island. The incidence of murders peaked in 2005 at 1,674 resulting in a murder rate of 63 per 100,000 persons, the highest rate in the world that year (PIOJ 2006). Similar yearly totals have kept this small island of just 2.6 million inhabitants at the top of the world rankings for murders for the past decade.

The Jamaican Government has made numerous attempts to stymie the crime problem. The government pursued a crime-management approach to resolving the problem, from increasing the share of government expenditure for national security to enacting stricter crime-fighting legislation. In the last four years, the local law enforcement agency, The Jamaica Constabulary Force (JCF), emphasized the need to include the citizenry as active participants in the fight against crime and to this end, a number of community-based initiatives have been successfully implemented. Notwithstanding, the murder rate remains dramatically high and the need for a greater response to the crime problem persists.

The need for a solution to the crime problem occurs against a backdrop of a renewed drive for national development. The Jamaican government recently engaged in the creation of a National Development Plan with the explicit goal of achieving developed country status for the island by 2030. To assist in the development of the plan, a dynamic simulation model, Threshold 21 developed by the Millennium Institute (Qu 1995), was enlisted to provide long-term, integrated projections on the outcomes of possible policy scenarios. Threshold 21's main relevance was to show country-specific interactions of important variables (Qu 2001) and this was deemed to be

of great importance in possibly understanding crime in the Jamaican context.

The purpose of this paper is to introduce the process of developing the crime sector in the T21 model and explore the consequences of crime reduction measures to national development. The paper will first provide the historical context in which this problem evolved. Prior research relevant to the issue will then be presented in a literature review. A discussion of the dynamic hypothesis follows and possible scenarios the model provides will be highlighted to establish its validity for realistic analysis. Finally, constraints of the model's scope of analysis will be shared and opportunities for further meaningful research will be addressed.

It must be noted from the onset that our intent is not to explain all the determinants of crime in Jamaica. There are elements of crime which are irrational and unpredictable and therefore would be impractical to model. With this in mind, we relegate our analysis to incentive-based, organized violent behaviour which we believe can greatly assist government intervention against crime.

## **Background**

### *Historical Context*

A proper understanding of the current crime situation requires an analysis of the historical antecedents that have shaped it. The island's first major flare-up of gun violence was during the 1980 general election. This period saw the deaths of over 800 civilians as well as 27 police officers, as rival factions supporting the two major political parties clashed for control of political turf. These rival groups and their leaders known as "dons", originally supported by the political parties, acted as enforcers of political will and ensured that citizens within respective constituencies voted in support of their preferred candidates. In exchange, the political parties allowed these enforcers to operate with impunity in these locales, in effect becoming the rule of law in some instances. These locales became known as "Garrison communities"(Stone 1981).

These communities were established and continue to exist for one reason alone, the need to survive. As the Jamaican economy suffered setbacks in the mid 90s, the lack of financial opportunities for the poor created a welcome environment for the proliferation of the international narcotics trade. Jamaica is used as a main trans-shipment point between Latin and North America in the illegal drugs trade (Moncrieffe 1998). Turf wars which were once political have therefore become drug-related and where political parties once had influence on these rival gangs, this influence is often only an illusion at best (Levy 1996).

## **Literature Review**

A relevant body of literature on modelling crime related issues, and in particular on the determinants and effects of criminal behaviour, formed the foundation for the crime sector of T21 Jamaica. This literature encompasses research from the System Dynamics field, as well as from the Sociology and Economics fields. To complement this research, information has been collected locally from experts within the JCF, public sector and academia on the specific characteristics of Jamaica's crime issues, via ad-hoc seminars and individual consultations.

### ***Determinants of criminal behaviour***

Research on criminal behaviour has traditionally focused on individuals' behaviour (Siegel 1998). In parallel, in the last three decades, an increasing number of studies have been carried out on macro-level dynamics of criminal behaviour (Bursik and Grasmick 1993).

Among these studies, eight major theories seem to have emerged (Pratt 2001): Social Disorganization Theory; Anomie/Strain Theory; Absolute deprivation/Conflict Theory; Relative Deprivation/Inequality Theory; Routine Activities Theory; Rational Choice/Deterrence Theory; Social Support/Altruism Theory; Sub-cultural Theory. Our model of organized crime is not a clear cut example of one specific theory of criminal behaviour, but its distinctive elements can be found in at least three of the theories above.

The information gathered from research done in Jamaica (World Bank 1997) pointed towards six major elements: (1) poverty, (2) unemployment, (3) education, (4) population density, (5) perceived gain from criminal activities, and (6) critical mass of criminals. Our theory of criminal behaviour is therefore more oriented towards the social disorganization theory (Shaw and McKay 1972). Elements such as poverty, unemployment and poor education not only seem to be clear determinants of criminal behaviour in Jamaica from direct observation, but also appear as strong predictors of crime in several empirical studies (Pratt 2001).

Nevertheless, our explanation of criminal behaviour also includes explanatory elements from the Rational Choice Theory, such as the perceived gain from criminal activities (Becker 1968). The perceived gain from criminal activities is also a determinant that has been recognized as major determinants in other System Dynamics studies of organized crime in Italy (Raimondi 2001) and on crime in Colombia (Hernandez and Dyer 2001).

Based on the information gathered from the field, we also included among the explanatory variables the population density, in order to explain the higher crime rates in urban areas. Similarly, the presence of a minimum critical mass of criminals seemed to be a necessary pre-condition for organized crime to take place. These explanatory elements are more closely related to the sub-cultural theory approach (Fisher 1975).

### ***Effects of crime on economic performance***

The effects of criminal activities on socio-economic development are of various natures: monetary costs, opportunity costs, human capital costs, and other non-monetary costs (e.g. pain, fear, etc.). Attempts to estimate these costs are particularly difficult in developing countries, where data series on criminal activities are missing, or at best incomplete. Our model represents only the monetary and opportunity costs of organized crime on economic development, and our estimations are based on both cross-country studies and local data (Harriott et al. 2003).

Various studies have recently attempted to estimate the cost related to criminal activities. Freeman (1996), provides generic figures for the cost of crime on GDP for the United States. Bourguignon (1999) identifies various types of costs associated to crime, distinguishing between industrialized and developing countries. Londoño and Guerrero (1998) estimate the costs of criminal activities in South America. Raimondi (2001) also offers a System Dynamics perspective on the various possible effects of crime on economic development in Italy.

Jamaica has a very peculiar economic and social structure, which can hardly be assimilated to that of other countries in South America and Caribbean. Thus, the applicability of the findings of the research above indicated to Jamaica is limited. Nevertheless, these studies assisted in our estimation of the effect of organized criminal activities on Jamaica's economic development. Our own research, based on the collection of local data on criminal and economic activities and the opinions of experts from the field, led us to the estimates used in the model.

## **Crime Modeling**

### ***Important Aspects***

The first aspect of the research was to identify how the issue of the alarming crime rate was to be studied. A superficial analysis of the official incidence of murder statistics for 2005 shows the primary motives for murder as: (1) due to other criminals acts; (2) undetermined; and (3) gang related activities; in order of prominence. Upon further enquiry, however, officers within the JCF explained that in the majority of murders committed in the island, the motive was gang-related

turf war or reprisal killing. The inability to prove the involvement of gangs in most cases, due to intimidation and fear of reprisal, leads to its placement as the third primary motive. The officers also advised that analyzing murder in isolation would not be the best indication of the desired trend of violent crime in Jamaica. They explained that with regards to the high incidence of shootings, in the vast majority of these cases the intent was to murder. They surmised, therefore, that a combination of these two indicators would yield a more accurate analysis of the Jamaican context.

Despite the uncertainty surrounding motives for committing violent crime in Jamaica, one thing has remained the same, the characteristics of the typical violent criminal. Data has shown that over the last 10 years, the majority of violent crimes are committed by males in the 15-24 age group. In 2005 for example, persons in this sub-category represented 43% of murder suspects and 48% of shooting suspects. Similarly, it has been noted that male youths in the 20-24 age cohort accounted for the largest share of murder and shooting victims, respectively in 2005 (PIOJ 2006).

The derivative from these trends is that a key element in the fight against crime is to understand the process by which a young man, living in a depressed community enters into a gang and the possible paths his life may take. An important part of the conceptualization was determining the unit of analysis. The question was “Should we focus on the gang as the unit of analysis or the individual member of the gang?” The risk in examining either unit was the possibility of negatively stereotyping certain communities as breeding grounds for crime. After consultations with local experts on the matter it was decided that the case for intervention would be best made by analyzing the individual and how macro-level determinants may dictate their behaviour. The variables established as determinants at the macro level, and the nature of their relationships to the crime rate, are exhibited below.

### ***Dynamic Hypothesis in Crime Sector***

Data on the murder and shooting indicators for the reference period were ably supplied by the Statistics Department of the JCF. The formulation of a dynamic hypothesis for our key issues was then undertaken in the crime sector as shown in Figure 1.

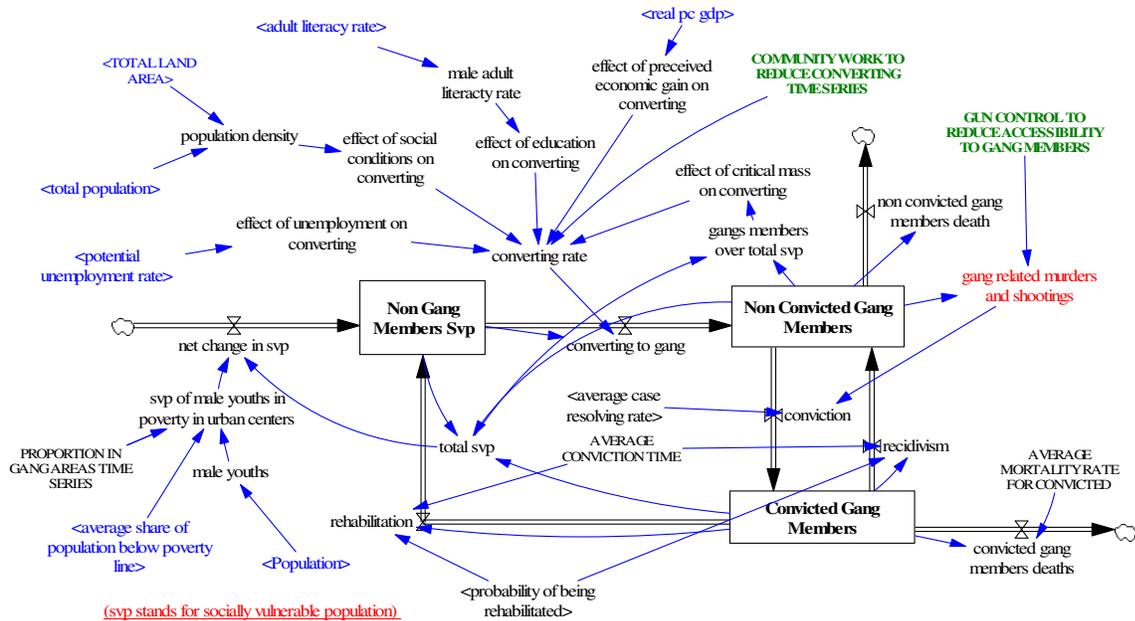


Figure 1: The crime sector in T21

In order to develop our dynamic hypothesis, we first identified the key stock variables to be represented. As mentioned above, we decided to analyze criminal behavior by first studying the subjects that actually perpetrate gang-related crimes. These subjects are often part of low income families, and we thus considered male youths from low income families as the pool from which gang members can be recruited. Male youths in this category (socially vulnerable population, or SVP) can thus be either active (non convicted) gang members, convicted gang members, or non gang members. *Non Gang Members Svp*, *Non Convicted Gang Members*, and *Convicted Gang Members* have thus been represented as stock variables.

The variables in blue, such as *total population*, are input variables to the crime sector from other sectors in T21. The two green variables on top right of the sketch, *COMMUNITY WORK TO REDUCE CONVERTING TIME SERIES* and *GUN CONTROL TO REDUCE ACCESSIBILITY TO GANG MEMBERS*, are exogenous variables representing policy interventions. The red variable on the right, *gang related murders and shootings*, represents variables created in the crime modules that will be used in other modules and is the major indicator to represent the crime rate.

The first stock variable, *Non Gang Members Svp*, is the group of male youths in the age cohort 15 to 24, living in poverty within known garrison communities. This group may be at risk in engaging in organized crime activities and becoming gang members. The rate variable

converting to gang, which leads from this group to the next group, *Non Convicted Gang Members*, is determined by a combination of factors, namely unemployment rate, population density, education, possible economic gain by being a gang member, gang critical mass, and the policy intervention of community work to reduce the conversion rate from an SVP to a gang member.

*Non Convicted Gang Members* increases with new recruits each year and recidivists and decreases due to deaths or convictions. The total membership within this population is also the key determinant of the major output from this sector, *gang related murders and shootings*. Not all gang members are assumed to be actual murderers, as some members may play strictly an advisory role or be involved in other illegal endeavours such as car theft or drug-trafficking.

The other variable that determines the output is the gun accessibility. Although we have no solid data to measure this accessibility, local experts in the field think that it has been increasing since 1990.

The third stock variable of interest is the group of *Convicted Gang Members*. It increases with convictions and decreases with releases (either becoming a non-gang SVP with rehabilitation or returning to the gang as represented by recidivism) or deaths. The conviction rate and the rehabilitation rate are further determined by the *average case resolving rate* and *probability of being rehabilitated* respectively. These two last variables are modeled in the diagram Figure 2.

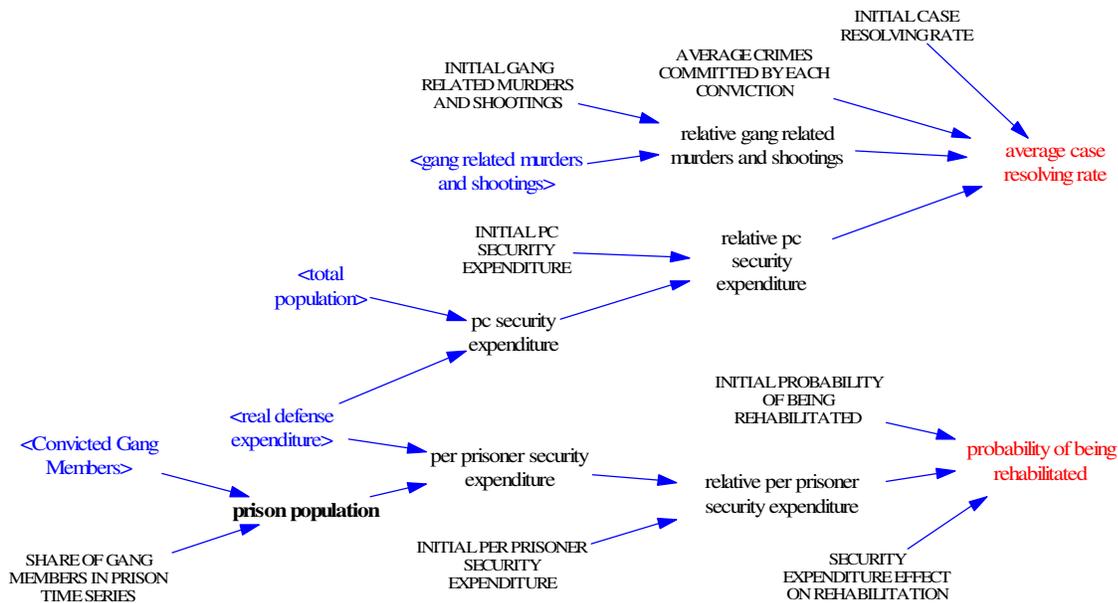


Figure 2: Average case resolving rate and probability of being rehabilitated

The variable *average case resolving rate* is assumed to be dependent on the expenditure given to the security system measured on per capita basis, while the *probability of being rehabilitated* is assumed to depend on the per prisoner security expenditure, as shown in Figure 2.

Crime impacts on other elements of the society. In T21 Jamaica, the relative change since 1990 in the incidence of gang related murders and shootings, is used to estimate the extent of crime’s impact on some of the most important elements for Jamaica’s national development. These elements and their derivatives are illustrated in Figure 3 below.

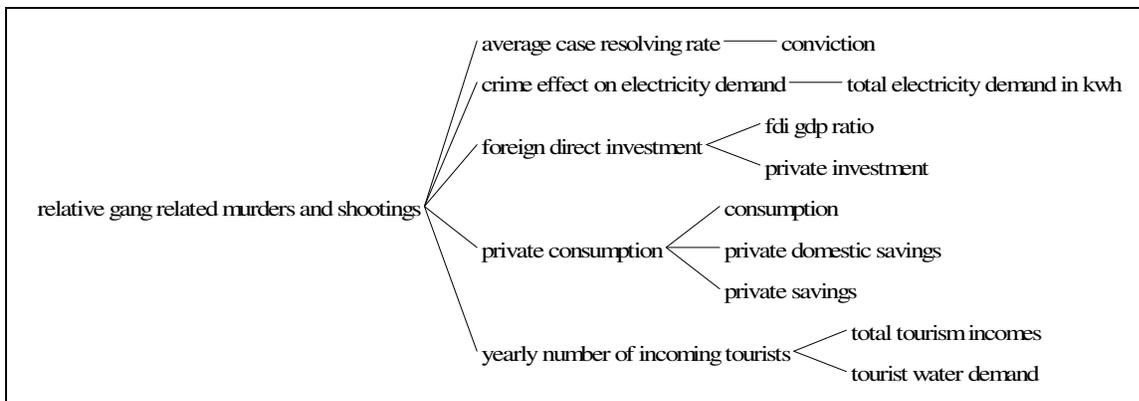


Figure 3: Crime’s effect on other sectors in T21 Jamaica

Crime’s effect on these variables is not always intuitive. The effect of crime on electricity demand is a positive one, for example, when crime increases persons increase their use of lighting and electronics for security purposes. Another positive effect is seen on private consumption. Foreign direct investment, average case resolving rate and the yearly number of incoming tourists are assumed to be negatively affected by in the crime rate.

### Crime Scenarios in T21

In this section we present the simulation results from four alternative scenarios: a business as usual scenario; a scenario with higher investment in police force; a scenario with higher investment in rehabilitation services; and a scenario with higher investment in poverty reduction.

#### *Baseline*

With the crime sector added to T21 Jamaica, it is possible to generate the baseline (business as usual) scenario to fit to historical data and project the trends for the future. The “business as

usual” scenario means that the present type and intensity of government intervention will remain unchanged over the projected time period. This includes the share of expenditure allocated to national security and enforcement efforts to mitigate accessibility to illegal guns.

In Figures 4, the baseline results from T21 (blue line) are compared to historical data (red line) for gang related murders and shootings. The fit of our baseline scenario with historical data is quite good, when considering that the model is the simplification of a reality that is yet to be fully understood. In 2005, for example, our model estimated gang related murders and shootings to be to 2,040 while historical records showed 2,324.

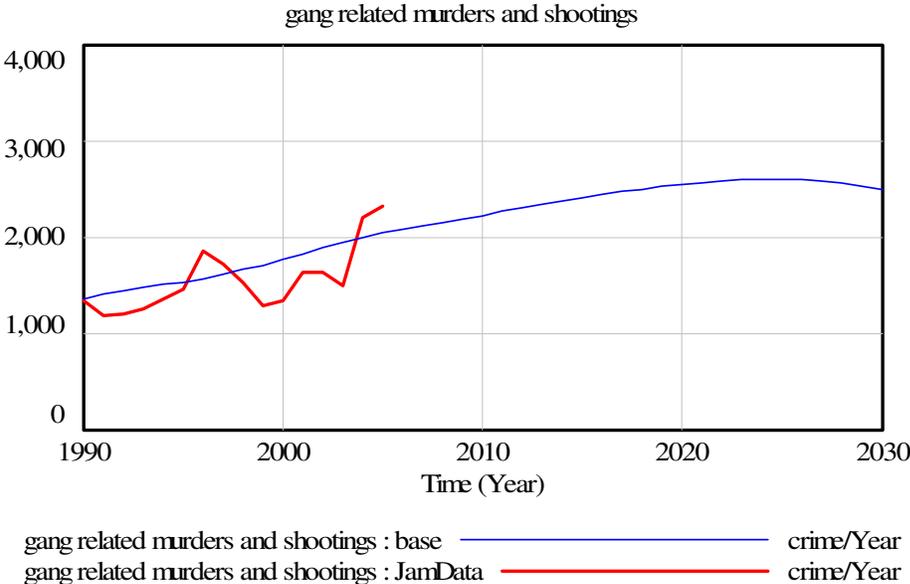


Figure 4: Gang related murders and shootings

The declining trend beyond 2020 in gang related murders and shootings is due primarily to the decline in the number of male youths and to a decline in poverty as shown in Figures 5 and 6, respectively. As these two variables decline over time, there are fewer people within the SVP who can potentially become gang members. This reduces the stock of active gang members and likewise their key output of gang related murders and shootings.

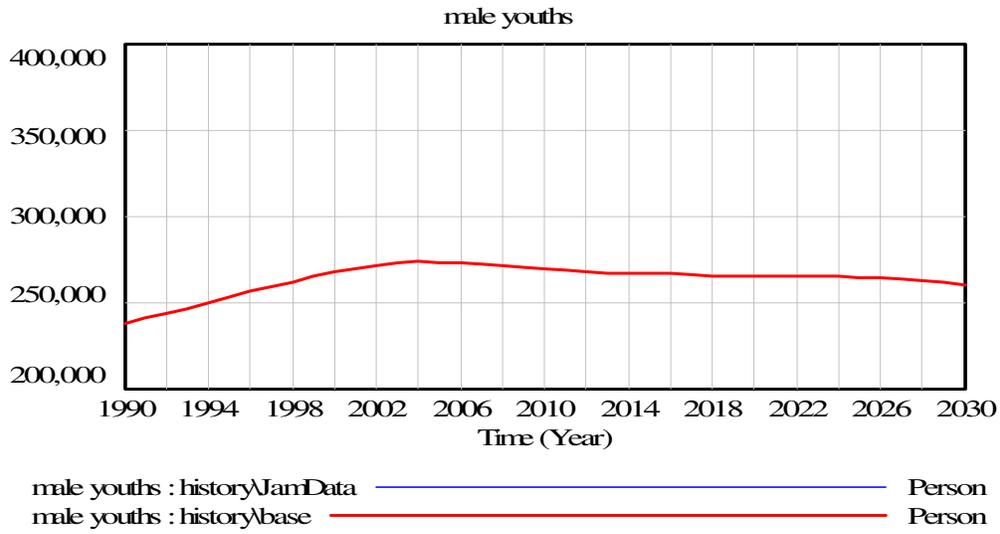
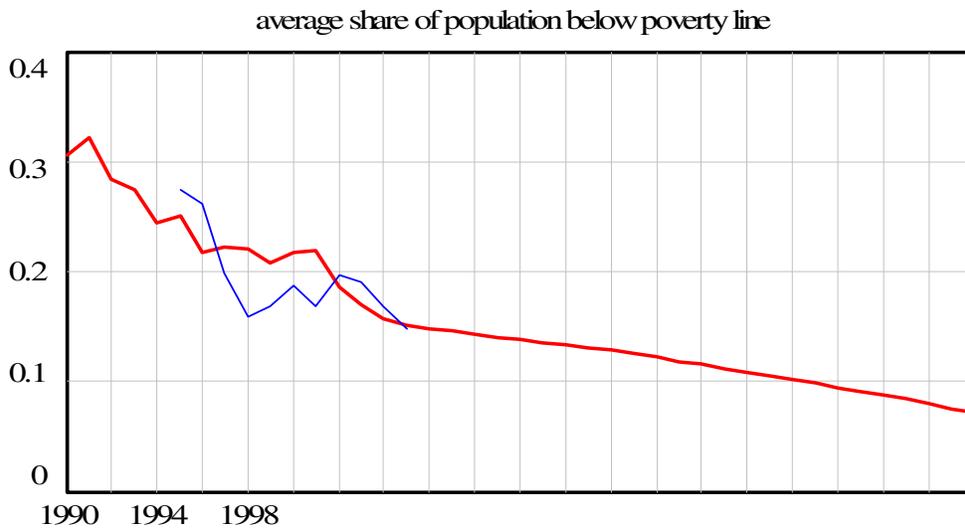


Figure 5: Male Youths aged 15 to 24



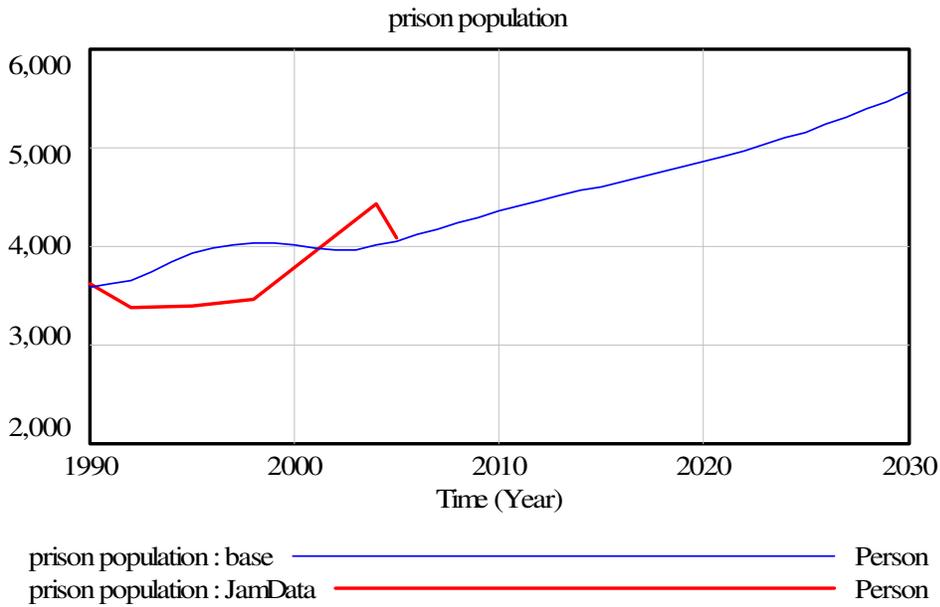


Figure 7: Prison population

It is also possible to use the model to estimate variables for which we do not have data. This can facilitate discussions with professionals in the field to advance our knowledge in crime related matters and test our measures in dealing with them. Figure 8 displays the trends of two such variables: *Non Convicted Gang Members* and *Convicted Gang Members*

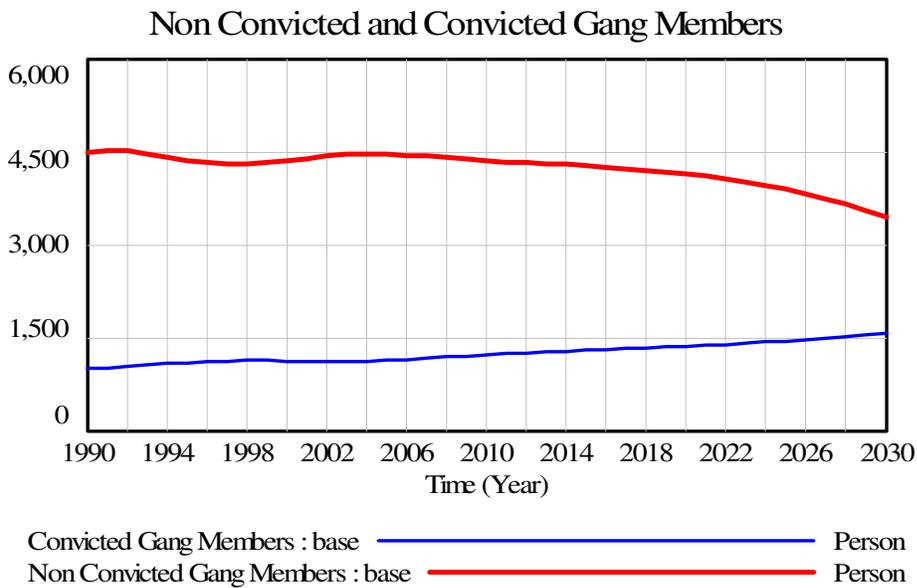


Figure 8: Convicted and non convicted gang members

**Crime Scenarios**

As the crime sector is dynamically linked to the other sectors within the T21 model, such as population, education, employment, poverty, and government expenditures, its output, gang related murders and shootings, will vary considerably with different development policies and assumptions. Such policies and assumptions cover a wide range of areas, including government fiscal policies, budget policies, future financial flows of grants, borrowings, remittance, and foreign direct investments, private consumptions and savings, international oil price, natural disaster, HIV infection rate, and government poverty reduction measures. For instance, in the scenario named Investment, where private marginal saving rate and foreign direct investment both increase 20% by the year 2030 over the baseline, there will be higher GDP, higher government revenues, higher employment, less poverty, and less crime, of which the last is shown in Figure 9.

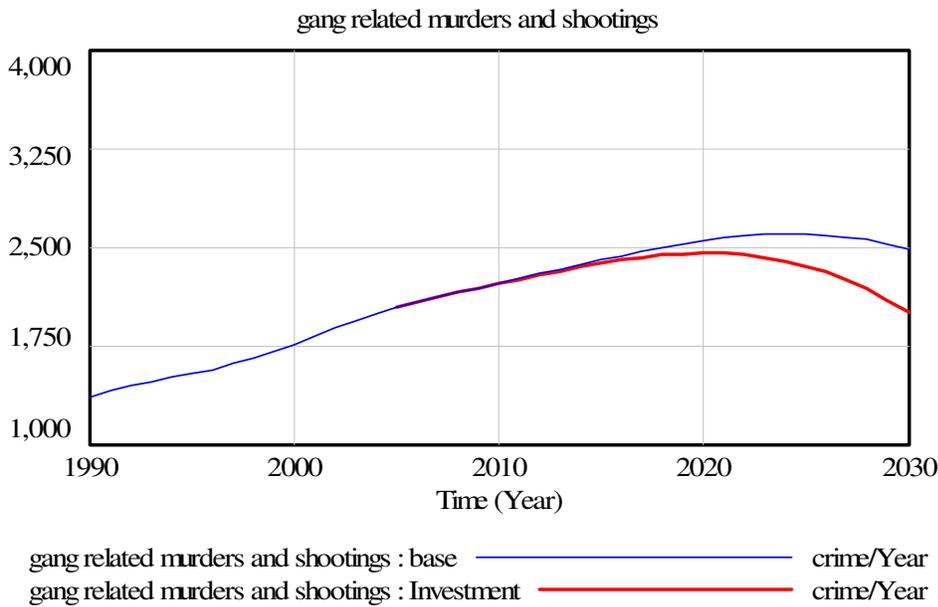


Figure 9: Scenario comparison on gang crimes

**Scenario 1: Crime Reduction**

When government takes effective measures in communities to slow the rate of recruitment to gangs and tighten gun control so that gang members will have less access to weapons, it will also affect all other sectors. The Crime Reduction scenario assumes that both the conversion to gang

and the access to guns will be reduced by 20% by 2030. Figures 10 to 14 show the improvements in GDP, employment, and poverty of this scenario over the base case.

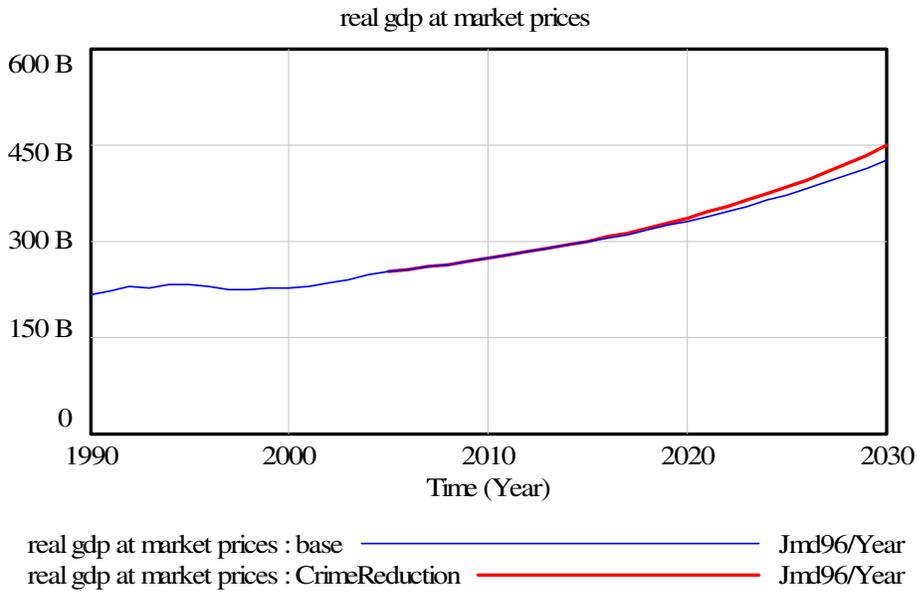


Figure 10: Crime Reduction Scenario Comparison on Real GDP

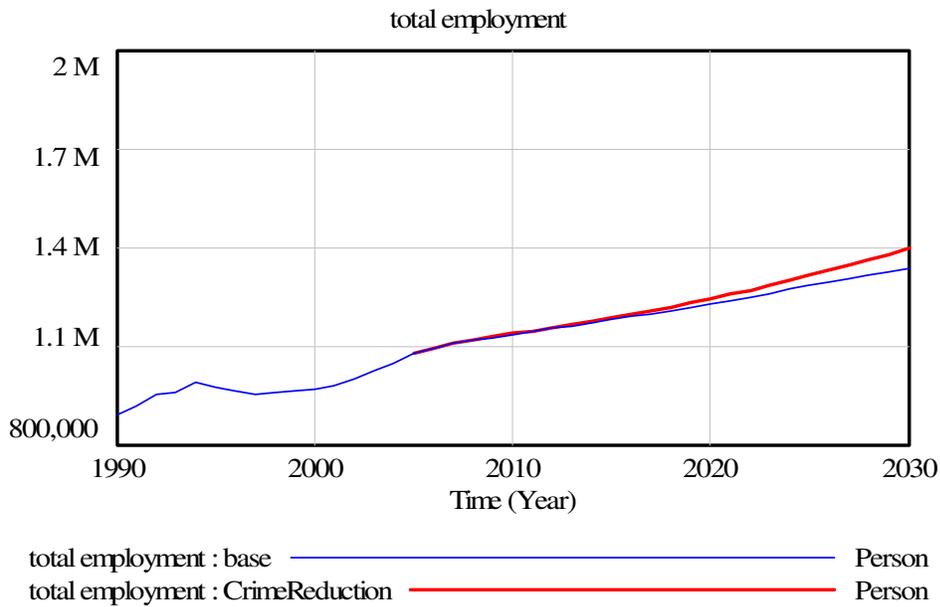


Figure 11: Crime Reduction Scenario Comparison on Total Employment

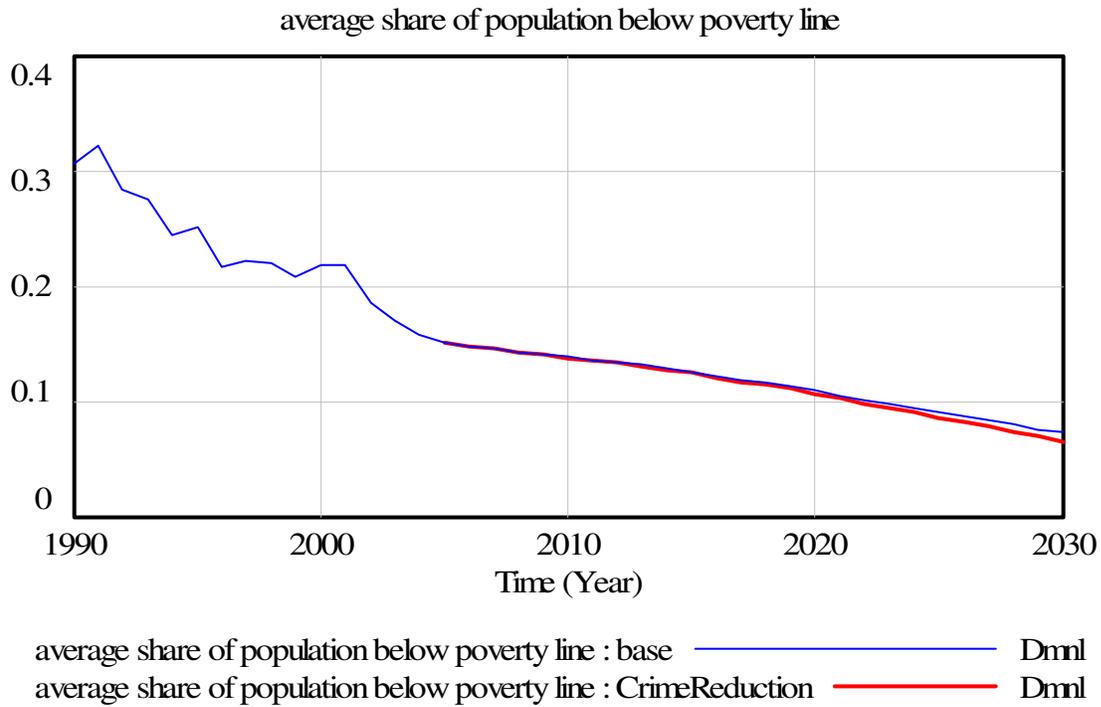


Figure 12: Crime Reduction Scenario Comparison on Poverty

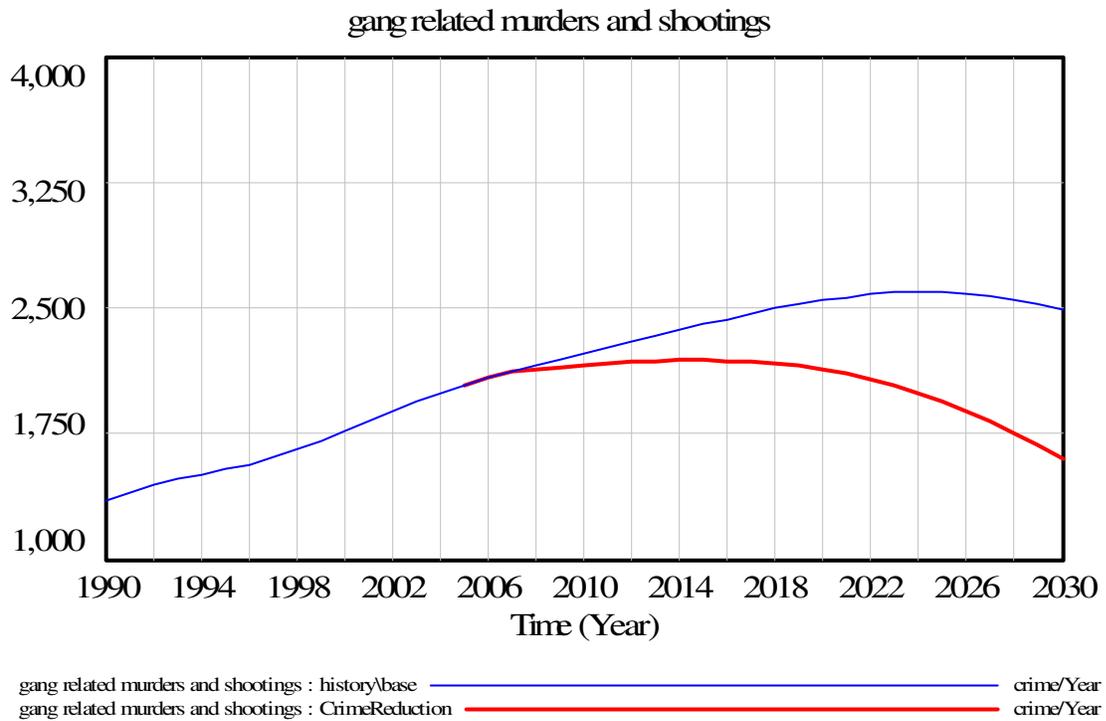


Figure 13: Crime Reduction Scenario Comparison on Gang Related Murders and Shootings

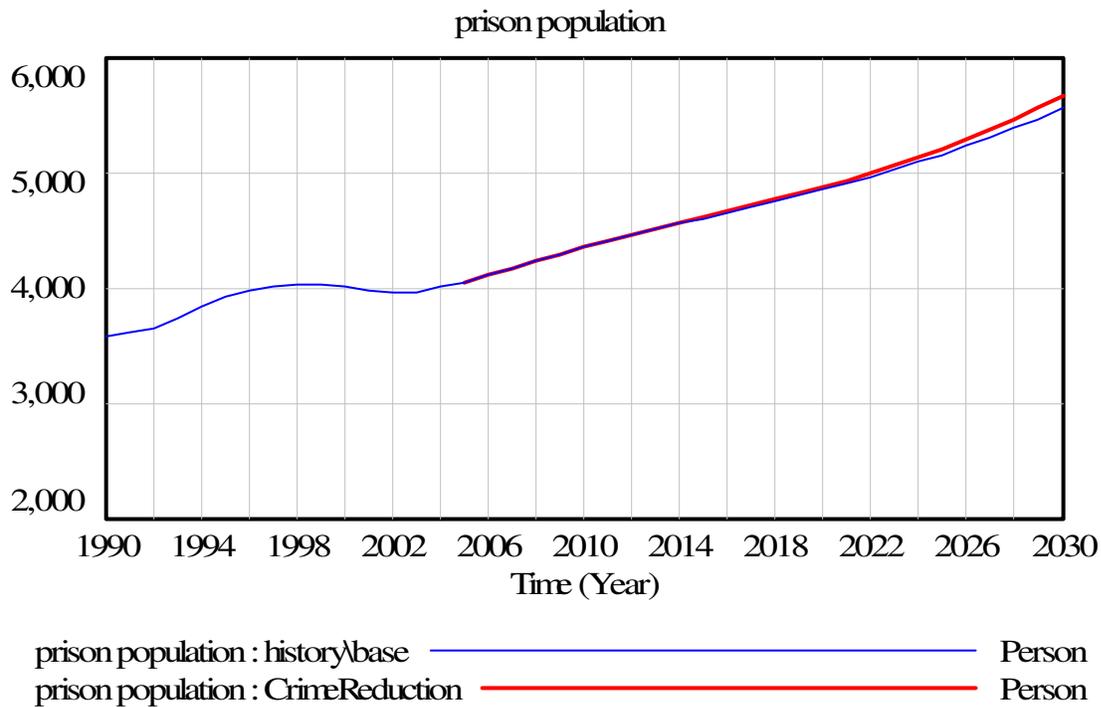


Figure 14: Crime Reduction Scenario Comparison on Prison Population

*Scenario 2: Security*

The government may take another direction in fighting crime and decide that they will increase the share of expenditure to national security. In the Security Scenario, the share of expenditure to national security is doubled by 2030. Figures 15 to 19 illustrate the impact of this policy on real GDP, employment and poverty.

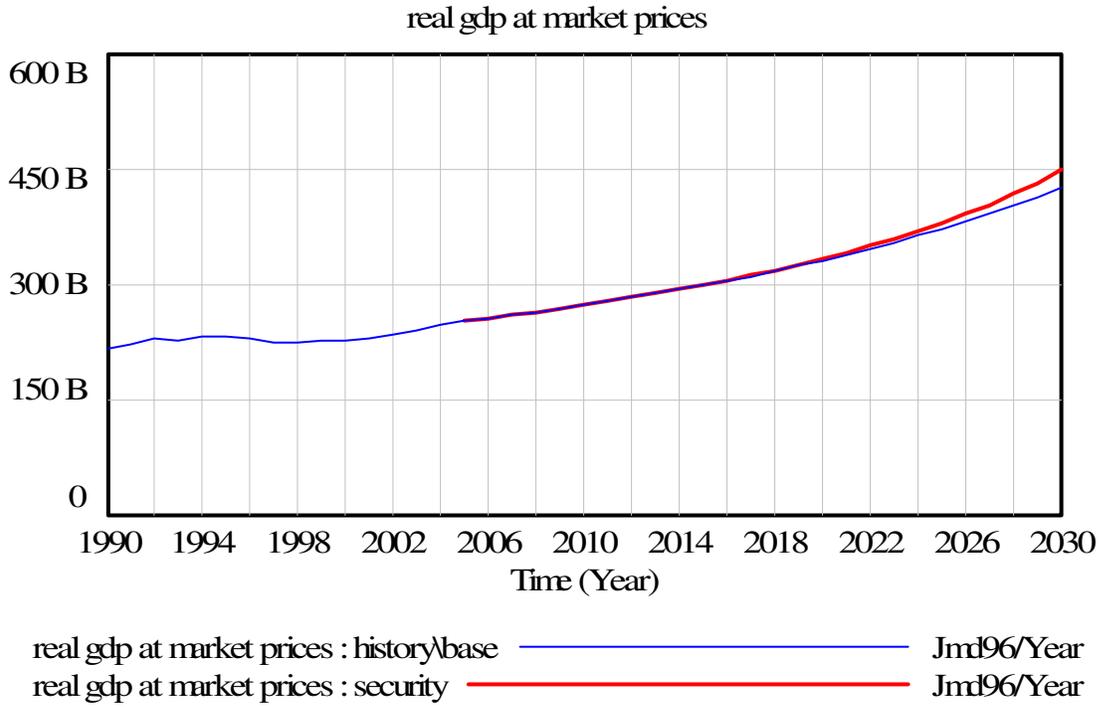


Figure 15: Security Scenario Comparison on GDP

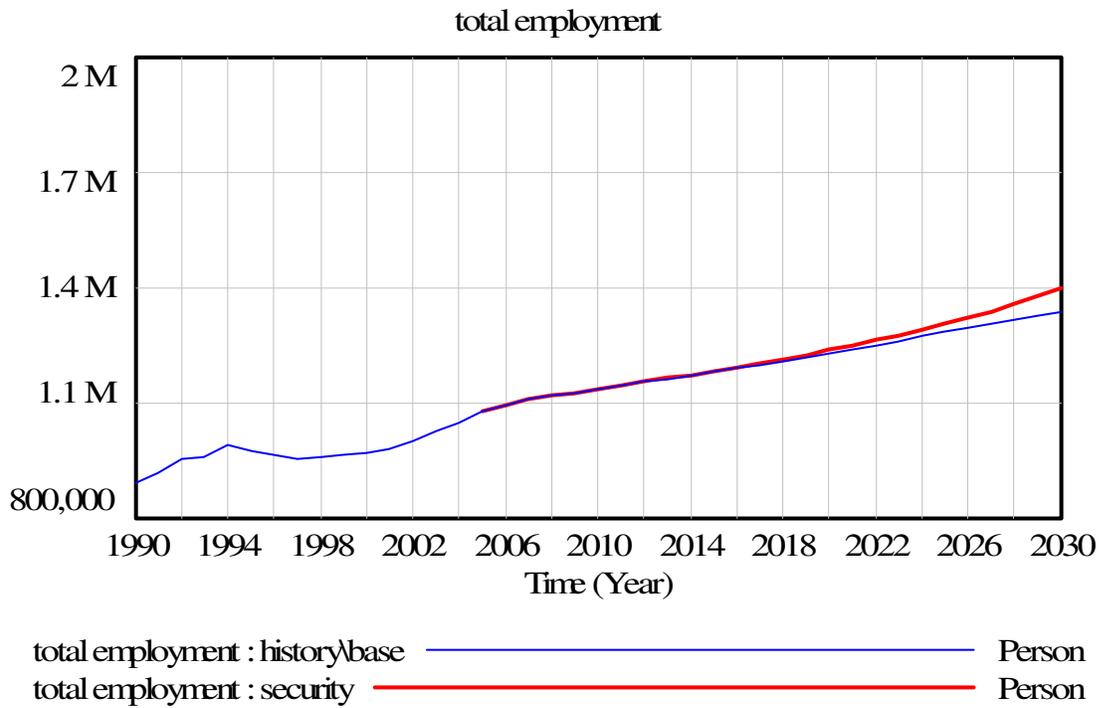


Figure 16: Security Scenario Comparison on Total Employment

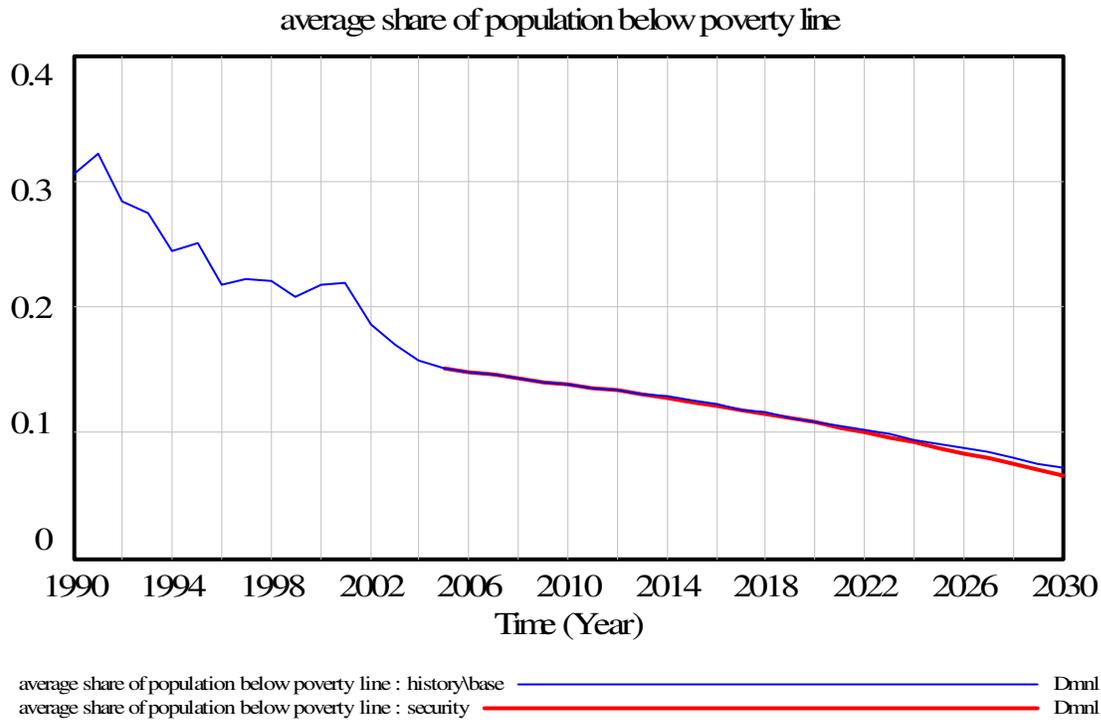


Figure 17: Security Scenario Comparison on Poverty

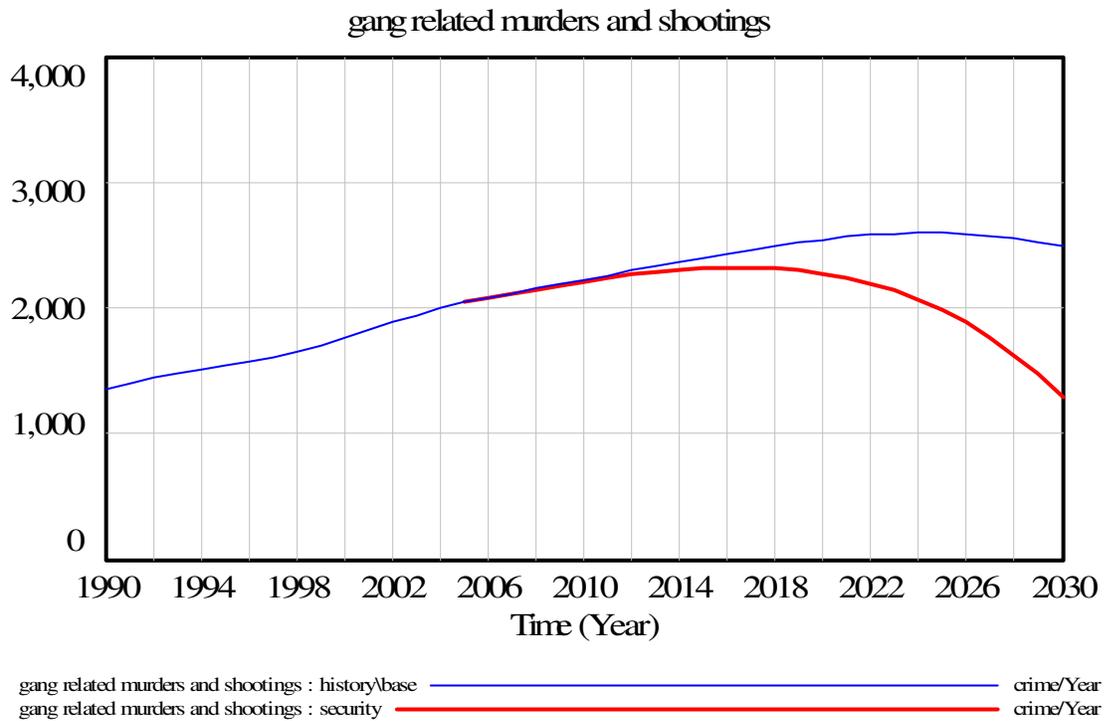


Figure 18: Security Scenario Comparison on Gang Related Murders and Shootings

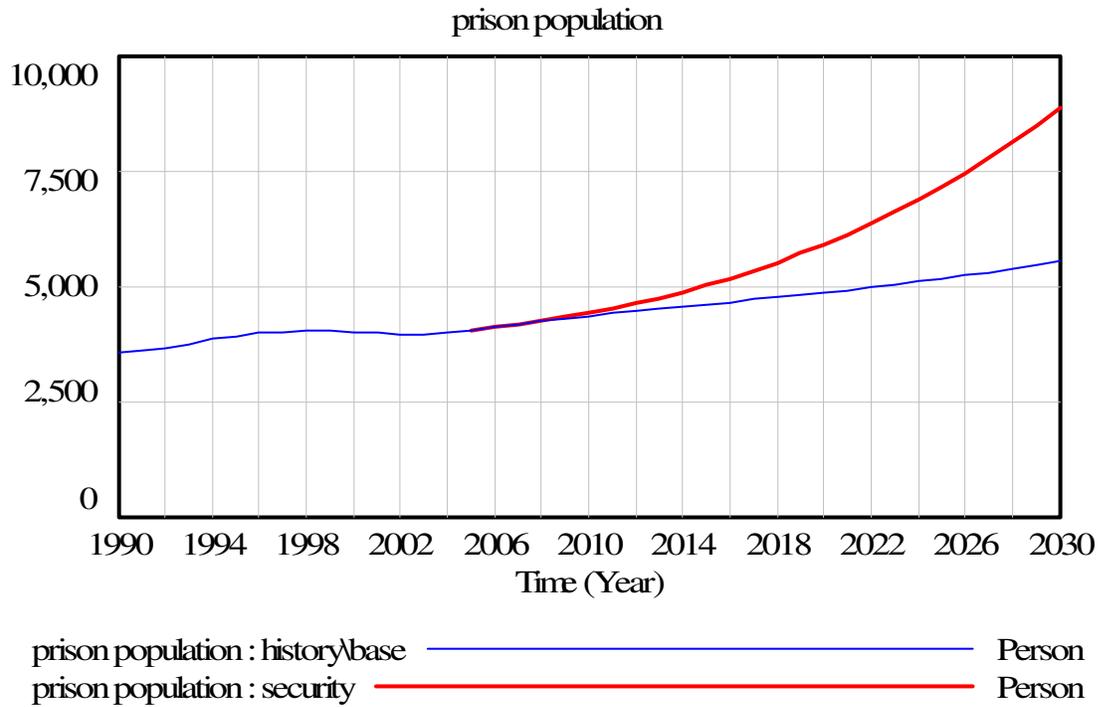


Figure 19: Security Scenario Comparison on Prison Population

*Scenario 3: Welfare*

A final scenario that the model provides is an illustration of poverty alleviation measures' impact on the situation. Bearing in mind that gang members come from poor families, government may try to reduce their numbers indirectly by increasing welfare expenditure to poor families. In the Welfare scenario, government increases welfare expenditure from 2.9 billion real Jamaican dollars to 5 billion real Jamaican dollars and increasing the share of welfare to the lowest quintile from 0.5 to 0.8. Figures 20 to 24 show the impact of this intervention on real GDP, employment, poverty, gang related murders and shootings and the prison population as against the base case.

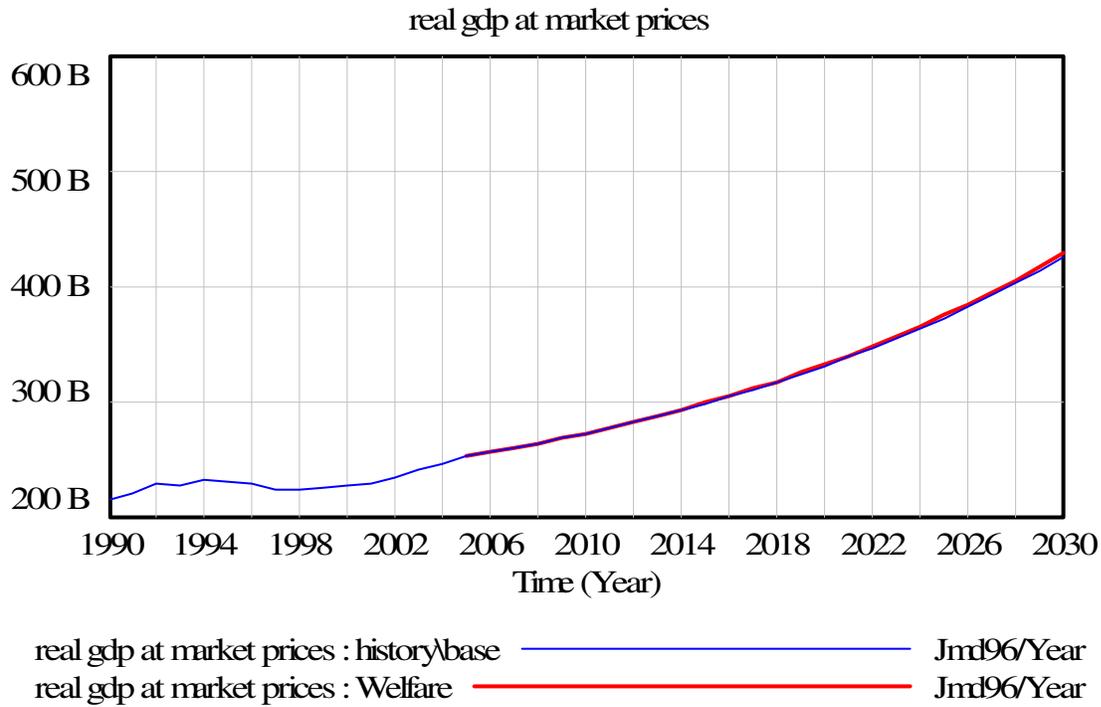


Figure 20: Welfare Scenario Comparison on GDP

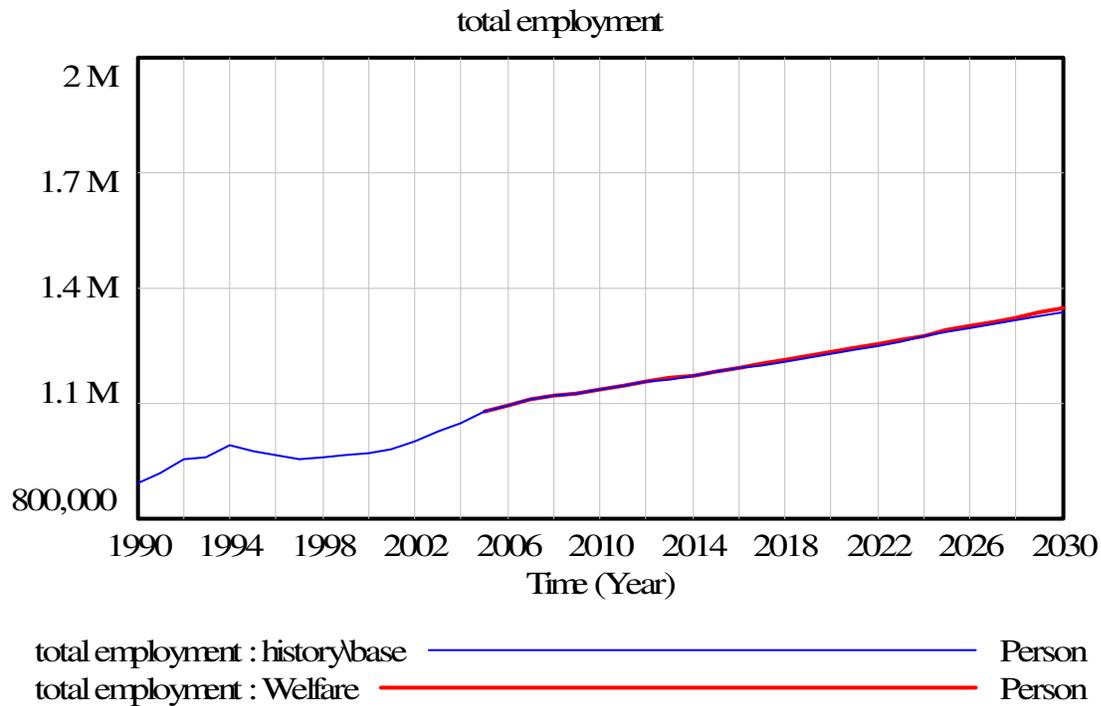


Figure 21: Welfare Scenario Comparison on Total Employment

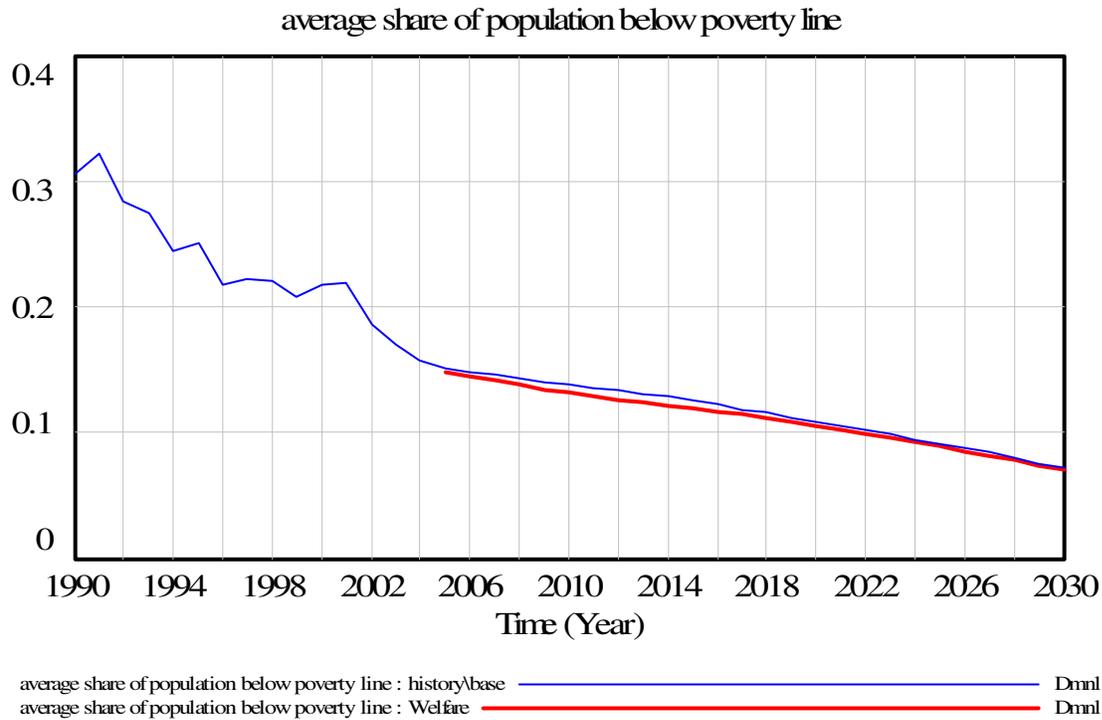


Figure 22: Welfare Scenario Comparison on Poverty

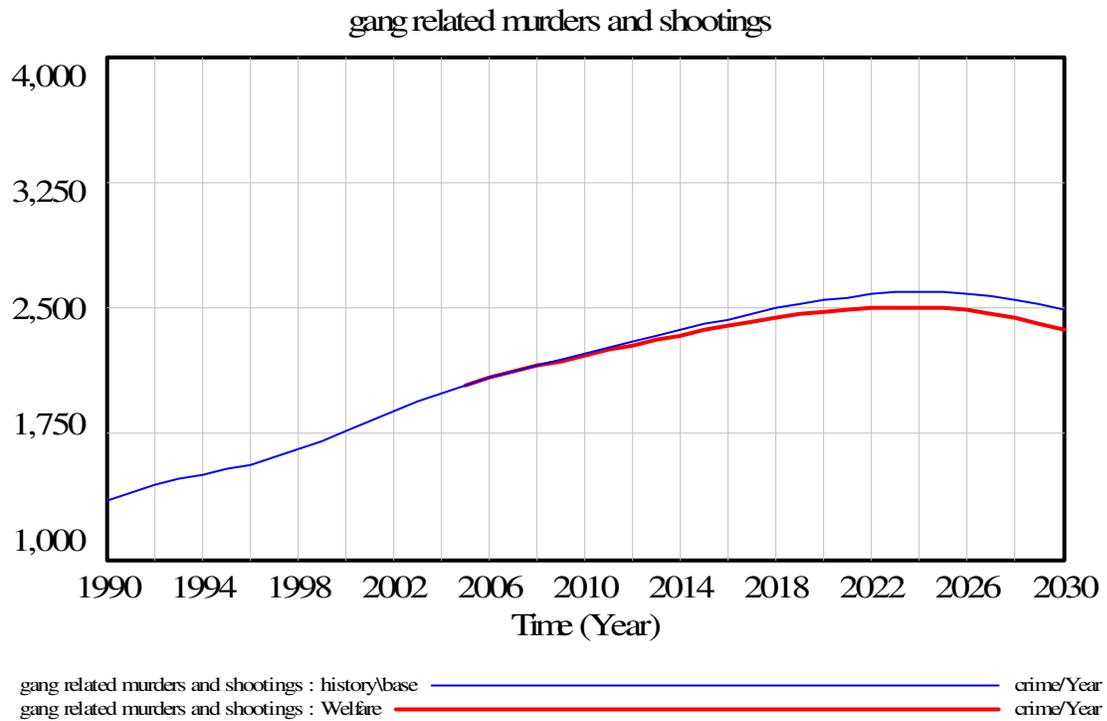


Figure 23: Welfare Scenario Comparison on Gang Related Murders and Shootings

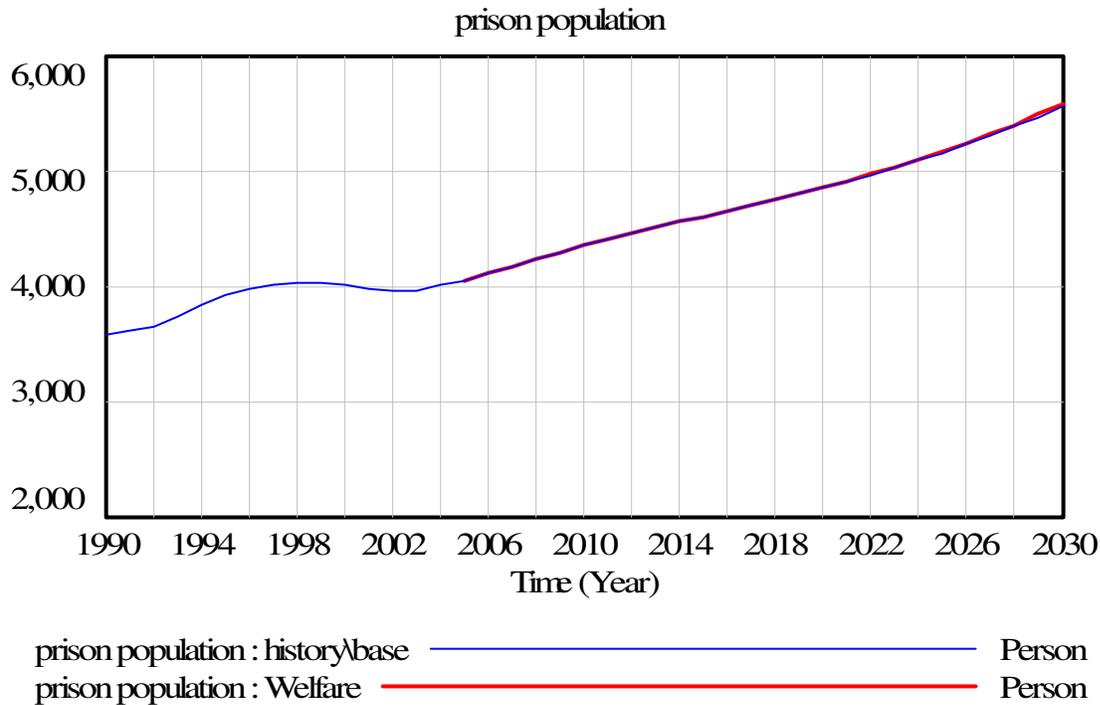


Figure 24: Welfare Scenario Comparison on Prison Population

### Conclusions

All scenarios reflect an improvement when compared with the base case. This indicates that government has a range of policy levers by which it can cause abatement in the crime rate. The Welfare scenario, however, seems to be the least effective of the three. For all the selected indicators, with the exception of gang related murders and shootings, the difference between the intervention and the base run was negligible. These results imply that if government wants to address crime it must do so using direct means as much as possible.

This leads us to the next two interventions, the crime reduction scenario and the security scenario. Their effects on real GDP, employment and poverty were almost identical. Their differences lie in their respective impacts on gang related murders and shootings and prison population. We find that the Crime Reduction scenario slowed the projected increase in the incidence of murders and shootings faster than the Security scenario and also showed a decline in the incidence by 2015 as opposed to 2017 with the Security scenario. The Security scenario on the other hand, showed a sharper decline in the incidence of murders and shootings, resulting in a lower incidence of 1,291 than the Crime Reduction scenario of 1,598 by 2030.

An undesired consequence of the Security scenario is, with the increase in real defense expenditure and the subsequent increase in the average case resolving rate, our prison population will grow dramatically from 5,554 to 8,874. The Crime Reduction scenario would, on the other hand, only see an increase of 100 prisoners over the base case. Based on our assumptions, any attempt to increase the efficiency of our justice system should also be coupled with expenditure to increase capacity of the prison system.

It should be noted that the model results are not predictions, but scenarios that help participatory discussions among all stakeholders and enable decision-makers to better understand the linkages among all areas of development. The results presented above are based on a preliminary version of the model that will be refined over time.

### **Further Research**

The research has a number of limitations. Historical data is generally unavailable, and the ones used to calibrate the model have not been externally vetted and could be a source of error. The model also does not seek to address the demand side dynamics for criminality such as the drug-trafficking link. The model also has room for further refinement, such as total land area could be disaggregated to rural and urban land areas to give a more accurate picture of the concepts they portray. The two points of intervention as well as the perceived economic gains from crime could also be elaborated on by expanding to separate modules to show the dynamics that determine their behaviour.

The reality is however that even if some important parameters need to be further calibrated it would still be a useful tool for national security policy makers in the island. Discussions on the model's result with such persons have confirmed this as it allows them to view the results of certain key policy assumptions in a transparent and objective manner. The model highlights those areas of the national security and justice system which are in dire need of attention. It could also point to the data collection mechanisms that need to be implemented or to pre-existing mechanisms which may have become outdated. Finally, the model represents an ideal starting place to engage various elements of the society with a frank discussion on the perceived ills and possible solutions to the crime problem.

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