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THE ECONOMETRICS OF VIOLENCE, TERRORISM AND SCENARIOS FOR PEACE IN COLOMBIA FROM 1950 TO 2019

By Gustavo Alejandro Gómez-Sorzano*

***Abstract*:** This paper continues a research born in 1993 as a consequence of the concern regarding the increase in Colombian violence, and especially for its escalation during the 1990's, its objective is to create an econometric model capable of forecasting the path of terrorist murder under different policy options and helping the country in the design of a state policy drawing the lineaments for reaching the pacification of the country. In the first part I use The Beveridge and Nelson decomposition of economic time series to estimate the cyclical component of murder which is used to construct a theoretically and statistically satisfying model to account for it from 1950 to 2004. The variables that together account for eighty three percent of the variation in cyclical terrorist murder are the years of Colombia's *La Violencia* period when the peasant self-defense movements appeared, the years of the so-called *National Front* political collusion between the two main establishment parties, the real trade balance, the size of Colombia's military forces as a proxy for all armed forces (military, para-military, guerrilla, and drug-related) in the country, the unemployment rate, the number of students matriculated in all modalities and people displaced in the country. The forecasts for cyclical terrorist murder for 2005-2007 show the big dilemma facing the Colombian authorities: the strong reduction of displaced people from 2003 to 2004 boost the cyclical terrorist murder in the countryside, erasing the initial results by president Uribe's administration at controlling the intensity of the Colombian civil conflict. The second part presents a first approach at constructing a theoretical near-VAR system for cyclical terrorist murder and social and economic variables in Colombia. The third section presents forecasts 2004-2007 estimated by the single equation model and the near VAR-system. Both models show a jump in terrorist murder by 2004 and 2005 implying that any future policy at diminishing the conflict should control the number of displaced people, one of the biggest problems facing Colombia today. Terrorist murder is expected to decrease again by 2006 and 2007 suggesting that the continuation of The *Democratic Security Policy* will be destroying the roots of the Colombian civil conflict. The final section presents 11 scenarios 2005-2010 and 18 scenarios 2006-2019. According to them peace will be attained around year 2008 and *sustainable peace* will be granted before year 2019.

Keywords: Colombia, cyclical terrorist murder, democratic security policy, sustainable peace.

JEL classification codes: C22, C53, D63, D74, D78, H42, H56, K42, N46, O54.

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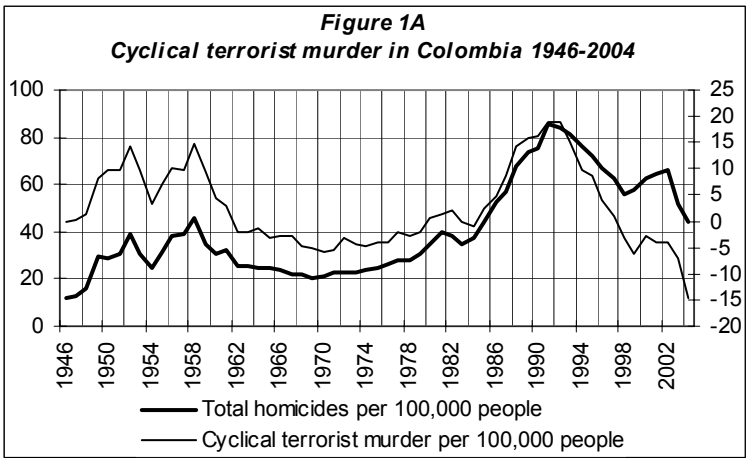
Introduction

Latin American countries record, by far, the highest homicide rates in the world, averaging 20 to 30 murders per 100,000 people, i.e., two to three times as many as in the next most violent regions of the world (see, e.g., Guerrero, 1998; and, especially, Londoño, 1998, p. 72). Within Latin America, Colombia is known for its extremely high levels of homicidal violence, resulting in one of the highest murder rates in the world. According to Colombian National Police statistics, homicides increased from around 5,000 per year in the 1950s and 1960s to about 10,000 per year by 1980 and to about 25,000 per year by 1990. A further surge to nearly 30,000 murders per year was seen in the early 1990s, but a moderation by 2002, 2003 and 2004 when in absolute numbers, they are 28,781 or around 66 murders per 100,000 people, 22,973 or 52 murders per capita, and 20,133 or 44.4 per capita respectively (figure 1); and a decrease for cyclical terrorist murder per capita[1] for those years of –4.06, -6.8 and –14.4 (figure 1A).

[1] The estimation of the cyclical terrorist murder per 100,000 people is presented in the section for data and methods.



The country's murder rate varies substantially not only over time, but also from region to region (e.g., Dinar and Keck, 1997, pp. 9-10; Guerrero, 1998, pp. 96-97; Londoño, 1998, p.76), with rates as low as 16/100,000. That would be regarded as not too far off "normal" for the world rates as high as 900/100,000 (Guerrero, 1998, p. 97). These numbers underestimate the truth. Following a survey, Rubio (1998a, p. 606) writes that even for murder, "more than half of the households victimized stated that they had 'not done anything', and only 38 percent reported that they had made a formal complaint to the authorities. Incredibly, by comparing separate statistical reporting by the police and the justice agencies, Rubio finds wide disparities for more that a quarter of Colombia's municipalities. The disparities are largest in municipalities characterized by the presence of any armed force (military, para-military, drug-gangs, guerillas; Rubio, 1998a, p.607). Apparently, victims fear reprisals.

Colombia's murderous violence is related to three salient features: political violence, guerrilla activity and drug trade, while the first two have marred the country for decades, the latter one appeared in the seventies. But less well known and appreciated is that these two factors account only for a small portion of all murders in the country (Guerrero, 1998, p.98). For murder, the primary risk factors are alcohol consumption, possession of firearms, and weekends. For example, a quarter of all murders take place on Sundays, more than half on Fridays, Saturdays and Sundays, with disproportionate increases on holidays. Most murders are non-political, take place at night, in urban areas, are committed by poor people on poor people, and alcohol is frequently found in the victims (Londoño, 1998, especially p.75; Guerrero 1998), although Guerrero observes that while alcohol consumption might explain the high levels it cannot explain the drastic increase in violence in Colombia in the 1980s and 1990s (1998, p.98). Others, such as Uprimny (2001, p.47), through the comparison between Colombia and Bolivia conclude the lack of collective action as an explanation of the persistence of violence in Colombia.

Also contrary to popular perception, several studies have failed to establish links between murderous violence and poverty rates, unemployment rates, urbanization rates, or rates of economic growth (Londoño, 1998, p.74; Guerrero, 1998, p. 97). Indeed, Rubio (1997) and others have made persuasive arguments according to which the educated and uneducated classes both engage in criminal and violent activity for the simple reason that crime pays well. Income and education are no longer linked, but income and crime are (Rubio 1997, p.812). Average annual income from crimes have been variously estimated up to $70,000 per person, a huge premium over Colombia's per capita 1995 GDP of around $1,800 (Bejarano, 1997, p.12). The break-down of the Colombian justice system further encourages criminal and violent behavior, as the

probability of being caught, tried, and convicted is becoming smaller over time. By 1994, conviction rates had dropped to below four percent (Rubio, 1998a,p.606), and sentences rarely exceeded six months of jail time (Rubio, 1998b, p.91). In a recent paper (Levitt and Rubio, 2000) find as explanations for Colombia's high crime rate: the drug trade, lack of punishment of criminals, guerrillas, poverty and income inequality and a probable propensity to violence from Colombians.

There is wide-spread agreement among analysts of all stripes that Colombia's violence is costly, both at the microeconomic level (e.g., Dinar and Keck, 1997) and at the macroeconomic level estimated at up to 15 percent of GDP (Bejarano, 1997, p.10) and there is good evidence that major perpetrators of violence – the military and paramilitary forces, the drug traders, and the various guerrilla groups – act in a semi-collusive fashion to keep the spoils of war going (Richani, 1997), evidence almost perfectly in line with the theory suggested by Brito and Intriligator (1992). Brauer, Gómez-Sorzano, and Sethuraman (2004) have applied the Hodrick-Prescott and Beveridge-Nelson business-cycle decomposition methods to separate the Colombian homicide time-series into a permanent and a cyclical component. They interpret the latter as due to political violence, economic booms and guerrilla activity and, when matching their estimated cyclical terrorist murder series with the political and economic events as well as terrorist activity in the country, they appear to generate a good overlap between the political and guerrilla violence the history suggests and the economic booms at least for the time period 1946-1999. In the next section I re-estimate the cyclical component for 1946-2004 and start the construction of a model that would capture the causal reasons why cyclical violence would move in the way it does.

Data and methods

Data were collected in Colombia from various Colombia sources and adjusted for inflation and population growth (see data source appendix for a detailed description). The estimation method used is multiple regression and Near Vector Autoregression (Near VAR) my analysis begins in 1950 since data on total armed forces personnel are available from that date forth.

Decomposition of Colombian murder into permanent and transitory components[2]

I use The Beveridge and Nelson (BN for short) decomposition of economic time series to obtain the cyclical and permanent components of murder. This method has been applied in Colombia to decompose macro indicators as Gross Domestic Product (GDP), by authors such as Cuddington (1986), Clavijo and Fernández (1989), Clavijo (1989), Cárdenas (1991), and Gaviria and Posada (1992). In the field of Defense Economics and Criminology has been applied by Brauer, Gómez-Sorzano and Sethuraman (2004), and Gómez-Sorzano (2005 and 2006). In this paper I use the estimated cyclical terrorist murder component according to Gómez-Sorzano (2005)[3]. The

[2] The technical reason for decomposing murder in order to create and estimate a model for cyclical terrorist murder stems in the fact that the series has a unit roots; additionally I realized multiples attempts to model the original per capita series for murder using the independent variables shown ahead, however it was not possible to come across with a model with the excellent econometric fitting found.

[3] The Colombian National Police distinguish 15 comprehensive categories of crime. Category #13, called crimes against life and personal integrity includes: abortion, common body lesions, culpable lesions

purpose of this decomposition is to construct and estimate and model explaining cyclical murder and in a future research a model for permanent murder. According to BN (1981) after verifying that the series of the logarithm of murder 1946-2004, do not reject the existence of a unit root, I proceed to perform the decomposition, which begins by adjusting the logarithm of the per capita murder series (PCM) to an ARIMA[4] model as follows:

$$\Delta LPCM = \mu + \sum_{i=1}^{k} \gamma_i \ \Delta LPCM_{t-i} + \sum_{i=1}^{h} \psi_i \ \varepsilon_{t-i} + \varepsilon_t$$

The model estimated for the Colombian case includes moving average components of order 1, 5 and 13, (t statistics shown in parenthesis):

$$\Delta LPCM = 0.025 + 0.2789\varepsilon_{t-1} - 0.2898\varepsilon_{t-5} - 0.2994\varepsilon_{t-13}$$
$$(1.73) \quad (2.27) \quad (-2.24) \quad (-2.27)$$
$$R^2 = 0.91 \quad D.W = 2.09$$

Then I replace the moving average parameters in the equation shown below, getting the estimated series for the logarithm of the permanent per capita component of murder:

$$LM_t^{PC} = V_0 + \frac{\mu . t}{1 - \gamma_1 - .....\gamma_k} + \frac{1 + \Psi_1 + ...\Psi_h}{1 - \gamma_1 - .....\gamma_k} \ \sum_{i=1}^{t} \varepsilon_i$$

The transitory component is now calculated by means of the difference between the original series and the exponential of the permanent per capita component shown above (LM_t^{PC}, figure 1A). That transitory component coincide with the political events lived by the country since 1946 and narrated by many Colombian historians, I use the chronology and political description of events taken by Bushnell (1993), and Valencia (1987) finding that the re-estimated cyclical component 1946-2004 coincides with Bushnell and other historians.

Historical adjustment of the estimated cyclical terrorist murder component with major socio political events in Colombia.

According to Gómez-Sorzano (2005), the Liberal Party was in power for 16 consecutive years from 1930 to 1946, this period was called the *Liberal Republic.* Although the country historically has had one of the longest electoral traditions in the continent and the world (Uribe Vélez, 2005, p. 16)[5], and in spite that at that time, the Colombian two party system, was superficially taken as evidence of the country's political stability, it was a handy way of keeping alive old grudges and passing them from father to son to grandson. This caused the beginning of

(lesions in job related accidents), culpable homicide (job related homicides), homicide, aggravated homicide (assessination), death associated with the exercise of official police duties and since 1993 murder with terrorist intent. For this analysis I use the last for subcategories collapsed in a single series.

[4] K and H represent the autoregressive and moving average components respectively.

[5] This paper is a presidential address to the Colombians in regards to the social and economic improvements that the country must reach by year 2019.

a rising cycle of violence just in time for the presidential elections of 1946[6] (Figure 1A). In the middle of this cycle in 1948 Gaitán, a charismatic liberal leader is assassinated starting what was called The Bogotazo, defined as an outburst of mass rioting in Bogotá and all over the country (e.g., cyclical terrorist murder passes from 0.28 per capita in 1947 to 1.53 in 1948, to 14.18 in 1952, fig. 1A). Gaitán was disliked by most of the party establishment, and a popular leader comparable to Dr. Martin Luther King Jr., His assassination caused that the army became tainted by politics to such a point that in a battle in 1952, they left an estimated of 1,500 people dead in El Líbano, State of Tolima (e.g., my estimates for terrorist murder effectively show a peak in 1952 with a rate of 14.18 per capita).

In 1953 the country had a second military government. General Gustavo Rojas Pinilla becomes president. During his regime thousands of guerrillas surrendered their weapons from 1953 to 1954 [7] (e.g., terrorist murder passed from 9.60 per capita in 1953 to 3.08 in 1954).
Then from 1958 to 1974 the country had the system of presidential alternation in power called the *National Front;* this was a new era of political reconciliation, and domestic peace the instutionalization of a bipartisan rule put an end to the electoral competition (e.g., terrorist murder decreases from 14.65 per capita in 1968 to –4.75 on 1974, fig. 1A). During this period, years 1963-1965-1967,1970 guerrilla groups appeared: in 1963 the Revolutionary armed Forces of Colombia (FARC) is born, in 1965 the National Liberation Army (ELN), in 1967 the Popular Liberation Army (EPL), and in 1970 the M-19 Group. The M-19 Group's life was ephemeral. In 1979 they stole 5,000 weapons from an army canton in the north of Bogotá, and used them in 1980 for taking over the Dominican Republic's embassy in Bogotá in the midst of a diplomatic reception and holding hostage 14 ambassadors including the U.S envoy.

From 1982 to 1986, the country experienced a first peace process. There were intensive efforts by the government to reach cease fire agreements with guerrilla groups, except for the ELN, resulting in a decreasing cycle as shown in Figure 1A (e.g., terrorist murder passed from 2.22 per capita in 1982 to –0.94 in 1984). However, in these agreements substantial items were not clearly resolved, particularly regarding demobilization, and surrendering of weapons. The agreements generated positive advantages for the groups, by paralyzing military operations and leaving large empty geographical gaps that were occupied by new guerrilla cells.

In 1985, during peace talks the M-19 Group seized the Justice Palace, seat of the Supreme Court, holding as hostage magistrates that by the end of the night were assassinated[8]. The assault to the Justice Palace was the final blow to the frustrated peace process and so, from 1986 to 1991 cyclical murder takes the form of a general conflict, made up of the confrontation between the government, drug traffickers and guerrillas, which caused hundreds of deaths in the Communist Party (Unión Patriótica), and the assassination of the Attorney General and three presidential candidates (Bernardo Jaramillo, Luis Carlos Galán and Carlos Pizarro). My estimates for terrorist murder pass from 2.52 per capita in 1985 to 4.81 in 1986 and 18.97 in 1991.

In 1990, Liberal César Gaviria is elected president starting a process of constitutional reform. He changed the Constitution and the policy toward drugs traffickers, he rejected extradition as a mean of countering the drug traffic and unveiled a program for dealing with the drug problem that produced concrete results: any trafficker that voluntarily surrender to Colombian authorities and plead guilty to one or more charges would not be extradited to the

[6] Conservative Mariano Ospina Pérez took office on August.
[7] The time period 1947-1960 is generally referred to as *La Violencia*, defined as a period of intense power clashes between the Liberal and Conservative parties mingled with a Roja's military intervention 1953-1957. A paradoxical phenomenon of these years was a surge of economic growth, homicides were going up but so was the GDP, at a rate of five percent annually from 1945 to 1955. Industrial output showed even sharper growth at a yearly rate of nine percent.
[8] There was intensive fire between the groups and the military who used tanks to get into the Palace. At the end of the nigth The Palace was completely destroyed and burned out.

U.S., but instead tried in Colombia. The Medellín Cartel organization declared a truce, and Pablo Escobar gave himself up in 1992 (e.g., terrorist murder decreases to 18.73 per capita in 1992 to 14.93 in 1993, figure 1A). In 1993, as the U.S., pressed for his extradition, Escobar escaped prison launching another terrorist campaign, but was killed by Los Pepes a group belonging to the Cali Cartel.

In 1994, Liberal Ernesto Samper is elected president. Colombia is decertified by Washington for the alleged involvement of drug money in the electoral campaign. A new actor in the conflict appeared this year; a federation of paramilitary groups led by Carlos Castaño, and called Self Defense Units of Colombia (AUC). As a consequence of this, displacement of civilians in the countryside increases sharply.

In 1998, Conservative Andrés Pastrana is elected president starting a second peace process (terrorist murder decreases from around 4 per capita in 1996 to –3 in 1998), and an ambitious plan to establish a negotiated peace without a cease fire agreement. Pastrana's government gave a demilitarized zone (DMZ) the size of Switzerland to the FARC, and restricted the presence of the army and the police within such zones. Cyclical murder is on the rise again from 1999 to 2000 (e.g., terrorist per capita murder jumps from –6.17 in 1999 to –2.95 in 2000, fig. 1A).

In 2002, independent Liberal Alvaro Uribe is elected president, enacting a strong policy to confront guerrillas and paramilitary, his Democratic Security Policy proves effective at diminishing the intensity of the conflict; the country lowers total and transitory murder per capita (e.g., passing from –4.02 terrorist murder per capita in 2002 to –14.47 in 2004). As the estimated component coincides with the historical political narrative I have called it Cyclical Terrorist Murder, and begin the construction of a model explaining the causal reasons for its movement across time.

Initial model

Political variables

Cyclical terrorist murder might be thought of as a "combined mixture" of politically motivated violence and guerrilla activity. In Colombia, the time-period from 1946 to 1957 (or in Bushnell's, 1993, discussion from 1947 to 1960) is generally referred to as *La Violencia*, a period of intense power clashes between the "liberal" and "conservative" parties, mingled with a brief, over military intervention (1954-1958) and incipient guerrilla activity. But from 1958 to 1978, the two main establishment parties came to a peace of sort and, under the name of National Front, arrived at a power-sharing agreement according to which the presidency would be swapped between the parties every four years, and – within each four-year term – cabinet and other high-ranking political posts would be divided up as well. During those years, political murder fell, even as guerrilla activity continued and intensified. After 1978, the power sharing arrangement broke down. Intense struggles and political dominance reemerged, now intensified by cocaine riches. The latter brought drug cartels into the political struggle as well, as drug-lords sought control over land to grow coca leaves. This, in turn, appears to have drawn owners of large-scale land-holdings into the conflict and various para-military groups emerged to participate in the struggle.[9][10]

[9] . On the role and links between and among police, army, and para-military troops in the Colombian conflict see, e.g., Giraldo (1996).

[10] . The information in this paragraph is uncontroversial. For a history of Colombia see, e.g., Bushnell (1993).

A model explaining cyclical terrorist murder then should contain variables for the *La Violencia* (a time period characterized by intense clashes between traditional political parties) and *National Front* years (the time period where the peasant self-defense movements or communist guerrilla appears). This is done in the simplest and most effective way with the use of dummy variables. Following Brauer & Gómez-Sorzano (2004B), I code *La Violencia* equal to 1 for 1947 to 1960, and call the variable "B" (for *Bogotazo*, which refers to the violent, murderous rioting in Bogotá and the whole country on April 9 1948). The National Front years ("CL" – conservative/liberal) are coded equal to 1 to 1958 to 1978.

It is not clear how to best represent the post-1978 years. Whereas I do have numbers on the strength of the police and armed (i.e., military) forces, I am not in possession of such numbers for para-military, guerrillas, and drug-gangs.[11] It might be argued, however, that the police and military personnel numbers reflect information about the strength and intensity of the various opposing forces so that, from a modeling perspective, the police and military forces can stand as a proxy for all armed groups in the country.

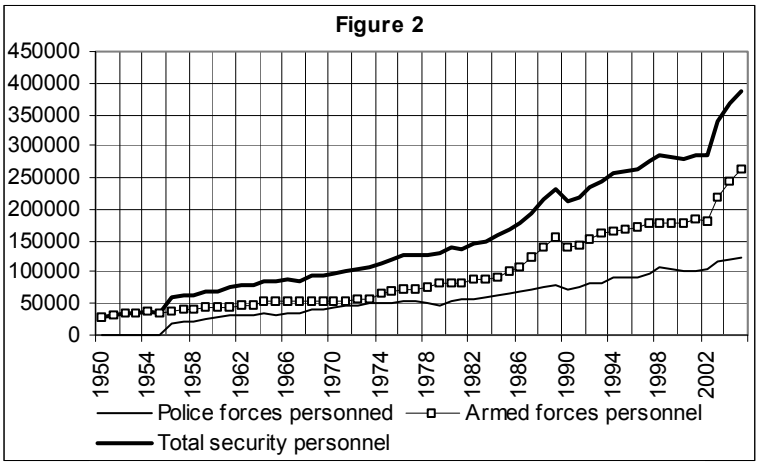
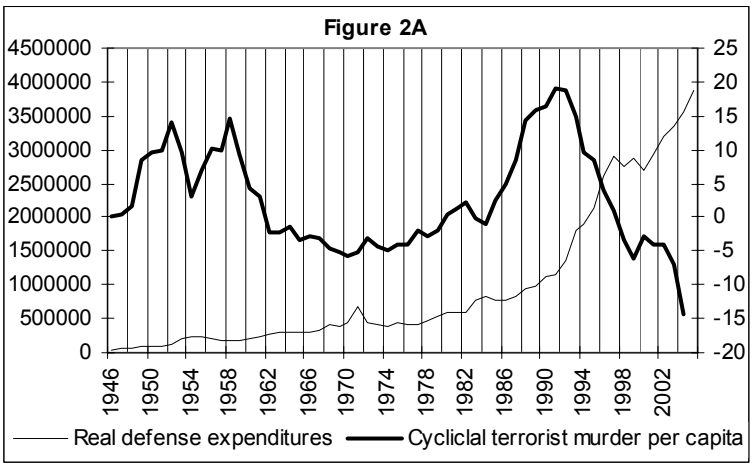


Figure 2 does show a constant level of armed forces during the National Front years, 1958 to 1978 and an ascending one for police forces. Thereafter, I note a drastic force increase, lasting, especially from 1983 to 1989. The 1983-1989 time-period saw heightened, often spectacular, guerrilla activity. This is also the time when cocaine became so profitable as to spur competition for control over land and corresponding political influence. This mingling of old and new economic interests and political control, in which established political parties, the police and military, the drug-lords, and landowners and para-military participated, lasted, roughly, from 1978 to 1989 with a minor stop in the pace of violence from 1990 to 1991, when respectively the M-19 guerrilla movement agreed to a cease-fire in order to create the political party Democratic Alliance M-19 and when Colombia adopted a new Constitution. The post-1991 period was politically calm but shows a growing level of security forces because of the continued conflict among the drug cartels and later on during president Pastrana's government (1998-2002),

[11] . Following reports in The Wall Street Journal and The Economist, numbers for 2002 run about 22,000 members for FARC and ELN, the two largest rebel groups, perhaps 10,000 to 12,000 para-military troops, and another 5,000 or so drug-related troops. The Colombian armed forces weigh in about 150,000 (including 50,000 salaried, professional troops) and the police force at 100,000.

between the paramilitaries and drug traffickers[12]. Bushnell (1993) is explicit in referring to the post-1991 era as the "end of war" period (and I will return to this point).

But to characterize cyclical terrorist murder, it is not clear that both police and military force data should be included. Examining figure 2 more closely, it does appear as if police and armed forces strength respond to different underlying motivations. In particular, note that during the National Front years, the armed force variables remains relatively stable, picking up in 1979 (7.6%) a year later after the National Front consensus broke apart, and increases drastically during the 1980s. The police force variable moves quite differently, decreasing in 1979 (-4.8%)[13]. Since both variables respond to different motives, a priori, the movement of the total security personnel (police + army = Taf1) is more closely associated with the historical cyclical terrorist homicide observed in Colombia during 1950 –2003, and it is this variable therefore what I will use in my model. It also has the advantage of reaching back to 1950, giving me additional degrees of freedom. In fact, the sharp rise in this variable in the early fifties is entirely consistent with the initial *La Violencia* years, increasing under the military General Rojas Pinilla (1954-1957). A different way to characterize the post-1978 period might be with the further use of dummy variables such as "all-out-war" (1979-1991) and "end-of-war" (post-1991) but the use of a continuous, relevant variable such as Taf1 that stretches across almost the entire time-period (1950-2002) is statistically preferred. Finally figure 2A presents the historical relationship between real defense expenditures and cyclical terrorist murder being notorious the strong inverse relationship between them from 1992 on.



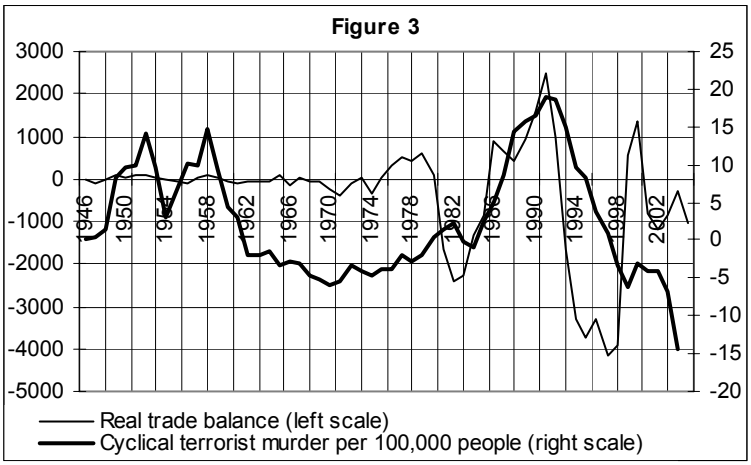
Economic variables

The Colombian literature has noted a seemingly curious link between commodity-export booms and political violence, i.e., between economic well-being and increases in murder. Recent

[12]. E.g., In 1993 Pablo Escobar escapes from prison launching a terrorist campaign as a the debate over extradition is pressed in Colombia by the U.S; also a new group, "Los Pepes," (victims of Pablo Escobar), emerges, connected to the Cali Cartel, Los Pepes carried out acts of terrorism against Escobar's organization and collaborated with the security forces in the search of Escobar up to his death by December this year. (NACLA, Report on the Americas Vol 35, No.1 pp 24-27)

[13]. The different movement of both series would be suggesting that in times of political clashes police forces increase while armed forces diminish; in similar way in times of guerrilla – drug traffickers and paramilitaries activities the armed forces increase while the police forces diminishes.

evidence finds for the seven biggest cities and their MSA's a strong relation between criminality and narco-traffic income (Sánchez, F and J. Núñez, 2000). One hypothesis is that commodity booms increase the pot-of-gold over which it is "worth fighting"[14]. One might therefore speculate and test the hypothesis that, for Colombia, movements in the inflation-adjusted trade balance (Rtb3) is an explanatory variable for cyclically motivated terrorist murder. An inspection of the descriptive graph (in figure 3) is suggestive. There are four four time-periods of pronounced improvements in the balance of trade: 1955-1959; 1971-1975; 1982-1991; and 1994-2001, figure3. Levels of cyclical violence in all of them are strongly directly associated with trade balance improvements and for this reason I am including this variable in my final model.



Social variables

As Jimeno (2001) cites there is a growing line of thought in Colombia that views violence as a non-specific, all-pervasive, non-historical phenomenon – the very essence of evil in Colombian society. This tendency runs parallel to the reasoning of those who view violence as an endemic disease of the Colombian social structure, the product of its social inequalities. General Alvaro Valencia Tovar (1997) considers violence as a continuous chain of violences, possibly having remote origin in the acts of the Spanish conquest, during those times inequality was essentially the product of clashes between the Spaniards invaders and the native rebellious Comuneros captains. I therefore include in this updated model a historical social inequality variable using as a proxy for it "education" measured by the number of students matriculated in all modalities in Colombia[15].

[14]. We know from the African experience that natural-resource riches may exert powerful effects to attract contestants (see Sambanis, 2002, for a literature review on this and other aspects of the economics of civil wars).

[15] . The National Demography and Health Care Survey (Profamilia, 1995) examined domestic violence in relation to the level of schooling and the number of children, both for spouse and child abuse, and found that the lower the level of education and the greater the number of children in the family, the greater the likelihood of domestic violence. (See Violence and Social Life in Colombia in Critique of Anthropology Vol. 21, No. 3 (2001) pp. 221-246)

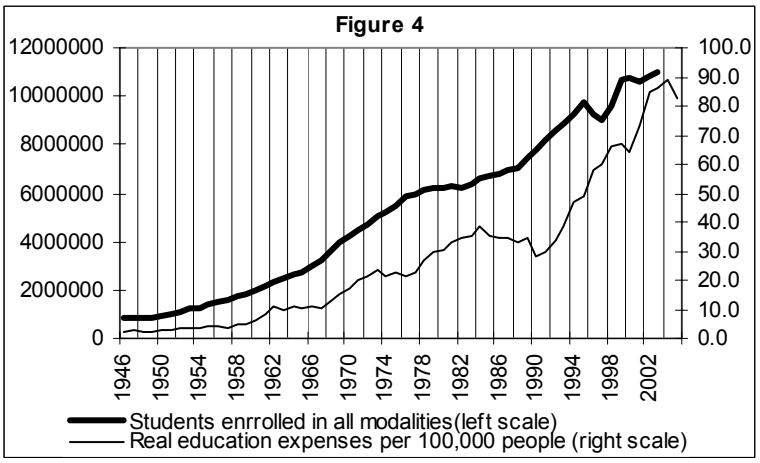


Figure 4 presents the historical movement of selected indicators for education in Colombia: students enrolled in all modalities and education expenses by the Ministry of Education.

Forced Displaced people and the unemployment rate.

The problem of internal displaced people in Colombia is one of the greatest facing the country today[16]. Nowadays, there are more than a million people affected by it and, this number is increasing daily as a consequence of the internal war. In general terms these people lose everything, abandoning their homes and possessions, keeping themselves in permanent danger because of retaliation or the possibility that a new surge of cyclical terrorist murder force them to move again. The Law 387 of 1997 defines *displaced people* as, "any person that has been forced to migrate inside the national territory, abandoning its quality shelter and its permanent economic activities because, his life, physical integrity, security and personal freedom have been wounded, or because they are directly threatened as a consequence of the internal war, disturbances and internal tensions, massive violations of the human rights and transgressions to the international humanitarian law".

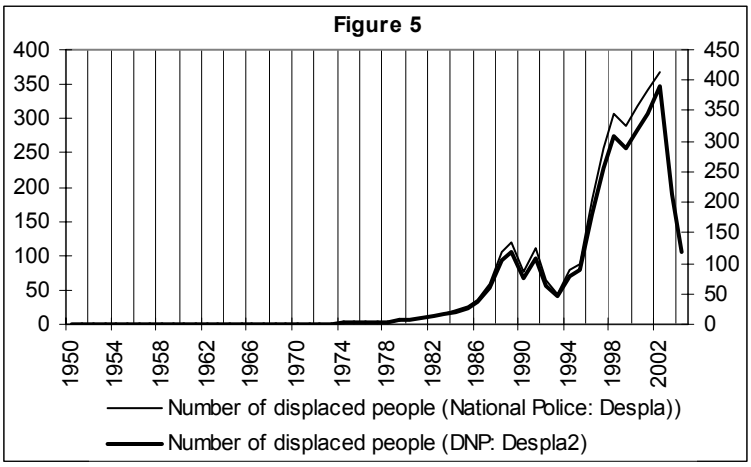
The Colombian Police has identified a total of five main causes generating displaced people: clashes between illegal armed groups disputing the possession of the territory in certain areas of the country. Normally these confrontations occur in strategic drug producing areas of the country or close to the international frontiers between Colombia and the neighboring countries since these borders favor the international drug trafficking; second, selective homicides accompanied by threatens and pressure forcing people to leave, splitting their families; third, massacres in which the delinquents deliberately killed peasants accusing them of being informants to guerrillas groups, to self defense groups or to the army; fourth, fumigations to coca crops affecting also basic plantations for human consumption and, fifth, the breaking of peace talks between the government or the guerrillas and para-military organizations (figure 5, shows the two statistical sources of data for displaced people: The Colombian National Police (1985-2001) and The National Planning Department, DNP (1985-2004). Both sources are reliable for 1985 on. However for running the model across the entire sample a reconstruction for these data is necessary and was done in the following way: from 1984 to 1962 the data for the police was backcasted using the average rate of 24.2% between 1985 and 2001 while the DNP data was

[16] . Revista Criminalidad, Policía Nacional de Colombia, 2002.

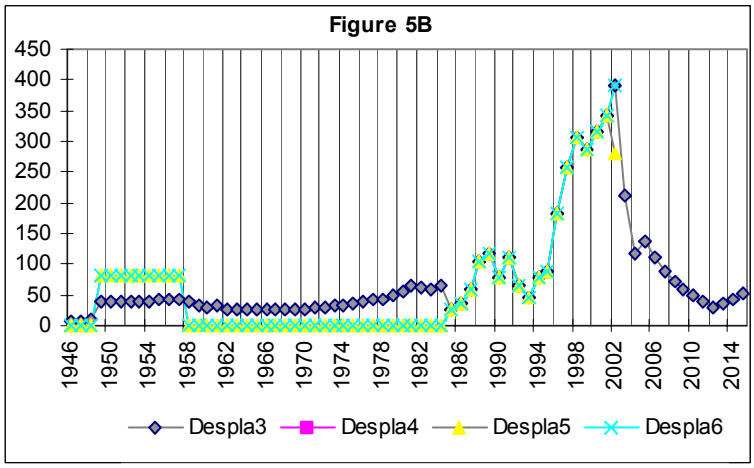
backcasted using its average rate of 19.8% between 1985 and 2004. The backcasting method turned both series in ceros from 1962 to 1946).[17] [18]

[17] The two sources are nearly identical. At the time of writing this analysis I was in possession of data for The DNP up to 2004 but for the National Police just up to 2002. The data for The DNP shows a strong deceleration in displaced people by 212,000 and 117,000 respectively for 2003 and 2004 a fact that affects the behavior of the forecasted component of terrorist murder jumps for 2004 creating a new cycle in terrorist murder.

[18] One reader suggested that an alternative reconstruction for displaced people should be done using the narrative by Colombian historians, I present these calculations now: A) Reconstructing displaced people Source the Colombian National Police – despla3 (original) or despla5 (expressed in thousands) (1985-2001). The reliable data for displaced people for the National Police starts in 1985 going up to year 2001. I reconstructed the missing data from 1946 to 1986 using the narrative by historians. Bergquist, 1992, p.105 mentions that in Tolima for example from 1949 to 1957 (a period of 9 years), 361,800 persons emigrated and, that these figure were greater in the state of Valle del Cauca. Using these data for Tolima results in an average of 40,200 persons per year, and I also use 40,200 per year for Valle del Cauca in spite of Bergquist's warning that these figures could have been bigger for the latter one. Accordingly I filled out the data for displacement from 1949 to 1957, with 80,400 per year, and also realized a correction to the data in the following way: I calculated the standard deviation (110 displaced people) for the annual data reported by the National Police from 1985 to 2001 and used this standard deviation, adding it year by year to the constant value of 80,400 from 1949 to 1957. According to this, the first data, for 1949 starts in 80,400 and the last one for 1957 turns out to be 81,200. Now for filling out the holes from 1946 to 1948 and from 1958 to 1984, I first calculated year by year for the historical data 1985-2001 the proportion between displaced people and the number of homicides, and using these independent proportions, I found an annual average of 0.60% among them. This annual average was used for estimating the number of displaced people for the sub-periods 1946-1948 and 1958-1984. The first data for 1946 is 7 displaced people (obtained as 1,184 homicides times 0.006), for 1947 10 (1,715 homicides times 0.006); and for 1984 is 64 displaced people (10,694 homicides times 0.006).
B) Reconstructing displaced people Source the National Planning Department (DNP), despla4 (original)-despla6 (expressed in thousands), 1985-2004. The reliable observed data for the National Planning Department also starts in 1985 going up to 2004. Same as in the cases of the reconstructed data for the police I use Bergquist, estimates of displacement of people in the State of Tolima: from 1949 to 1957 (a period of 9 years), 361,800 persons emigrated. This results in an average of 40,200 persons per year. I also corrected for the displacement in Valle del Cauca and so I filled out data for displacement for those years 1949 to 1957, with 80,400 per year, and as before I realized a correction to the data in the following way. I calculated the standard deviation for the historical data reported by the DNP from 1985 to 2004 (112 displaced people). Again I used this standard deviation, adding it to the constant value of 40,200 from 1949 to 1957. Accordingly, the first data, for 1949 is 40,200 displaced people and the last one for 1957 turns out to be 41,100. For filling out the holes from 1946 to 1948 and from 1958 to 1984, I calculate again for each year the proportion of displaced people and the number of homicides, being the annual average for that proportion from 1985 to 2001 0.65%. The first data for 1946 turns out to be 7.6 people (obtained as 1,184 homicides times the proportion of 0.65%), for 1948, 11.1 (1,715 homicides times 0.0065). Accordingly for 1984 the number of displaced people is 69.5 (10,694 homicides times 0.0065). In general terms the two reconstructed series are almost identical just differing in 2003 and 2004 where the data for the National Planning Department shows a structural break. Figure 5B shows the reconstructed series in thousands of displaced people. Finally the series from 2005 to 2015 include projections expected by the National Planning Department.



In regard to the consequences of displaced people, the Colombian Police also mentions, family splitting; political, social and cultural ruptures of the population, migration and most importantly the increase in the unemployment rate. It is for this reason that I have included the number of displaced people along with the unemployment rate in the four main cities of the country as predictors for cyclical terrorist violence. The logic is that displaced people coming to the four main cities is the result of innovations in cyclical terrorist murder in the countryside (e.g., I expect a positive correlation between cyclical terrorist murder and forced displaced people); these new migrants to the cities in turn boost the unemployment rate[19] reducing the social pressure and killing in the countryside (e.g., I expect to find a negative relation between unemployment rate and cyclical terrorist murder in the countryside).



[19] The unemployment rate for 2003 is assumed to be 23.2% + 2.1%= 25.4%. The 2.1% is the total growth in informal employment (April to June) from 2002 to 2003.

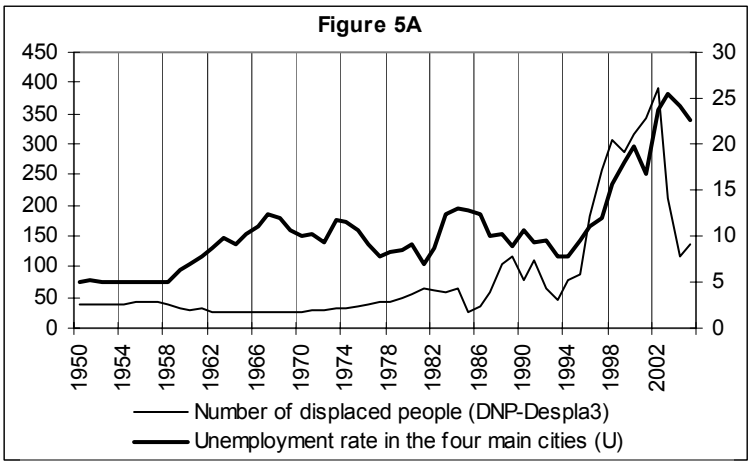


Figure 5A, shows the direct relationship particularly in the 1990's between displaced families for innovations in cyclical terrorist murder in the countryside and its output or consequence, the increase in the unemployment rate [20].

Results and interpretation

My initial model to be tested thus is (with expected signs preceding the variables):

$$(1)\ Cvpc1_t = F\left(+B_t,\ -CL_t,\ +Rtb3_t, +Taf1_t, -U_t, -Students_t,\ -Despla_t,\ -Rcpr_t, -Rgaso_t, -Rde_t\right)$$

Where

Cvpc1	estimated cyclical terrorist murder per capita
B	years of *La Violencia* (1947-1960, following Bushnell's dating)
CL	years of *National Front* (1958-1978)
CL1	years of National Front (1958-1978) and (1994 to 2006)[21]
Rtb3	real trade balance (also Rtb6)
Taf1	total number of armed forces (police + army), also Taf11
U	Unemployment rate (four main cities)
Students	number of students matriculated in all modalities, also students1
Despla	number of displaced persons (source National Police)
Despla3	number of displaced persons – reconstructed series according to Bergquist (source National Police).
Despla2	number of displaced persons (source DNP)
Despla5	number of displaced persons – reconstructed series (source Nat.Police)

[20] . The theoretical reasons for this relationship are explained in Revista Criminalidad, Policía Nacional de Colombia #45, 2002 pp 86-91. It contains a description of the phenomenon of displaced people, generalities, legal background, causes generating displaced people, consequences of having these people displaced, and forms of displacement.

[21] As a curious remark Colombia has had alternation in power again from 1994 to 2006 (e.g., from 1994 to 1998 Liberal Samper was in power, from 1998 to 2002, Conservative Pastrana, and liberal independent Uribe Vélez from 2002-2006)

Despla6	number of displaced persons – reconstructed series (source DNP)
Rcpr	real private consumption
Rgaso	real social (health and education) consumption
Rde	real defense expenditures

The monetary variable real trade balance is measured in millions of pesos. Since the data for the total armed forces is available only as from 1950, the model is run for 1950-2003. To gauge the pronounced kink in the cyclical violence data in 1991 (figure 3), the model is also run for 1950-1991. The initial results are displayed in table 1.

Table 1: Initial estimation results

Sample 1950-1991

```
Dependent Variable CVPC1 - Estimation by Least Squares
Annual Data From 1950:01 To 1991:01
Usable Observations     42      Degrees of Freedom    35
Centered R**2     0.913650      R Bar **2   0.898847
Uncentered R**2   0.926082      T x R**2      38.895
Mean of Dependent Variable      2.8691295124
Std Error of Dependent Variable 7.0809861593
Standard Error of Estimate      2.2520713865
Sum of Squared Residuals        177.51389355
Durbin-Watson Statistic             2.021577
Q(10-0)                            17.038312
Significance Level of Q           0.07352052

   Variable                     Coeff       Std Error      T-Stat     Signif
*******************************************************************************
1.  B                         9.518219327  0.873436780     10.89743  0.00000000
2.  CL                       -2.404694579  1.029955318     -2.33476  0.02541897
3.  RTB3                      0.000001183  0.000000549      2.15560  0.03807277
4.  TAF1                      0.000120681  0.000043593      2.76835  0.00894684
5.  U                        -0.583704357  0.208340439     -2.80169  0.00822727
6.  STUDENTS                 -0.000001688  0.000000760     -2.21965  0.03301725
7.  DESPLA2                   0.050556773  0.041331224      1.22321  0.22942249
```

Table 2, sample 1950-2003 (displaced people by National Police)

```
Dependent Variable CVPC1 - Estimation by Least Squares
Annual Data From 1950:01 To 2003:01
Usable Observations     54      Degrees of Freedom    45
Centered R**2     0.875797      R Bar **2   0.853716
Uncentered R**2   0.890944      T x R**2      48.111
Mean of Dependent Variable      2.7072675635
Std Error of Dependent Variable 7.3325216958
Standard Error of Estimate      2.8044739251
Sum of Squared Residuals        353.92832985
Durbin-Watson Statistic             1.625010
Q(13-0)                            14.195791
Significance Level of Q           0.36020136

   Variable                     Coeff       Std Error      T-Stat     Signif
*******************************************************************************
1.  B                         8.708807769  1.077253540      8.08427  0.00000000
2.  CL                       -4.085731125  1.116121463     -3.66065  0.00065849
3.  RTB3                      0.000001296  0.000000411      3.15341  0.00287249
4.  TAF1                      0.000233191  0.000035675      6.53647  0.00000005
5.  U                        -0.824787464  0.167616679     -4.92068  0.00001197
6.  STUDENTS                 -0.000002548  0.000000953     -2.67382  0.01041326
7.  DESPLA                   -0.042670341  0.010001407     -4.26643  0.00010081
8.  RGASO                    -0.000000489  0.000001427     -0.34259  0.73350091
9.  RCPR                     -0.000000226  0.000000356     -0.63463  0.52888271
```

Table 3, sample 1950-2003

```
Dependent Variable CVPC1 - Estimation by Least Squares
```

```
Annual Data From 1950:01 To 2003:01
Usable Observations     54      Degrees of Freedom    47
Centered R**2     0.872746      R Bar **2   0.856501
Uncentered R**2   0.888265      T x R**2      47.966
Mean of Dependent Variable      2.7072675635
Std Error of Dependent Variable 7.3325216958
Standard Error of Estimate      2.7776518348
Sum of Squared Residuals        362.62143663
Durbin-Watson Statistic             1.508770
Q(13-0)                            17.403768
Significance Level of Q           0.18149732
```

	Variable	Coeff	Std Error	T-Stat	Signif
1.	B	8.492089142	1.010716121	8.40205	0.00000000
2.	CL	-3.772061414	1.048389163	-3.59796	0.00076847
3.	RTB3	0.000001582	0.000000254	6.22425	0.00000012
4.	TAF1	0.000219402	0.000024148	9.08583	0.00000000
5.	U	-0.795858090	0.160044493	-4.97273	0.00000922
6.	STUDENTS	-0.000003222	0.000000653	-4.93478	0.00001048
7.	DESPLA	-0.048444008	0.006148901	-7.87848	0.00000000

Table 3A, sample 1950-2003 – **model selected, regression ran up to 2003**[22]

```
Dependent Variable CVPC1 - Estimation by Least Squares
Annual Data From 1950:01 To 2003:01
Usable Observations     54      Degrees of Freedom    47
Centered R**2     0.838935      R Bar **2   0.818374
Uncentered R**2   0.858577      T x R**2      46.363
Mean of Dependent Variable      2.7072675635
Std Error of Dependent Variable 7.3325216958
Standard Error of Estimate      3.1249477899
Sum of Squared Residuals        458.96903840
Durbin-Watson Statistic             1.989708
Q(13-0)                             7.218919
Significance Level of Q           0.89051992

   Variable                     Coeff       Std Error      T-Stat     Signif
*******************************************************************************
1.  B                        9.765180183  1.087890247      8.97625  0.00000000
```

[22] Using the reconstructed series for displacement by the police (despla5):

TABLE 3B

```
Dependent Variable CVPC1 - Estimation by Least Squares
Annual Data From 1950:01 To 2003:01
Usable Observations     54      Degrees of Freedom    47
Centered R**2     0.790852      R Bar **2   0.764152
Uncentered R**2   0.816358      T x R**2      44.083
Mean of Dependent Variable      2.7072675635
Std Error of Dependent Variable 7.3325216958
Standard Error of Estimate      3.5609792607
Sum of Squared Residuals        595.98694486
Durbin-Watson Statistic             1.440625
Q(13-0)                            24.293635
Significance Level of Q           0.02853404

   Variable                     Coeff       Std Error      T-Stat     Signif
*******************************************************************************
1.  B                        12.78876771   1.22869529     10.40841  0.00000000
2.  CL                       -1.16178383   1.19999350     -0.96816  0.33792112
3.  RTB3                      0.00000163   0.00000033      4.98495  0.00000885
4.  TAF1                      0.00015492   0.00002764      5.60527  0.00000106
5.  U                        -1.33734423   0.17775969     -7.52333  0.00000000
6.  STUDENTS                 -0.00000109   0.00000073     -1.49651  0.14120758
7.  DESPLA5                  -0.03386834   0.00769682     -4.40031  0.00006176
```

Using the reconstructed data for displacement by the DNP (despla6):

TABLE 3C

```
Dependent Variable CVPC1 - Estimation by Least Squares
Annual Data From 1950:01 To 2003:01
Usable Observations     54      Degrees of Freedom    47
Centered R**2     0.823727      R Bar **2   0.801224
Uncentered R**2   0.845224      T x R**2      45.642
Mean of Dependent Variable      2.7072675635
Std Error of Dependent Variable 7.3325216958
Standard Error of Estimate      3.2691542195
Sum of Squared Residuals        502.30635760
Durbin-Watson Statistic             1.782232
Q(13-0)                            12.492058
Significance Level of Q           0.48776568

   Variable                     Coeff       Std Error      T-Stat     Signif
*******************************************************************************
1.  B                        12.42452349   1.10899028     11.20346  0.00000000
2.  CL                       -2.78729201   1.21312125     -2.29762  0.02608156
3.  RTB3                      0.00000163   0.00000030      5.44058  0.00000187
4.  TAF1                      0.00017409   0.00002611      6.66662  0.00000003
5.  U                        -1.08202479   0.17390734     -6.22185  0.00000012
6.  STUDENTS                 -0.00000177   0.00000069     -2.55930  0.01376651
7.  DESPLA6                  -0.04281975   0.00760055     -5.63377  0.00000096
```

2.	CL	-2.363455035	1.100562595	-2.14750	0.03694180
3.	RTB3	0.000001683	0.000000288	5.84823	0.00000046
4.	TAF1	0.000182686	0.000025277	7.22724	0.00000000
5.	U	-1.123354004	0.162769316	-6.90151	0.00000001
6.	STUDENTS	-0.000001886	0.000000664	-2.84026	0.00664221
7.	DESPLA2	-0.045921655	0.007336981	-6.25893	0.00000011

Table 4, Sample 1950-2003 (including defense expenses as predictor)

```
Dependent Variable CVPC1 - Estimation by Least Squares
Annual Data From 1950:01 To 2003:01
Usable Observations     54      Degrees of Freedom    46
Centered R**2     0.855202      R Bar **2   0.833168
Uncentered R**2   0.872861      T x R**2      47.134
Mean of Dependent Variable      2.7072675635
Std Error of Dependent Variable 7.3325216958
Standard Error of Estimate      2.9949770922
Sum of Squared Residuals        412.61483801
Durbin-Watson Statistic             1.821001
Q(13-0)                             9.758026
Significance Level of Q           0.71359160
```

	Variable	Coeff	Std Error	T-Stat	Signif
1.	B	9.429356403	1.053056835	8.95427	0.00000000
2.	CL	-2.856634849	1.076868344	-2.65272	0.01092153
3.	RTB3	0.000001140	0.000000365	3.12343	0.00308997
4.	TAF1	0.000209722	0.000026988	7.77097	0.00000000
5.	U	-1.055763079	0.158807738	-6.64806	0.00000003
6.	STUDENTS	-0.000002120	0.000000645	-3.28899	0.00193297
7.	DESPLA2	-0.018033707	0.014140180	-1.27535	0.20858816
8.	RDE	-0.000005297	0.000002330	-2.27327	0.02772531

Table 5, Model selected when the regression is ran from 1950 to 2004. [23]

```
Dependent Variable CVPC1A - Estimation by Least Squares
Annual Data From 1950:01 To 2004:01
Usable Observations     55      Degrees of Freedom    48
Centered R**2     0.837609      R Bar **2   0.817310
Uncentered R**2   0.861084      T x R**2      47.360
Mean of Dependent Variable      3.0649597001
Std Error of Dependent Variable 7.5245963055
Standard Error of Estimate      3.2161849023
Sum of Squared Residuals        496.50457562
Durbin-Watson Statistic             1.983628
Q(13-0)                             7.979113
Significance Level of Q           0.84495834
```

	Variable	Coeff	Std Error	T-Stat	Signif
1.	B	10.68663861	1.05964631	10.08510	0.00000000
2.	CL1	-3.14541243	1.01074100	-3.11199	0.00312714
3.	RTB6	0.00138709	0.00036688	3.78079	0.00043272
4.	TAF11	0.00017640	0.00002193	8.04323	0.00000000
5.	U	-0.91325021	0.15507595	-5.88905	0.00000037
6.	STUDENTS1	-0.00000192	0.00000058	-3.29327	0.00186406
7.	DESPLA3	-0.03785128	0.00699415	-5.41185	0.00000196

I first discuss the estimates for the shorter period, 1950-1991 (table 1). All coefficient estimates conform to my prior expectations. The *La violencia* dummy is positive and statistically significant; the National Front dummy is negative and statistically significant, proving the reason to regard the inherited partisan rivalry of Liberals and Conservatives as the second most

[23] The parameters of this model are used to prepare scenarios 2006-2010 and 2006-2019

important single cause of cyclical terrorist murder[24]. As to the monetary variables, the trade balance effect is positive, as predicted, and is also statistically significant. The total number of armed forces variable is statistically significant and carries as, expected, a positive sign. The unemployment variable shows the expected negative sign indicating the trade-off between the deceleration in cyclical terrorist violence in the countryside and the increase in unemployment in the four main cities. The number of students matriculated carries the expected sign being statistically significant; however in this first run the variables displaced people by the National Police and DNP were not significant (table 1). So I increased the sample up to 2003 and included in this updated model social and private consumption (table 2); in this case I found a satisfactory model where all variables were carrying the expected signs being statistically significant, excepting social and private consumption [25]. I dropped these two variables and used displaced people by the DNP (despla2 and despla6 which are theoretically more related with cyclical terrorist murder) finding my updated final models in tables 3 and 3C (using despla2 and despla6 respectively) with a large adjusted R^2 (0.83) and an optimal Durbin-Watson statistic (DW=1.98), output from table 3b on the other hand has as R^2, 082 and D.W=1.78. In table 4, I model the inclusion of real defense expenditures (Rde) finding statistical significance over the cyclical terrorist murder but since displaced people turned out not significant I choose model from table 3 as statistically preferred. I increase the sample including year 2004, a year in which Colombia experienced a big drop in terrorist murder of 13% and still table 5, shows that the adjustment of the model is preserved: R^2= 0.83 and an excellent DW index of 1.98.

Preparing the model for forecasting purposes: Predicting the explanatory variables using ARIMA models (the Box-Jenkins approach)

For forecasting the future path of cyclical terrorist violence in Colombia I estimate in this section the political, economic and social explanatory variables feeding up the model for cyclical terrorist murder. All variables are forecasted excepting the years of *La Violencia* and the *National Front*, for which I fill out the spreadsheet containing these dummies with ceros up and ones for National Front to account for the recent historical alternation in power. The methodology used is the Box–Jenkins approach.

Forecasting the Colombian real trade balance. Figure 6, shows the forecasts for the real trade balance up to year 2007, under an ARIMA model (2,1,7)(1,0,0) (table 4).

```
Table 4
Dependent Variable RTB3 - Estimation by Box-Jenkins
Iterations Taken    16
Annual Data From 1950:01 To 2003:01
Usable Observations     54      Degrees of Freedom    47
```

[24] . Note the overlap of the B and CL dummy variables for 1958, 1959, and 1960. For these years, the combined effect on cvp1, relative to the intercept, would be the sum of the coefficients for these two variables (i.e., 8.09 for the 1950-1991 model). To learn what difference the coding might make, we also coded the *La Violencia* years (variable B) to last only until 1957. Although magnitudes change, the signs of all coefficients are unchanged and, in most cases, their statistical significance is unaffected. In any event, our final coding (with the overlap) follows the descriptive literature on Colombia and is the theoretically preferred measure to use.

[25] . Both variables were included in the updated model in levels, since in per-capita terms they were highly collinear.

```
Centered R**2     0.752381      R Bar **2   0.720770
Uncentered R**2   0.767759      T x R**2      41.459
Mean of Dependent Variable       -403783.186
Std Error of Dependent Variable  1583907.961
Standard Error of Estimate        836971.545
Sum of Squared Residuals        3.29245e+013
Durbin-Watson Statistic            1.957655
Q(13-7)                           10.556783
Significance Level of Q            0.10307912

   Variable                     Coeff       Std Error      T-Stat     Signif
********************************************************************************
1.  AR{2}                   -0.797576921  0.105764017     -7.54110  0.00000000
2.  SAR{1}                  -0.877007063  0.075294009    -11.64777  0.00000000
3.  MA{1}                    1.500933349  0.147459354     10.17862  0.00000000
4.  MA{2}                    1.359372540  0.121194931     11.21641  0.00000000
5.  MA{3}                    1.216465606  0.031819566     38.23011  0.00000000
6.  MA{5}                   -0.329322012  0.099725093     -3.30230  0.00183765
7.  MA{7}                   -0.232882992  0.116168961     -2.00469  0.05077565
```

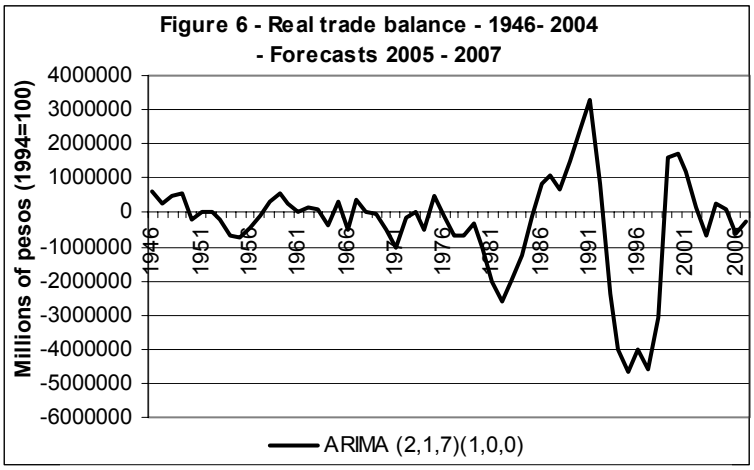
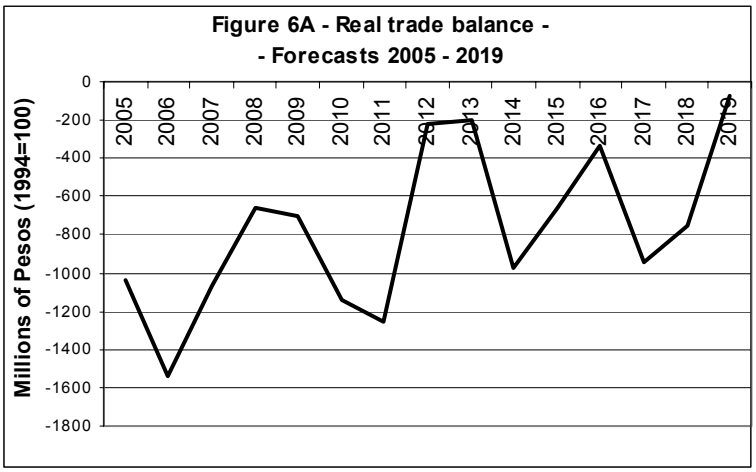


Table 4A, shows the ARIMA selected when increasing the sample up to 2005. This model is used for forecasting real trade balance up to 2019, figure 6A

```
Dependent Variable RTB6 - Estimation by Box-Jenkins
Iterations Taken    17
Annual Data From 1948:01 To 2005:01
Usable Observations     58      Degrees of Freedom    53
Centered R**2     0.859213      R Bar **2   0.848587
Uncentered R**2   0.870483      T x R**2      50.488
Mean of Dependent Variable       -383.032759
Std Error of Dependent Variable  1309.819119
Standard Error of Estimate        509.674154
Sum of Squared Residuals        13767690.376
Durbin-Watson Statistic            1.808283
Q(14-5)                           13.299962
Significance Level of Q            0.14949638

   Variable                     Coeff       Std Error      T-Stat     Signif
********************************************************************************
1.  AR{1}                    0.358340468  0.131218447      2.73087  0.00855846
2.  MA{2}                   -0.650031687  0.054769556    -11.86849  0.00000000
3.  MA{7}                   -0.765818812  0.051489396    -14.87333  0.00000000
4.  MA{13}                   0.717571152  0.080505810      8.91328  0.00000000
5.  MA{18}                  -0.651758756  0.168114968     -3.87686  0.00029369
```



Forecasting total armed forces. Figure 7, shows the results under the Arima model presented on table 4A.

Table 4A
Dependent Variable LTAF1 - Estimation by Box-Jenkins
Iterations Taken 1545
Annual Data From 1953:01 To 2004:01

Usable Observations	52	Degrees of Freedom	47
Centered R**2	0.988803	R Bar **2	0.987850
Uncentered R**2	0.999972	T x R**2	51.999
Mean of Dependent Variable		11.799500945	
Std Error of Dependent Variable		0.600411435	
Standard Error of Estimate		0.066182354	
Sum of Squared Residuals		0.2058648863	
Durbin-Watson Statistic		1.919202	
Q(13-4)		1.944901	
Significance Level of Q		0.99230922	

	Variable	Coeff	Std Error	T-Stat	Signif
1.	CONSTANT	0.046611394	0.008519859	5.47091	0.00000168
2.	AR{1}	-1.641962166	0.109495209	-14.99574	0.00000000
3.	AR{2}	-0.736215077	0.129800149	-5.67191	0.00000084
4.	MA{1}	1.765771928	0.242887890	7.26991	0.00000000
5.	MA{2}	0.645028650	0.268667227	2.40085	0.02036755

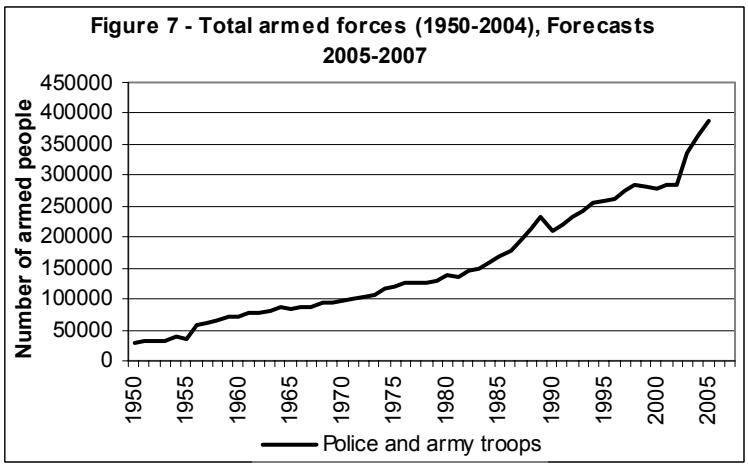
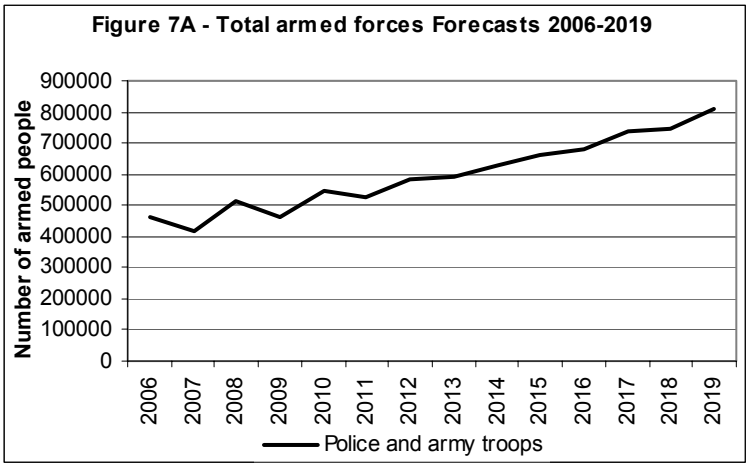


Table 4B, presents the ARIMA used for forecasting armed forces up to year 2019, figure 7A presents the forecasts

```
Dependent Variable LTAF11 - Estimation by Box-Jenkins
Iterations Taken  1310
Annual Data From 1953:01 To 2005:01
Usable Observations     53      Degrees of Freedom    48
Centered R**2     0.989353      R Bar **2   0.988465
Uncentered R**2   0.999972      T x R**2      52.999
Mean of Dependent Variable      11.819621942
Std Error of Dependent Variable  0.612387627
Standard Error of Estimate       0.065770219
Sum of Squared Residuals        0.2076346409
Durbin-Watson Statistic             1.836407
Q(13-4)                             2.056694
Significance Level of Q           0.99053897

   Variable                     Coeff       Std Error      T-Stat     Signif
*******************************************************************************
1.  CONSTANT                 0.047250718  0.008545293      5.52944  0.00000130
2.  AR{1}                   -1.646048658  0.111690064    -14.73765  0.00000000
3.  AR{2}                   -0.737838643  0.129657254     -5.69069  0.00000074
4.  MA{1}                    1.775558779  0.245555420      7.23079  0.00000000
5.  MA{2}                    0.664951609  0.262472553      2.53341  0.01461652
```



Forecasting the unemployment rate in the four main cities (figure 8). The model is an ARIMA(0,1,9)(1,0,0) (table 5).

```
Table 5
Dependent Variable LU - Estimation by Box-Jenkins
Iterations Taken    18
Annual Data From 1952:01 To 2003:01
Usable Observations     52      Degrees of Freedom    48
Centered R**2     0.903804      R Bar **2   0.897792
Uncentered R**2   0.997462      T x R**2      51.868
Mean of Dependent Variable      2.2670248604
Std Error of Dependent Variable 0.3768675236
Standard Error of Estimate      0.1204844476
Sum of Squared Residuals        0.6967921014
Durbin-Watson Statistic             2.028686
Q(13-4)                            11.827401
Significance Level of Q           0.22321545

   Variable                     Coeff       Std Error      T-Stat     Signif
*******************************************************************************
1.  SAR{1}                  -0.310904112  0.142637702     -2.17968  0.03421869
2.  MA{1}                    0.748104787  0.058365759     12.81753  0.00000000
3.  MA{7}                   -0.292017925  0.080740666     -3.61674  0.00071479
4.  MA{9}                   -0.376569751  0.144867768     -2.59940  0.01237084
```

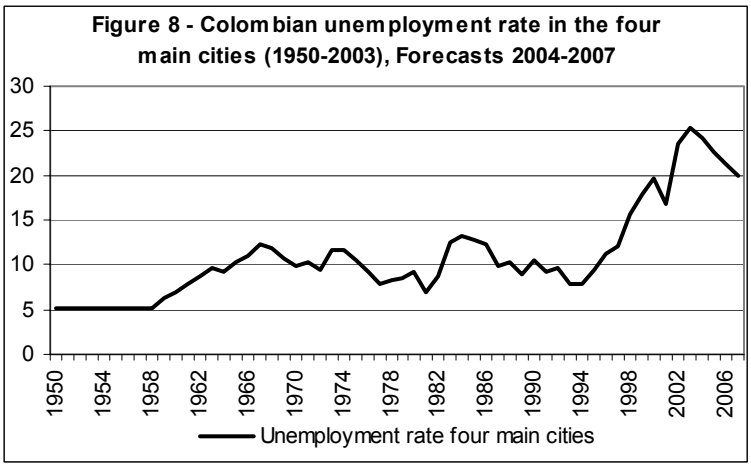
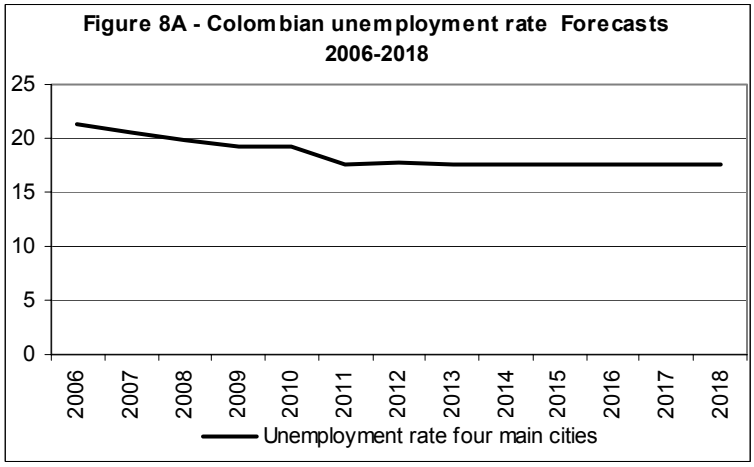


Table 8A, shows the ARIMA used for forecasting the unemployment rate up to year 2019

Table 8A.
Dependent Variable LU - Estimation by Box-Jenkins
Iterations Taken 17
Annual Data From 1952:01 To 2004:01

Usable Observations	53	Degrees of Freedom	49
Centered R**2	0.913685	R Bar **2	0.908401
Uncentered R**2	0.997552	T x R**2	52.870
Mean of Dependent Variable		2.2843706674	
Std Error of Dependent Variable		0.3940105114	
Standard Error of Estimate		0.1192487066	
Sum of Squared Residuals		0.6967924474	
Durbin-Watson Statistic		2.033907	
Q(13-4)		11.531740	
Significance Level of Q		0.24101239	

Variable	Coeff	Std Error	T-Stat	Signif
1. SAR{1}	-0.310829649	0.140529427	-2.21185	0.03167116
2. MA{1}	0.748063258	0.057229317	13.07133	0.00000000
3. MA{7}	-0.292076169	0.079148004	-3.69025	0.00056228
4. MA{9}	-0.376531977	0.143171902	-2.62993	0.01137999



Forecasting the number of students matriculated in all modalities (figure 9). This variable uses ARIMA (2,1,3) (table 6).

```
Table 6
Dependent Variable LSTUDENTS - Estimation by Box-Jenkins
Iterations Taken    42
Annual Data From 1949:01 To 2003:01
Usable Observations     55      Degrees of Freedom    50
Centered R**2     0.998309      R Bar **2   0.998173
Uncentered R**2   0.999996      T x R**2      55.000
Mean of Dependent Variable      15.270153380
Std Error of Dependent Variable  0.759810012
Standard Error of Estimate       0.032472880
Sum of Squared Residuals        0.0527243966
Durbin-Watson Statistic             2.082584
Q(13-4)                             5.200826
Significance Level of Q           0.81646201

   Variable                     Coeff       Std Error      T-Stat     Signif
********************************************************************************
1.  CONSTANT                0.050074729  0.010545873      4.74828  0.00001762
2.  AR{1}                   1.436176713  0.235353698      6.10221  0.00000015
3.  AR{2}                  -0.581446519  0.214029861     -2.71666  0.00903370
4.  MA{1}                  -1.067513236  0.151509866     -7.04583  0.00000001
5.  MA{3}                   0.422527497  0.128991854      3.27561  0.00191914
```

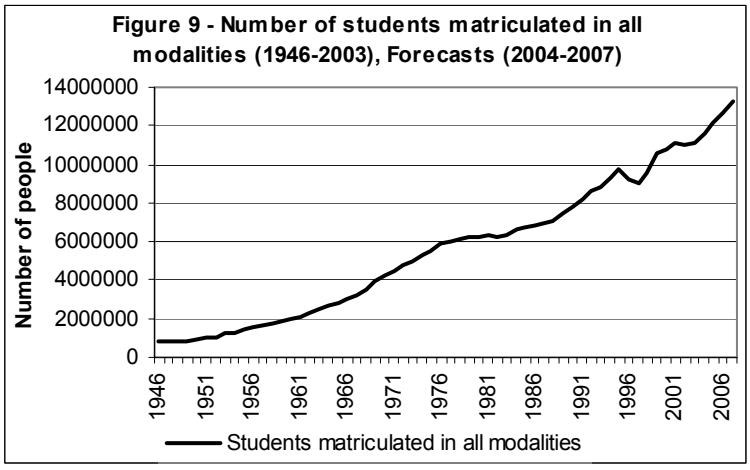
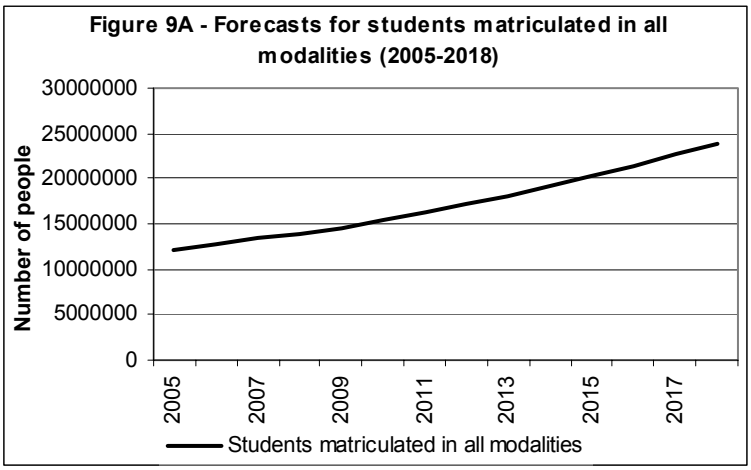


Table 6A shows the ARIMA model used for forecasting students up to year 2019

```
Dependent Variable LSTUDENTS1 - Estimation by Box-Jenkins
Iterations Taken    28
Annual Data From 1949:01 To 2003:01
Usable Observations     55      Degrees of Freedom    50
Centered R**2     0.998384      R Bar **2   0.998255
Uncentered R**2   0.999996      T x R**2      55.000
Mean of Dependent Variable      15.269007765
Std Error of Dependent Variable  0.758374661
Standard Error of Estimate       0.031680782
Sum of Squared Residuals        0.0501835962
Durbin-Watson Statistic             2.085137
Q(13-4)                             9.601845
Significance Level of Q           0.38366838

   Variable                     Coeff       Std Error      T-Stat     Signif
********************************************************************************
1.  CONSTANT                0.053858053  0.008726244      6.17196  0.00000012
2.  AR{1}                   1.440658216  0.131695361     10.93932  0.00000000
3.  AR{2}                  -0.699439719  0.127378440     -5.49104  0.00000134
4.  MA{1}                  -1.054636352  0.048335872    -21.81892  0.00000000
5.  MA{3}                   0.590468444  0.053437945     11.04961  0.00000000
```



Forecasting the number of displaced people (figure 10). This variable by the National Police (despla) is forecasted using an Arima (0,1,5) (table 7), and Arima (0,1,16) for the data for DNP, despla2 (table 7A)[26].

Table 7
Dependent Variable LDESPLA - Estimation by Box-Jenkins
Iterations Taken 14
Annual Data From 1985:01 To 2002:01

Usable Observations	18	Degrees of Freedom	15
Centered R**2	0.872791	R Bar **2	0.855830
Uncentered R**2	0.996462	T x R**2	17.936
Mean of Dependent Variable	4.7714405787		
Std Error of Dependent Variable	0.8304799374		
Standard Error of Estimate	0.3153313742		
Sum of Squared Residuals	1.4915081333		
Durbin-Watson Statistic	2.005360		
Q(4-2)	9.466331		
Significance Level of Q	0.00879858		

	Variable	Coeff	Std Error	T-Stat	Signif
1.	CONSTANT	0.209917473	0.029870890	7.02749	0.00000409
2.	MA{1}	-0.598038938	0.211061519	-2.83348	0.01257974
3.	MA{5}	-1.024276620	0.260933610	-3.92543	0.00134941

Table 7A
Dependent Variable LDESPLA2 - Estimation by Box-Jenkins
Iterations Taken 7
Annual Data From 1985:01 To 2004:01

Usable Observations	20	Degrees of Freedom	18
Centered R**2	0.830215	R Bar **2	0.820782
Uncentered R**2	0.995626	T x R**2	19.913
Mean of Dependent Variable	4.8038341064		
Std Error of Dependent Variable	0.8014362802		
Standard Error of Estimate	0.3392808170		
Sum of Squared Residuals	2.0720065096		
Durbin-Watson Statistic	1.814890		
Q(5-1)	8.155816		
Significance Level of Q	0.08603434		

	Variable	Coeff	Std Error	T-Stat	Signif

[26] The assumption of an exponential growth for displaced people, as shown in the forecasts by the police implies a permanent declining forecasts for cyclical terrorist murder. I will get back to this in the section for forecasts for terrorist murder.

```
*****************************************************************************
1.  CONSTANT                  0.198869634  0.065059119      3.05675  0.00679165
2.  MA{16}                   -2.259230750  1.004338543     -2.24947  0.03723470
```

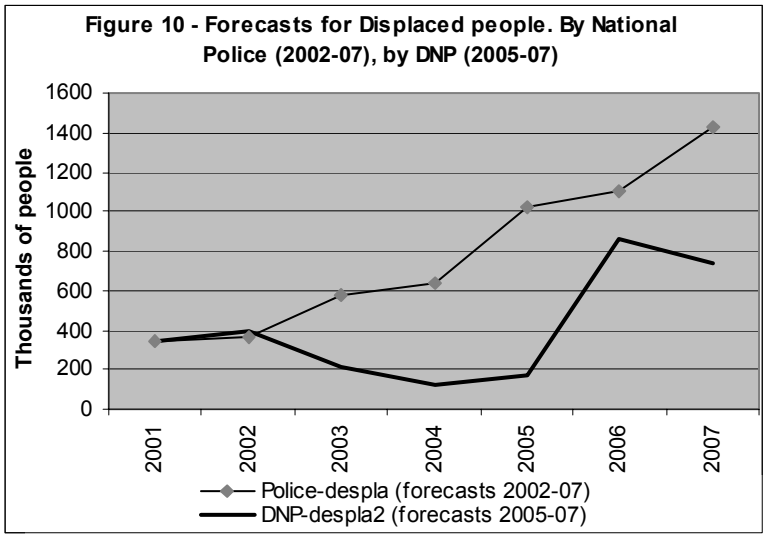


Table 7D, shows the ARIMA model used for forecasting Despla2(DNP) up to year 2019

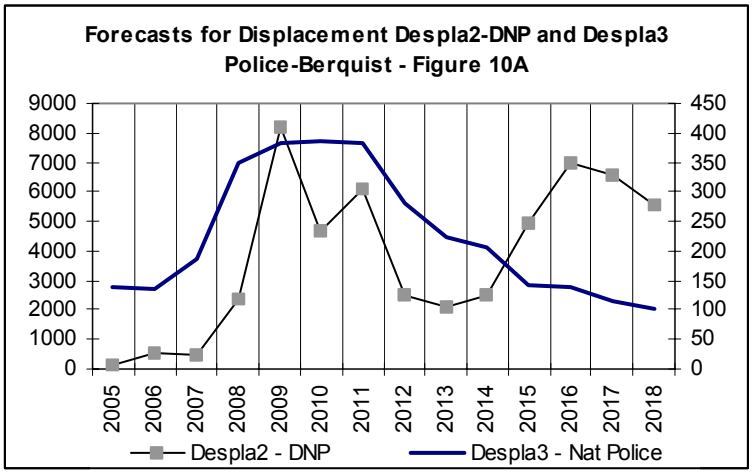
```
Independent Variable LDESPLA2 - Estimation by Box-Jenkins
Iterations Taken     5
Annual Data From 1985:01 To 2005:01
Usable Observations     21      Degrees of Freedom    19
Centered R**2     0.828251      R Bar **2   0.819212
Uncentered R**2   0.995786      T x R**2      20.912
Mean of Dependent Variable      4.8094690686
Std Error of Dependent Variable 0.7815701596
Standard Error of Estimate      0.3323175116
Sum of Squared Residuals        2.0982636424
Durbin-Watson Statistic            1.818337
Q(5-1)                             8.074508
Significance Level of Q           0.08888667

   Variable                     Coeff       Std Error      T-Stat     Signif
*****************************************************************************
1.  CONSTANT                  0.178306829  0.054913122      3.24707  0.00424154
2.  MA{16}                   -2.003875973  0.804253351     -2.49160  0.02212870


Table 7F Displacement police Berquist reconstruction
Dependent Variable LDESPLA3 - Estimation by Box-Jenkins
Iterations Taken    43
Annual Data From 1950:01 To 2005:01
Usable Observations     56      Degrees of Freedom    49
Centered R**2     0.936519      R Bar **2   0.928745
Uncentered R**2   0.997690      T x R**2      55.871
Mean of Dependent Variable      4.0461698283
Std Error of Dependent Variable 0.7934194713
Standard Error of Estimate      0.2117918524
Sum of Squared Residuals        2.1979336493
Durbin-Watson Statistic            2.050278
Q(14-6)                           18.579087
Significance Level of Q           0.01728021

   Variable                     Coeff       Std Error      T-Stat     Signif
*****************************************************************************
1.  CONSTANT                 -0.004451462  0.000719135     -6.19002  0.00000012
```

2.	AR{1}	-0.030080503	0.006105488	-4.92680	0.00000994
3.	MA{1}	0.220521458	0.114454048	1.92672	0.05982372
4.	MA{4}	-1.101093327	0.063787060	-17.26202	0.00000000
5.	MA{5}	-0.428509643	0.147746200	-2.90031	0.00556730
6.	MA{16}	-0.772486996	0.172064557	-4.48952	0.00004341
7.	MA{18}	-0.537400046	0.179983803	-2.98582	0.00440511



Forecasting the number of displaced people, using the reconstructed series for displaced people (figure 11). This variable by the National Police (despla5) is forecasted using Arima (0,1,5) (table 7B); and Arima (0,1,16) for the data for DNP, despla6 (table 7C)

Table 7B

Dependent Variable LDESPLA5 - Estimation by Box-Jenkins
Iterations Taken 20
Annual Data From 1948:01 To 2001:01

Usable Observations	54	Degrees of Freedom	49
Centered R**2	0.889513	R Bar **2	0.880493
Uncentered R**2	0.891177	T x R**2	48.124
Mean of Dependent Variable	0.4932432268		
Std Error of Dependent Variable	4.0256950477		
Standard Error of Estimate	1.3916713590		
Sum of Squared Residuals	94.900709398		
Durbin-Watson Statistic	1.859244		
Q(13-4)	7.586897		
Significance Level of Q	0.57625157		

	Variable	Coeff	Std Error	T-Stat	Signif
1.	CONSTANT	0.211789926	0.042801345	4.94821	0.00000924
2.	MA{1}	0.199485093	0.068648112	2.90591	0.00548323
3.	MA{5}	-0.245460216	0.058638646	-4.18598	0.00011752
4.	MA{7}	-0.274910636	0.074003928	-3.71481	0.00052138
5.	MA{9}	-0.968395000	0.083028274	-11.66344	0.00000000

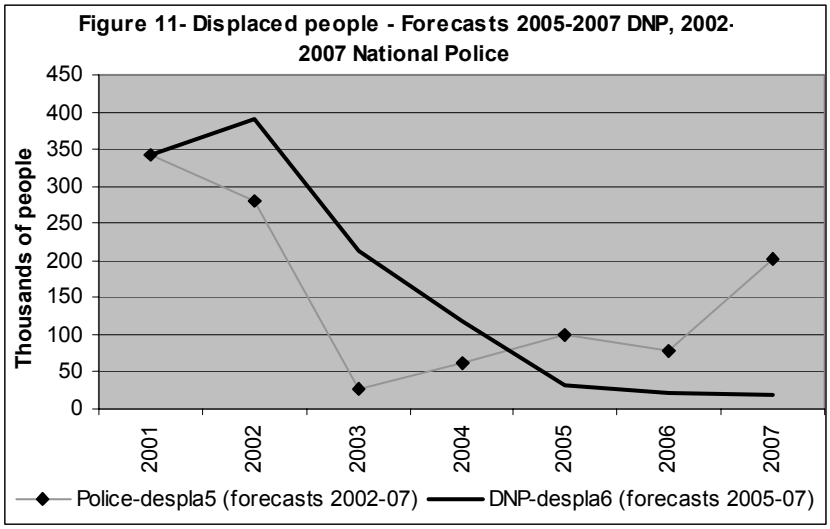
Table 7C

Dependent Variable LDESPLA6 - Estimation by Box-Jenkins
Iterations Taken 22
Annual Data From 1948:01 To 2004:01

Usable Observations	57	Degrees of Freedom	55
Centered R**2	0.874568	R Bar **2	0.872287
Uncentered R**2	0.879287	T x R**2	50.119
Mean of Dependent Variable	0.7894969042		
Std Error of Dependent Variable	4.0285642696		
Standard Error of Estimate	1.4396848648		

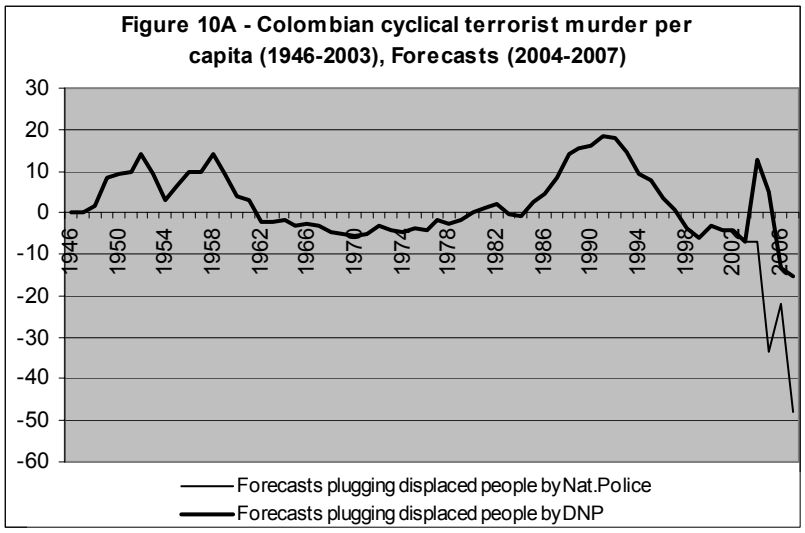
```
Sum of Squared Residuals        113.99808804
Durbin-Watson Statistic            2.058360
Q(14-2)                           10.664724
Significance Level of Q            0.55784919

   Variable                    Coeff       Std Error      T-Stat     Signif
*******************************************************************************
1.  MA{1}                   0.267030319  0.060632737      4.40406  0.00004950
2.  MA{9}                  -0.875984749  0.067253375    -13.02514  0.00000000
```



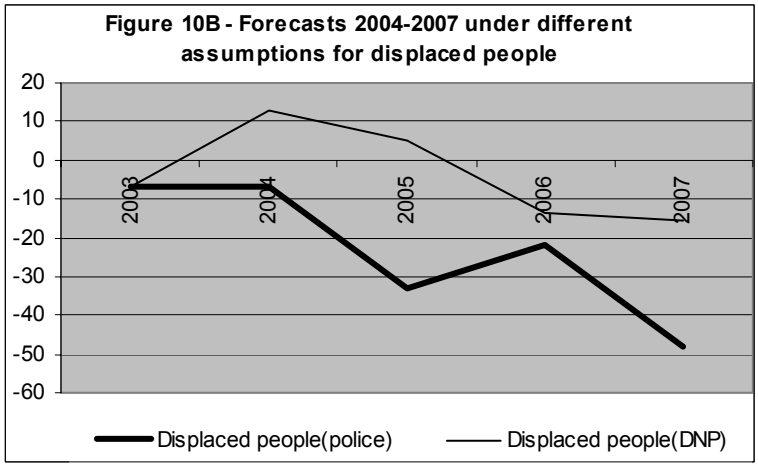
Conditional forecasts for cyclical terrorist murder per capita for 2004 – 2007, using series for displaced people: despla (police) and despla2 (DNP).

In this section I use the Arima forecasts for the predictors to plug them to the estimated coefficients to get the forecasts for cyclical terrorist murder under alternatives forecasted sources for displaced people by the National Police and DNP. Figure 10A presents the dilemma facing Colombian authorities: if it is assumed that displacement of people is not controlled and this tendency continues as shown in figure 10 (Nat.police), this tendency would be destroying the Colombian civil conflict at the cost of leaving and empty countryside. On the other hand, the diminishing tendency in displacement, which is the most probable scenario, is causing a jump in terrorist murder and a new abrupt decline by 2006 and 2007. These assumptions are based on the forecasts shown on figure 10.



Forecasts 2004-2007 for cyclical terrorist murder per capita for Colombia. Table 8

	Displaced people by Nat. police (1)	Displaced people by DNP (2)
2003	-6.9	-6.9
2004	-6.9	12.9
2005	-33.32	5.2
2006	-21.96	-13.3
2007	-48.11	-15.4



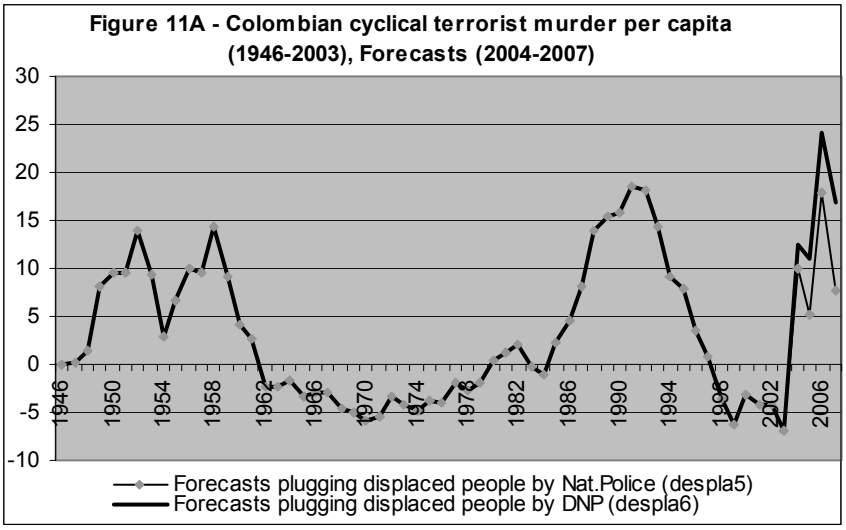
Conditional forecasts for cyclical terrorist murder per capita for 2004 – 2007, using reconstructed series for displaced people: despla5 (police) and despla6 (DNP).

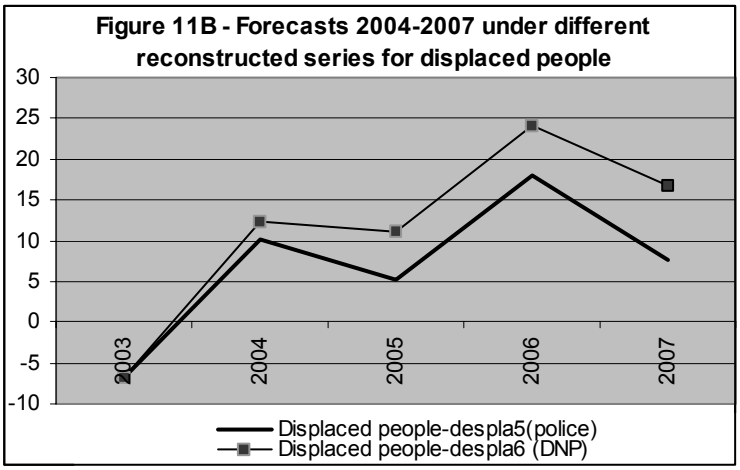
In this section I present the forecasts for terrorist murder using the reconstructed series for displaced people. The forecasts using displacement by the DNP appears as the most probable scenario since the adjustment for the equation using despla6-DNP is optimum (table 3c), when compared with the adjustment using forecasts for displacement by the despla5-police (table 3c).

Accordingly the forecasts using despla6-DNP show several jumps in terrorist murder for 2004 (12.45 murders per 100,000 people) and (10.99 murders per capita) by 2005, figures 11A and 11B. The graph is showing how terrorist murder will begin a new cycle if the decrease in people displaced continues over time. Innovations in terrorist murder by 2006 and 2007 are forecasted by the model (24.22 and 16.87 murders per capita respectively for those years).

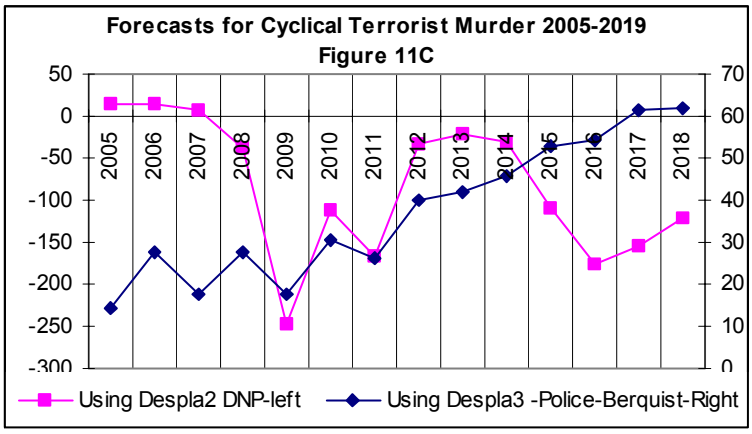
Forecasts 2004-2007 for cyclical terrorist murder per capita for Colombia. Table 8A

	Displaced people by Nat. police - despla5	Displaced people by DNP - despla6
2003	-6.9	-6.9
2004	10.09	12.45
2005	5.13	10.99
2006	17.9	24.22
2007	7.63	16.87





Conditional forecasts for cyclical terrorist murder per capita for 2005 – 2019, using reconstructed series for displaced people: despla2 (police-Berquist reconstruction) and despla3 (DNP).



Theoretical Near Vector auto-regression approach (Near-VAR).

This second part presents a first provisional approach at constructing a theoretical near-VAR for cyclical terrorist murder and social and economic variables. The model uses the theoretical basis of the single equation model for cyclical terrorist murder and so, it is composed by six equations: real trade balance, total armed forces, unemployment rate, students matriculated, displaced people and cyclical terrorist murder per-capita; it assumes three exogenous variables: education expenses, social expenses, public consumption, and real defense expenses. For forecasting purposes and impulse response analysis (appendix A) the system is estimated twice; the first run includes displaced people by the National Police sample 1946-2002 and DNP sample 1946-2003.

Characterization of the series.

I use the augmented Dickey Fuller tests to verify the existence of unit roots. These tests present the structural form shown in equation (2).

$$\Delta Y_t = \alpha + \theta . t + \phi\, Y_{t-1} + \sum_{i=1}^{k} \gamma_i\, \Delta Y_{t-i} + \varepsilon_t \quad (2)$$

In this test, the existence of a unit root, is given by (phi) ϕ=0. I use the methodology by Campbell and Perron (1991), in which an auto-regression process of order k is previously selected in order to capture possible seasonality of the series and, lags are eliminated sequentially if: a) after estimating a regression the last lag does not turn out to be significant or, b) if the residuals pass a white noise test at the 0.05 significance level.

Table 1 Dickey & Fuller test for Unit Roots

Series	K	Alpha	Theta	Phi	Stationary
Real trade balance	8	458,986	-29,306	-1.66	Yes
		(1.40)	(-2.83)	**(-4.33)**	
Total of armed forces	5	-1.22	561	-0.11	
		(-0.03)	(1.75)	(-1.83)	
Unemployment rate	19	9.68	0.17	-1.67	
		(1.04)	(2.14)	(-1.45)	
Students matriculated	13	-131,615	170,630	-0.864	Yes
		(-2.83)	(3.75)	**(-3.64)**	
Displaced people (despla)	14	-18	0.76	-0.68	
(police)		(-1.68)	(2.02)	(-1.98)	
Displaced people (despla2)	14	-17.51	0.75	-0.68	
(DNP)		(-1.53)	(-1.88)	(-1.60)	
Displaced people (despla6)	7	-19.02	0.86	-0.07	
(Reconstructed DNP)		(-1.23)	1.81	(-0.58)	
Cyclical terrorist	4	0.21	-0.004	-0.11	
murder		(0.24)	(-0.16)	(-1.90)	
Real social consumption	14	180,738	-8,066	0.39	
(health & education)		(-0.95)	(-0.90)	(1.88)	
Real education	8	59,734	-2,190	0.32	
expenses		(-0.76)	(-0.55)	(2.82)	
Real defense expenses	11	10,388	-4,059	0.57	
		(-0.12)	(-0.81)	(1.93)	
Real public consumption	11	-20,630	-4,709	0.36	
		(-0.05)	(-0.220	(-1.8)	

Notes: 1. P is the chosen lag length. The t-test are in parentheses and represent the t-test for the null hypothesis that a coefficient is equal to zero. Under the null of non-stationarity, it is necessary to use the Dickey-Fuller critical value that at the 0.05 level for the t-statistic is -3.45.
2. Real trade balance and students matriculated appear to be stationary.

Forecasts for the exogenous variables

Tables 9,10,11 and 12 present the Arima models estimated for forecasting the exogenous variables: real education expenses, real social expenses, real public consumption, and real defense expenses.

Table 9

Dependent Variable LRGASED - Estimation by Box-Jenkins
Iterations Taken 42
Annual Data From 1948:01 To 2003:01

Usable Observations	56	Degrees of Freedom	48
Centered R**2	0.995069	R Bar **2	0.994350
Uncentered R**2	0.999938	T x R**2	55.997
Mean of Dependent Variable	12.913203990		
Std Error of Dependent Variable	1.465978344		
Standard Error of Estimate	0.110194270		
Sum of Squared Residuals	0.5828532993		
Durbin-Watson Statistic	1.877847		
Q(14-7)	6.431237		
Significance Level of Q	0.49039152		

Variable	Coeff	Std Error	T-Stat	Signif
1. CONSTANT	0.057510164	0.023865853	2.40973	0.01984737
2. AR{1}	0.553320367	0.149104608	3.71095	0.00053644
3. MA{1}	-1.001631885	0.101770254	-9.84209	0.00000000
4. MA{2}	0.491921960	0.091834115	5.35664	0.00000237
5. MA{8}	0.458971916	0.074130616	6.19139	0.00000013
6. MA{15}	-0.313966135	0.106786599	-2.94013	0.00503407
7. MA{16}	0.446882620	0.100204468	4.45971	0.00004935
8. MA{18}	0.257852666	0.097543642	2.64346	0.01105201

Table 10

Dependent Variable LRGASO - Estimation by Box-Jenkins
Iterations Taken 52
Annual Data From 1948:01 To 2003:01

Usable Observations	56	Degrees of Freedom	51
Centered R**2	0.994544	R Bar **2	0.994116
Uncentered R**2	0.999938	T x R**2	55.997
Mean of Dependent Variable	13.285819070		
Std Error of Dependent Variable	1.431494261		
Standard Error of Estimate	0.109803485		
Sum of Squared Residuals	0.6148970737		
Durbin-Watson Statistic	1.995390		
Q(14-4)	19.725192		
Significance Level of Q	0.03196171		

Variable	Coeff	Std Error	T-Stat	Signif
1. CONSTANT	0.089299031	0.003716922	24.02499	0.00000000
2. AR{1}	-0.245007576	0.070699766	-3.46547	0.00108238
3. MA{3}	-0.887909979	0.080531357	-11.02564	0.00000000
4. MA{4}	-0.552466949	0.068664873	-8.04585	0.00000000
5. MA{13}	-0.432602904	0.114888925	-3.76540	0.00043146

Table 11

Dependent Variable LRCPUR - Estimation by Box-Jenkins
Iterations Taken 62
Annual Data From 1952:01 To 2003:01

Usable Observations	52	Degrees of Freedom	46
Centered R**2	0.993987	R Bar **2	0.993333
Uncentered R**2	0.999967	T x R**2	51.998
Mean of Dependent Variable	14.788033762		
Std Error of Dependent Variable	1.113711578		
Standard Error of Estimate	0.090935144		
Sum of Squared Residuals	0.3803832159		
Durbin-Watson Statistic	2.029817		
Q(13-5)	25.480445		

```
Significance Level of Q           0.00128824

   Variable                     Coeff       Std Error      T-Stat     Signif
*******************************************************************************
1.  CONSTANT                0.077034165  0.012341082      6.24209  0.00000013
2.  AR{2}                   0.127991996  0.035018735      3.65496  0.00065811
3.  MA{8}                   0.655683072  0.071513177      9.16870  0.00000000
4.  MA{9}                  -0.464264758  0.072166737     -6.43322  0.00000006
5.  MA{13}                 -0.820164640  0.079064406    -10.37337  0.00000000
6.  MA{18}                  0.677193233  0.095715154      7.07509  0.00000001
```

Table 12

```
Dependent Variable LRDE - Estimation by Box-Jenkins
Iterations Taken    30
Annual Data From 1952:01 To 2004:01
Usable Observations     53      Degrees of Freedom    50
Centered R**2     0.982953      R Bar **2   0.982271
Uncentered R**2   0.999916      T x R**2      52.996
Mean of Dependent Variable      13.365171240
Std Error of Dependent Variable  0.949101815
Standard Error of Estimate       0.126373600
Sum of Squared Residuals         0.7985143427
Durbin-Watson Statistic              1.800367
Q(13-2)                              9.439564
Significance Level of Q           0.58138732

   Variable                     Coeff       Std Error      T-Stat     Signif
*******************************************************************************
1.  CONSTANT                0.076900597  0.006620138     11.61616  0.00000000
2.  AR{2}                   0.620311245  0.059017333     10.51066  0.00000000
3.  MA{2}                  -1.141359884  0.033501297    -34.06913  0.00000000
```

Estimates for the structural near-VAR model, using displaced people (despla2) by DNP (Colombian National Planning Department).

The six equations are estimated in differences excepting real trade balance and students matriculated which are stationary. The estimation method is seemingly unrelated equations (SUR), the sample is 1946-2003.

First equation: real trade balance.

$$Rtb3 = \underset{(10.5)}{0.83}Rtb3_{t-1} + \underset{(2.62)}{40}Dtaf1_{t-2} + \underset{(3.58)}{231{,}505}Du_{t-1} + \underset{(2.35)}{1.33}Students_{t-1} \underset{(-2.53)}{-1.49}Students_{t-2}$$
$$+ \underset{(2.80)}{16{,}913}Ddespla2_{t-1} + \underset{(2.69)}{14{,}134}Ddespla2_{t-2} + \underset{(2.58)}{108{,}534}\,Dcvpc1_{t-1} \qquad R^2 = 0.77 \quad D.W = 2.04$$

Second equation: total armed forces.

$$Dtaf1 = \underset{(2.26)}{5{,}298}Cons\tan t + \underset{(1.03)}{0.001}Rtb3_{t-1} - \underset{(-0.34)}{0.0003}Rtb3_{t-6} + \underset{(1.33)}{1{,}267}Du_{t-4} - \underset{(-4.02)}{0.010}Students_{t-1} +$$
$$\underset{(4.22)}{0.015}Students_{t-4} - \underset{(-3.46)}{198}Ddespla2_{t-2} + \underset{(1.53)}{663.7}Dcvpc1_{t-1} - \underset{(-2.55)}{1{,}028}Dcvpc1_{t-2}$$

$$R^2 = 0.36 \quad D.W = 1.67$$

Third equation: unemployment rate.

$$Du = \underset{(-5.16)}{-0.0000009}Rtb3_{t-2} + \underset{(6.03)}{0.000001}Rtb3_{t-3} - \underset{(-4.59)}{0.0000008}Rtb3_{t-4} - \underset{(-3.77)}{0.00008}Dtaf1_{t-2}$$
$$+ \underset{(4.24)}{0.00009}Dtaf1_{t-3} + \underset{(4.47)}{0.03}Ddespla2_{t-2} - \underset{(-1.77)}{0.01}Ddespla2_{t-3} - \underset{(-2.0)}{0.12}Dcvpc1_{t-1}$$

$$R^2 = 0.61 \quad D.W = 1.88$$

Fourth equation: students matriculated

$$Students = \underset{(0.50)}{0.011}Rtb3_{t-2} + \underset{(1.11)}{4.51}Dtaf1_{t-2} + \underset{(0.60)}{11{,}858}Du_{t-1} + \underset{(10.4)}{1.62}Students_{t-1} - \underset{(-3.8)}{0.61}Students_{t-2}$$
$$+ \underset{(1.54)}{2{,}715}Ddespla2_{t-1} + \underset{(0.09)}{0.01}Drgased_{t-2} - \underset{(-2.80)}{0.95}Drgased_{t-4} - \underset{(-0.42)}{1{,}539}Dcvpc1_{t-4}$$

$$R^2 = 0.99 \quad D.W = 1.69$$

Fifth equation: displaced people

$$Ddespla2 = \underset{(-1.26)}{-0.000004}Rtb3_{t-2} + \underset{(1.27)}{0.0009}Dtaf1_{t-2} - \underset{(-0.84)}{3.2}Du_{t-3} - \underset{(-0.21)}{0.000004}Students_{t-1}$$

$$+ \underset{(0.16)}{0.000003}Students_{t-2} + \underset{(0.59)}{0.17}Ddespla2_{t-4} - \underset{(-1.09)}{1.86}Dcvpc1_{t-4} + \underset{(0.87)}{0.0001}Drgased_{t-1}$$

$$- \underset{(-0.67)}{0.00007}Drgaso_{t-1} + \underset{(1.08)}{0.00001}Drcpur_{t-1}$$

$$R^2 = 0.18 \quad D.W = 1.86$$

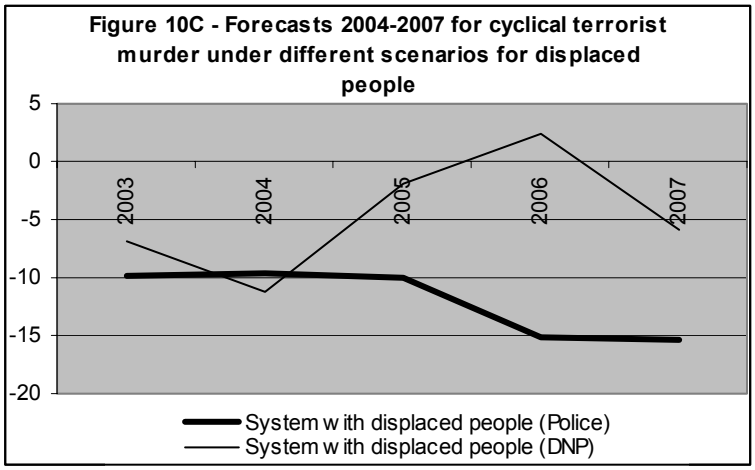
Sixth equation: cyclical terrorist murder per capita

$$Dcvpc1 = \underset{(3.27)}{0.0000007 Rtb3_{t-1}} \underset{(-3.42)}{-0.0000008\ Rtb3_{t-2}} \underset{(2.46)}{+0.00008 dtaf1_{t-2}} \underset{(-2.08)}{-0.000002 Students}$$

$$\underset{(2.02)}{+0.000002 students_{t-1}} \underset{(-4.15)}{-0.68 Du_t} \underset{(-4.46)}{-0.83 Du_{t-1}} \underset{(2.17)}{+0.03 Ddespla2_{t-4}} \underset{(2.49)}{+0.23\ Dcvpc1_{t-3}}$$

$$\underset{(-0.87)}{-0.000002\ Drde_t} \qquad R^2 = 0.53 \quad D.W = 1.70$$

Forecasts for cyclical terrorist murder 2004-2007 under varying assumptions for displaced people (despla by Police and despla2 by DNP).



Forecasts for cyclical terrorist murder per capita by the Near VAR systems for Colombia 2004-2007 according to different sources. Table 9		
	Displaced people by Nat. police, system (1)	Displaced people by DNP, system (2)
2003	-9.9	-6.9
2004	-9.62	-11.22
2005	-9.98	-1.96
2006	-15.19	2.49
2007	-15.3	-5.84

Note:real defense expenses (Rde) is included in both systems.

Estimates for the structural near-VAR model, using the reconstructed series for displaced people (despla6) by DNP

The estimation method is seemingly unrelated equations (SUR), the sample is 1946-2003.

First equation: real trade balance.

$$Rtb3 = \underset{(10.1)}{0.82}Rtb3_{t-1} + \underset{(2.78)}{42.9}Dtaf1_{t-2} + \underset{(3.80)}{252{,}153}Du_{t-1} + \underset{(2.22)}{1.27}Students_{t-1} - \underset{(-2.38)}{1.42}Students_{t-2}$$
$$+ \underset{(2.82)}{14{,}345}Ddespla6_{t-1} + \underset{(2.24)}{10{,}221}Ddespla6_{t-2} + \underset{(2.27)}{102{,}086}\,Dcvpc1_{t-1} \qquad R^2 = 0.76 \quad D.W = 1.97$$

Second equation: total armed forces.

$$Dtaf1 = \underset{(1.90)}{4{,}508}Cons\tan t + \underset{(1.08)}{0.001}Rtb3_{t-1} - \underset{(-0.03)}{0.00003}Rtb3_{t-6} + \underset{(1.61)}{1{,}538}Du_{t-4} - \underset{(-3.93)}{0.012}Students_{t-1} +$$
$$\underset{(4.12)}{0.014}Students_{t-4} - \underset{(-3.19)}{158.1}Ddespla6_{t-2} + \underset{(2.35)}{1018}Dcvpc1_{t-1} - \underset{(-2.94)}{1{,}215}Dcvpc1_{t-2}$$

$$R^2 = 0.35 \quad D.W = 1.65$$

Third equation: unemployment rate.

$$Du = \underset{(-4.81)}{-0.0000009}Rtb3_{t-2} + \underset{(5.42)}{0.000001}Rtb3_{t-3} - \underset{(-4.56)}{0.0000008}Rtb3_{t-4} - \underset{(-2.89)}{0.00006}Dtaf1_{t-2}$$
$$+ \underset{(3.47)}{0.00007}Dtaf1_{t-3} + \underset{(3.06)}{0.02}Ddespla6_{t-2} - \underset{(-1.52)}{0.01}Ddespla6_{t-3} - \underset{(-2.14)}{0.14}Dcvpc1_{t-1}$$

$$R^2 = 0.52 \quad D.W = 2.00$$

Fourth equation: students matriculated.

$$Students = \underset{(0.33)}{0.007}Rtb3_{t-2} + \underset{(1.02)}{4.11}Dtaf1_{t-2} + \underset{(0.53)}{10{,}664}Du_{t-1} + \underset{(10.48)}{1.60}Students_{t-1} - \underset{(-3.75)}{0.59}Students_{t-2}$$
$$+ \underset{(1.42)}{1{,}990}Ddespla6_{t-1} - \underset{(-0.05)}{0.009}Drgased_{t-2} - \underset{(-2.95)}{0.98}Drgased_{t-4} - \underset{(-0.09)}{941.9}Dcvpc1_{t-4}$$

$$R^2 = 0.99 \quad D.W = 1.71$$

Fifth equation: displaced people.

$$Ddespla6 = \underset{(-1.26)}{-0.000004Rtb3_{t-2}} \underset{(-0.05)}{-0.0004Dtaf1_{t-2}} \underset{(-0.30)}{-1.21Du_{t-3}} \underset{(0.10)}{+0.000002Students_{t-1}}$$

$$\underset{(-0.13)}{-0.000003Students_{t-2}} + \underset{(0.19)}{0.02Ddespla6_{t-4}} \underset{(-0.38)}{-0.71Dcvpc1_{t-4}} + \underset{(0.51)}{0.00007Drgased_{t-1}}$$

$$\underset{(-0.31)}{-0.00003Drgaso_{t-1}} + \underset{(1.0)}{0.00001Drcpur_{t-1}} \qquad R^2 = 0.13 \quad D.W = 1.80$$

Sixth equation: cyclical terrorist murder per capita.

$$Dcvpc1 = \underset{(3.83)}{0.0000007Rtb3_{t-1}} \underset{(-3.41)}{-0.0000007\ Rtb3_{t-2}} \underset{(2.23)}{+0.00007dtaf1_{t-2}} \underset{(-1.95)}{-0.000002Students}$$

$$\underset{(1.92)}{+0.000002students_{t-1}} \underset{(-3.42)}{-0.54Du_t} \underset{(-4.45)}{-0.82Du_{t-1}} \underset{(2.18)}{+0.02Ddespla6_{t-4}} \underset{(2.21)}{+0.20\ Dcvpc1_{t-3}}$$

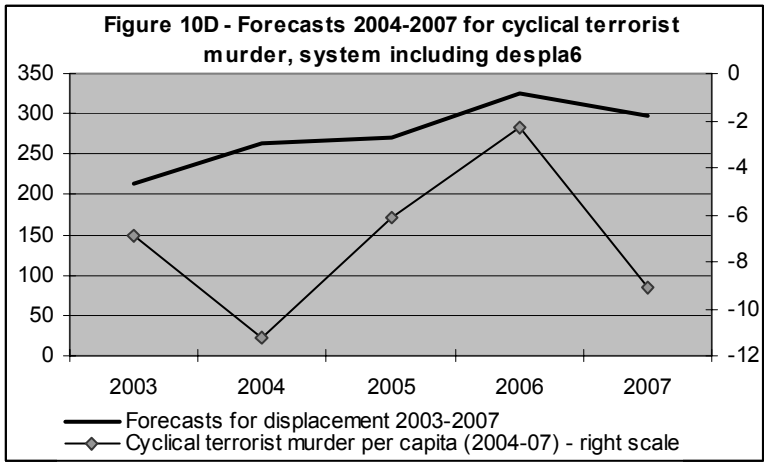
$$\underset{(-1.22)}{-0.000003\ Drde_t} \qquad R^2 = 0.54 \quad D.W = 1.71$$

Forecasts for cyclical terrorist murder 2004-2007 using reconstructed series for displaced people (despla6) by DNP.

Forecasts for displaced people 2004 - 2007. Table 10	
	System with despla6 by DNP included (Thousands)
2003	213
2004	262
2005	270
2006	325
2007	297
The forecasts for displacement were generated by the internal dynamics of the systems	

Forecasts for cyclical terrorist murder per capita by the Near VAR systems for Colombia 2004-2007 when the system includes Despla6 by DNP. Table 11	
	Displaced people by DNP system with despla6
2003	-6.9
2004	-11.2
2005	-6.16
2006	-2.3
2007	-9.09

Note:real defense expenses (Rde) is included in the system.



Scenarios for peace 2005-2010, Second presidential period Dr. Alvaro Uribe.

Introduction.

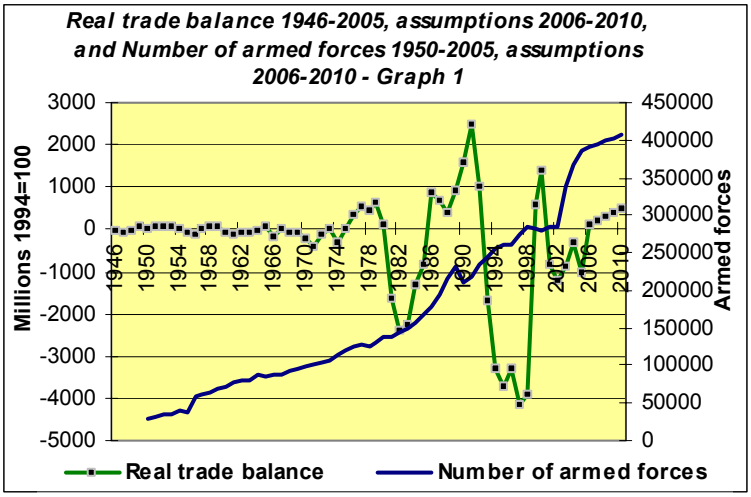
This section is an executive summary presenting 11 scenarios that show the forecasting capability of the Model of Cyclical Terrorist Murder. Each scenario is accompanied by the assumptions for the independent variables feeding up the model up to year 2010. In the second part I use the model again to produce forecasts and 18 scenarios up to year 2019 that coincides with the year by which Colombia is celebrating 200 years after getting independence. The 11 tables are consecutively assigned to the scenarios presented and are shown on appendix B.

Each of the 29 scenarios assume that up to year 2010 and 2019 the country is not having additional outburst of violence as the one experienced in 1948 (so the independent dummy variable B for *Bogotazo* continues with the value of zero up to 2010 and 2019), and after the second presidential period of Dr. Alvaro Uribe the country starts again the alternation in power every 4 years (so the dummy CL1 for National Front years becomes 1 in 2002 up to 2010 and 2019). I want to warn the reader about the big jump in terrorist murder for year 2005 which is shown in all of the scenarios presented, this is as a consequence of the immense efforts realized by the government at reducing displaced people during the last years. The model shows

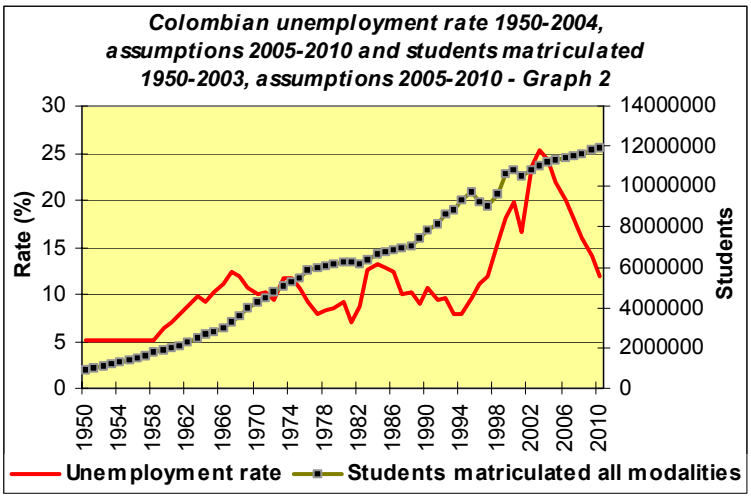
statistically the strong inverse relationship between terrorist murder and displaced people, a situation that shows the big dilemma facing Colombian policy makers[27].

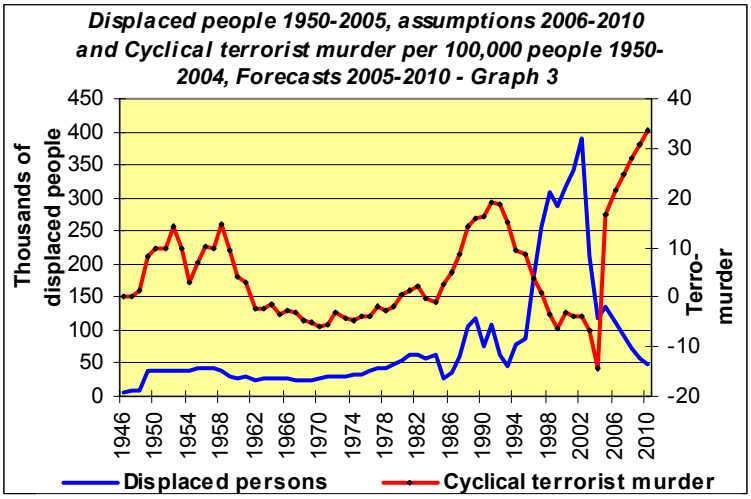
SCENARIO 1 – An increase in army troops boosts terrorist murder. Assumptions

The real trade balance becomes positive for 2006 starting at 100 millions of pesos ending up by 2010 at 500 millions; the total armed forces continues growing annually at 1% from 2006 forth; the number of displaced people follows the trend estimated by the National Planning Department (DNP); the unemployment rate continues its declining tendency, in this case diminishing 2% annually from 2004 forth; the number of students matriculated grows 1% annually from 2004 forth. The scenario does not do much at changing army forces, and the upward trend in troops joined with the modest reductions in the unemployment rate and displaced people plus the increasing trade balance situation are responsible for boosting the cyclical terrorist murder abruptly again up to year 2010.



[27] All of the scenarios presented in this first section will show this instant jump in terrorist murder due to the fact of the strong reduction in displaced people during the last years. Additionally the scenarios presented are based on the assumption of a continuous declining trend for displacement which is expected and proposed as presidential policy during the next years up to year 2019 (Visión Colombia II Centenario, propuesta para discusión, resúmen ejecutivo)



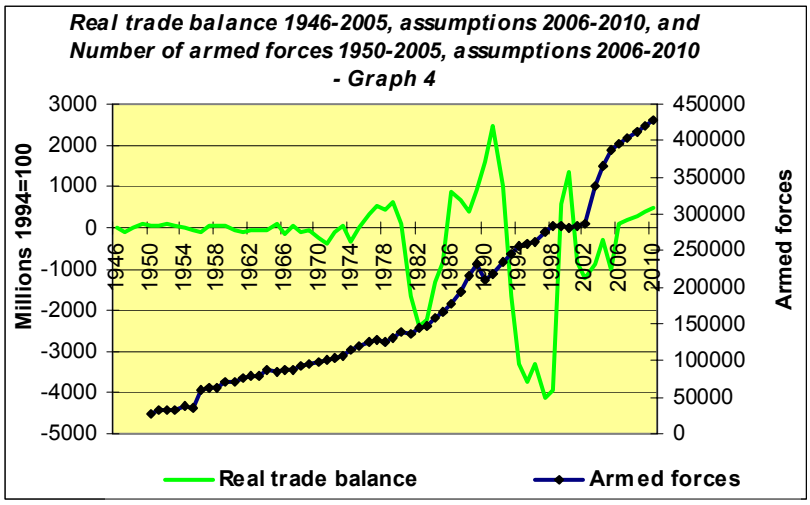


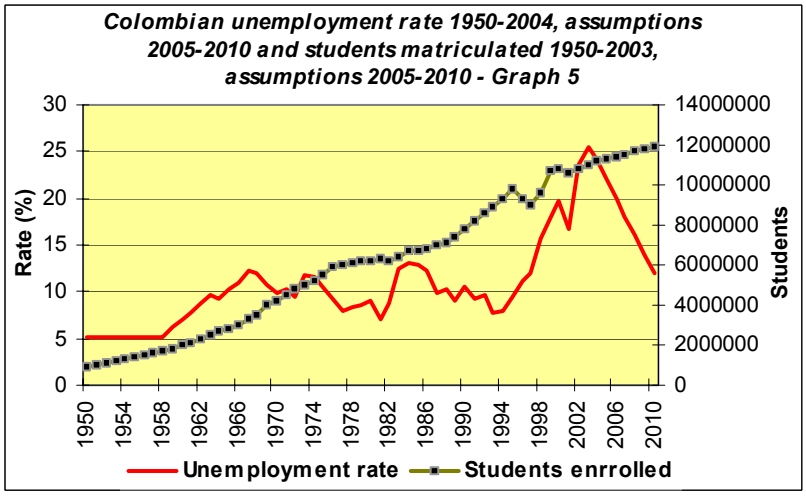
SCENARIO 2 – A further increase in army troops increases the intensity of the conflict. Assumptions.

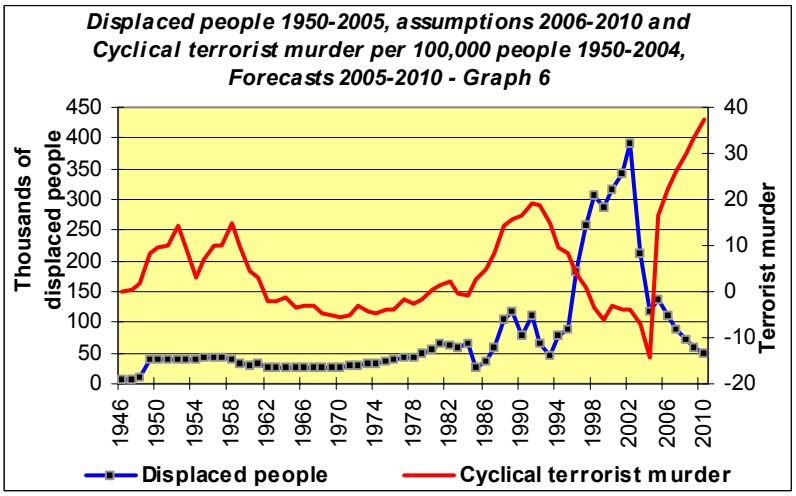
I keep the assumption from scenario 1, the real trade balance becomes positive for 2006 starting at 100 millions of pesos ending up by 2010 at 500 millions. In order to learn about the reaction of terrorist murder a further increase in army troops is presented: the armed forces starts growing annually at 2% from 2006 forth[28]; the number of displaced people follows the trend estimated by the National Planning Department (DNP); the unemployment rate continues its declining tendency, in this case, diminishing 2% annually from 2004 forth; the number of students matriculated grows 1% annually from 2004 forth[29]. Concluding, terrorist murder increases further.

[28] This is the only variable changing compared to the last scenario. According the model, the positive coefficient for army troops implies that further increases in army will boost the intensity of the conflict.

[29] The theoretical model assumes negative coefficients for these three variables, and a positive one for students matriculated. A declining number of displaced people along with declining unemployment rate will be pushing the cyclical murder, while enrollment of students will diminish the intensity of the conflict.

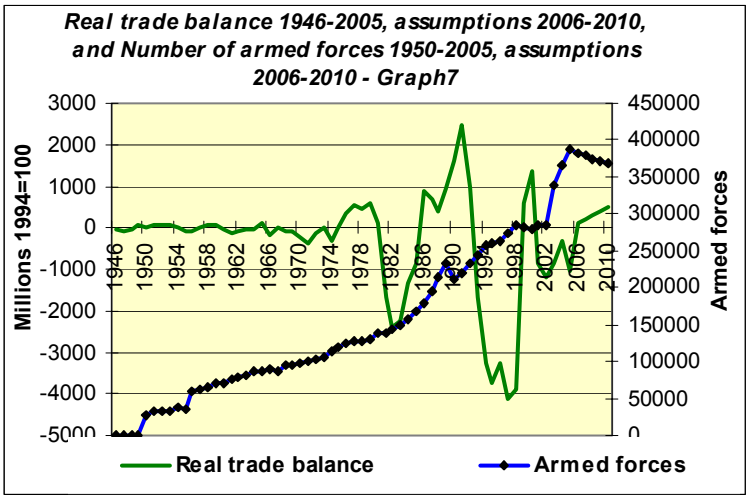

Real trade balance 1946-2005, assumptions 2006-2010, and Number of armed forces 1950-2005, assumptions 2006-2010 - Graph 4
Millions 1994=100
Armed forces
Real trade balance
Armed forces

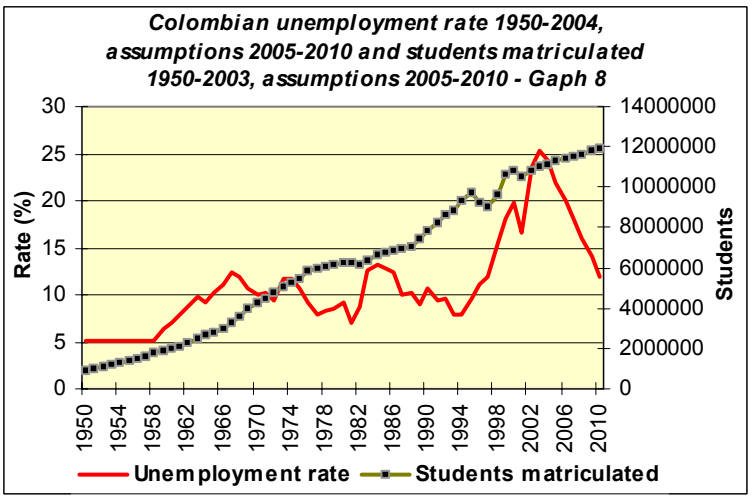

Colombian unemployment rate 1950-2004, assumptions 2005-2010 and students matriculated 1950-2003, assumptions 2005-2010 - Graph 5
Rate (%)
Students
Unemployment rate
Students enrrolled


Displaced people 1950-2005, assumptions 2006-2010 and Cyclical terrorist murder per 100,000 people 1950-2004, Forecasts 2005-2010 - Graph 6
Thousands of displaced people
Terrorist murder
Displaced people
Cyclical terrorist murder

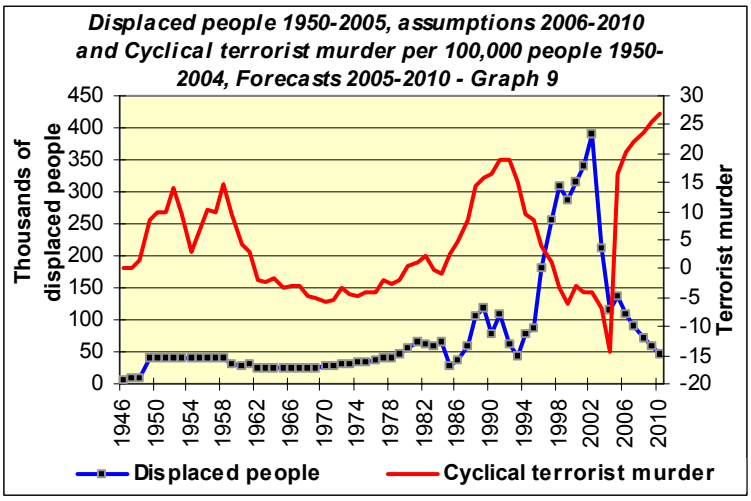
SCENARIO 3 – Small disarmament: reduction in army troops by 1% annually. Assumptions

The real trade balance continues positive for 2006 starting at 100 millions of pesos ending up by 2010 at 500 millions; the armed forces starts diminishing annually at 1% from 2006 forth[30]; the number of displaced people follows the trend estimated by the National Planning Department (DNP); the unemployment rate continues its declining tendency, diminishing at 2% annually from 2004 forth; the number of students matriculated grows 1% annually from 2004 forth. As conclusion terrorist murder reduces according to the disarmament proposed.



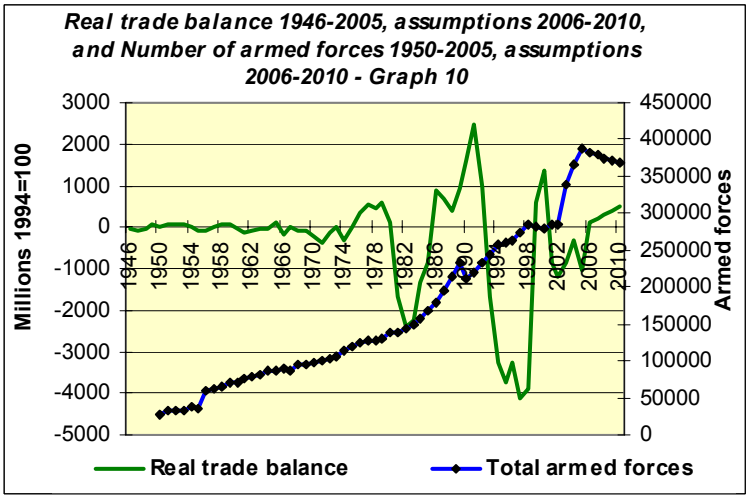


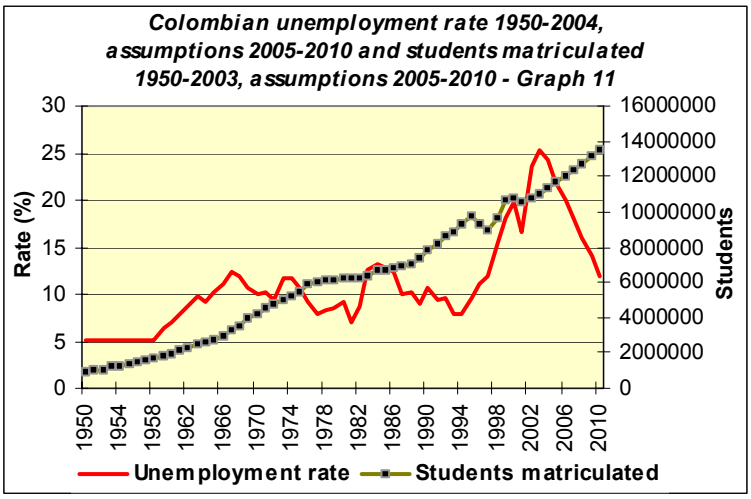
[30] First scenario which, reduces army troops annually at 1%, its impact is instantly felt in terrorist murder which starts diminishing. The other variables remain the same compared to last scenario.

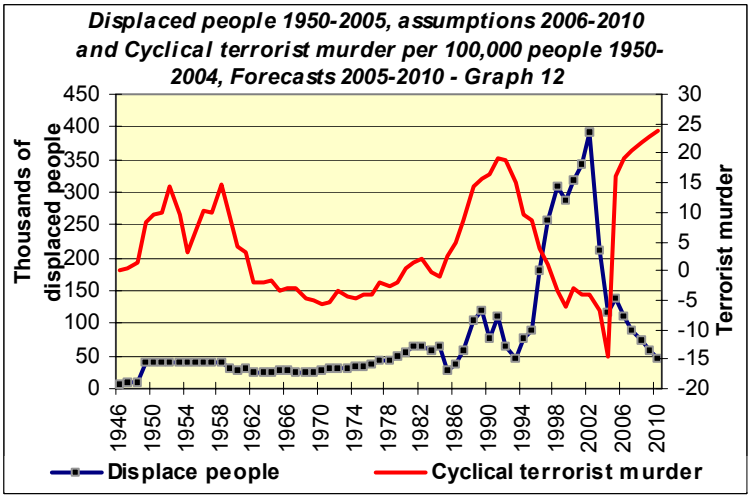


SCENARIO 4 – Social content introduced plus disarmament: students enrolled in all modalities increases annually at 3%, while army forces diminish at 1%. Assumptions.

For this scenario I start increasing students matriculated in all modalities at 3% annually from 2004 forth. The other variables remain the same compared to last scenario.
The real trade balance becomes positive for 2006 starting at 100 millions of pesos ending up by 2010 at 500 millions; the total armed forces starts diminishing annually at 1% from 2006 forth; the number of displaced people follows the trend estimated by the National Planning Department (DNP); the unemployment rate continues its declining tendency by, in this case diminishing 2% annually from 2004 forth**;** the number of students matriculated grows at 3% annually from 2004 on. Terrorist murder decreases further compared to last scenario, but still the changes are not sufficiently strong as required.

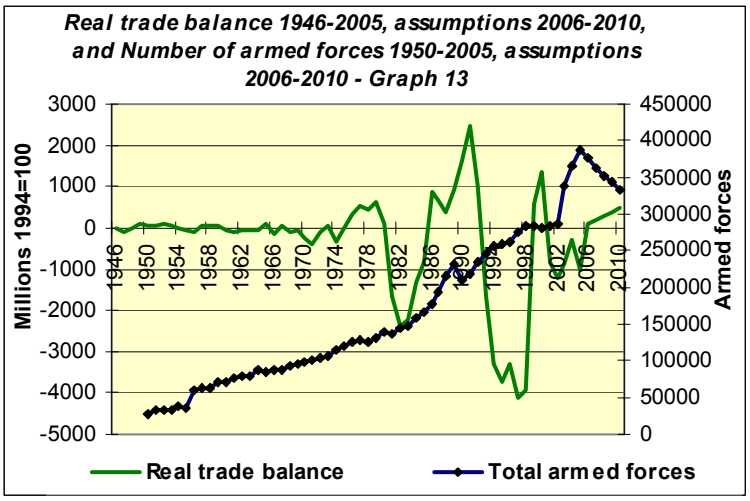


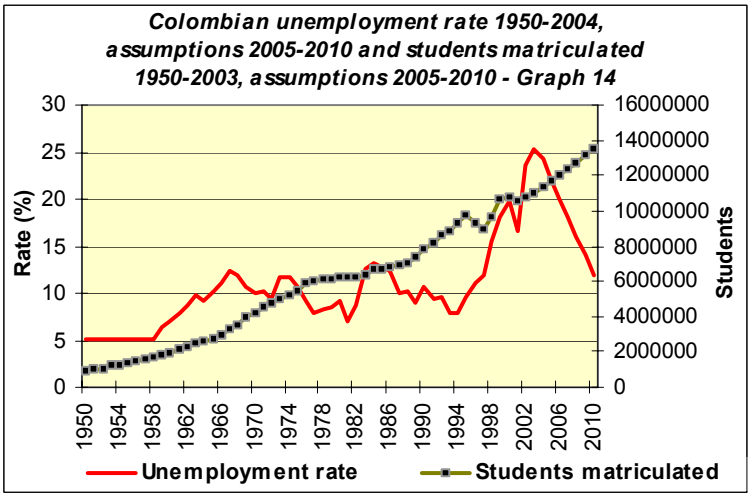


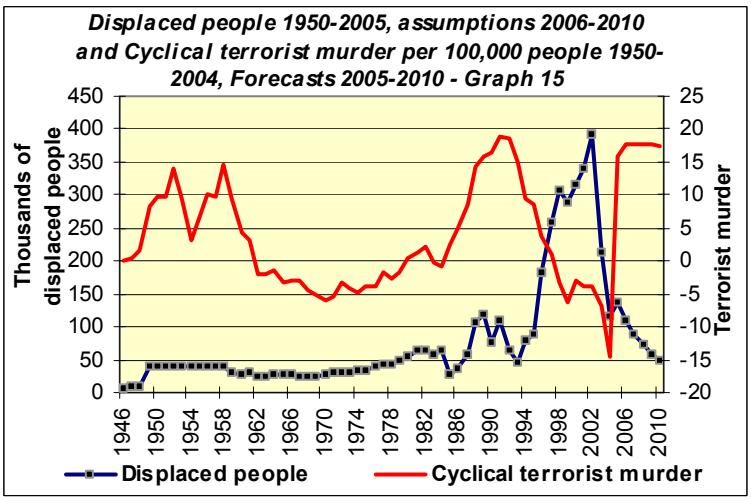


SCENARIO 5 – Students enrolled increasing annually at 3%, and army troops reducing annually at 6% (moderate disarmament). Assumptions

The number of students matriculated in all modalities continues growing annually at 3% from 2004 forth. Additionally the total armed forces start diminishing annually at 6% from 2006 forth. The real trade balance becomes positive for 2006 starting at 100 millions of pesos ending up by 2010 at 500 millions; the total armed forces starts diminishing annually at 3% from 2006 forth; the number of displaced people follows the trend estimated by the National Planning Department (DNP); the unemployment rate continues its declining tendency by, in this case diminishing 2% annually from 2004 forth; the number of students matriculated grows at 3% annually from 2004 forth. As conclusion cyclical murder appears high (17.5 murder per 100,000 people) implying that 2010 is a real short period of time to accomplish results and that further analyses should look for severe changes in the independent variables in order to accomplish tangible results by year 2019.

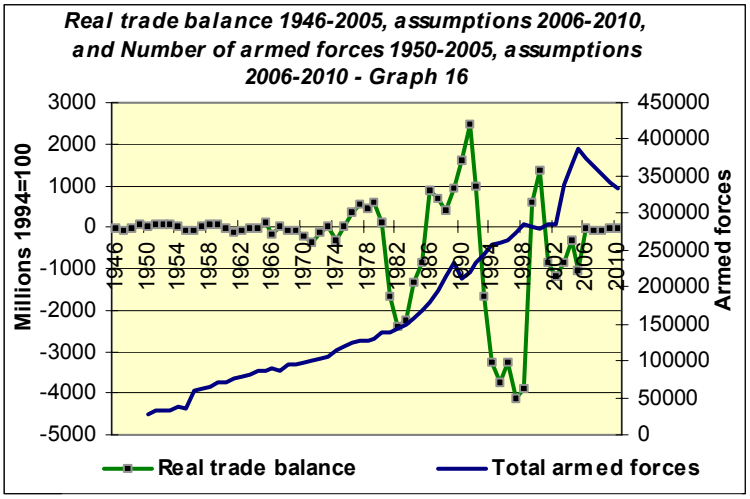

Real trade balance 1946-2005, assumptions 2006-2010, and Number of armed forces 1950-2005, assumptions 2006-2010 - Graph 13
Millions 1994=100
Armed forces
Real trade balance
Total armed forces

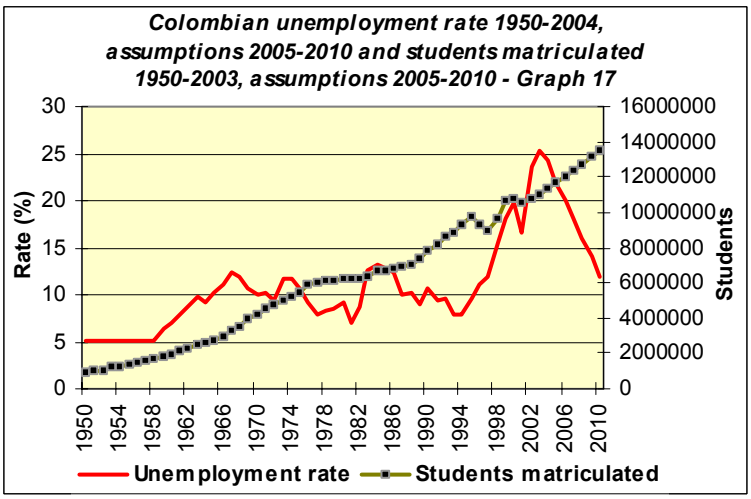

Colombian unemployment rate 1950-2004, assumptions 2005-2010 and students matriculated 1950-2003, assumptions 2005-2010 - Graph 14
Rate (%)
Students
Unemployment rate
Students matriculated

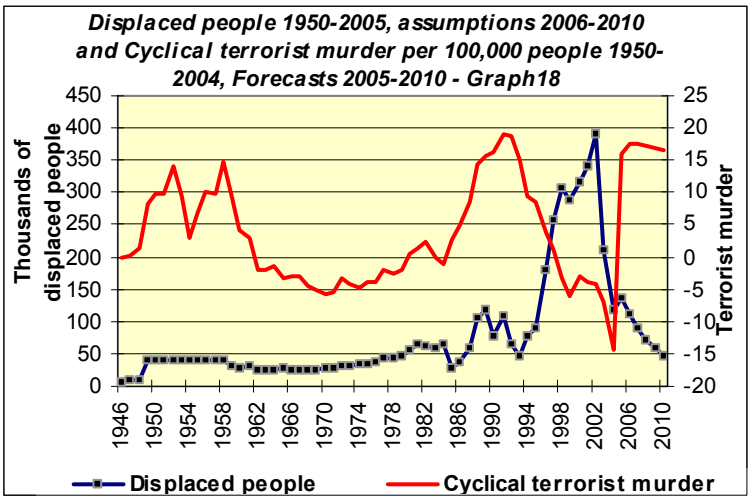

Displaced people 1950-2005, assumptions 2006-2010 and Cyclical terrorist murder per 100,000 people 1950-2004, Forecasts 2005-2010 - Graph 15
Thousands of displaced people
Terrorist murder
Displaced people
Cyclical terrorist murder

SCENARIO 6 – Modeling the impact of a negative real trade balance.
Assumptions

The only change in this scenario in relation to the last one is real trade balance. I assume the real trade balance is identical to what Colombia experienced during the *"Front National years"*, so starting in 2006, I model the impact of an oscillatory negative real trade balance around small figures. So the model is feed up with the same monetary figures from 1960 to 1964, so for 2006 (-54 millions of pesos), 2007(-64 millions of pesos), 2008(-70), 2009(-59), 2010 (-38). The remaining assumptions are kept: the number of students matriculated in all modalities continues growing annually at 3% from 2004 forth; the total armed forces starts diminishing annually at 3% from 2006 forth; the number of displaced people follows the trend estimated by the National Planning Department (DNP); the unemployment rate continues its declining tendency diminishing 2% annually from 2004 forth; the number of students matriculated diminish at 3% annually from 2004 forth. This scenario reduces terrorist murder by a half percent point compared to last scenario. Again a stronger policy looks is needed to achieve tangible results.







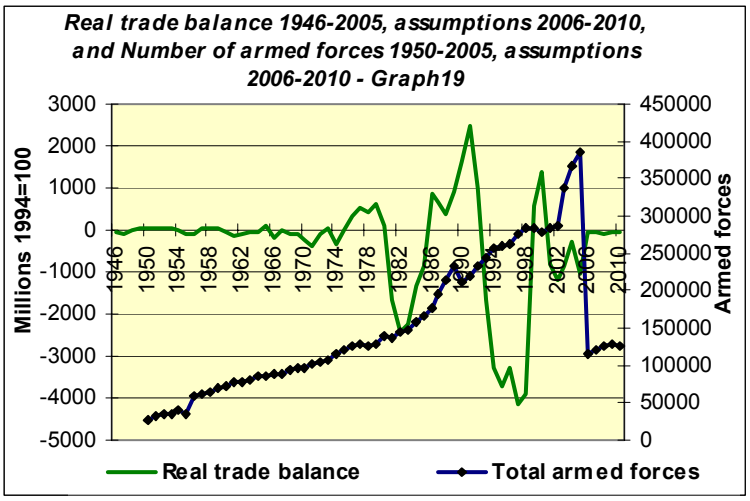
SCENARIO 7 – Figures for army troops identical to those experienced during the National Front years. Assumptions[31]. Concrete results achieved via wrong figures for trade balance, displacement, and unemployment rate.

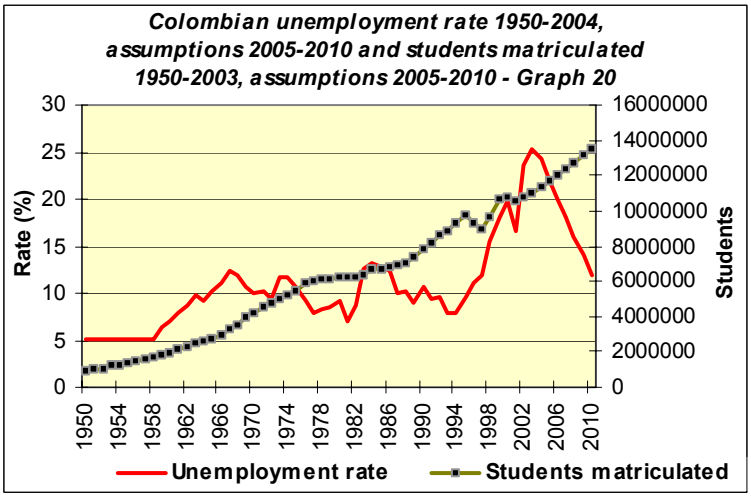
The only change in this scenario is with respect to the last one is army troops. I assume the reduction of army troops to the historical figures that the country experienced during the "National front years": *the most peaceful time during Colombian political history* (years 1974 to 1978), so starting in 2006 (115,203 troops, corresponds to the figures in 1974), 2007(120,327 figures for 1975), 2008(125,636 figures for 1976), 2009(127,732 figures for 1977), 2010 (126,463 figures for 1978).

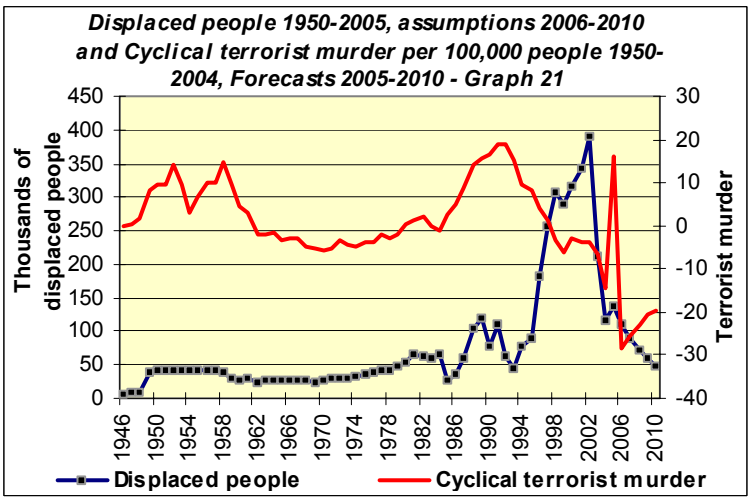
The social content continues: the number of students matriculated in all modalities continues growing annually at 3% from 2004 forth; the real trade balance displays the same small negative results experienced during the 60's; the total armed forces reduces by a small number and increases later by a small amount according to what happened during the national front years; the number of displaced people follows the trend estimated by the National Planning Department (DNP); the unemployment rate continues its declining tendency by, in this case diminishing 2% annually from 2004 forth; the number of students matriculated increases at 3% annually from 2004 forth.

As conclusion this scenario produces concrete results reducing terrorist murder by –21 per capita by year 2010, however the results were obtained via consecutive values for trade balance from 2006 to 2010, still a high unemployment rate, and the figures expected for displacement.

[31] The scenario shows that a strong reduction in troops reduces terrorist murder per-capita by –28 per 100,000 people instantly by year 2006.


Real trade balance 1946-2005, assumptions 2006-2010, and Number of armed forces 1950-2005, assumptions 2006-2010 - Graph19
Millions 1994=100
Armed forces
Real trade balance
Total armed forces

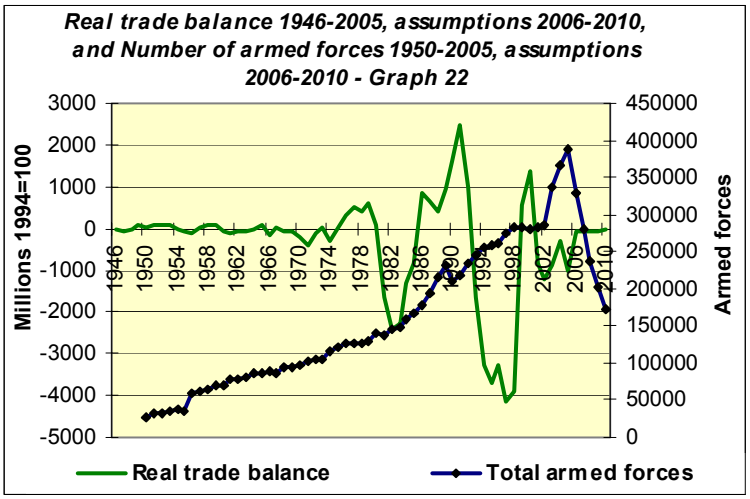

Colombian unemployment rate 1950-2004, assumptions 2005-2010 and students matriculated 1950-2003, assumptions 2005-2010 - Graph 20
Rate (%)
Students
Unemployment rate
Students matriculated

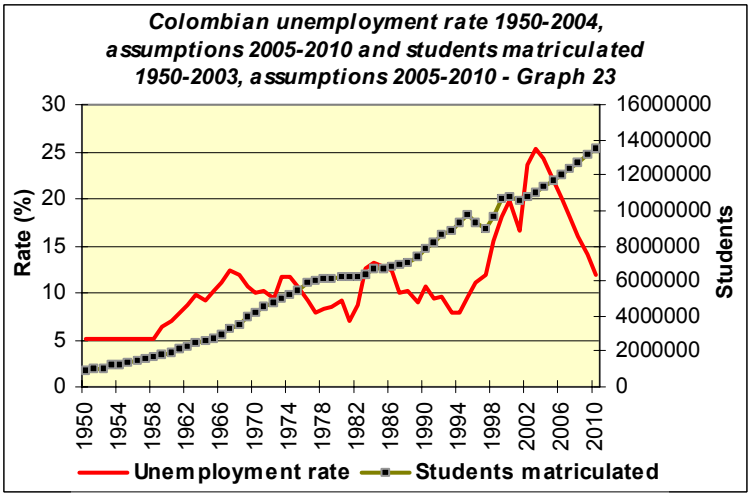

Displaced people 1950-2005, assumptions 2006-2010 and Cyclical terrorist murder per 100,000 people 1950-2004, Forecasts 2005-2010 - Graph 21
Thousands of displaced people
Terrorist murder
Displaced people
Cyclical terrorist murder

SCENARIO 8 – Accelerating disarmament – army troops decreasing 15% annually[32]. Assumptions

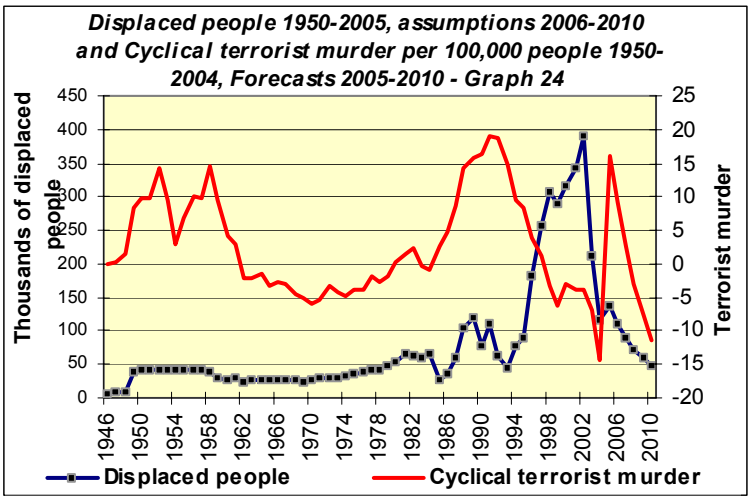
The only change in this scenario with respect to the last one is army troops. Armed forces start decreasing at 15% per year from 2006 up to 2010. The number of students matriculated in all modalities continues growing annually at 3% from 2004 forth. The real trade balance displays the same small negative results experienced during the 60's; the total armed forces decrease annually at 15%; the number of displaced people follows the trend estimated by the National Planning Department (DNP); the unemployment rate continues its declining tendency by, in this case diminishing 2% annually from 2004 forth; the number of students matriculated increases at 3% annually from 2004 forth.

As conclusion, compared to the last scenario, this one appears more appealing and probably just requires extra gauging in order to find the right value for armed forces placing terrorist murder in zero. Currently its value gets –11 terrorist murder per capita by 2010.



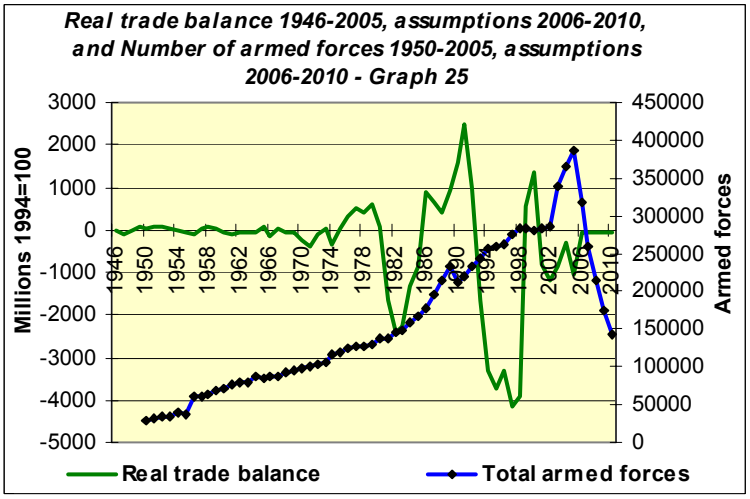


[32] This scenario would grant a reduction in terrorist murder to 3 cases per 100,000 people by year 2007.

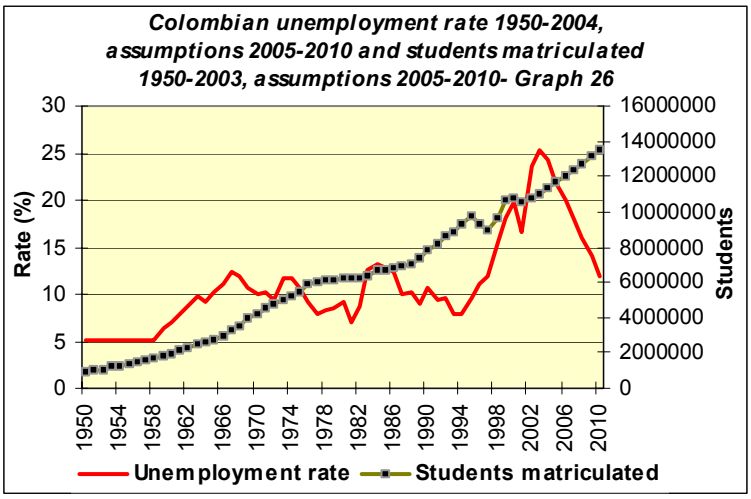


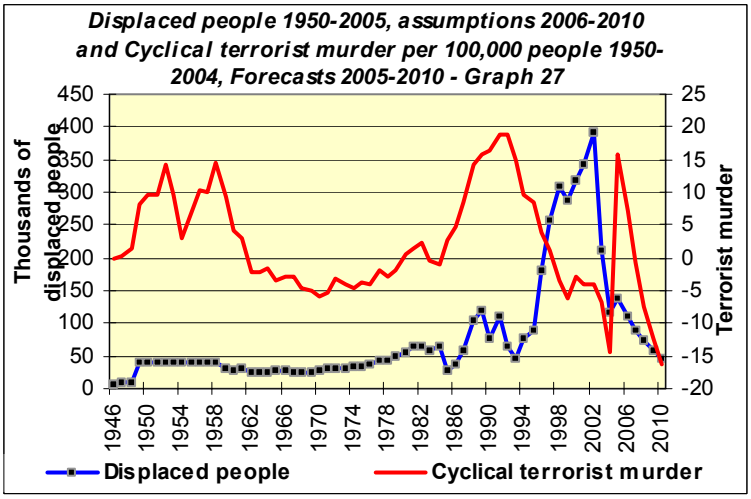
SCENARIO 9 – Further actions at accelerating disarmament: 18% annually[33]. Assumptions

In this section, armed forces starts decreasing continually at 18% per year. The number of students matriculated in all modalities continues growing annually at 3% from 2004 forth. The real trade balance displays the same small negative results experienced during the 60's; the number of displaced people follows the trend estimated by the National Planning Department (DNP); the unemployment rate continues its declining tendency diminishing 2% annually from 2004 forth; the number of students matriculated increases at 3% annually from 2004 forth. As conclusion the augmented disarmament reduces terrorist murder by –16 per capita by 2010.



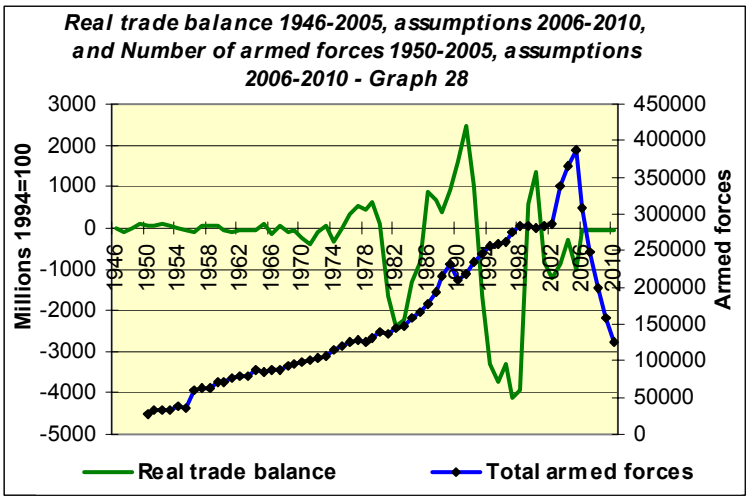
[33] This scenario reduces terrorist murder to –7 cases per 100,000 people.

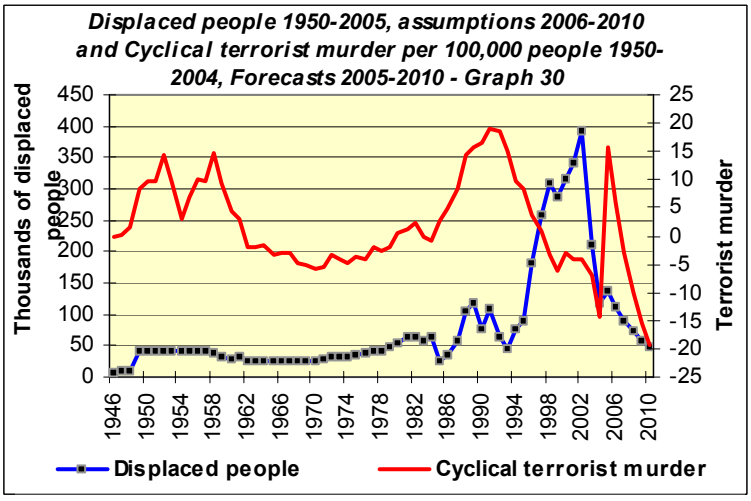




SCENARIO 10 – Modeling strong disarmament of 20% annually. Assumptions

Armed forces start decreasing at 20% per year this time. The number of students matriculated in all modalities continues growing annually at 3% from 2004 forth.
The real trade balance displays the same small negative results experienced during the 60's; the number of displaced people follows the trend estimated by the National Planning Department (DNP); the unemployment rate continues its declining tendency by, in this case diminishing 2% annually from 2004 forth; the number of students matriculated increases at 3% annually from 2004 forth. As conclusion, terrorist murder diminishes by –19 murder per capita by 2010.

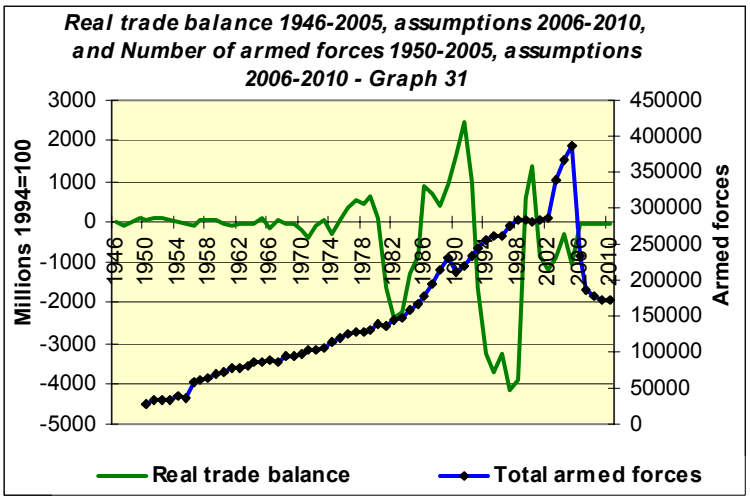


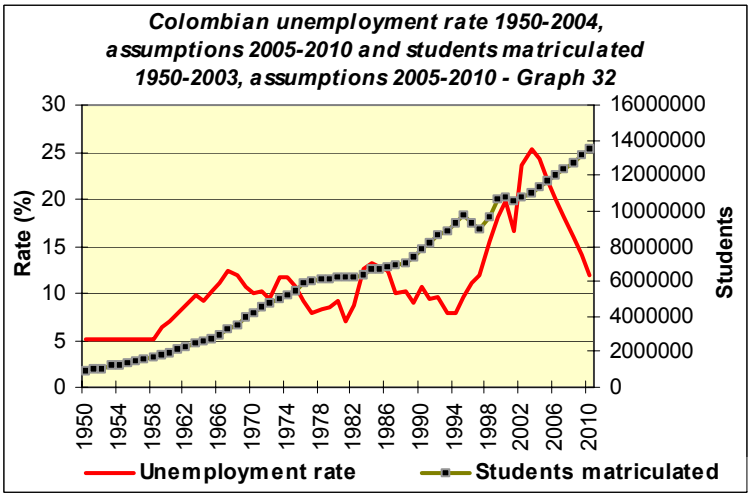


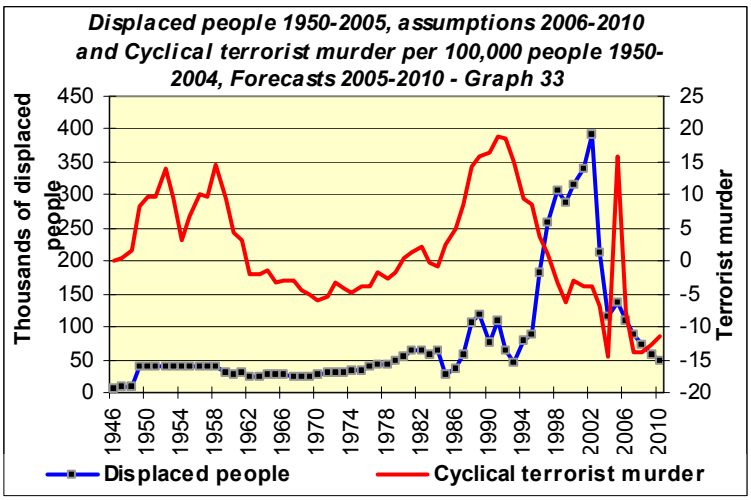
SCENARIO 11 – Armed forces decreasing in a gradient way. Assumptions

.

Armed forces start decreasing according to a gradient: 40% 2006, 20% 2007, 5% 2008, 2% 2009, 1% 2010. The number of students matriculated in all modalities continues growing annually at 3% from 2004 forth. The real trade balance displays the same small negative results experienced during the 60's; the number of displaced people follows the trend estimated by the National Planning Department (DNP); the unemployment rate continues its declining tendency diminishing at 2% annually from 2004 forth; the number of students matriculated increases at 3% annually from 2004 forth.


Real trade balance 1946-2005, assumptions 2006-2010, and Number of armed forces 1950-2005, assumptions 2006-2010 - Graph 31
Millions 1994=100
Armed forces
Real trade balance
Total armed forces


Colombian unemployment rate 1950-2004, assumptions 2005-2010 and students matriculated 1950-2003, assumptions 2005-2010 - Graph 32
Rate (%)
Students
Unemployment rate
Students matriculated


Displaced people 1950-2005, assumptions 2006-2010 and Cyclical terrorist murder per 100,000 people 1950-2004, Forecasts 2005-2010 - Graph 33
Thousands of displaced people
Terrorist murder
Displaced people
Cyclical terrorist murder

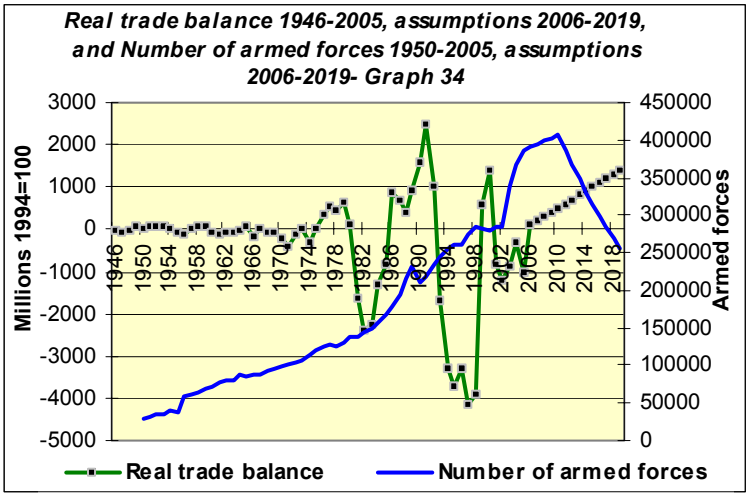
A MODEL OF CYCLICAL TERRORIST MURDER IN COLOMBIA, 1950 –2004. SCENARIOS GRANTING SUSTAINABLE PEACE BY YEAR 2019

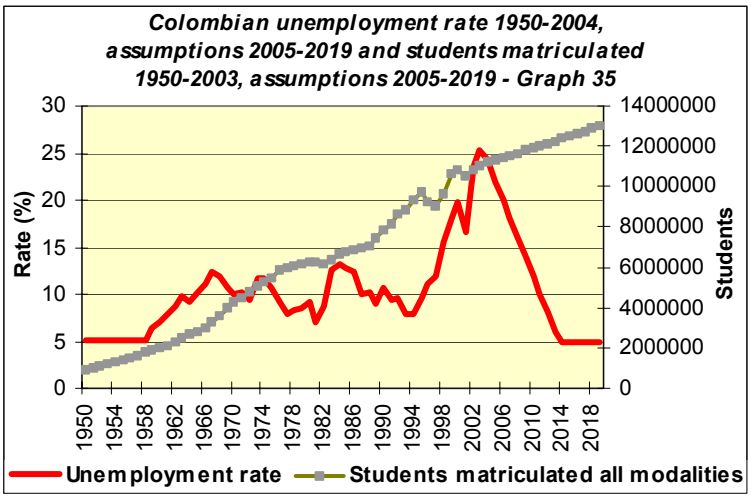
Introduction.

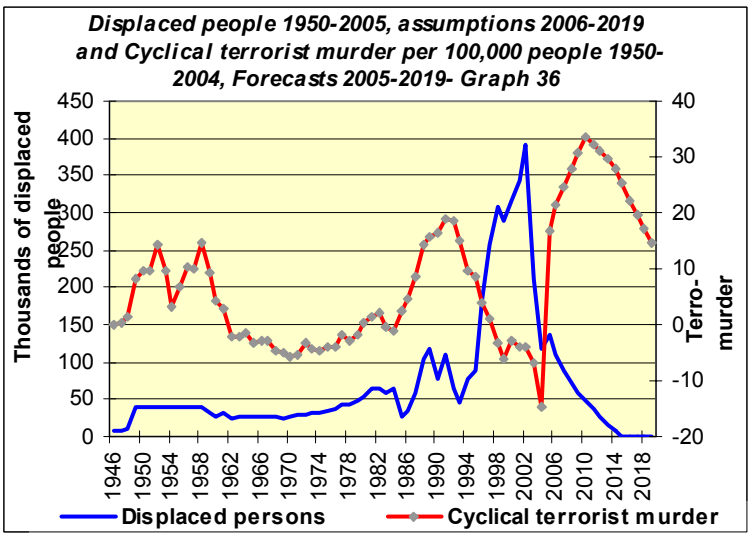
This section presents 18 scenarios, some of them granting sustainable peace before year 2019; its tables are presented on appendix C.

SCENARIO 1 – Assumptions

The real trade balance becomes positive in year 2006, and increases by 100 millions up to year 2019; total armed forces grows at 1% from 2005 to 2010, in year 2011 starts decreasing annually at 5%; the unemployment rate decreases annually at 2% from 2006 to 2013, from 2014 forth stabilizes around 5%; students enrolled in all modalities increases at annually at 1% after 2003 up to 2019; displaced people follows the trend estimated by the National Planning Department up to 2010, from 2011 to 2014 they diminish annually by 10,000 people and becomes zero from 2015 to 2019 (table 1, and graphs 34 to 36).

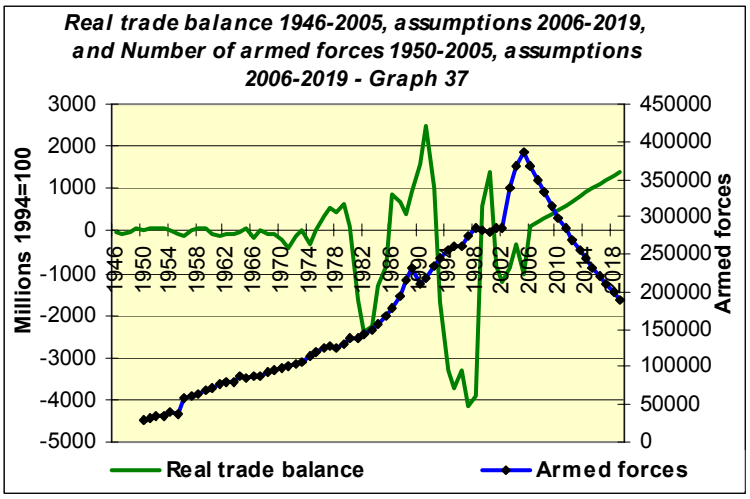


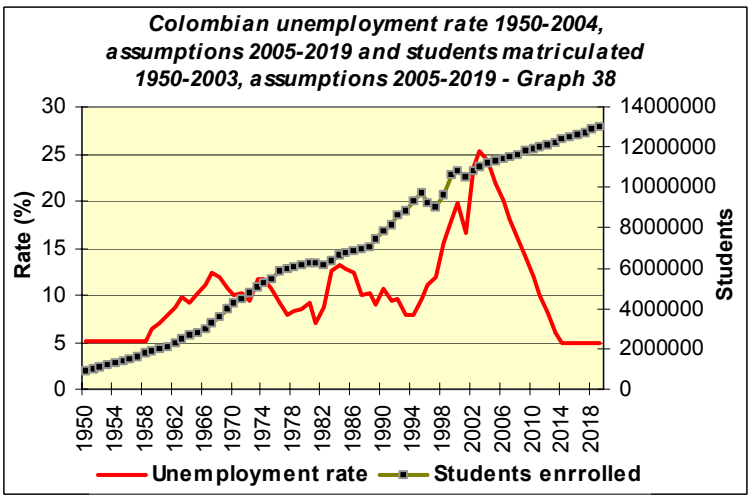


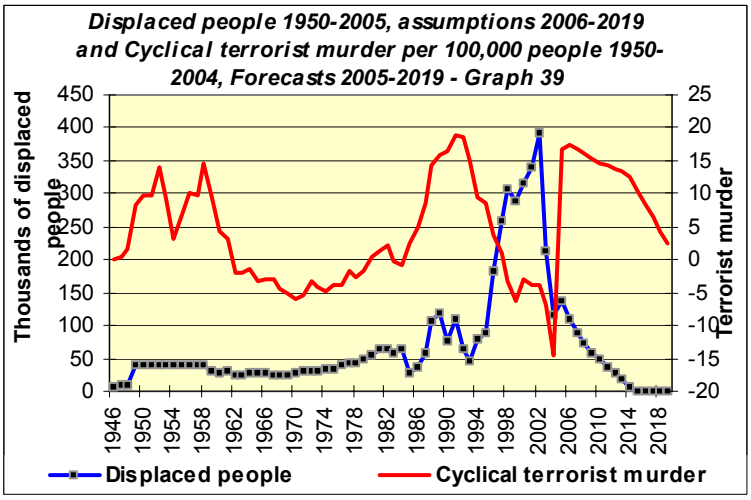


SCENARIO 2 – Assumptions – Moderate disarmament, Army troops diminishing at 5%

The only change in this scenario compared to the last one, is army troops diminishing at 5% annually from 2006 to 2019.
Real trade balance increases by 100 millions annually from 2006 to 2019; students enrolled grows at 1% annually from 2006 to 2019; displaced people follows the forecasts by DNP; the unemployment rate diminish annually at 2% after 2004. As conclusion this scenario grants peace by 2019 (terrorist murder at 3 cases per 100,000 people)


Real trade balance 1946-2005, assumptions 2006-2019, and Number of armed forces 1950-2005, assumptions 2006-2019 - Graph 37
Millions 1994=100
Armed forces
Real trade balance
Armed forces

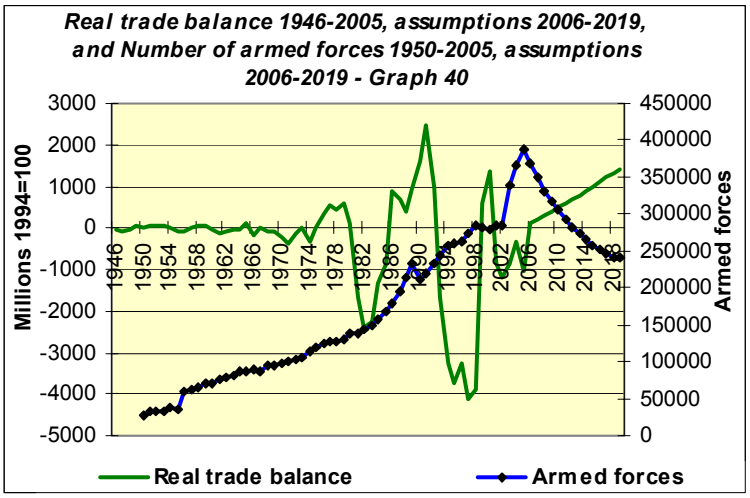

Colombian unemployment rate 1950-2004, assumptions 2005-2019 and students matriculated 1950-2003, assumptions 2005-2019 - Graph 38
Rate (%)
Students
Unemployment rate
Students enrrolled

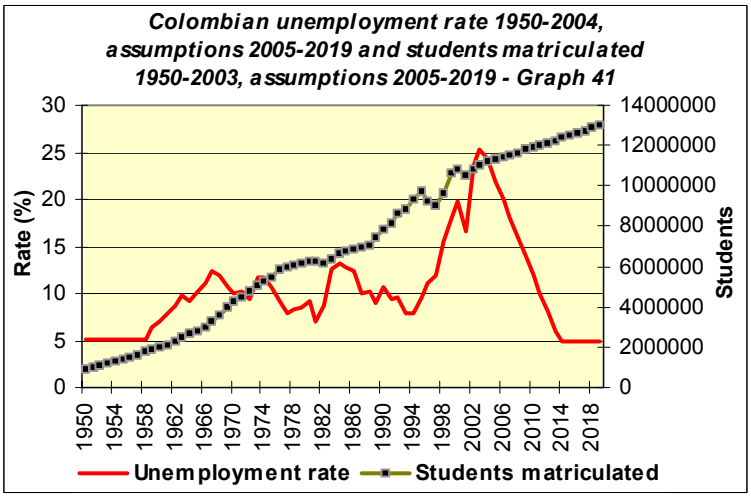

Displaced people 1950-2005, assumptions 2006-2019 and Cyclical terrorist murder per 100,000 people 1950-2004, Forecasts 2005-2019 - Graph 39
Thousands of displaced people
Terrorist murder
Displaced people
Cyclical terrorist murder

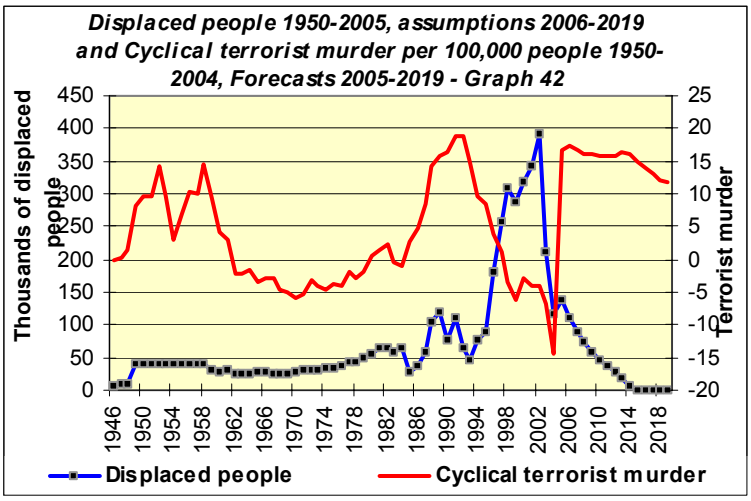
SCENARIO 3 – Assumptions. Army troops diminishing.

Army troops diminishing at 5% annually from 2006 to 2008; 4% from 2009 to 2012; 3% from 2013 to 2015 and 2% from 2016 to 2018.

Real trade balance increases annually by 100 millions up to year 2019; students enrolled grows at 1% annually; displacement follows the forecasts estimated by DNP; and the unemployment rates falling annually by 2 percent points. This scenario does not destroy completely cyclical murder, and so scenario #2 proves better when compared with this one.

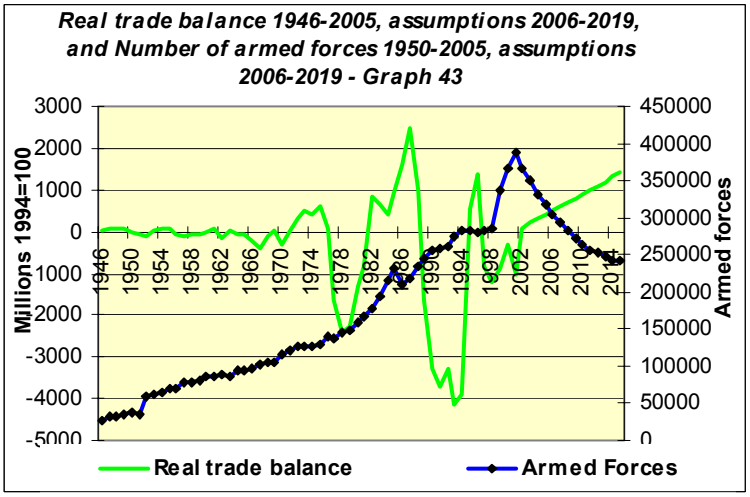


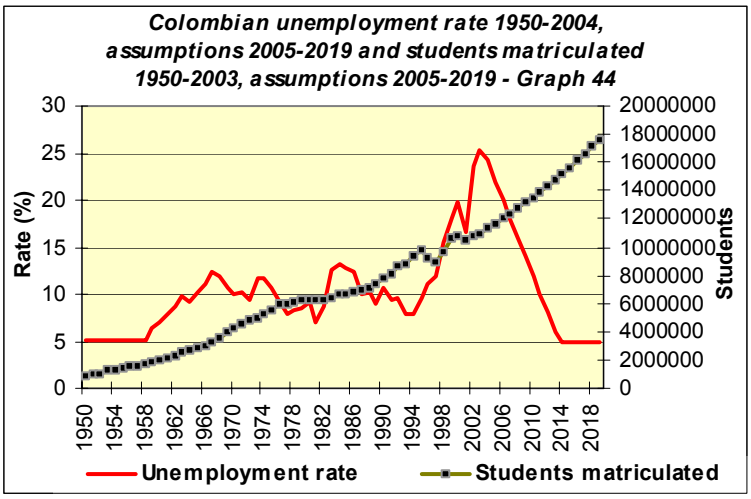


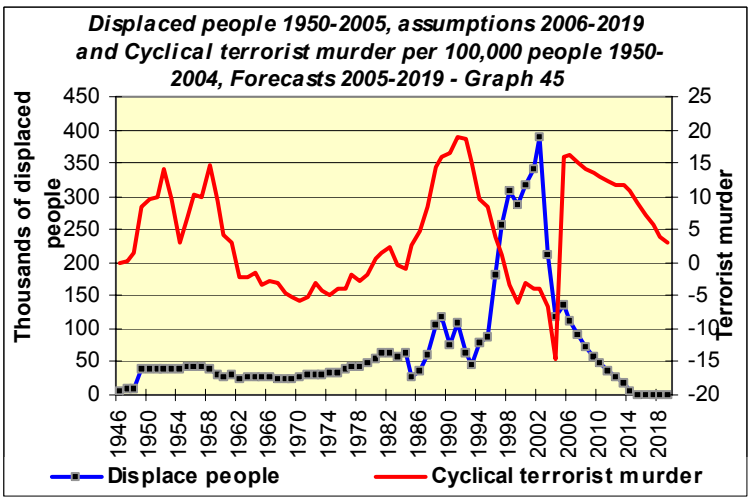


SCENARIO 4 – Social content introduced: students enrolled in all modalities increases annually at 3%, while army forces diminish according to changes in last scenario. Assumptions.

Armed forces diminish at 5%(2006-2008); 4%(2009-2012); 3%(2013-2015); 2%(2016-2018). Students matriculated increases annually at 3% annually from 2004 forth. The other variables remain the same compared to last scenario. Real trade balance increases annually 100 millions; displacement follows assumptions by DNP; and the unemployment rate falling at 2% annually. As conclusion keeping the reduction in armed forces plus increasing enrollment grants peace by 2019.



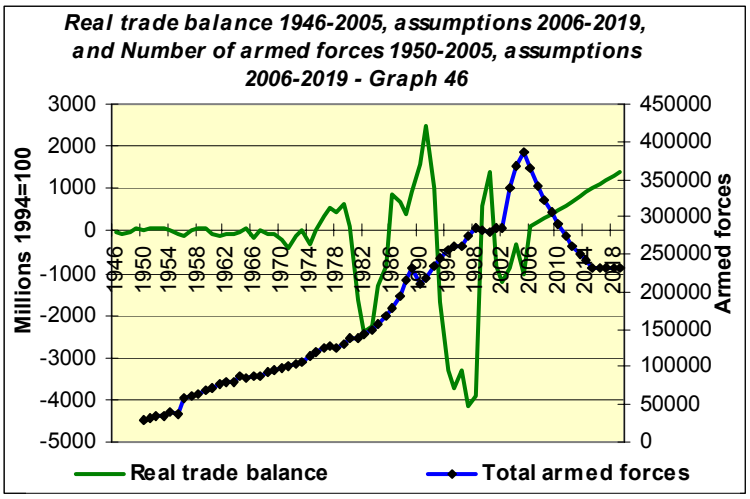


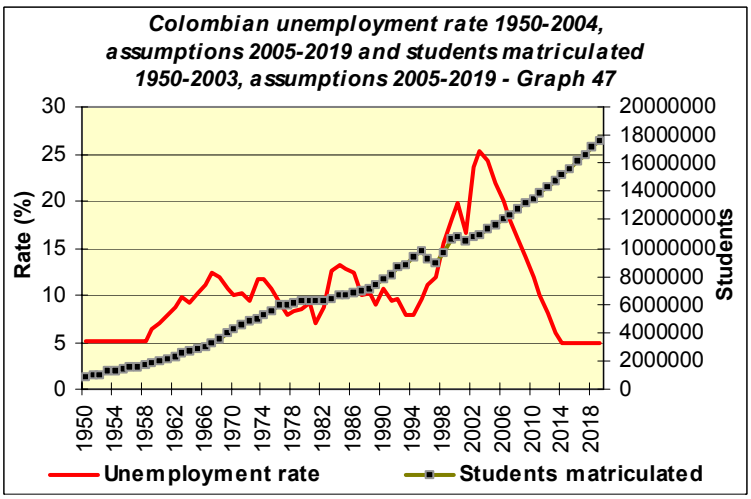


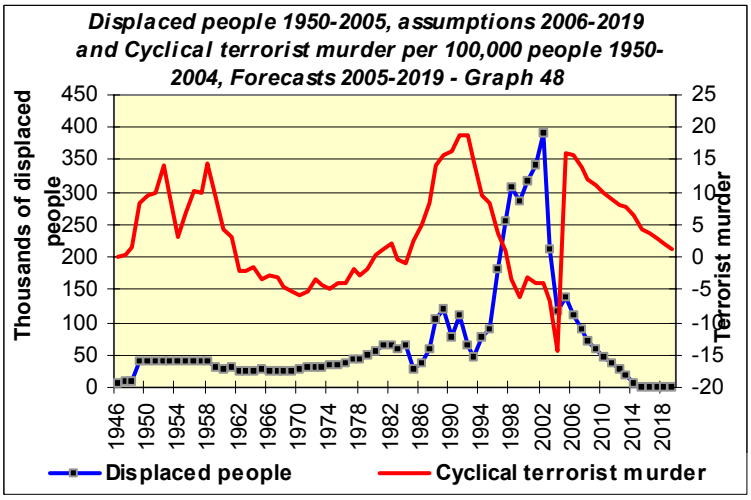
SCENARIO 5 – Pursuing further reduction in army troops. Assumptions

Army troops diminishing annually at 6% from 2006 to 2008; at 5% from 2009 to 2012; at 4% from 2013 to 2015, from 2006 forth remains constant at the figures form 2015.

Real trade balance increases by 100 millions annually; students enrolled grows at 3% annually, displacement of people follows the forecasts estimated by DNP; the unemployment rate falls annually 2%. As conclusion a further disarmament grants peace, grants results faster (by 2019 cyclical murder is almost cero).

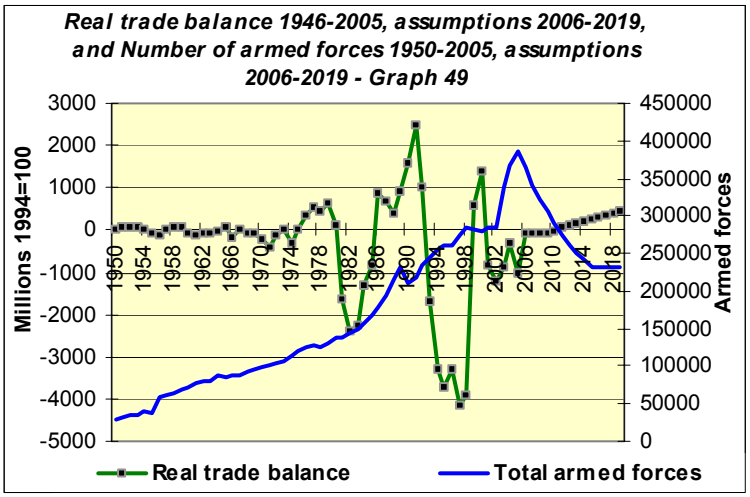

Real trade balance 1946-2005, assumptions 2006-2019, and Number of armed forces 1950-2005, assumptions 2006-2019 - Graph 46
Millions 1994=100
Armed forces
Real trade balance
Total armed forces

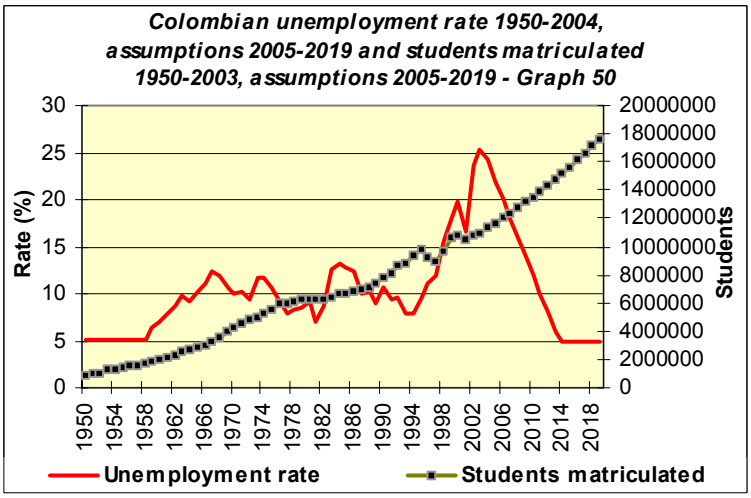

Colombian unemployment rate 1950-2004, assumptions 2005-2019 and students matriculated 1950-2003, assumptions 2005-2019 - Graph 47
Rate (%)
Students
Unemployment rate
Students matriculated

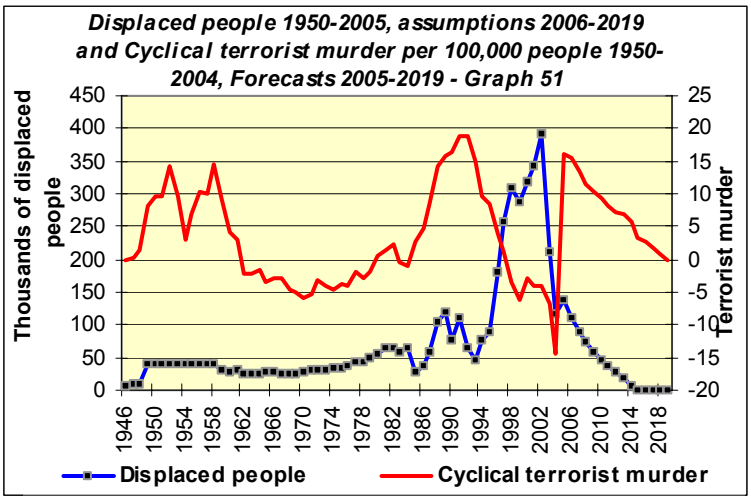

Displaced people 1950-2005, assumptions 2006-2019 and Cyclical terrorist murder per 100,000 people 1950-2004, Forecasts 2005-2019 - Graph 48
Thousands of displaced people
Terrorist murder
Displaced people
Cyclical terrorist murder

SCENARIO 6 – Modeling the impact of a negative real trade balance. Assumptions.

The only change in this scenario is real trade balance. I assume the real trade balance is identical to what Colombia experienced during the *"National Front Years"*, basically from 1960 to 1964; so starting in 2006, I model the impact of an oscillatory negative real trade balance. For 2006 (-54 millions-figures of 1960), 2007(-64 millions-figure of 1961), 2008(-70 millions - figures of 1962), 2009(-59 millions-figures of 1963), 2010 (-38 millions-figures of 1964). Later in 2010 becomes positive at 50 millions and start increasing that quantity annually up to 2019. Armed forces diminish annually at 6%(2006-2008), 5%(2009-2012),4%(2013-2015); students enrolled grows at 3% annually, displaced people follows the pattern estimated by DNP and, the unemployment rates diminish at 2% annually. This scenario destroys murder, but it is not acceptable for the assumption of a negative trade balance.

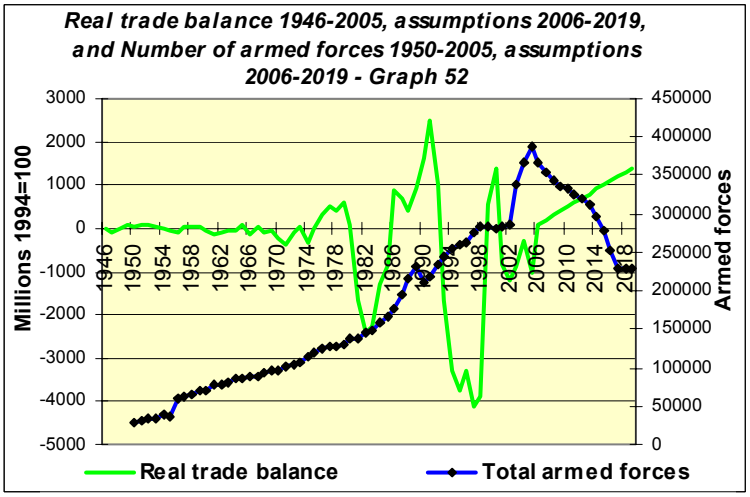


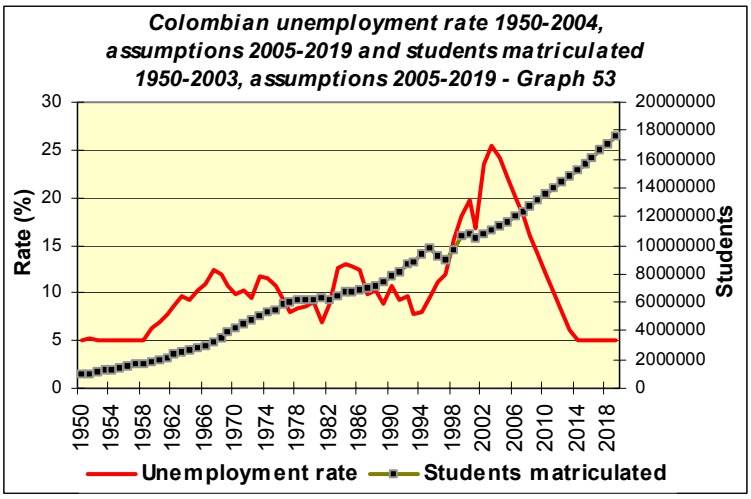


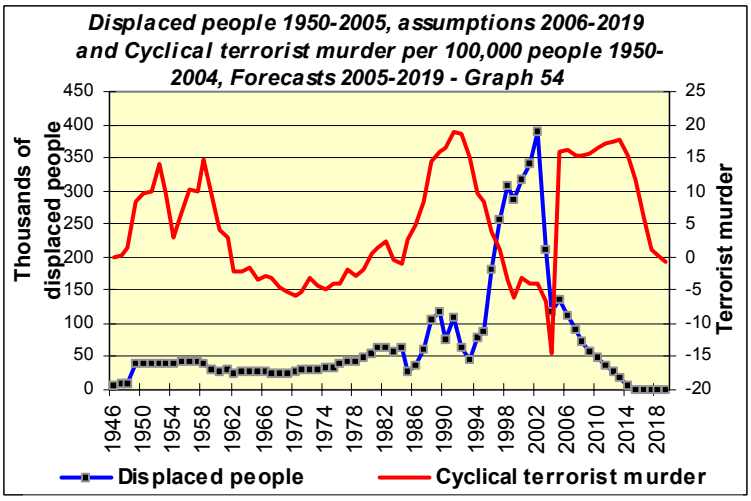


SCENARIO 7 – Moderate disarmament continued up to 2019. Assumptions

Armed forces diminish 5% in 2006; 4% 2007, 3% 2008, 2% 2009, 1% 2010. 2% in 2011, 2% 2012, 2% 2013, 5% 2014, 6% 2015, 10% 2016, 9% 2017, from 2018 to 2019 I keep the forces from 2017. The real trade balance remains at the same figures of the National Front years; students enrolled growing at 3% annually; displacement follows the assumptions by DNP; unemployment rate falling at 2% annually. As conclusion this scenario not just destroys terrorist murder, but makes it negative.

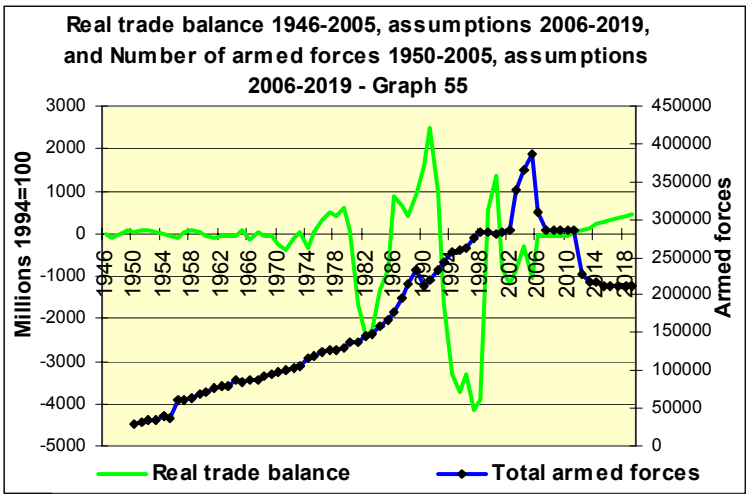


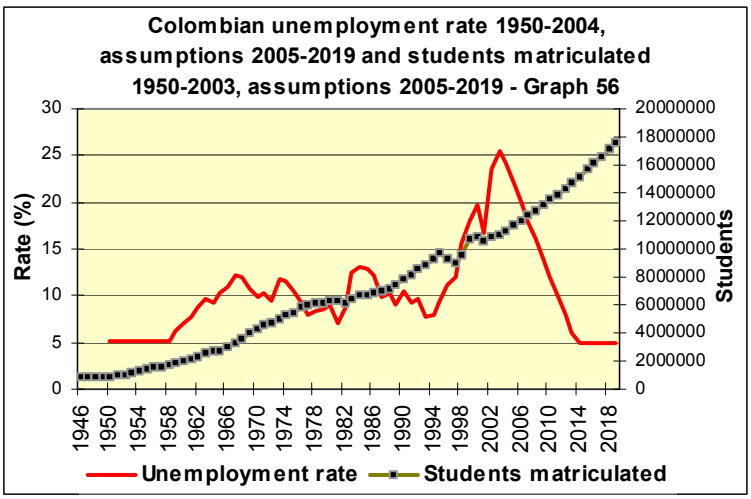


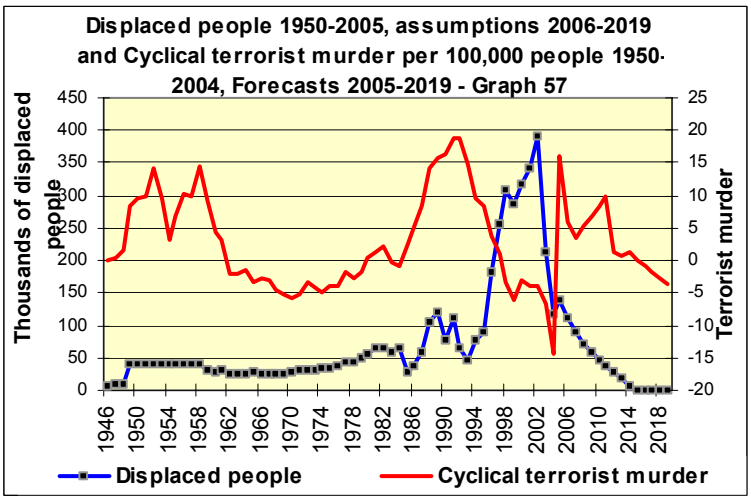


SCENARIO 8 – Beginning strong disarmament – army troops decreasing 20% the first year. Assumptions

Armed forces diminish in this scenario variably: 20% on 2006 , 8% on 2007; then remain constant from 2008 to 2011. On 2012 they diminish 20%, and 5% on 2013, on 2014 they remain constant; on 2015 they reduce again by 2% and, from 2016 to 2019 they remain constant. . The real trade balance remains at the same figures of the National Front years; students enrolled growing at 3% annually; displacement follows the assumptions by DNP; unemployment rate falling at 2% annually. As conclusion further reduction in disarmament reduces terrorist murder accordingly.

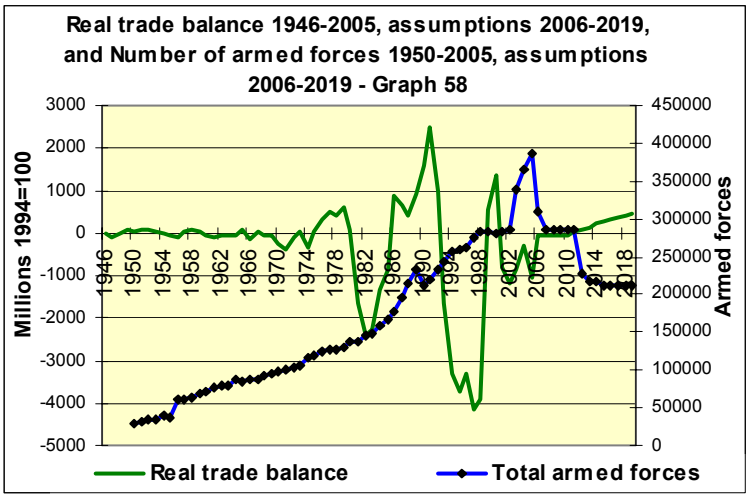

Real trade balance 1946-2005, assumptions 2006-2019, and Number of armed forces 1950-2005, assumptions 2006-2019 - Graph 55
Millions 1994=100
Armed forces
Real trade balance
Total armed forces

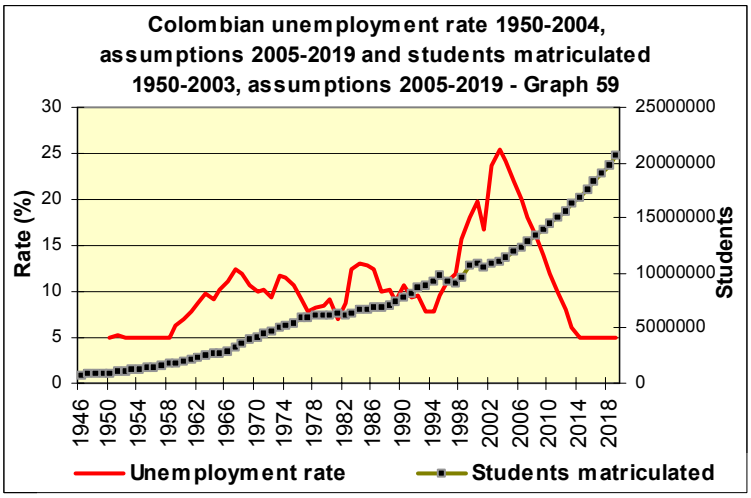

Colombian unemployment rate 1950-2004, assumptions 2005-2019 and students matriculated 1950-2003, assumptions 2005-2019 - Graph 56
Rate (%)
Students
Unemployment rate
Students matriculated

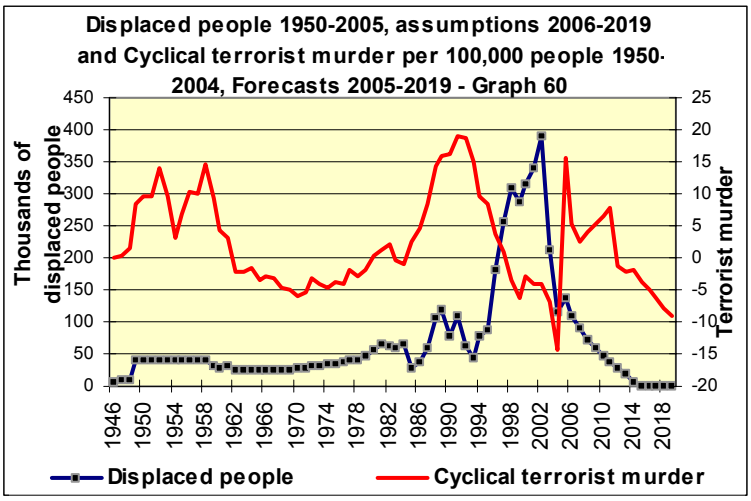

Displaced people 1950-2005, assumptions 2006-2019 and Cyclical terrorist murder per 100,000 people 1950-2004, Forecasts 2005-2019 - Graph 57
Thousands of displaced people
Terrorist murder
Displaced people
Cyclical terrorist murder

SCENARIO 9 – Increasing the social content. Students enrolled growing at 4% annually. Assumptions

Armed forces diminish in this scenario variably: 20% on 2006 , 8% on 2007; then remain constant from 2008 to 2011. On 2012 they diminish 20%, and 5% on 2013, on 2014 they remain constant; on 2015 they reduce again by 2% and, from 2016 to 2019 they remain constant. . The real trade balance remains at the same figures of the National Front years; students enrolled growing at 4% annually; displacement follows the assumptions by DNP; unemployment rate falling at 2% annually. As conclusion further reduction in disarmament reduces murder plus the increase in enrollment destroys terrorist murder, according to this scenario it appears that if we do not want to sacrifice troops have to pursue further increases in enrollment.

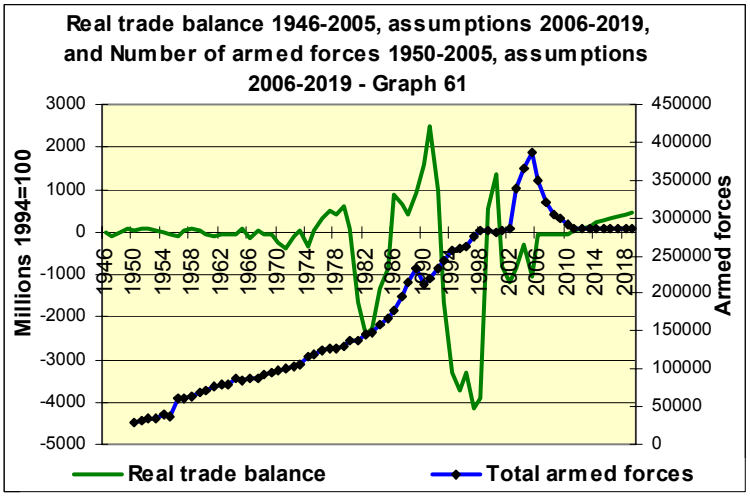


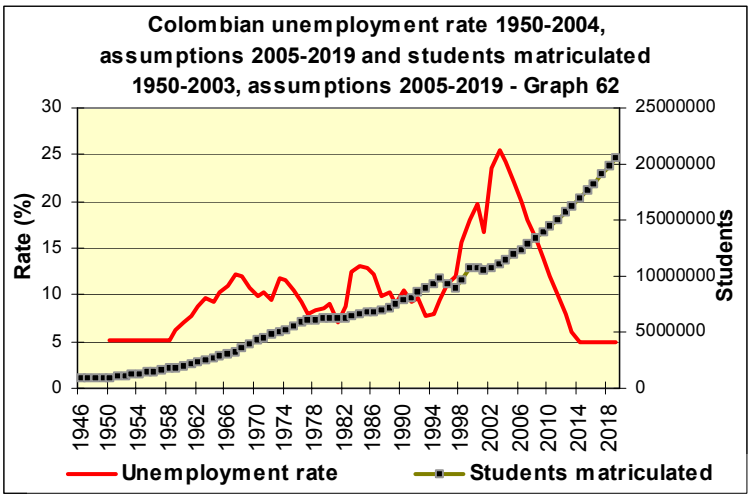


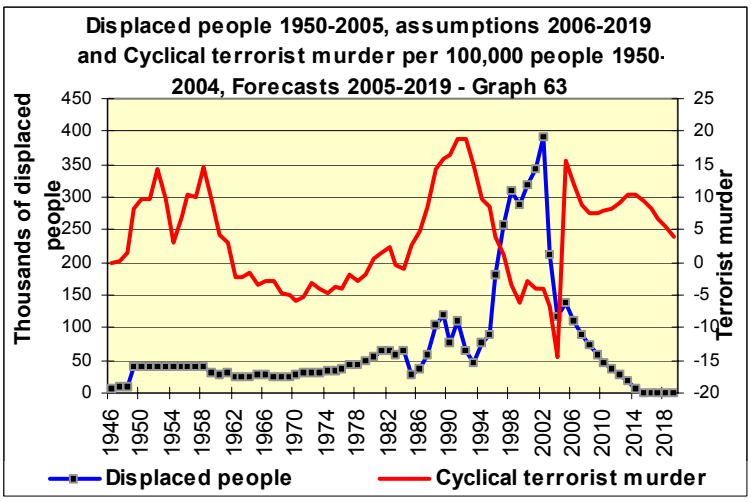


SCENARIO 10 – Modeling moderate disarmament, 10% on 2006. Assumptions

Armed forces decrease by 10% on 2006, 8% on 2007, 5% on 2008, 2% continuous from 2009 to 2011, from 2012 forth it remains constant. The real trade balance remains at the same figures of the National Front years but from 2011 to 2019 increase annually in 50 millions; students enrolled growing at 4% annually; displacement follows the assumptions by DNP; unemployment rate falling at 2% annually. As conclusion, this scenario appears displaying no sacrifice in trade balance neither armed forces, enrollment grows, displacement is eradicated and terrorist murder remains at 4 per capita which is acceptable.

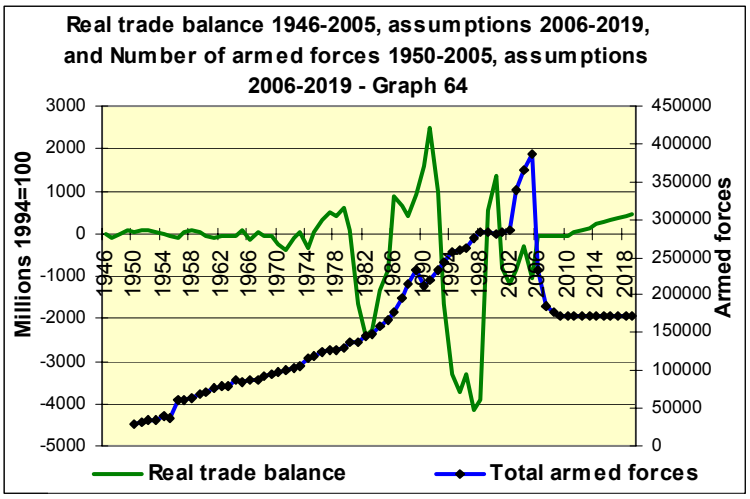


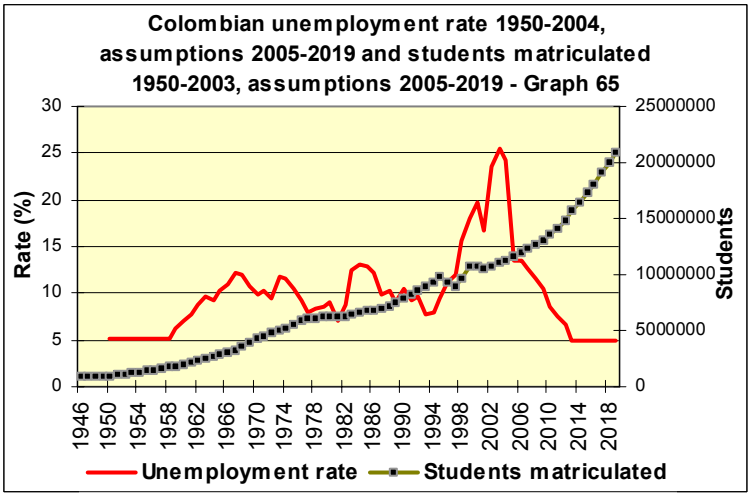


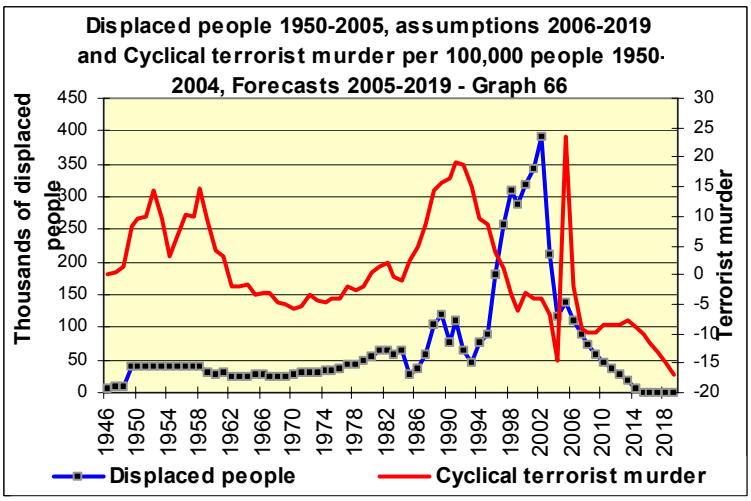


SCENARIO 11 – Increasing the social content, students growing at 5% annually, and strong disarmament of 40% on 2006. Assumptions.

In this scenario, students enrolled are growing at 3% from 2004 to 2010, and at 5% from 2011 to 2019. The armed forces are disarmed at 40% on 2005, 20% on 2006, 5% on 2007, 2% on 2008, 1% on 2009, from 2010 to 2019 remain constant. The real trade balance oscillates around negative figures form 2006 to 2010 and becomes positive from 2011 to 2019; displacement follows the assumptions by DNP. As conclusion the policy mixture is too strong since terrorist murder becomes excessively negative (-17 per capita).


Real trade balance 1946-2005, assumptions 2006-2019, and Number of armed forces 1950-2005, assumptions 2006-2019 - Graph 64
Millions 1994=100
Armed forces
Real trade balance
Total armed forces

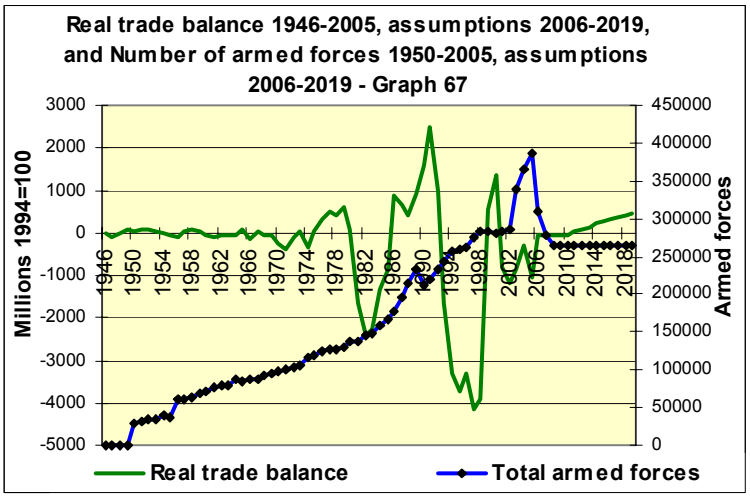

Colombian unemployment rate 1950-2004, assumptions 2005-2019 and students matriculated 1950-2003, assumptions 2005-2019 - Graph 65
Rate (%)
Students
Unemployment rate
Students matriculated

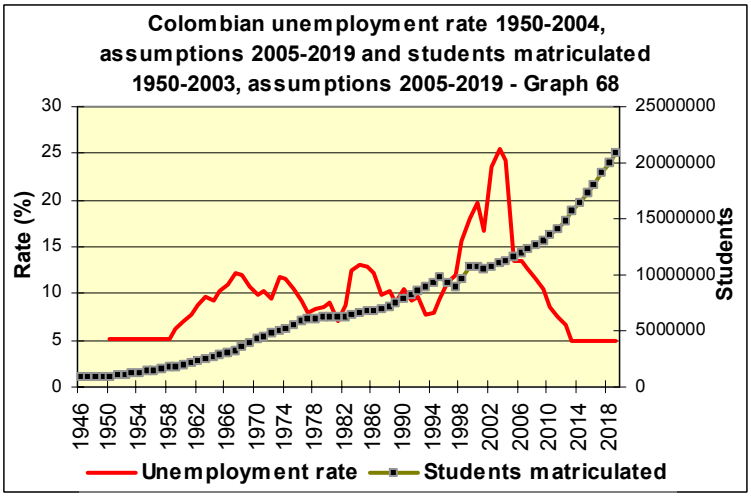

Displaced people 1950-2005, assumptions 2006-2019 and Cyclical terrorist murder per 100,000 people 1950-2004, Forecasts 2005-2019 - Graph 66
Thousands of displaced people
Terrorist murder
Displaced people
Cyclical terrorist murder

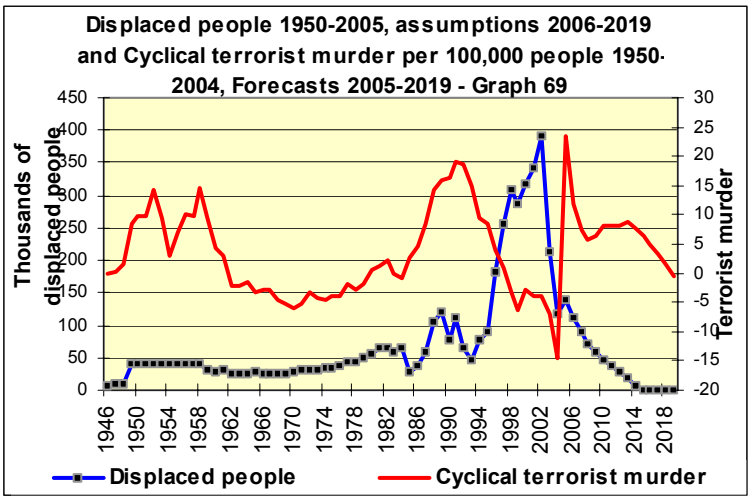
SCENARIO 12. Intentionally blank

SCENARIO 13. Disarmament. Assumptions.

Armed forces diminish 20% on 2006, 10% on 2007 and 5% on 2008; from 2009 to 2019 they remain constant. Students growing at 3% from 2004 to 2010, and at 5% from 2011 to 2019; the real trade balance oscillates around negative figures form 2006 to 2010 and becomes positive from 2011 to 2019; displacement follows the assumptions by DNP. As conclusion this scenario grants peace by year 2019.

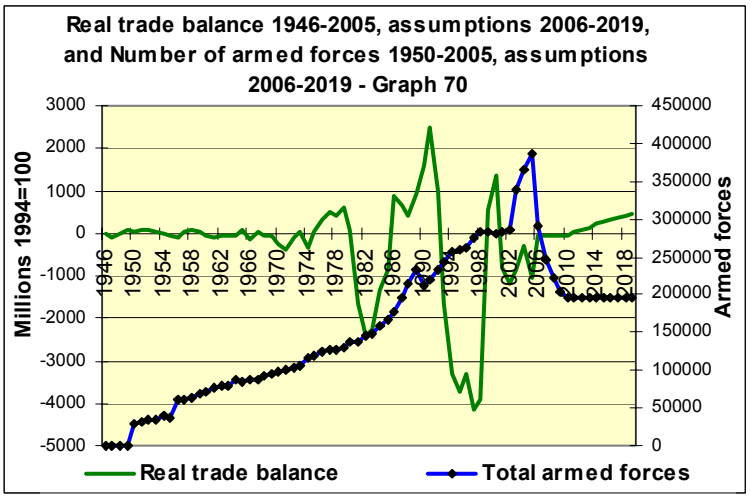


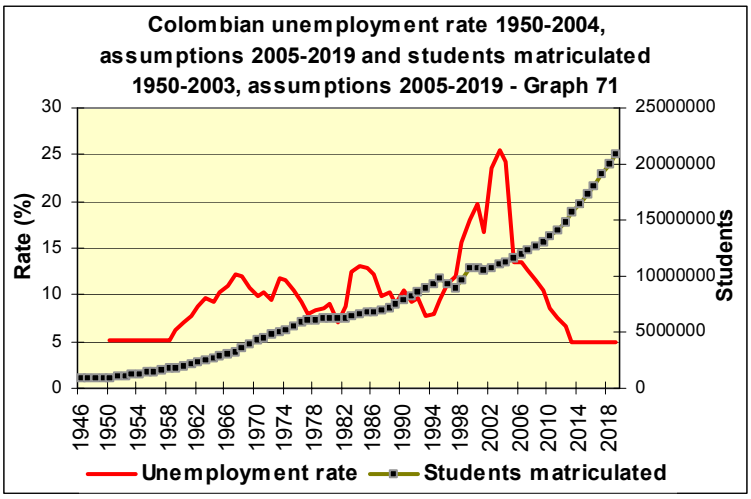


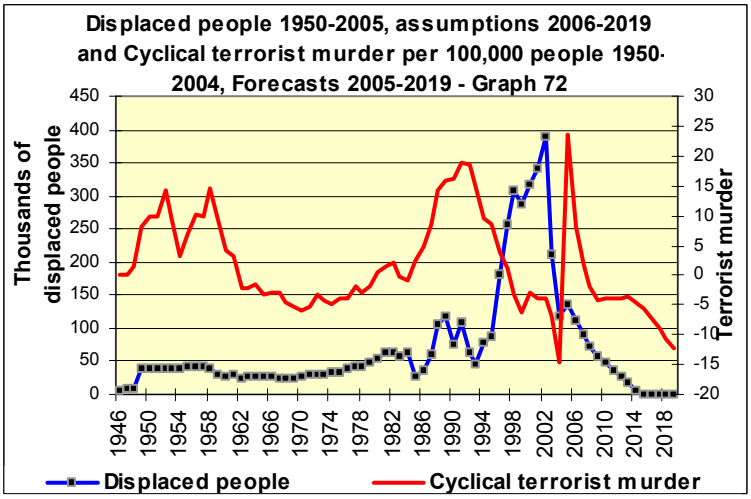


SCENARIO 14 – More than moderate disarmament again, armed forces diminish 25% the first year. Assumptions.

Armed forces diminish 25% on 2006, 15% on 2007, 10% on 2008, 8% on 2009, 4% on 2010, and remains constant from 2011 to 2019. Students growing at 3% from 2004 to 2010, and at 5% from 2011 to 2019; the real trade balance oscillates around negative figures form 2006 to 2010 and becomes positive from 2011 to 2019; displacement follows the assumptions by DNP. As conclusion this scenario grants peace by year 2019; it appears to be a good choice since it grants peace by year 2008 (with terrorist murder at –2 per capita).

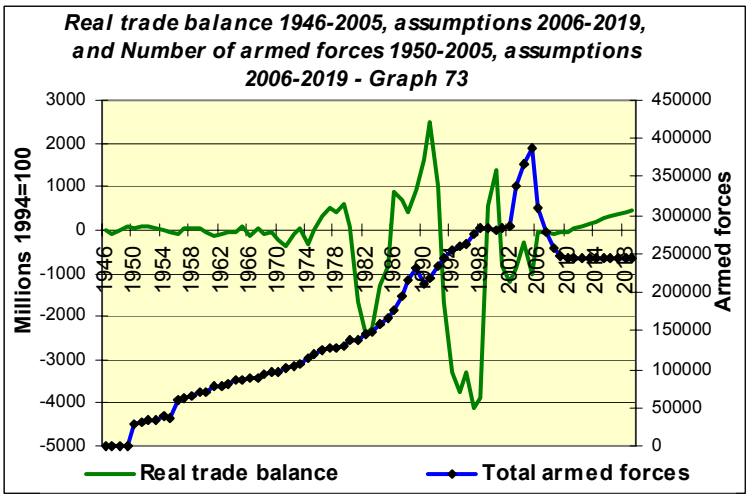


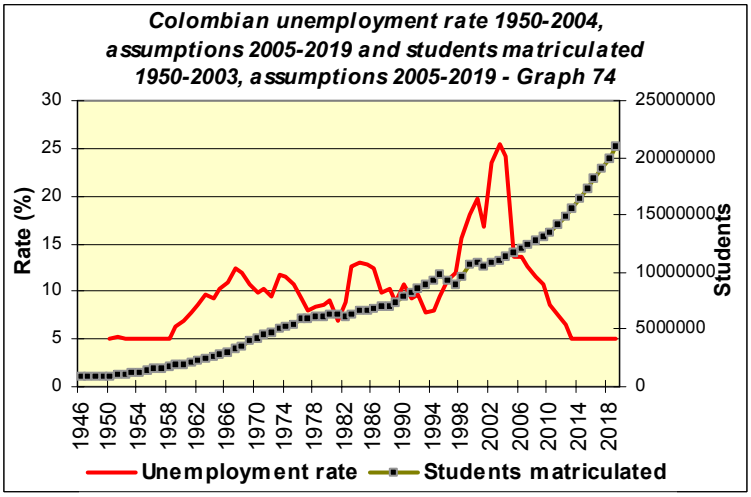


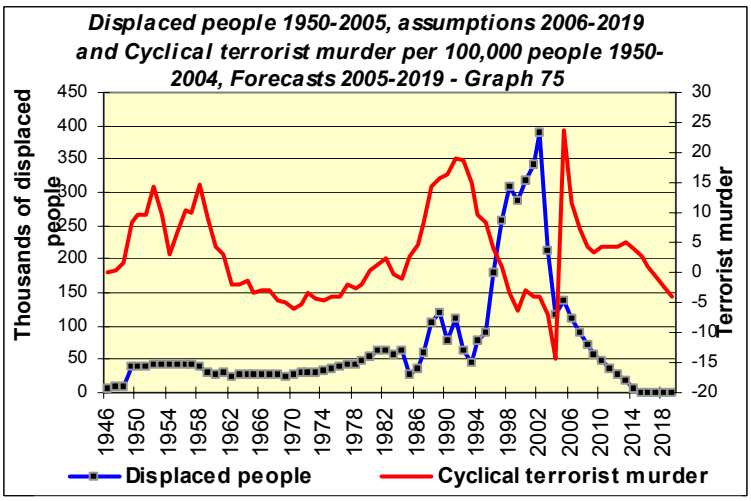


SCENARIO 15. Disarmament. Assumptions.

Armed forces diminish by 20% on 2006, 10% on 2007, 8% on 2008, 4% on 2009 and 1% on 2010, from 2011 to 2019 they remain constant. Students growing at 3% from 2004 to 2010, and at 5% from 2011 to 2019; the real trade balance oscillates around negative figures form 2006 to 2010 and becomes positive from 2011 to 2019; displacement follows the assumptions by DNP. This scenario grants peace by year 2015 (3 terrorist murder per capita).


Real trade balance 1946-2005, assumptions 2006-2019, and Number of armed forces 1950-2005, assumptions 2006-2019 - Graph 73
Millions 1994=100
Armed forces
Real trade balance
Total armed forces

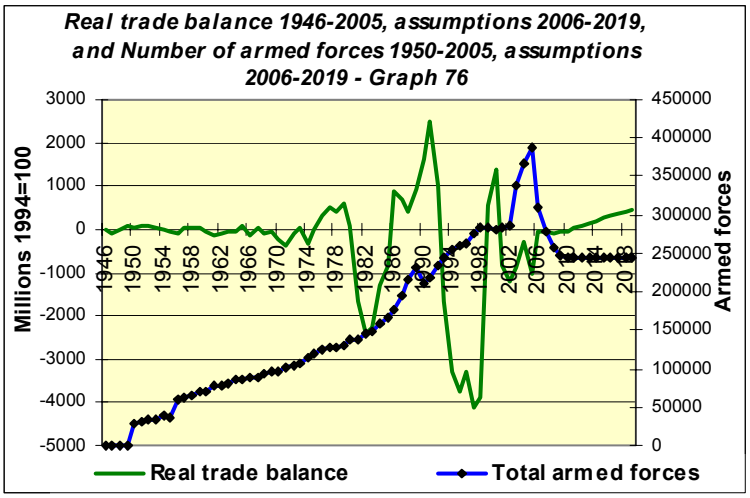

Colombian unemployment rate 1950-2004, assumptions 2005-2019 and students matriculated 1950-2003, assumptions 2005-2019 - Graph 74
Rate (%)
Students
Unemployment rate
Students matriculated

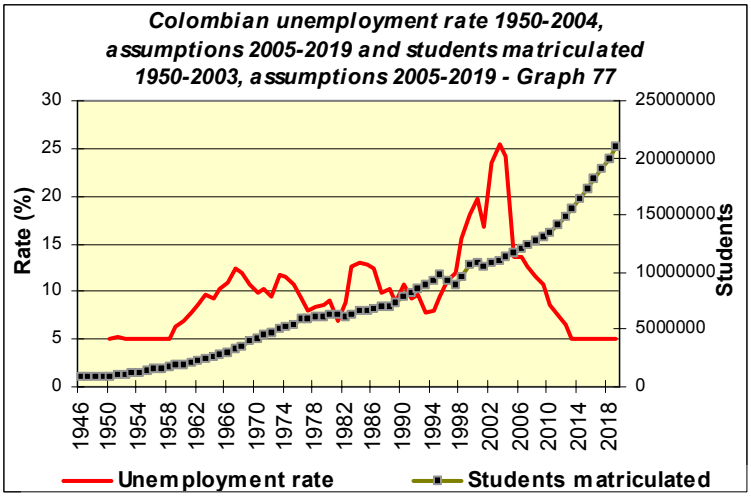

Displaced people 1950-2005, assumptions 2006-2019 and Cyclical terrorist murder per 100,000 people 1950-2004, Forecasts 2005-2019 - Graph 75
Thousands of displaced people
Terrorist murder
Displaced people
Cyclical terrorist murder

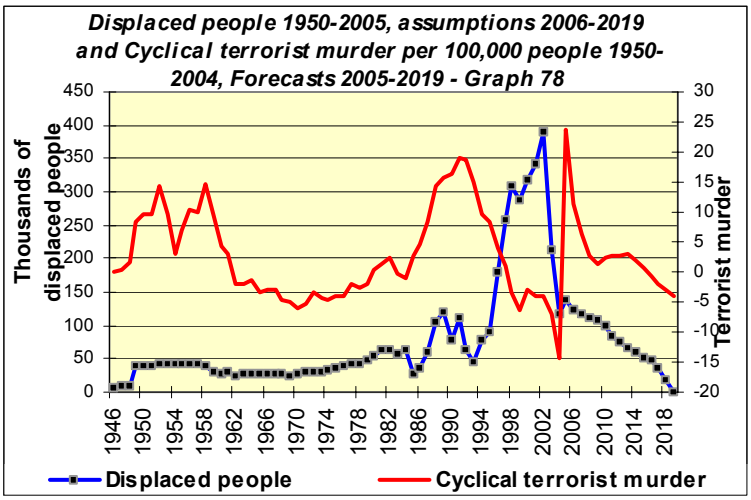
SCENARIO 16. Pessimistic scenario. The existence of displaced people by year 2018

For didactic purposes I model a slow reduction of displaced people, and its existence up to year 2018. According to this, displaced people diminish 10% on 2006, 6% on 2007, 4% on 2008, 3% on 2009, 10% on 2010, 15% on 2011, 10% on 2012, 10% on 2013, 10% on 2014, 15% on 2015, 10% on 2016, 50% on 2018.

Armed forces also diminish by 20% on 2006, 10% on 2007, 8% on 2008, 4% on 2009, and 1% on 2010. Students growing at 3% from 2004 to 2010, and at 5% from 2011 to 2019; the real trade balance oscillates around negative figures form 2006 to 2010 and becomes positive from 2011 to 2019. This scenario grants peace by year 2008 (judging as acceptable 3 cyclical murders per capita).



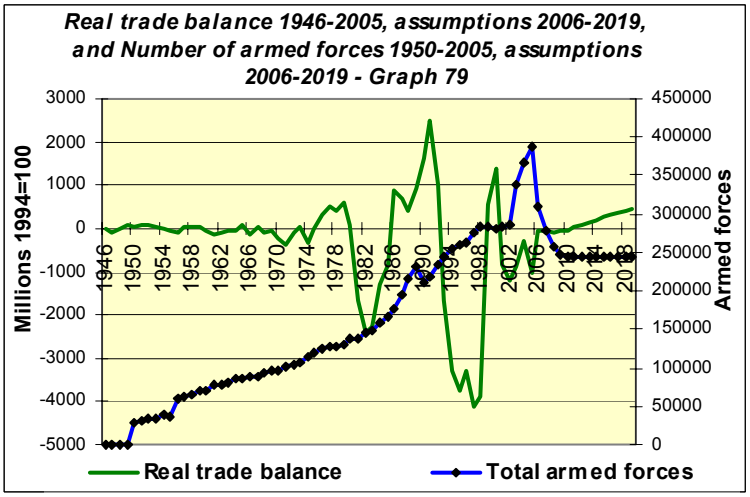


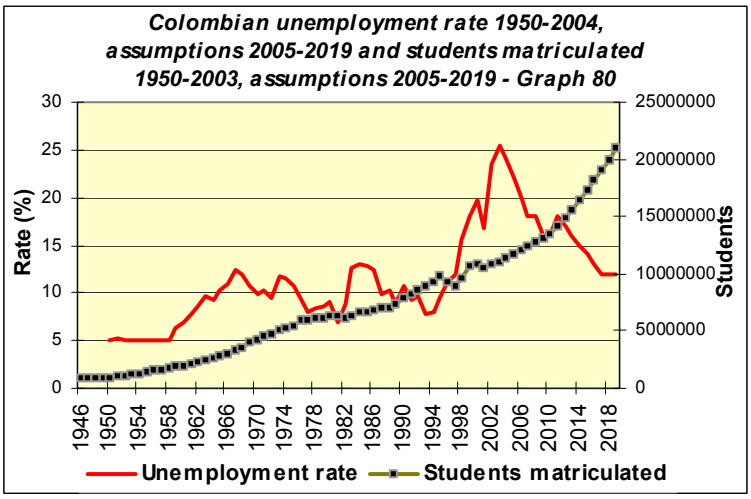


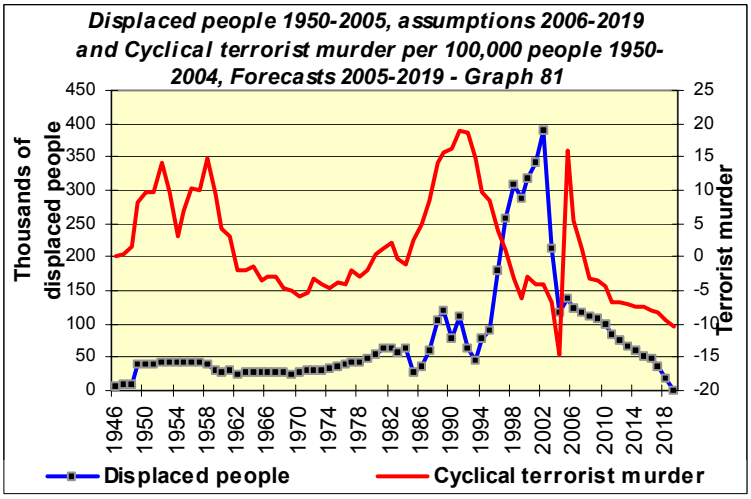
SCENARIO 17. Pessimistic scenario. High unemployment rate, displacement continues, armed forces increases

I model the assumption of a high unemployment rate up to year 2019. Displaced people diminish 10% on 2006, 6% on 2007, 4% on 2008, 3% on 2009, 10% on 2010, 15% on 2011, 10% on 2012, 10% on 2013, 10% on 2014, 15% on 2015, 10% on 2016, 50% on 2018.

Armed forces also diminish by 20% on 2006, 10% on 2007, 8% on 2008, 4% on 2009, and 1% on 2010. Students growing at 3% from 2004 to 2010, and at 5% from 2011 to 2019; the real trade balance oscillates around negative figures form 2006 to 2010 and becomes positive from 2011 to 2019. The scenario appears to be granting peace by year 2007.



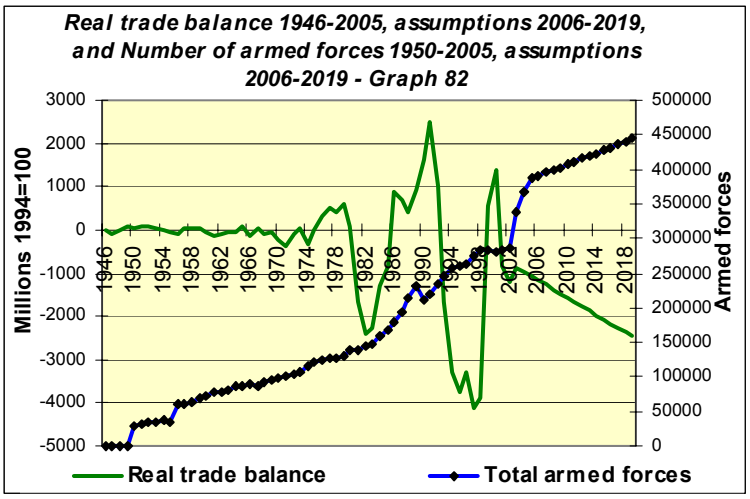


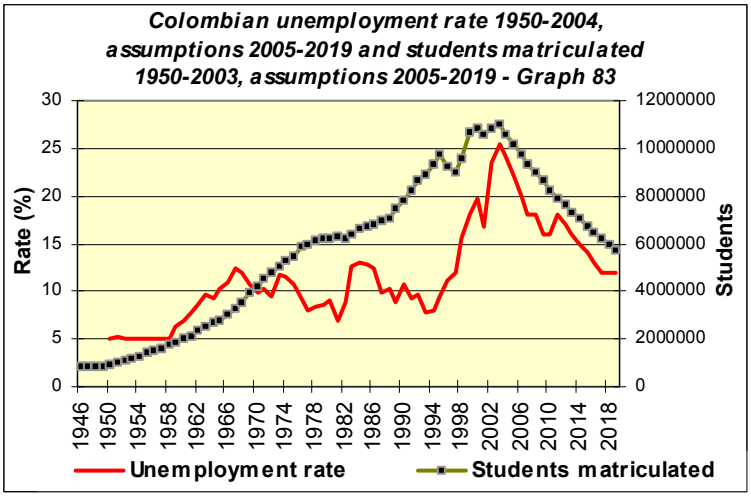


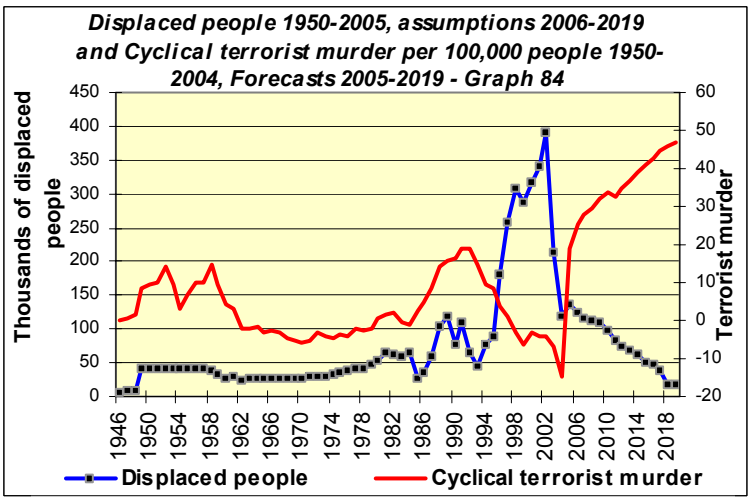
SCENARIO 18. PESSIMISTIC SCENARIO. ***A situation where everything shifts for the worst.***

In this hypothetic scenario, I assume there is no alternation in power, real trade balance starts deteriorating, students enrolled diminish, armed forces and displaced people continue increasing and the country keeps the high unemployment rate from last scenario.

Real trade balance becomes negative on 2004, and diminish by 100 millions yearly up to 2019, total armed forces increases 1% annually from 2005 to 2019, displaced people increases 1% annually from 2006 to 2019 (approximate number of 18,000), students enrolled diminish at 4% annually from 2004 to 2019. As conclusion terrorist murder explodes instantly.


Real trade balance 1946-2005, assumptions 2006-2019, and Number of armed forces 1950-2005, assumptions 2006-2019 - Graph 82
Millions 1994=100
Armed forces
Real trade balance
Total armed forces


Colombian unemployment rate 1950-2004, assumptions 2005-2019 and students matriculated 1950-2003, assumptions 2005-2019 - Graph 83
Rate (%)
Students
Unemployment rate
Students matriculated


Displaced people 1950-2005, assumptions 2006-2019 and Cyclical terrorist murder per 100,000 people 1950-2004, Forecasts 2005-2019 - Graph 84
Thousands of displaced people
Terrorist murder
Displaced people
Cyclical terrorist murder

Conclusion

Provided with a data series of cyclical terrorist murder in Colombia 1946-2003, I created a model to explain the movements in that terrorist murder data. I confirm that obvious variables, such as coding for the *La Violencia* and the *National Front years*, are indeed statistically significant (and of the expected sign). I also find that, as the narrative literature and Gómez-Sorzano (2005) suggests, that the increase in real trade balance leads to higher levels of cyclical terrorist murder; and, that an increase in armed people increases the cyclical terrorist murder; finally as the Colombian National Police and several historians suggest I also find statistically that the increase in displaced people (families coming to main cities of the country) decreases the cyclical terrorist violence mostly concentrated in the countryside and causes in turn a increase in the unemployment rate in the main cities of the country. In regard to the trade balance the underlying theoretical point is that trade balance improvements derive from commodity booms (coffee, cocaine, emeralds, petroleum, gas) that make land more valuable and therefore the contest over land more severe. Although this finding is worth investigating in detail, appendix A, graph group 5, shows its dynamics: a shock in terrorist murder in the countryside which is assumed as caused by the fight for land is positively affecting the real trade balance. Finally, I find that increases in the number of students enrolled in all modalities (pre-elementary, elementary, high school, university) reduce the cyclical terrorist murder.

In regard to the recent overall results in the behavior of murder and cyclical terrorist murder per capita for Colombia, figures 1 and 1A show the results between the past and current administrations. During President Pastrana's government (1998-2002), both graphs show an upwards tendency in both indicators, while for 2003 they presents a sharp decrease, implying up to that year Alvaro Uribe's *Democratic Security Policy* is highly effective at annihilating terrorist guerrilla clashes in the countryside and strongly suggesting that a continuation of this policy would be possible destroying the roots of the Colombian civil conflict. [34] However, the analyses presented in this paper show the big dilemma currently facing Colombian authorities: the forecasts in figure 10A, 10B and table 8 show the trade-off or inverse relationship between displaced people and cyclical terrorist murder. The simulations presented when varying the number of future displaced people using two different sources show a picture in which the reduction of forced displacement from 212,000 people in 2003 to 117,000 in 2004 is having a impact on the intensity of the conflict, creating a new cycle boosting the terrorist murder concentrated in the countryside from -6.93 murders per capita in 2003 to 12.9 in 2004 and 5.2 in 2004. Although this upsurge in murder appears to be erasing the initial results obtained in 2003 by The Uribe's administration, terrorist murder is expected to decrease again by 2006 and 2007 and peace will be attained around year 2008 and *sustainable peace* found before year 2019.

[34]. These findings coincide with the analyses done by Jorge Restrepo and Michael Spagat (2004) in regards to Uribe's first 17 months in the presidency, quoting them in their abstract to the paper "The Colombian Conflict: Uribe's first 17 Months: Analysis of our new, 16-year dataset on the Colombian civil war finds under Uribe: guerrilla and paramilitary attacks dropping sharply to long-run averages since 1988, lower for April-December 2003; government-guerrilla clashes at all-time highs, exceeding guerrilla attacks; civilian killings dropping sharply and continuously to all-time lows, mainly from decreased paramilitary attacks; combatants killings rising sharply to all-time highs; guerrilla tactics shifting toward indiscriminate attacking, forcing civilians injuries to long-run highs; government-to-guerrilla casualty ratios in clashes falling; government-paramilitary clashes increasing but still uncommon; paramilitary performance in clashes poor and worsening; guerrilla-paramilitary clashes dropping sharply; the ELN (National Liberation Army) seriously weakened, mounting few attacks.

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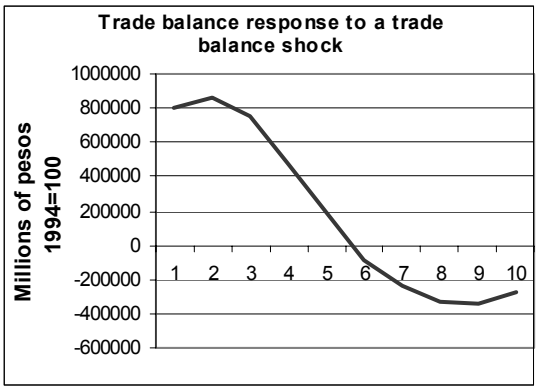
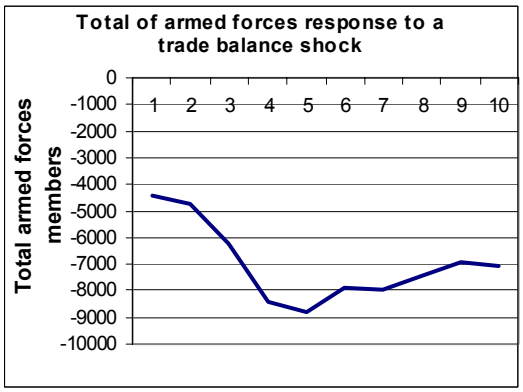
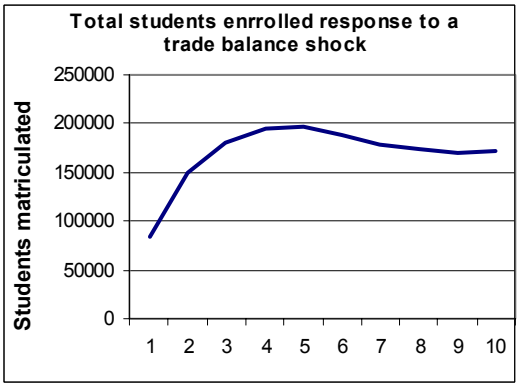
Appendix A

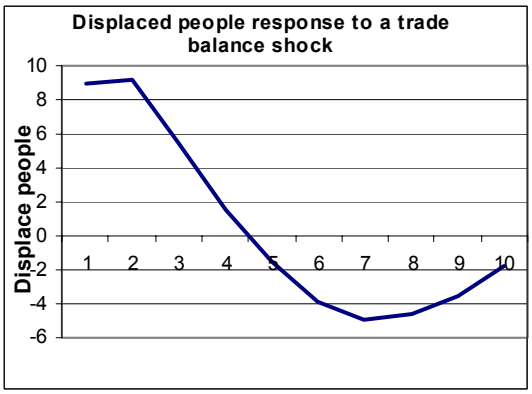
Impulse response functions for the Near-Var Model, system including reconstructed series for displaced people by DNP (despla6)

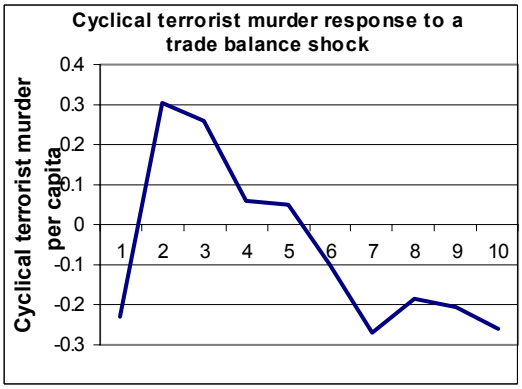
1) One standard deviation shock in trade balance



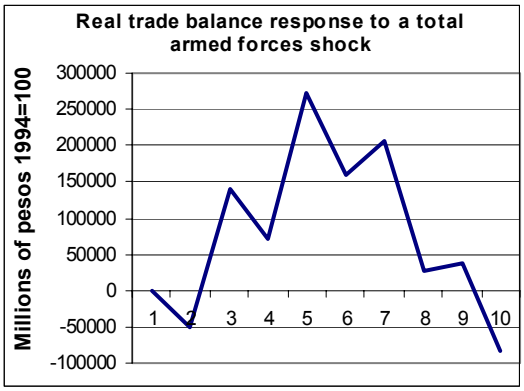


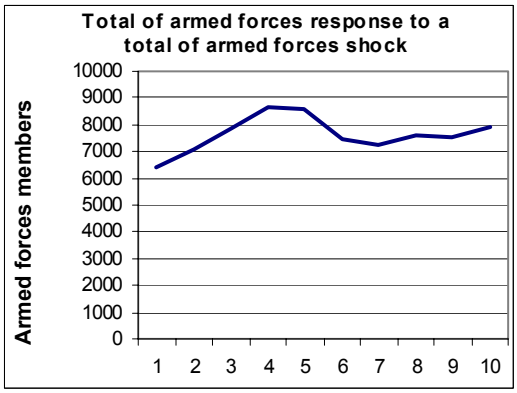


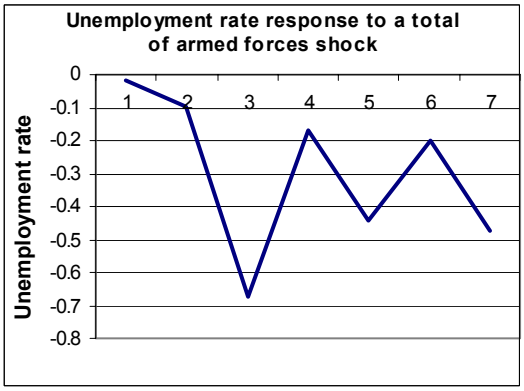


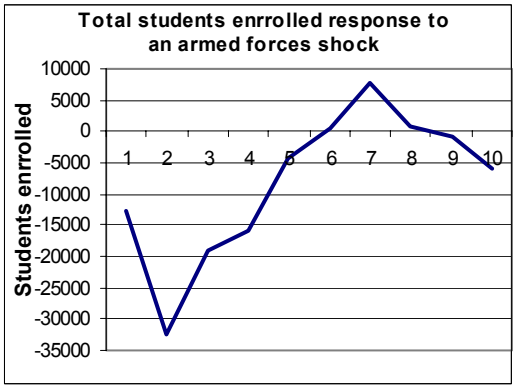


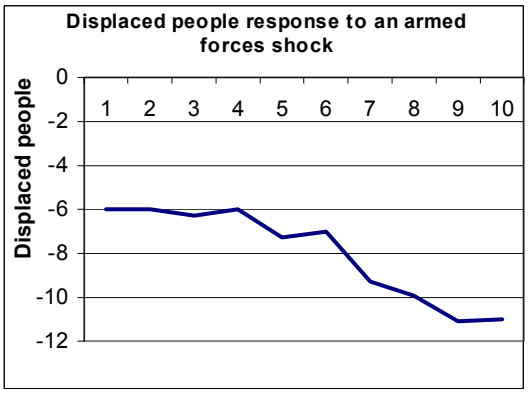
2) One standard deviation shock in armed forces

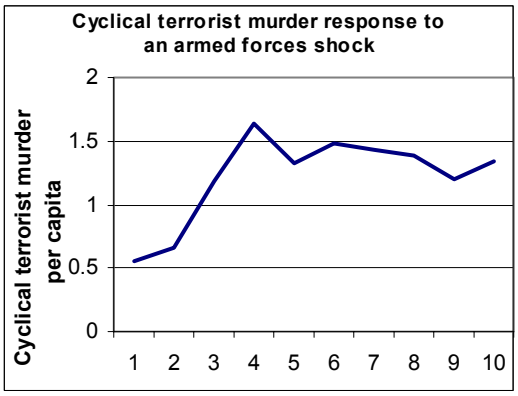




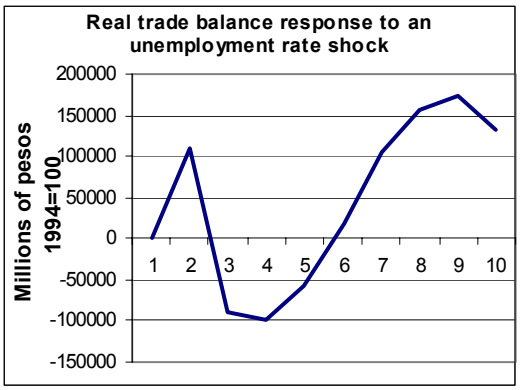


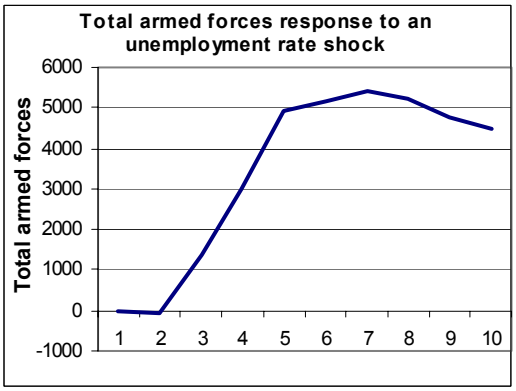


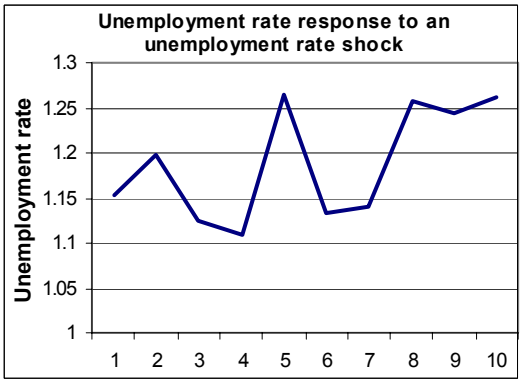


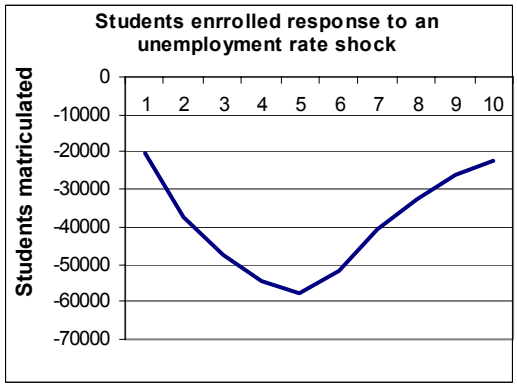


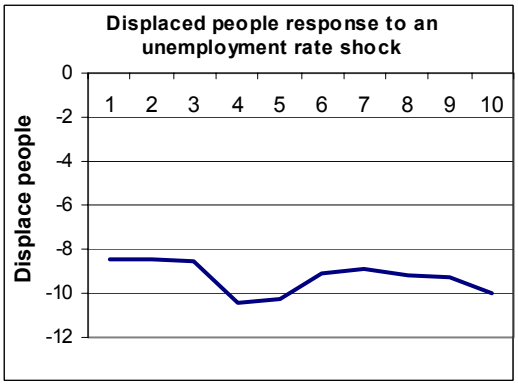
3) One standard deviation shock in unemployment rate

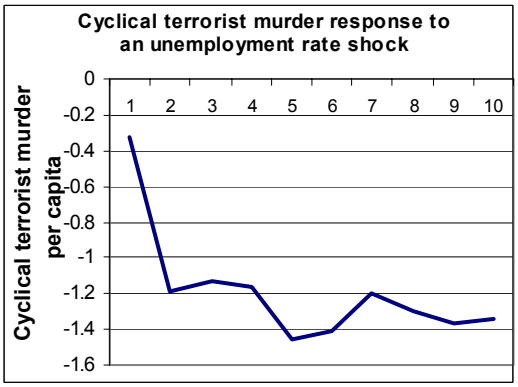




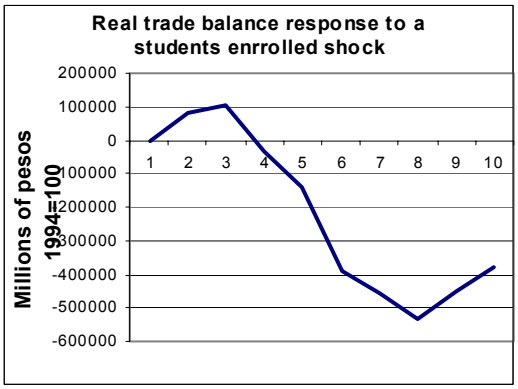


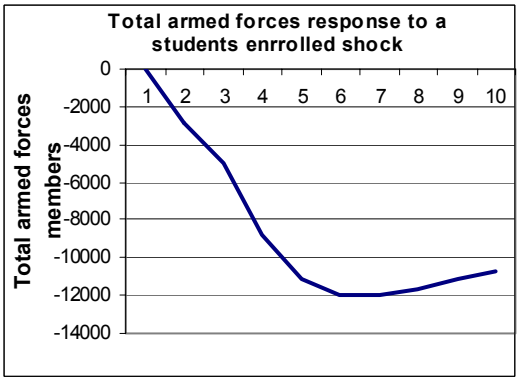


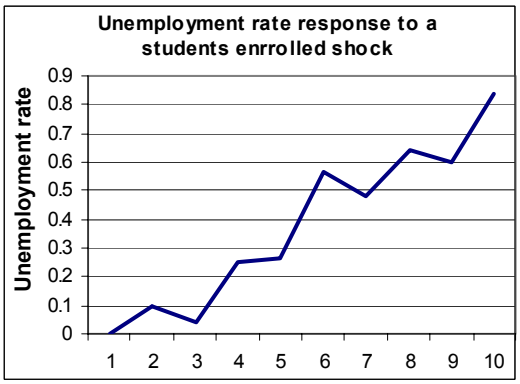


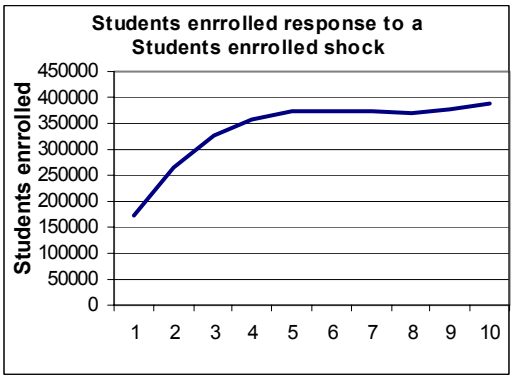


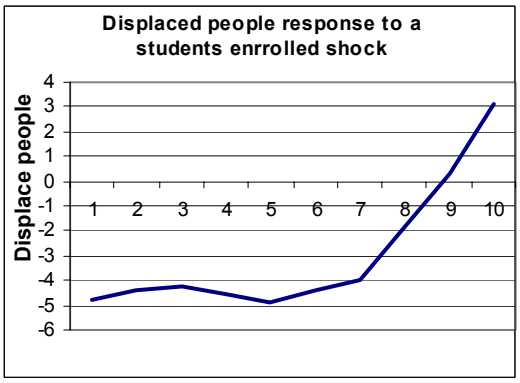
4) One standard deviation shock in students enrolled in all modalities

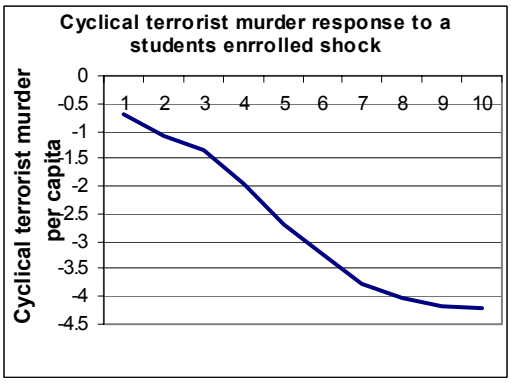




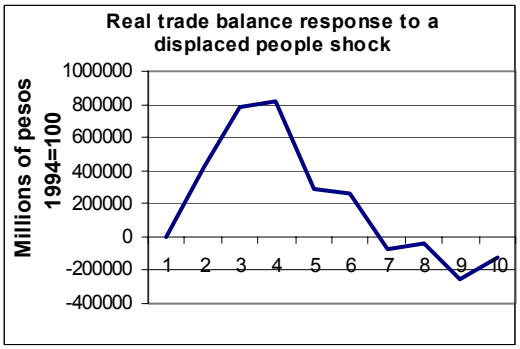


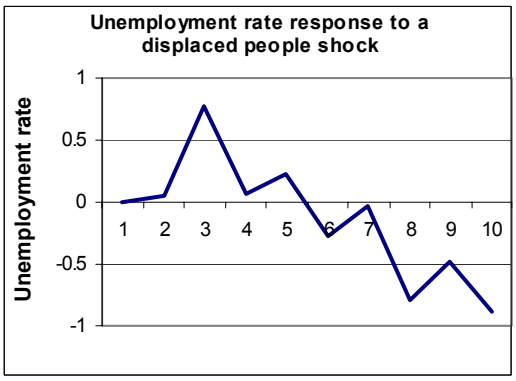


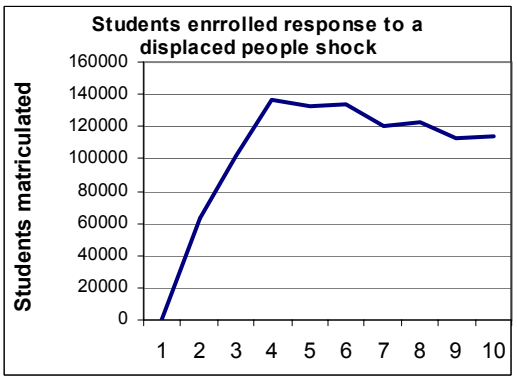


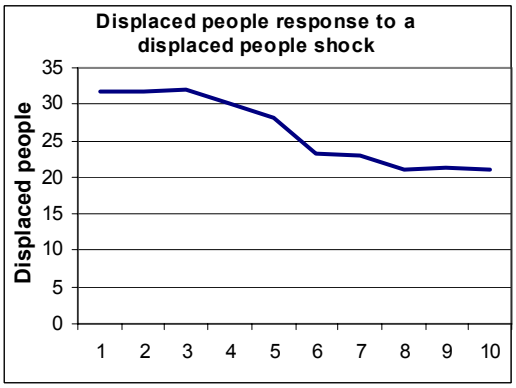


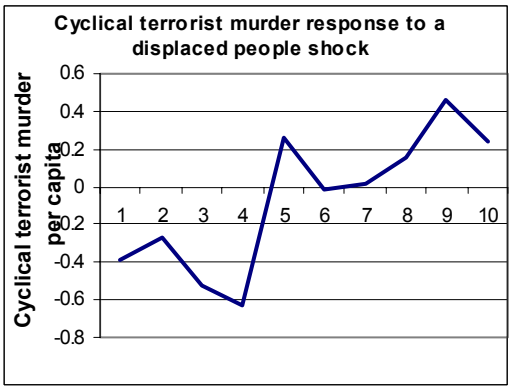
5) One standard deviation shock in displaced people



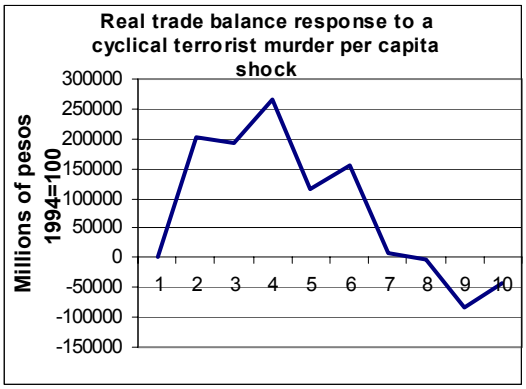


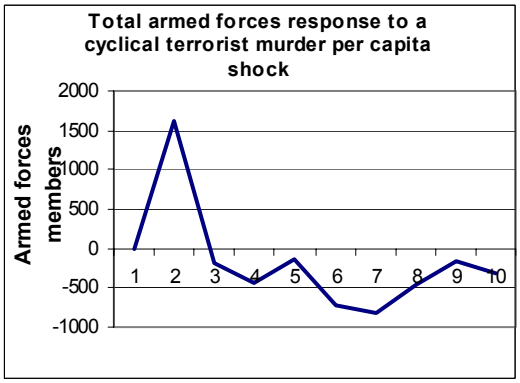


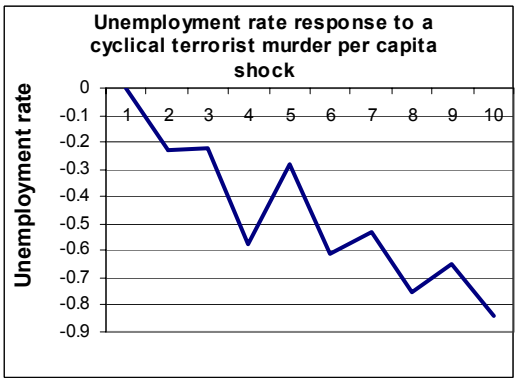


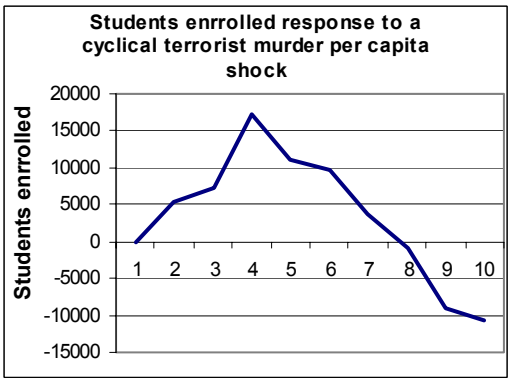


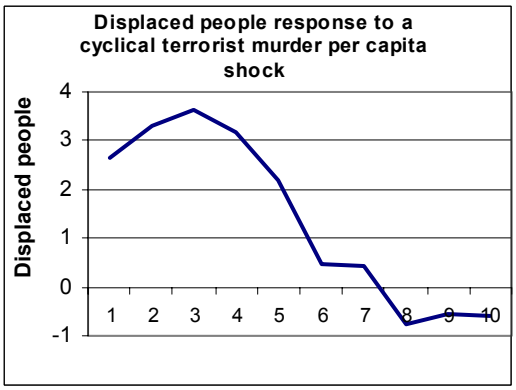
6) One standard deviation shock in cyclical terrorist murder per capita

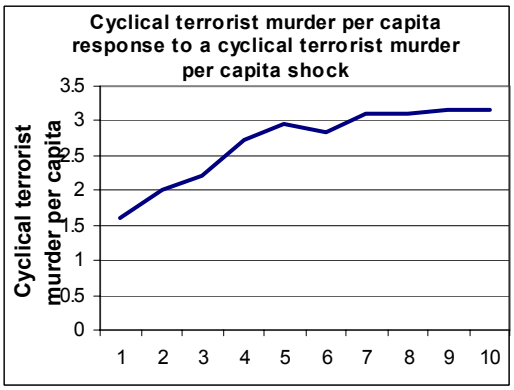












Appendix B – Scenarios 2005- 2010

Scenario 1

Table 1

year	B	CL1	Rtb6	Taf11	U	students1	despla3	cvpc1A
2005	0	1	-1,040	386,897	22	11,312,000	137.3	17
2006	0	1	100	390,765	20	11,425,120	110.9	21
2007	0	1	200	394,672	18	11,539,371	89.6	25
2008	0	1	300	398,618	16	11,654,764	72.4	28
2009	0	1	400	402,604	14	11,771,311	58.5	31
2010	0	1	500	406,630	12	11,889,024	47.3	34

B: Bogotazo years, CL1: Alternation in power, Rtb6: Real trade balance (millions of pesos)

Taf1: Total armed forces (Police + Army), U: Unemployment rate, Students1: Students enrolled in all modalities.

Despla3 : Displaced people (thousands), Cvpc1a: Cyclical terrorist murder per 100,000 people.

Scenario 2

Table 2

year	B	CL1	Rtb6	Taf11	U	students1	despla3	cvpc1A
2005	0	1	-1,040	386,897	22	11,312,000	137.3	17
2006	0	1	100	394,634	20	11,425,120	110.9	22
2007	0	1	200	402,526	18	11,539,371	89.6	26
2008	0	1	300	410,576	16	11,654,764	72.4	30
2009	0	1	400	418,787	14	11,771,311	58.5	34
2010	0	1	500	427,162	12	11,889,024	47.3	37

B: Bogotazo years, CL1: Alternation in power, Rtb6: Real trade balance (millions of pesos)

Taf1: Total armed forces (Police + Army), U: Unemployment rate, Students1: Students enrolled in all modalities.

Despla3 : Displaced people (thousands), Cvpc1a: Cyclical terrorist murder per 100,000 people.

Scenario 3

Table 3

year	B	CL1	Rtb6	Taf11	U	students1	despla3	cvpc1A
2005	0	1	-1,040	386,897	22	11,312,000	137.3	17
2006	0	1	100	383,029	20	11,425,120	110.9	20
2007	0	1	200	379,199	18	11,539,371	89.6	22
2008	0	1	300	375,408	16	11,654,764	72.4	24
2009	0	1	400	371,654	14	11,771,311	58.5	25
2010	0	1	500	367,938	12	11,889,024	47.3	27

B: Bogotazo years, CL1: Alternation in power, Rtb6: Real trade balance (millions of pesos)

Taf1: Total armed forces (Police + Army), U: Unemployment rate, Students1: Students enrolled in all modalities.

Despla3 : Displaced people (thousands), Cvpc1a: Cyclical terrorist murder per 100,000 people.

Scenario 4

Table 4

year	B	CL1	Rtb6	Taf11	U	students1	despla3	cvpc1A
2005	0	1	-1,040	386,897	22	11,659,309	137.3	16
2006	0	1	100	383,029	20	12,009,088	110.9	19
2007	0	1	200	379,199	18	12,369,360	89.6	20
2008	0	1	300	375,408	16	12,740,440	72.4	22
2009	0	1	400	371,654	14	13,122,653	58.5	23
2010	0	1	500	367,938	12	13,516,332	47.3	24

B: Bogotazo years, CL1: Alternation in power, Rtb6: Real trade balance (millions of pesos)

Taf1: Total armed forces (Police + Army), U: Unemployment rate, Students1: Students enrolled in all modalities.

Despla3 : Displaced people (thousands), Cvpc1a: Cyclical terrorist murder per 100,000 people.

Scenario 5

Table 5

year	B	CL1	Rtb6	Taf11	U	students1	despla3	cvpc1A
2005	0	1	-1,040	386,897	22	11,659,309	137.3	16
2006	0	1	100	375,290	20	12,009,088	110.9	18
2007	0	1	200	364,032	18	12,369,360	89.6	18
2008	0	1	300	353,112	16	12,740,440	72.4	18
2009	0	1	400	342,519	14	13,122,653	58.5	18
2010	0	1	500	332,243	12	13,516,332	47.3	18

B: Bogotazo years, CL1: Alternation in power, Rtb6: Real trade balance (millions of pesos)

Taf1: Total armed forces (Police + Army), U: Unemployment rate, Students1: Students enrolled in all modalities.

Despla3 : Displaced people (thousands), Cvpc1a: Cyclical terrorist murder per 100,000 people.

Scenario 6

Table 6

year	B	CL1	Rtb6	Taf11	U	students1	despla3	cvpc1A
2005	0	1	-1,040	386,897	22	11,659,309	137.3	16
2006	0	1	-54	375,290	20	12,009,088	110.9	17
2007	0	1	-64	364,032	18	12,369,360	89.6	17
2008	0	1	-77	353,112	16	12,740,440	72.4	17
2009	0	1	-59	342,519	14	13,122,653	58.5	17
2010	0	1	-38	332,243	12	13,516,332	47.3	17

B: Bogotazo years, CL1: Alternation in power, Rtb6: Real trade balance (millions of pesos)

Taf1: Total armed forces (Police + Army), U: Unemployment rate, Students1: Students enrolled in all modalities.

Despla3 : Displaced people (thousands), Cvpc1a: Cyclical terrorist murder per 100,000 people.

Scenario 7

Table 7

year	B	CL1	Rtb6	Taf11	U	students1	despla3	cvpc1A
2005	0	1	-1,040	386,897	22	11,659,309	137.3	16
2006	0	1	-54	115,203	20	12,009,088	110.9	-28
2007	0	1	-64	120,327	18	12,369,360	89.6	-25
2008	0	1	-77	125,636	16	12,740,440	72.4	-23
2009	0	1	-59	127,732	14	13,122,653	58.5	-21
2010	0	1	-38	126,463	12	13,516,332	47.3	-19

B: Bogotazo years, CL1: Alternation in power, Rtb6: Real trade balance (millions of pesos)

Taf1: Total armed forces (Police + Army), U: Unemployment rate, Students1: Students enrolled in all modalities.

Despla3 : Displaced people (thousands), Cvpc1a: Cyclical terrorist murder per 100,000 people.

Scenario 8

Table 8

year	B	CL1	Rtb6	Taf11	U	students1	despla3	cvpc1A
2005	0	1	-1,040	386,897	22	11,659,309	137.3	16
2006	0	1	-54	328,862	20	12,009,088	110.9	9
2007	0	1	-64	279,533	18	12,369,360	89.6	3
2008	0	1	-77	237,603	16	12,740,440	72.4	-3
2009	0	1	-59	201,963	14	13,122,653	58.5	-8
2010	0	1	-38	171,669	12	13,516,332	47.3	-11

B: Bogotazo years, CL1: Alternation in power, Rtb6: Real trade balance (millions of pesos)

Taf1: Total armed forces (Police + Army), U: Unemployment rate, Students1: Students enrolled in all modalities.

Despla3 : Displaced people (thousands), Cvpc1a: Cyclical terrorist murder per 100,000 people.

Scenario 9

Table 9

year	B	CL1	Rtb6	Taf11	U	students1	despla3	cvpc1A
2005	0	1	-1,040	386,897	22	11,659,309	137.3	16
2006	0	1	-54	317,256	20	12,009,088	110.9	7
2007	0	1	-64	260,150	18	12,369,360	89.6	-1
2008	0	1	-77	213,323	16	12,740,440	72.4	-7
2009	0	1	-59	174,925	14	13,122,653	58.5	-12
2010	0	1	-38	143,438	12	13,516,332	47.3	-16

B: Bogotazo years, CL1: Alternation in power, Rtb6: Real trade balance (millions of pesos)

Taf1: Total armed forces (Police + Army), U: Unemployment rate, Students1: Students enrolled in all modalities.

Despla3 : Displaced people (thousands), Cvpc1a: Cyclical terrorist murder per 100,000 people.

Scenario 10

Table 10

year	B	CL1	Rtb6	Taf11	U	students1	despla3	cvpc1A
2005	0	1	-1,040	386,897	22	11,659,309	137.3	16
2006	0	1	-54	309,518	20	12,009,088	110.9	6
2007	0	1	-64	247,614	18	12,369,360	89.6	-3
2008	0	1	-77	198,091	16	12,740,440	72.4	-10
2009	0	1	-59	158,473	14	13,122,653	58.5	-15
2010	0	1	-38	126,778	12	13,516,332	47.3	-19

B: Bogotazo years, CL1: Alternation in power, Rtb6: Real trade balance (millions of pesos)

Taf1: Total armed forces (Police + Army), U: Unemployment rate, Students1: Students enrolled in all modalities.

Despla3 : Displaced people (thousands), Cvpc1a: Cyclical terrorist murder per 100,000 people.

Scenario 11

Table 11

year	B	CL1	Rtb6	Taf11	U	students1	despla3	cvpc1A
2005	0	1	-1,040	386,897	22	11,659,309	137.3	16
2006	0	1	-54	232,138	20	12,009,088	110.9	-8
2007	0	1	-64	185,710	18	12,369,360	89.6	-14
2008	0	1	-77	176,424	16	12,740,440	72.4	-14
2009	0	1	-59	172,896	14	13,122,653	58.5	-13
2010	0	1	-38	171,167	12	13,516,332	47.3	-12

B: Bogotazo years, CL1: Alternation in power, Rtb6: Real trade balance (millions of pesos)

Taf1: Total armed forces (Police + Army), U: Unemployment rate, Students1: Students enrolled in all modalities.

Despla3 : Displaced people (thousands), Cvpc1a: Cyclical terrorist murder per 100,000 people.

Appendix C – Tables for scenarios granting sustainable peace by year 2019.

Scenario 1

Table 1A

year	B	CL1	Rtb6	Taf11	U	students1	despla3	cvpc1A
2005	0	1	-1,040	386,897	22	11,312,000	137	17
2006	0	1	100	390,765	20	11,425,120	111	22
2007	0	1	200	394,672	18	11,539,371	90	25
2008	0	1	300	398,618	16	11,654,764	72	28
2009	0	1	400	402,604	14	11,771,311	59	31
2010	0	1	500	406,630	12	11,889,024	47	34
2011	0	1	600	386,298	10	12,007,914	37	32
2012	0	1	700	366,983	8	12,127,993	27	31
2013	0	1	800	348,634	6	12,249,272	17	30
2014	0	1	900	331,202	5	12,371,764	7	28
2015	0	1	1,000	314,642	5	12,495,481	0	25
2016	0	1	1,100	298,910	5	12,620,435	0	22
2017	0	1	1,200	283,964	5	12,746,639	0	20
2018	0	1	1,300	269,766	5	12,874,105	0	17
2019	0	1	1,400	256,278	5	13,002,846	0	14

B: Bogotazo years, CL1: Alternation in power, Rtb6: Real trade balance (millions of pesos)

Taf1: Total armed forces (Police + Army), U: Unemployment rate, Students1: Students enrolled in all modalities.

Despla3 : Displaced people (thousands), Cvpc1a: Cyclical terrorist murder per 100,000 people.

Scenario 2

Table 2A

year	B	CL1	Rtb6	Taf11	U	students1	despla3	cvpc1A
2005	0	1	-1,040	386,897	22	11,312,000	137.3	17
2006	0	1	100	367,552	20	11,425,120	110.9	17
2007	0	1	200	349,174	18	11,539,371	89.6	17
2008	0	1	300	331,715	16	11,654,764	72.4	16
2009	0	1	400	315,129	14	11,771,311	58.5	15
2010	0	1	500	299,373	12	11,889,024	47.3	15
2011	0	1	600	284,404	10	12,007,914	37.3	14
2012	0	1	700	270,184	8	12,127,993	27.3	14
2013	0	1	800	256,675	6	12,249,272	17.3	14
2014	0	1	900	243,841	5	12,371,764	7.3	13
2015	0	1	1,000	231,649	5	12,495,481	0	11
2016	0	1	1,100	220,067	5	12,620,435	0	8
2017	0	1	1,200	209,064	5	12,746,639	0	6
2018	0	1	1,300	198,611	5	12,874,105	0	4
2019	0	1	1,400	188,680	5	13,002,846	0	3

B: Bogotazo years, CL1: Alternation in power, Rtb6: Real trade balance (millions of pesos)

Taf1: Total armed forces (Police + Army), U: Unemployment rate, Students1: Students enrolled in all modalities.

Despla3 : Displaced people (thousands), Cvpc1a: Cyclical terrorist murder per 100,000 people.

Scenario 3

Tabla 3A

year	B	CL1	Rtb6	Taf11	U	students1	despla3	cvpc1A
2005	0	1	-1,040	386,897	22	11,312,000	137.3	17
2006	0	1	100	367,552	20	11,425,120	110.9	17
2007	0	1	200	349,174	18	11,539,371	89.6	17
2008	0	1	300	331,715	16	11,654,764	72.4	16
2009	0	1	400	318,446	14	11,771,311	58.5	16
2010	0	1	500	305,708	12	11,889,024	47.3	16
2011	0	1	600	293,480	10	12,007,914	37.3	16
2012	0	1	700	281,741	8	12,127,993	27.3	16
2013	0	1	800	273,289	6	12,249,272	17.3	17
2014	0	1	900	265,090	5	12,371,764	7.3	16
2015	0	1	1,000	257,137	5	12,495,481	0	15
2016	0	1	1,100	251,994	5	12,620,435	0	14
2017	0	1	1,200	246,954	5	12,746,639	0	13
2018	0	1	1,300	242,015	5	12,874,105	0	12
2019	0	1	1,400	242,015	5	13,002,846	0	12

B: Bogotazo years, CL1: Alternation in power, Rtb6: Real trade balance (millions of pesos)

Taf1: Total armed forces (Police + Army), U: Unemployment rate, Students1: Students enrolled in all modalities.

Despla3 : Displaced people (thousands), Cvpc1a: Cyclical terrorist murder per 100,000 people.

Scenario 4

Table 4A

year	B	CL1	Rtb6	Taf11	U	students1	despla3	cvpc1A
2005	0	1	-1,040	386,897	22	11,659,309	137.3	16
2006	0	1	100	367,552	20	12,009,088	110.9	16
2007	0	1	200	349,174	18	12,369,360	89.6	15
2008	0	1	300	331,715	16	12,740,440	72.4	14
2009	0	1	400	318,446	14	13,122,653	58.5	13
2010	0	1	500	305,708	12	13,516,332	47.3	13
2011	0	1	600	293,480	10	13,921,821	37.3	12
2012	0	1	700	281,741	8	14,339,475	27.3	12
2013	0	1	800	273,289	6	14,769,659	17.3	12
2014	0	1	900	265,090	5	15,212,748	7.3	11
2015	0	1	1,000	257,137	5	15,669,130	0	9
2016	0	1	1,100	251,994	5	16,139,203	0	7
2017	0	1	1,200	246,954	5	16,623,379	0	6
2018	0	1	1,300	242,015	5	17,122,080	0	4
2019	0	1	1,400	242,015	5	17,635,742	0	3

B: Bogotazo years, CL1: Alternation in power, Rtb6: Real trade balance (millions of pesos)

Taf1: Total armed forces (Police + Army), U: Unemployment rate, Students1: Students enrolled in all modalities.

Despla3 : Displaced people (thousands), Cvpc1a: Cyclical terrorist murder per 100,000 people.

Scenario 5

Table 5A

year	B	CL1	Rtb6	Taf11	U	students1	despla3	cvpc1A
2005	0	1	-1,040	386,897	22	11,659,309	137.3	16
2006	0	1	100	363,683	20	12,009,088	110.9	16
2007	0	1	200	341,862	18	12,369,360	89.6	14
2008	0	1	300	321,350	16	12,740,440	72.4	12
2009	0	1	400	305,282	14	13,122,653	58.5	11
2010	0	1	500	290,018	12	13,516,332	47.3	10
2011	0	1	600	275,517	10	13,921,821	37.3	9
2012	0	1	700	261,739	8	14,339,475	27.3	8
2013	0	1	800	251,269	6	14,769,659	17.3	8
2014	0	1	900	241,218	5	15,212,748	7.3	7
2015	0	1	1,000	231,569	5	15,669,130	0	4
2016	0	1	1,100	231,569	5	16,139,203	0	4
2017	0	1	1,200	231,569	5	16,623,379	0	3
2018	0	1	1,300	231,569	5	17,122,080	0	2
2019	0	1	1,400	231,569	5	17,635,742	0	1

B: Bogotazo years, CL1: Alternation in power, Rtb6: Real trade balance (millions of pesos)

Taf1: Total armed forces (Police + Army), U: Unemployment rate, Students1: Students enrolled in all modalities.

Despla3 : Displaced people (thousands), Cvpc1a: Cyclical terrorist murder per 100,000 people.

Scenario 6

Table 6A

year	B	CL1	Rtb6	Taf11	U	students1	despla3	cvpc1A
2005	0	1	-1040	386,897	22	11,659,309	137.3	16
2006	0	1	-54	363,683	20	12,009,088	110.9	15
2007	0	1	-64	341,862	18	12,369,360	89.6	13
2008	0	1	-70	321,350	16	12,740,440	72.4	12
2009	0	1	-59	305,282	14	13,122,653	58.5	10
2010	0	1	-38	290,018	12	13,516,332	47.3	9
2011	0	1	50	275,517	10	13,921,821	37.3	8
2012	0	1	100	261,739	8	14,339,475	27.3	7
2013	0	1	150	251,269	6	14,769,659	17.3	7
2014	0	1	200	241,218	5	15,212,748	7.3	6
2015	0	1	250	231,569	5	15,669,130	0	3
2016	0	1	300	231,569	5	16,139,203	0	3
2017	0	1	350	231,569	5	16,623,379	0	2
2018	0	1	400	231,569	5	17,122,080	0	1
2019	0	1	450	231,569	5	17,635,742	0	0

B: Bogotazo years, CL1: Alternation in power, Rtb6: Real trade balance (millions of pesos)

Taf1: Total armed forces (Police + Army), U: Unemployment rate, Students1: Students enrolled in all modalities.

Despla3 : Displaced people (thousands), Cvpc1a: Cyclical terrorist murder per 100,000 people.

Scenario 7

Table 7A

year	B	CL1	Rtb6	Taf11	U	students1	despla3	cvpc1A
2005	0	1	-1040	386,897	22	11,659,309	137.3	16
2006	0	1	-54	367,552	20	12,009,088	110.9	16
2007	0	1	-64	352,850	18	12,369,360	89.6	15
2008	0	1	-70	342,264	16	12,740,440	72.4	15
2009	0	1	-59	335,419	14	13,122,653	58.5	16
2010	0	1	-38	332,065	12	13,516,332	47.3	17
2011	0	1	50	325,424	10	13,921,821	37.3	17
2012	0	1	100	318,916	8	14,339,475	27.3	17
2013	0	1	150	312,538	6	14,769,659	17.3	18
2014	0	1	200	296,911	5	15,212,748	7.3	15
2015	0	1	250	279,096	5	15,669,130	0	12
2016	0	1	300	251,186	5	16,139,203	0	6
2017	0	1	350	228,579	5	16,623,379	0	1
2018	0	1	400	228,579	5	17,122,080	0	0
2019	0	1	450	228,579	5	17,635,742	0	-1

B: Bogotazo years, CL1: Alternation in power, Rtb6: Real trade balance (millions of pesos)

Taf1: Total armed forces (Police + Army), U: Unemployment rate, Students1: Students enrolled in all modalities.

Despla3 : Displaced people (thousands), Cvpc1a: Cyclical terrorist murder per 100,000 people.

Scenario 8

Table 8A

year	B	CL1	Rtb6	Taf11	U	students1	despla3	cvpc1A
2005	0	1	-1040	386,897	22	11,659,309	137.3	16
2006	0	1	-54	309,518	20	12,009,088	110.9	6
2007	0	1	-64	284,757	18	12,369,360	89.6	3
2008	0	1	-70	284,757	16	12,740,440	72.4	5
2009	0	1	-59	284,757	14	13,122,653	58.5	7
2010	0	1	-38	284,757	12	13,516,332	47.3	8
2011	0	1	50	284,757	10	13,921,821	37.3	10
2012	0	1	100	227,806	8	14,339,475	27.3	1
2013	0	1	150	216,416	6	14,769,659	17.3	1
2014	0	1	200	216,416	5	15,212,748	7.3	1
2015	0	1	250	212,088	5	15,669,130	0	0
2016	0	1	300	212,088	5	16,139,203	0	-1
2017	0	1	350	212,088	5	16,623,379	0	-2
2018	0	1	400	212,088	5	17,122,080	0	-3
2019	0	1	450	212,088	5	17,635,742	0	-4

B: Bogotazo years, CL1: Alternation in power, Rtb6: Real trade balance (millions of pesos)

Taf1: Total armed forces (Police + Army), U: Unemployment rate, Students1: Students enrolled in all modalities.

Despla3 : Displaced people (thousands), Cvpc1a: Cyclical terrorist murder per 100,000 people.

Scenario 9

Table 9A

year	B	CL1	Rtb6	Taf11	U	students1	despla3	cvpc1A
2005	0	1	-1040	386,897	22	11,886,802	137.3	16
2006	0	1	-54	309,518	20	12,362,274	110.9	5
2007	0	1	-64	284,757	18	12,856,764	89.6	2
2008	0	1	-70	284,757	16	13,371,034	72.4	4
2009	0	1	-59	284,757	14	13,905,875	58.5	5
2010	0	1	-38	284,757	12	14,462,110	47.3	7
2011	0	1	50	284,757	10	15,040,594	37.3	8
2012	0	1	100	227,806	8	15,642,217	27.3	-1
2013	0	1	150	216,416	6	16,267,905	17.3	-2
2014	0	1	200	216,416	5	16,918,621	7.3	-2
2015	0	1	250	212,088	5	17,595,365	0	-4
2016	0	1	300	212,088	5	18,299,179	0	-5
2017	0	1	350	212,088	5	19,031,146	0	-6
2018	0	1	400	212,088	5	19,792,391	0	-8
2019	0	1	450	212,088	5	20,584,086	0	-9

B: Bogotazo years, CL1: Alternation in power, Rtb6: Real trade balance (millions of pesos)

Taf1: Total armed forces (Police + Army), U: Unemployment rate, Students1: Students enrolled in all modalities.

Despla3 : Displaced people (thousands), Cvpc1a: Cyclical terrorist murder per 100,000 people.

Scenario 10

Table 10A

year	B	CL1	Rtb6	Taf11	U	students1	despla3	cvpc1A
2005	0	1	-1040	386,897	22	11,886,802	137.3	16
2006	0	1	-54	348,207	20	12,362,274	110.9	12
2007	0	1	-64	320,350	18	12,856,764	89.6	9
2008	0	1	-70	304,333	16	13,371,034	72.4	7
2009	0	1	-59	298,247	14	13,905,875	58.5	8
2010	0	1	-38	292,282	12	14,462,110	47.3	8
2011	0	1	50	286,436	10	15,040,594	37.3	8
2012	0	1	100	286,436	8	15,642,217	27.3	9
2013	0	1	150	286,436	6	16,267,905	17.3	10
2014	0	1	200	286,436	5	16,918,621	7.3	10
2015	0	1	250	286,436	5	17,595,365	0	9
2016	0	1	300	286,436	5	18,299,179	0	8
2017	0	1	350	286,436	5	19,031,146	0	7
2018	0	1	400	286,436	5	19,792,391	0	5
2019	0	1	450	286,436	5	20,584,086	0	4

B: Bogotazo years, CL1: Alternation in power, Rtb6: Real trade balance (millions of pesos)

Taf1: Total armed forces (Police + Army), U: Unemployment rate, Students1: Students enrolled in all modalities.

Despla3 : Displaced people (thousands), Cvpc1a: Cyclical terrorist murder per 100,000 people.

Scenario 11

Table 11A

year	B	CL1	Rtb6	Taf11	U	students1	despla3	cvpc1A
2005	0	1	-1040	386,897	13.6	11,659,309	137.3	24
2006	0	1	-54	232,138	13.6	12,009,088	110.9	-2
2007	0	1	-64	185,710	12.6	12,369,360	89.6	-9
2008	0	1	-76.9	176,424	11.6	12,740,440	72.4	-10
2009	0	1	-59.3	172,896	10.6	13,122,653	58.5	-10
2010	0	1	-38.2	171,167	8.6	13,516,332	47.3	-8
2011	0	1	50	171,167	7.6	14,192,148	37.3	-8
2012	0	1	100	171,167	6.6	14,901,755	27.3	-8
2013	0	1	150	171,167	5	15,646,842	17.3	-8
2014	0	1	200	171,167	5	16,429,184	7.3	-9
2015	0	1	250	171,167	5	17,250,643	0	-10
2016	0	1	300	171,167	5	18,113,175	0	-12
2017	0	1	350	171,167	5	19,018,833	0	-13
2018	0	1	400	171,167	5	19,969,774	0	-15
2019	0	1	450	171,167	5	20,968,262	0	-17

B: Bogotazo years, CL1: Alternation in power, Rtb6: Real trade balance (millions of pesos)

Taf1: Total armed forces (Police + Army), U: Unemployment rate, Students1: Students enrolled in all modalities.

Despla3 : Displaced people (thousands), Cvpc1a: Cyclical terrorist murder per 100,000 people.

Scenario 13

Table 13A

year	B	CL1	Rtb6	Taf11	U	students1	despla3	cvpc1A
2005	0	1	-1040	386,897	13.6	11,659,309	137.3	24
2006	0	1	-54	309,518	13.6	12,009,088	110.9	12
2007	0	1	-64	278,566	12.6	12,369,360	89.6	7
2008	0	1	-76.9	264,638	11.6	12,740,440	72.4	6
2009	0	1	-59.3	264,638	10.6	13,122,653	58.5	6
2010	0	1	-38.2	264,638	8.6	13,516,332	47.3	8
2011	0	1	50	264,638	7.6	14,192,148	37.3	8
2012	0	1	100	264,638	6.6	14,901,755	27.3	8
2013	0	1	150	264,638	5	15,646,842	17.3	9
2014	0	1	200	264,638	5	16,429,184	7.3	8
2015	0	1	250	264,638	5	17,250,643	0	6
2016	0	1	300	264,638	5	18,113,175	0	5
2017	0	1	350	264,638	5	19,018,833	0	3
2018	0	1	400	264,638	5	19,969,774	0	1
2019	0	1	450	264,638	5	20,968,262	0	0

B: Bogotazo years, CL1: Alternation in power, Rtb6: Real trade balance (millions of pesos)

Taf1: Total armed forces (Police + Army), U: Unemployment rate, Students1: Students enrolled in all modalities.

Despla3 : Displaced people (thousands), Cvpc1a: Cyclical terrorist murder per 100,000 people.

Scenario 14

Table 14A

year	B	CL1	Rtb6	Taf11	U	students1	despla3	cvpc1A
2005	0	1	-1040	386,897	13.6	11,659,309	137.3	24
2006	0	1	-54	290,173	13.6	12,009,088	110.9	8
2007	0	1	-64	246,647	12.6	12,369,360	89.6	2
2008	0	1	-76.9	221,982	11.6	12,740,440	72.4	-2
2009	0	1	-59.3	204,223	10.6	13,122,653	58.5	-4
2010	0	1	-38.2	196,054	8.6	13,516,332	47.3	-4
2011	0	1	50	196,054	7.6	14,192,148	37.3	-4
2012	0	1	100	196,054	6.6	14,901,755	27.3	-4
2013	0	1	150	196,054	5	15,646,842	17.3	-3
2014	0	1	200	196,054	5	16,429,184	7.3	-4
2015	0	1	250	196,054	5	17,250,643	0	-6
2016	0	1	300	196,054	5	18,113,175	0	-7
2017	0	1	350	196,054	5	19,018,833	0	-9
2018	0	1	400	196,054	5	19,969,774	0	-11
2019	0	1	450	196,054	5	20,968,262	0	-12

B: Bogotazo years, CL1: Alternation in power, Rtb6: Real trade balance (millions of pesos)

Taf1: Total armed forces (Police + Army), U: Unemployment rate, Students1: Students enrolled in all modalities.

Despla3 : Displaced people (thousands), Cvpc1a: Cyclical terrorist murder per 100,000 people.

Scenario 15

Table 15A

year	B	CL1	Rtb6	Taf11	U	students1	despla3	cvpc1A
2005	0	1	-1040	386,897	13.6	11,659,309	137.3	24
2006	0	1	-54	309,518	13.6	12,009,088	110.9	12
2007	0	1	-64	278,566	12.6	12,369,360	89.6	7
2008	0	1	-76.9	256,281	11.6	12,740,440	72.4	4
2009	0	1	-59.3	246,030	10.6	13,122,653	58.5	3
2010	0	1	-38.2	243,570	8.6	13,516,332	47.3	4
2011	0	1	50	243,570	7.6	14,192,148	37.3	4
2012	0	1	100	243,570	6.6	14,901,755	27.3	4
2013	0	1	150	243,570	5	15,646,842	17.3	5
2014	0	1	200	243,570	5	16,429,184	7.3	4
2015	0	1	250	243,570	5	17,250,643	0	3
2016	0	1	300	243,570	5	18,113,175	0	1
2017	0	1	350	243,570	5	19,018,833	0	-1
2018	0	1	400	243,570	5	19,969,774	0	-2
2019	0	1	450	243,570	5	20,968,262	0	-4

B: Bogotazo years, CL1: Alternation in power, Rtb6: Real trade balance (millions of pesos)

Taf1: Total armed forces (Police + Army), U: Unemployment rate, Students1: Students enrolled in all modalities.

Despla3 : Displaced people (thousands), Cvpc1a: Cyclical terrorist murder per 100,000 people.

Scenario 16

Table 16A

year	B	CL1	Rtb6	Taf11	U	students1	despla3	cvpc1A
2005	0	1	-1040	386,897	13.6	11,659,309	137.3	24
2006	0	1	-54	309,518	13.6	12,009,088	124	11
2007	0	1	-64	278,566	12.6	12,369,360	116.6	6
2008	0	1	-76.9	256,281	11.6	12,740,440	112	3
2009	0	1	-59.3	246,030	10.6	13,122,653	108.64	1
2010	0	1	-38.2	243,570	8.6	13,516,332	97.8	2
2011	0	1	50	243,570	7.6	14,192,148	83.2	3
2012	0	1	100	243,570	6.6	14,901,755	74.9	3
2013	0	1	150	243,570	5	15,646,842	67.5	3
2014	0	1	200	243,570	5	16,429,184	60.8	2
2015	0	1	250	243,570	5	17,250,643	51.7	1
2016	0	1	300	243,570	5	18,113,175	46.6	-1
2017	0	1	350	243,570	5	19,018,833	37.28	-2
2018	0	1	400	243,570	5	19,969,774	18.68	-3
2019	0	1	450	243,570	5	20,968,262	0	-4

B: Bogotazo years, CL1: Alternation in power, Rtb6: Real trade balance (millions of pesos)

Taf1: Total armed forces (Police + Army), U: Unemployment rate, Students1: Students enrolled in all modalities.

Despla3 : Displaced people (thousands), Cvpc1a: Cyclical terrorist murder per 100,000 people.

Scenario 17

Table 17A

year	B	CL1	Rtb6	Taf11	U	students1	despla3	cvpc1A
2005	0	1	-1040	386,897	22	11,659,309	137.3	16
2006	0	1	-54	309,518	20	12,009,088	124	5
2007	0	1	-64	278,566	18	12,369,360	116.6	1
2008	0	1	-76.9	256,281	18	12,740,440	112	-3
2009	0	1	-59.3	246,030	16	13,122,653	108.64	-4
2010	0	1	-38.2	243,570	16	13,516,332	97.8	-4
2011	0	1	50	243,570	18	14,192,148	83.2	-7
2012	0	1	100	243,570	17	14,901,755	74.9	-7
2013	0	1	150	243,570	16	15,646,842	67.5	-7
2014	0	1	200	243,570	15	16,429,184	60.8	-7
2015	0	1	250	243,570	14	17,250,643	51.7	-7
2016	0	1	300	243,570	13	18,113,175	46.6	-8
2017	0	1	350	243,570	12	19,018,833	37.28	-8
2018	0	1	400	243,570	12	19,969,774	18.68	-9
2019	0	1	450	243,570	12	20,968,262	0	-10

B: Bogotazo years, CL1: Alternation in power, Rtb6: Real trade balance (millions of pesos)

Taf1: Total armed forces (Police + Army), U: Unemployment rate, Students1: Students enrolled in all modalities.

Despla3 : Displaced people (thousands), Cvpc1a: Cyclical terrorist murder per 100,000 people.

Scenario 18

Table 18A

year	B	CL1	Rtb6	Taf11	U	students1	despla3	cvpc1A
2005	0	1	-1,077	386,897	22	10,128,402	137.3	19
2006	0	0	-1,177	390,765	20	9,723,266	124	25
2007	0	0	-1,277	394,673	18	9,334,335	116.6	28
2008	0	0	-1,377	398,620	18	8,960,962	112	29
2009	0	0	-1,477	402,606	16	8,602,523	108.64	32
2010	0	0	-1,577	406,632	16	8,258,422	97.8	34
2011	0	0	-1,677	410,698	18	7,928,085	83.2	33
2012	0	0	-1,777	414,805	17	7,610,962	74.9	35
2013	0	0	-1,877	418,953	16	7,306,524	67.5	37
2014	0	0	-1,977	423,143	15	7,014,263	60.8	39
2015	0	0	-2,077	427,374	14	6,733,692	51.7	41
2016	0	0	-2,177	431,648	13	6,464,344	46.6	43
2017	0	0	-2,277	435,965	12	6,205,771	37.28	45
2018	0	0	-2,377	440,324	12	5,957,540	18.68	46
2019	0	0	-2,477	444,728	12	5,719,238	18.68	47

B: Bogotazo years, CL1: Alternation in power, Rtb6: Real trade balance (millions of pesos)

Taf1: Total armed forces (Police + Army), U: Unemployment rate, Students1: Students enrolled in all modalities.

Despla3 : Displaced people (thousands), Cvpc1a: Cyclical terrorist murder per 100,000 people.

Appendix: data sources

All monetary variables were obtained in nominal terms and converted with the implicit GDP deflactor (1994=100). The deflactor is obtained for 1946-49 from CEPAL, for 1950-1980 from Banco de la República (Central Bank of Colombia), and for 1981-1999 from Departamento Administrativo Nacional de Estadística (DANE).

Per capita adjustments are made on the basis of total population (millions) counts coming from the censuses of 1953, 1968, 1973, 1978, 1983, 1985, 1993 and projections by DANE.

Nominal social expenses (in millions of Colombian pesos) consist of health expenditures and education expenditures. For 1946-1970, taken from "Estado y Hacienda Pública en Colombia, 1934-1990," by César Giraldo (Contraloría General de la República); for 1971-1999, taken from financial reports of the General Comptrollers Office of Colombia.

Nominal trade balance data (millions of colombian pesos) is obtained as the difference of exports and imports of goods and services; Banco de la República (Colombian Central Bank), DANE, and calculations by the Departamento Nacional de Planeación (National Planning Department), Macroeconomics Studies Unit. Nominal private consumption (millions of Colombian pesos); Banco de la República, DANE, and calculations by the National Planning Department, Macroeconomic Studies Unit. Nominal government consumption (millions of Colombian pesos); Banco de la República, DANE, and calculations by the National Planning Department, Macroeconomic Studies Unit.

The data for the total number of personnel of the Colombian police (PF) and for the total number of members of the armed forces both come up to year 1989 from the National Planning Department, Justice and Security Unit; from 1999 and projections to 2006 come from the National Ministry of Defense.

The coding for the years of *La Violencia* and the *National Front* years are taken from Bushnell, 1993.

Total homicides are the sum of four murder series: murder (*homicidio*), aggravated murder (*homicidio agravado*), murder with cyclical intent (*homicidio con fin cyclicala*), and death associated with the exercise of official duties (*homicidio con función, razón cargo o ejercicio de sus funciones*). The data are taken from various issues of *Revista Criminalidad*; Colombian National Police. Finally, the cyclical component of total homicides is computed by and reported in Gómez-Sorzano (2005).

The unemployment rate for the period 1950-54 comes from the monthly bulletins of statistics (DANE), for the period 1955-1976 it was taken from Londoño (1990) and, since 1977 it corresponds to the unemployment rate in the four largest Colombian cities (Bogotá, Cali, Medellín and Barranquilla) the source is DANE.

The number of students enrolled in all modalities (pre-elementary, elementary, high school, university) are taken from 1946-1990 from Londoño (1990), for 1987-2002 from the Ministry of National Education and the ICFES (Colombian Institute for the Promotion of Higher Education).

The data for displaced families are taken from Revista Criminalidad #45, 2002 p.p. 86-92; and Justice and Security Unit National Planning Department (DNP).

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