

Cómo citar este artículo: Chavarro Miranda, F., Grautoff Laverde, M. & Riaño Cruz, J. D. (2017, julio-diciembre). Model for Economic Growth and Public Spending Focused on Security: the Colombian Military Strategy Approach (2002-2009). *Rev. Cient. Gen. José María Córdova*, 15(20), 27-45. DOI: <http://dx.doi.org/10.21830/19006586.174>



Model for Economic Growth and Public Spending Focused on Security: the Colombian Military Strategy Approach (2002-2009)*

DOI: <http://dx.doi.org/10.21830/19006586.174>

Recibido: 8 de septiembre de 2016 • Aceptado: 5 de junio de 2017

Modelo de crecimiento económico y gasto público focalizado en seguridad: enfoque desde la estrategia militar en Colombia (2002-2009)

Modèle de croissance économique et des dépenses publiques focalisé sur la sécurité: une approche fondée sur la stratégie militaire en Colombie (2002-2009)

Modelo para crescimento econômico e gasto público focado na segurança: perspectivas a partir da estratégia militar colombiana (2002-2009)

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* This article resulted from a research project in economic development carried out between February 2-2012 and November 30-2015 as part of the economic development line of research from the Economic and Business Research Group.

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Abstract. This paper analyzes the Colombian military forces' strategy supported on the widening of war-fighting capabilities related to the inclusion of civil rights considering the fifty-year internal war, in view of the 2002-2009 results for social policies through a historical review of the armed conflict, military strategy analysis from the doctrine point of view, and the developing a correlational model that links economic growth with the standing of the public good called 'defense'. Results evidence that military strategy as a doctrine will become sustainable once the Government provides financing for security and defense spending through permanent income, thus providing success to social policies supporting military strategies, proving the 'guns versus butter' dilemma does not occur in Colombia.

Keywords: economic growth; military spending; military strategy; public good; social policy.

Resumen. El documento analiza la estrategia de las Fuerzas Militares sustentada en la ampliación de las capacidades bélicas hacia el ámbito de la inclusión de los derechos ciudadanos en el marco del conflicto armado de más de cincuenta años. Para esto se consideran los resultados de política social durante 2002 y 2009, se hace una revisión histórica del conflicto, se analiza la estrategia militar desde los aspectos de la doctrina y se desarrolla un modelo que permite establecer la correlación entre el crecimiento económico y la dotación del bien público denominado defensa. Los resultados evidencian que la estrategia militar como doctrina será sostenible en la medida en que el Estado financie los gastos en seguridad y defensa con ingresos permanentes, con lo cual la política social que acompaña la estrategia militar será exitosa. Esto demuestra que el dilema *guns versus butter* en Colombia no se presenta.

Palabras clave: bien público; crecimiento económico; estrategia militar; gasto militar; política social.

Résumé. Le document analyse la stratégie des forces militaires soutenues par l'expansion de la guerre dans le domaine de l'inclusion des droits des citoyens en ce qui concerne les faits à la lumière du conflit armé depuis plus de 50 ans par rapport aux résultats des capacités de la politique sociale en 2002 et 2009, grâce à l'examen historique du conflit, l'analyse de la stratégie militaire des aspects de la doctrine et l'élaboration d'un modèle pour établir la corrélation entre la croissance économique et la fourniture de biens publics appelée défense. Les résultats montrent que la stratégie militaire et de la doctrine, être durable que le financement public des coûts de sécurité et de défense avec le revenu permanent et la politique sociale qui accompagne la stratégie militaire montre avec succès, montrant que les armes à feu de dilemme par rapport à beurre en Colombie, il ne se présente pas.

Mots-clés: croissance économique; dépenses de bien-être public; stratégie militaire; politique sociale militaire.

Resumo. O artigo analisa a estratégia das forças militares apoiadas pela expansão da guerra para o campo da inclusão dos direitos dos cidadãos sobre os factos à luz do conflito armado há mais de 50 anos, em comparação com os resultados de capacidades de política social em 2002 e 2009. O estudo se desenvolveu por meio da revisão histórica do conflito, da análise da estratégia militar e dos aspectos da doutrina, e do desenvolvimento de um modelo para estabelecer a correlação entre o crescimento económico e a provisão de bem público chamado defesa. Os resultados mostram que a estratégia e doutrina militar poderão passar a ser sustentável se houver o financiamento dos custos de segurança e defesa pelo governo com recursos permanente, promovendo o sucesso da política social que acompanha a estratégia militar, mostrando que o dilema 'guns versus butter' não existe na Colômbia.

Palavras chave: bem-estar público; crescimento econômico; estratégia militar; gastos militares; políticas sociais.



Introduction

The article presented henceforth describes how strategies executed by the Colombian military forces between 2002 and 2009, provide a doctrinal update, and widening of operative capacities. In other words, it is evidenced that the Colombian military strategy became constrained by tactics, the organization itself, supplies, and the military forces training and tutoring, instead of an action with any impact on social policies.

For that matter, a historical review is prepared with the purpose of generating awareness to readers regarding how the Colombian state, through the lack of provision of public goods to conflict zones, allowed violence to scale up to reach high levels exhibited during the 1990s. The article also describes how the implementation of broadened security and institutionalization concepts within the strategic focus, led to reach successful operational levels during the last decade.

Additionally, a public spending and growth model is proposed that demonstrates how economic development levels can be reached from public spending. In the same manner, it is shown that the 'guns versus butter' dilemma does not have an application in Colombia, considering it is only a theory and not a conventional cycle for the Colombian economy. In a more contextualized sense, the 'guns versus butter' dilemma is the standard model cited by economists to enlighten the Production Possibility Frontier (PPF). PPF exhibits a curve that represents the maximum allowed quantities of goods and services that an economy could produce. Hence, and using pre-established production factors such as capital, land and labor, any country could produce optimal quantities of two products: 'guns' or 'butter'. Therefore, and considering the scarcity of resources, societies reveal a trade-off relationship among two or more alternatives that imply one single choice: to produce more 'guns' entails having less 'butter' and vice versa.

Accordingly, the first part introduces the topic and provides a historical background. For the second part, a historical review for the Colombian conflict is exhibited, and on the third section, the strategy used by the Colombian armed forces is analyzed. Next, the public spending and growth model is unveiled, as well as, the demonstration of the military spending versus social spending, and finally, relevant conclusions are drawn.

Historical Background

Regions where the 'Omega' Joint Task Force military operation is carried out, represent colonized areas belonging to the Andean region which have evidenced migration, thus causing social inequality and violence. Situation which has also pushed colonials to settle down in the 'Macarena' natural park during the mid-1970s, previously known for low population density levels and distancing from the center of the country.

This shaped two main problems, firstly, due to colonies' disorganization, the provision of public goods was partly insufficient and for the most part, nonexistent; consequently, poor life conditions became the 'rule of thumb' for that particular region. Secondly, due to the settling at natural parks, deforestation and erosion arose due to agricultural practices. These two issues set ideal conditions for Colombian illegal armed groups to settle down which began assuming



'government' roles due to the lack of presence of state and local authorities, and motivated high prices for public goods¹ to those regions. Additionally, political centralism evidenced during that period, allowed for social explosion which spread to the east and west of the country.

Therefore, subversion groups ended up administering justice, security and granted a network of country roads, to which a new group of *allies* will join and strengthen such groups. Back in the 1980s, Peru and Bolivia launched a massive program against the production of illegal drugs, which helped resettle those coca crops into Colombia that was only part of the route for illegal drugs transportation at that time. Consequently, Colombia will become the main producer of cocaine hydrochloride, gestating cooperatives for the trafficking and production of illegal drugs later named *carteles*² by the mass media. Those drug trafficking associations will become the main target of subversion, considering that was a major financing opportunity for their insurgent activity, and because the subversive groups forbade such illegal business (Octava Conferencia de Las Fuerzas Armadas Revolucionarias de Colombia, 1982). Conversely, subversive groups engage in drug trafficking supporting the thesis proposed by Collier and Hoeffler (1998, p 570) which states that those organizations are criminal by portraying a political discourse legitimizing their delinquent actions.

At the same time, coca crops are settled at natural parks since they provide optimal environmental conditions for this activity, thus, replacing previous agricultural activities for coca crops considering they provided greater economic advantages to farmers. Therefore, new migrations occur in search of profits derived of illegal crops cultivation.

Under this new scenery, drug traffickers congregated to fight off rebel groups, implementing strategies such as attacking locals and villagers whom supported subversives. According Stoker (2008, p. 265), in order to achieve this objective, drug traffickers hired mercenaries from the UK and Israel, whom trained them with counterinsurgent tactics and knowledge.

As a result, locals became target of criminal actions; under the concept of breaking the logistics of the supply chain assuming citizens were active players in the armed conflict violating International Human Rights (IHR) and International Conflict Rights' protocols. The reasoning behind self-defense was to point out that judgment must have been to combatants, nonetheless, locals were not taking an active part within the armed conflict.

Accordingly, many innocent people unaffiliated to rebels were killed. The violation of the Geneva protocols by the insurgents declared them guilty of severe defilements to the IHR, and the Colombian government accused of violating human rights due to its omission and lack of collaboration by the Armed Forces of Colombia (AFC).

This caused the subversion to change its strategy by executing control through violence over the regions it was settled in, thus, escalating the number of victims originated by means of numerous confrontations. Since Ernesto Samper's government period (1994-1998), various efforts

1 Public goods are a particular case for a positive externality. However, public goods can be analyzed through economic theory. A pure public good must engrain characteristics such as: non-exclusivity as in if the public good is available, no citizen can be excluded of benefiting from it; and Non-rivalry: consumption of the public good by one beneficiary will not reduce the available quantity to other potential beneficiaries (Extracted from Nupia, 2008).

2 *Cartel* is an economic definition meaning that an organization controls the market price or the quantity produced, however, it is not the case for the Colombian drug traffickers.



were initiated to link irregular armed groups with the trafficking and production of illegal drugs, which meant that beginning in 1998, the Colombian and American governments signed cooperative agreements related to military intelligence with the objective of hunting down irregular groups involved in the illegal drugs business (Isacson, 2000, p. 5).

Furthermore, multinational companies (MNE) were target of irregular groups in two ways: extortion and kidnapping as Rubio (2003, p. 23) argues. According Estrada (2009, p. 22), MNEs indirectly began to take part in the armed conflict by shielding staff members and regional operations using private financing³ sponsored by paramilitary groups or through sharp increases in security systems spending.

Companies engaged in the exploration, extraction, production and commercialization of non-renewables resources coming from fossil and mineral origins, faced a more complex situation due to association contracts which imposed a disadvantageous reality making the development of exploration projects unfeasible and providing little return. Add this to the change in judicial regulations and insecurity conditions Colombia lived in at the time which caused lower oil production as seismic data provided by the Colombian government during the 1990s (Estrada, 2009).

Oil sites discoveries in Cusiana and Cupiagua provided important lessons, one of them unveils how such non-renewable resources could cause great social unrest due to high profits sought after by irregular groups; another, how activity for tradable goods within the region decreases due to mining (Ebrahim-Zadeh, 2003)⁴; and lastly, how the state receiving royalties end up exploiting those resources by means of executing public works which do not generate positive externalities⁵ of high social impact, case in point, an adequate endowment for public goods.

Literature Review

Strategy is the way to achieve an objective with political implications, or as supported by Clausewitz (1984/1976, p 20) war is the continuation of politics by other means, that must have repercussions on the political environment, thus, strategy limits or prohibits the use of force; according Betts (1997), security includes concepts that differ from a military standpoint, consequently, security and strategy are categorical imperatives that come together.

Considering the indivisibility proposed by Betts (2000), two major schools are exhibited in terms of strategy, first, of Anglo-Saxon origin presents security as a main object of study coupled

3 Among penalized companies: Coca Cola, Nestlé, Chiquita Brands, Drummond, Cemex, Holcim, Muriel Mining Corporation, Glencorextrata, Anglo American, BHP Billiton, Anglo Gold Ashanti – Kedadha, Smurfit Kapa – Carton de Colombia, Pizano S.A. and its subsidiary Maderas del Darién, Urapalma S.A., Monsanto, Dyncorp, Multifruit S.A. subsidiary of Transnacional del Monte, Occidental Petroleum Corporation, British Petroleum, Repsol YPF, Unión Fenosa, Endesa, Aguas de Barcelona, Telefónica, Canal Isabel II, Canal de Suez, Ecopetrol, Petrominerales, Gran Tierra, Energy, Brisa S.A., Empresas Públicas de Medellín, B2 Gold – Cobre y Oro de Colombia S.A. (Estrada, 2009).

4 This phenomenon is known as ‘Dutch disease’, a situation evidenced during the late 19th century in Holland, originated by a sharp increase in tulips exports, when tulips’ international price decreased, a great part of the region had put aside their more traditional activities, which ended up spoiling local production. Economic specialization, such as the ‘Dutch disease’, drives regions to concentrate on a single industry sector, one which provides greater benefits mostly temporarily, that distort the economic outcome since it forget the remaining of the sectors. Population only focused on one sector lives at survival rates (Ebrahim-Zadeh, 2003).

5 Externalities occur when consumption or production by an agent, affects the profit or production of another agent.



with strategic principles; researchers belonging to this school include Baldwin (1997), Freedman (1998) and Baylis, Wirtz and Cohen (2002).

The second school proposes that strategic studies must be treated in a marginal manner or be eliminated and focus exclusively on security studies; representatives of this school include Krause-Williams (1996) and Beier and Arnold (2005).

From that perspective, a conceptual debate arises discussing definitions of strategy, while considering security topics, in such a way that Buzan (1998) refers to the widened security agenda. In this sense, the classical definition for strategy refers to planning and management of military operations, where logistics must be synchronized, and enemy's capacities analyzed in order to deploy actions looking to achieve pre-established objectives, thus becoming political victories. This orientation comes from war savvy representatives such as Gray (1999), Couteau-Bégarie (1999) and Luttwak (2002). However, this vision has been reassessed due to new characteristics found in modern conflicts, further evidencing that threats are no longer originated from interstate wars, but from elements beyond the military atmosphere.

Moreover, the geostrategic vision sets the path for the military forces to touch on security topics; under this configuration traditional strategy is limited and in need of new elements that allow for the present society to fulfill new challenges. According Geré (2000, p. 252), strategy is "the concept and execution of a collective action in a conflictive setting". Considering the previous definition, modern strategy consists on defeating the opponent in a devastating way and leading him to a place where conflict resolution can take place, in other words, security is the final purpose. In that sense, security objectives are defined, and ways to reach them are established accordingly; which in turn, drives such ways, to become diplomatic and coercive within a democratic framework.

Therefore, strategy currently considers security as part of its backbone, relevant for international relations, technological development in armory and war equipment updates shedding light on the intentions for the use of that equipment, all of this encompassed by the study of the strategy. Colombia, a country greatly affected by violence and hatching of diverse criminal structures, is conspicuous by the absence of studies in strategy and international relations. Strategy branches off a historical analysis on conflicts and war, and the development exhibited in geopolitics. Modern authors such as Chaliand (1990) and Baylis, Wirtz and Cohen (2002) are hired by strategists of developed countries.

National defense policy has its origins on the analysis for national development objectives, diplomatic relations and military capacities, without forgetting internal, external, regional and global threats. The trading integration world promised the elimination of arms race and never ending peace, greatly advocated by Immanuel Kant (1765/1785), however, reality has told a different truth. It has demonstrated that in the international scenery, negotiating power lies within the defense apparatus and in its ability to portray as strong before international forums; the production of military technology is the most dominant within that setting; parting from the fact that it is the origin of modern state production apparatus. A link has been created in such a way that the field of economy has developed the field of defense economy with the objective of analyzing security and defense phenomena, and its impact on economic growth.



Based on those sceneries, security organisms must comprehend the technology behind social networks and media, allowing for fixed and transaction costs to decrease; consequently, special regulations are set in place to prevent those mechanisms to be used in a harmful way. Therefore, the strategy needed to guarantee the achievement of those objectives, in relation to new threats, has led to delinquency portraying an authenticating discourse as supported by Collier (2000) only pretending to justify the pillage of resources and framing strategy within a rational agent, thus maximizing benefits. Likewise, Kaldor (2001) utilizes the *new wars* term to explain violent situations happening outside the public sphere and transcend to the private sphere, limiting the reach of the classic strategy approach.

This article shifts towards the concept of strategy from a military standpoint based on actions by social public policies. Under this perspective, military forces have conceived strategy as a way of elimination of internal threats, nonetheless, considering warfare deployment will only be successful if the Colombian state provides citizens from war affected areas with public goods. Therefore, the Colombian state must provide for a fiscal effort that allows it to uphold military operations for a long period of time, in order to later consolidate areas through social spending. This has led to the completion of the first phase of security policy by meeting its preset objectives, but to continue with the next phase of the program, it is necessary to obtain fiscal resources that are currently temporary; through the application of an economic growth model proposed by Barro (1990) explaining the security strategy sustainability problem.

Strategic Reform within the Colombian Military Forces

Internal conflict situation in Colombia turned dramatically due in part to the failure in peace negotiations pursued by the Colombian government between 1998 and 2002. This involved a change in strategy by the military forces to fend off irregular groups. In first place, a doctrinal update was set in place through an increase in size for military forces in relation to the number of combatants and police force; and technological resources were provided highlighting a sense of command and control. When this document refers to doctrine, it is associated with procedural manuals and military tactics that were updated, modified and adapted to constraints set by an asymmetric type of conflict. Consequently, land at valleys were yielded to irregular groups, but mobilization corridors were cut off through high mountain battalions, following Sun Tzu's logic (2007), which states "All armies prefer high ground to low, and sunny places to dark. If you are careful of your men, and camp on hard ground, the army will be free from disease of every kind, and this will spell victory".

Likewise, it was discovered that command and control exercised by the collegiate body of the insurgent groups was their center of gravity (Clausewitz, 1984/1976)⁶, and once that coordinated communication model designed as a 'communion cup' in service of the extortion and kidnapping was broken apart, criminal activities were notoriously reduced.

⁶ The 'Center of Gravity' is an enemy's characteristic, where its moral and physical strength lay. The comprehension of the concept of 'Center of Gravity' must not be overblown, considering it is a vital tool towards the development of combat operations planning (Clausewitz, 1984/1976).



Once insurgent groups were left out of control over the remainder of the units, they were unable to withhold military operations for a long period of time, which caused a strategic withdrawal, consisting of refraining from pursuing any military operation against public forces, however, transferred to a political war, where any situation could be used to generate conflict. Moreover, another answer against irregular groups was to fumigate illicit crops, and deny the use of aerial space through an electronic umbrella that allowed to intercept illegal flights coming from illegal drug trafficking.

Joint Commands and Control Action

The jump in the operational strategy comes from the modification in the way military forces operated, changing the outline from an interstate war model to an asymmetric war model was carried out through the *joint* concept, that is to say, armed forces worked in a coordinated manner under the *unified command* of an operations commander without considering the force where he is originally from. Consequently, that is how an innovative *joint command* model works in a low intensity war, bearing fruit by optimally exploiting various forces' capacities.

Therefore, when public force controls an area, the center for coordinated control action comes into action. State institutions carefully execute a synchronized action plan where resources and efforts are aimed at recovering a specific region. It is by means of that coordinated control action that appropriate provision of public goods is delivered to the community, public administration is rightfully managed, and confidence to citizens is restored making them part of the rebuilding of the country.

This is the major success within the new strategy against irregular groups, considering that in the past, a strictly military orientation was carried out isolating public support. Clausewitz (1984/1976) highlights wars can be won over through public support, and Sun Tzu (2007) points out that victory is achieved within the heart of the people taming its fighting intentions.

The driving of sustainable economic growth through employment generation allows for the buildup of victory-like conditions, while generating security conditions that allow for depressed and violent areas to improve. According the transitional directive 016 issued on 2009 by the General Command of the military forces, in which it states:

To the joint command number 1, Caribbean, and the 'Omega' Joint Task Force, to support the various activities part of the Integral Action Coordination Centre (CCAI), under the Presidency of the Republic of Colombia. These are scheduled for 2009, and aimed at strengthening the legitimacy, governability, and state presence within those regions prioritized as 'complementary' for the Democratic Security and Defense Policy, framed by 'Social Retrieval of Land', and the Consolidation Plan – Strategic Jump. (Comando General de las Fuerzas Militares, 2009)

Under this scenery, and added to the blows delivered to vulnerable targets of high strategic value, insurgent groups, have been pressured to modify their strategy in order to face new confrontation challenges. Therefore, making civilians take a more participative role, using them as a protective shield, insurgency camouflage, and as an infiltration intermediary. Additionally, due to the ri-



chness of this region in terms of hydrocarbons, oil well exploitation is regulated by partnership contracts, deliberately involving foreign petroleum companies, part of the conflict, with the purpose of obtaining financial resources and generating government pressure.

Finally, this situation could present the following scenarios; a newly and modified strategy executed by insurgent groups, whom through the loss of some of their ringleaders have developed the 'Renacer' plan, focusing on delivering illegal actions through criminal bands denominated 'BACRIM'. Such bands play the decentralized commanding centers' role, and their modus operandi is consummated under conventional media (mobile phones and radio).

Using these resources and an extended infiltration network, illegal groups undertake intelligence operations, and leak information regarding military troops and multinational companies' schedules, with the sole purpose of attacking public forces under the guerrillas' war structure, as well as extorting and kidnapping workers from multinational companies, or any other related party; likewise, they devote themselves to criminal activities in a professional manner. Under this structure, the Democratic Security Policy (DSP) can be seriously affected through the infiltration of such bands, generating sabotaged actions or using local inhabitants aiming at incentivizing popular mobilizations against the government, delegitimizing its actions among the public opinion, thus, obtaining political advantages amid the international scenery.

Emergent criminal bands 'BACRIM' are a group of criminals that arise from the paramilitary demobilization process and that hold an organizational structure to attack right at the moment when there is an identification of weaknesses within the Colombian military forces. Reports coming from those regions indicate that the increase in the homicide and ordinary crime rates, is due to the activities accomplished by those bands and not to isolated events.

Economic Growth and Military Spending

Economic growth has been a competence exclusively studied by economic sciences, and has practically been based upon mathematical developments. This article breaks new grounds and links growth conceptions together with security strategies; Barro (1991) developed a growth and public spending model leading to controversial debates due to the preference of the neoclassic school by highlighting fiscal expenditure as a generator of macroeconomic instability. Despite criticism, the author is able to demonstrate that under certain conditions the model proposed could drive growth forward, limiting the magnitude of such spending, meaning that efficiency in fiscal expenditure will set the path for growth.

In Colombia, a security policy was created implementing a strategy to recuperate those regions dominated by irregular groups, thus, generating a strategic and classic model establishing a theater for war, out of which subsequent operational war theaters would branch out having their corresponding leader. Such subsequent war theaters must comply with objectives proposed by the national strategy which led to the operational strategy for operational war theaters.

In order to fulfill intended purposes, military capacity was expanded which required a major budgetary effort and the coordination of departments in charge of budgetary planning and execution. Next, additional resources were financed through 'peace bonds' which, in other words,



are short term public debt; aimed at strengthening Armed Forces. The second part of the strategy was to provide support to conflict affected populations by means of twenty-two social programs. The concept of economic efficiency is present within this strategy thanks in part to the clustering of institutions, making possible that effort, knowledge, and scarce resources concentrate in a country's focal point. Likewise, economies of scale are evident once the clustering of institutions occur, costs are minimized by transferring knowledge, thus, making it safe to say that it is a social cluster. Consequently, it is possible to provide public goods without having resources left to waste while generating a learning curve breeding a self-catalytic process. Successes achieved by the security policy, lay upon the fact that the strategy forgot the former militaristic concept and adapted to a more democratic process of social inclusiveness.

Barro's model (1991) is built upon Ramsey's theoretical foundations, cited by Sala-i-Martin (2000); thus, the provision for public goods entails the non-rivalry and non-exclusivity properties, represented by letter 'G', technology is represented by letter 'A', while letter 'K' is the quantity of capital used by the productive sector of the country. Consequently, the economy encompasses a supply of public and private goods which are positively affected by the degree of technological development represented in the following functional form:

$$y_i = A * K_j * G_j^{1-\alpha} \quad (1)$$

By means of providing impure public goods to the productive sector, the functional form is modified, this axiom obeys to the nation's productivity not only depending on the private sector, but also on the provision of public goods supplied by the government, consequently, the following is true,

$$y_i = A * K_j * g_j^{1-\alpha} \quad (2)$$

An impure public good is the result of the inability of the state to provide the necessary supply to the entire productive sector, in practice, the good is not monetized, however, it becomes insufficient for the community. In terms of access to security, it is guaranteed to all citizens by constitutional law, but the inability to provide it nationwide results in the poor allocation of such resource. When the supply of a public good remains intact while facing an increase in investment, the inability to balance out this increase in investment produces a reduction in productivity, resulting in,

$$y_i = A * K_j * \left(\frac{G}{K}\right)^{1-\alpha} \quad (3)$$

In favor of developing the model, it is made clear that the public good 'G' is subject to rivalry limitations, similarly, this must be constantly updated, as it is the case of Defense and Security Spending (DSS), likewise, every citizen represents a percentage of the productive sector, thus, requiring a supply of DSS.



The government balances spending with direct taxation not affecting consumers' behavior. The function that represents this behavior is of Ramsey type, cited by Sala-i-Martin (2000), where 'ρ' represents the intertemporal discount rate; thus, penalizing consumption while promoting tomorrow's consumption, population growth 'n' is negative indicating that low demographic levels result in future benefits, consumption assumes a form of constant elasticity where 'θ' is the parameter to measure risk aversion, the greater the 'θ' households will consume equally throughout all time periods. The utility function is an integral due to the model being dynamic, and the exponential function is utilized with the purpose of representing the effects population growth has on consumption.

$$U(0) = \int_0^{\infty} e^{-(\rho-n)t} * \left(\frac{c_t^{1-\theta} - 1}{1-\theta} \right) \quad (4)$$

The family budgetary restriction is its income less taxes, thus, being distributed among consumption and investment, deducting depreciation 'δ' and population growth 'n' off of the investment.

$$\dot{K} = (1 - \tau) * (A * k^{\alpha} * g^{1-\alpha} - c - (\delta + n) * k) \quad (4.1)$$

Government limitations depend on the ability to collect revenues and taxes with the purpose of transferring it to the supply of public goods, thus, 'τ' is the tax percentage charged over the size of GDP per capita represented by the letter 'y'; while 'α' is the shared percentage of public and private goods.

$$g = \tau * y = \tau * A * k^{\alpha} * g^{1-\alpha} \quad (5)$$

With the purpose of solving a maximization problem of a dynamic type, it is used the Hamiltonian Method, considering that when individuals try to optimize public spending and consumption decisions, they are not aware of how those decisions affect the macroeconomics of the nation. Therefore, the neoclassic postulate stating that only the private sector produces growth and the state intervention is perverse is reevaluated, that way, the maximization problem results in

$$H(*) = e^{-(\rho-n)t} * \left(\frac{c_t^{1-\theta} - 1}{1-\theta} \right) + \vartheta_t * [(1 - \tau) * A * k^{\alpha} * g^{1-\alpha} - c - (\delta + n) * k] \quad (6)$$

After proposing the Hamiltonian Model, first order conditions are developed, the first constraint related to consumption, and the second, related to investment. The purpose is to find the marginal relation between consumption and investment both needed to solve the system, this way, the result obtained after the proceeding indicates that,

$$H_c = 0 \leftrightarrow e^{-(\rho-n)t} * c_t^{-\theta} = \vartheta_t \quad (6.1)$$



$$H_K = -\vartheta \leftrightarrow \vartheta \left[(1 - \tau) * A * \alpha \left(\frac{g}{k} \right)^{1-\alpha} - (\delta + n) \right] = -\dot{\vartheta}_t \quad (6.2)$$

Applying natural logarithms to the result of the first order constraints for (6.1), in this case corresponding to equation (7),

$$-(\rho - n) * t - \theta * \text{Ln}(c_t) = \text{Ln}(\vartheta_t) \quad (7)$$

Now, this expression is the derivative with respect to time,

$$-(\rho - n) - \theta * \frac{\dot{c}}{c} = \frac{\dot{\vartheta}}{\vartheta} \quad (7.1)$$

Replacing equation (6.2) in equation (7.1) giving as a result,

$$-(\rho - n) - \theta * \frac{\dot{c}}{c} = \frac{\vartheta \left[(1 - \tau) * A * \alpha \left(\frac{g}{k} \right)^{1-\alpha} - (\delta + n) \right]}{\vartheta} \quad (7.2)$$

Next, consumption is solved with regards to time, giving,

$$\theta * \frac{\dot{c}}{c} = (1 - \tau) * A * \alpha \left[(1 - \tau) * A * \alpha \left(\frac{g}{k} \right)^{1-\alpha} - (\delta + \rho) \right] - (\delta + n) - \rho - n \quad (7.3)$$

Simplifying (7.3), the next expression is obtained,

$$\theta * \frac{\dot{c}}{c} = (1 - \tau) * A * \alpha \left(\frac{g}{k} \right)^{1-\alpha} - (\delta + \rho) = \frac{\dot{c}}{c} = \frac{1}{\theta} \left[(1 - \tau) * A * \alpha \left(\frac{g}{k} \right)^{1-\alpha} - (\delta + \rho) \right] \quad (7.4)$$

The consumption growth rate is equal to the capital growth and the stationary state rate; thus, the government budgetary restriction in function of the tax rate must grow to meet the private and public goods investment rate, leading to infer that the economy's growth depends on the supply of public and private goods; accordingly, the mathematical expression is,

$$\frac{\dot{c}}{c} = \frac{\dot{k}}{k} = \frac{\dot{y}}{y} \Rightarrow \frac{\dot{k}}{k} = \frac{[(1-\tau)*A*\alpha*k^\alpha*g^{1-\alpha}-c-(\delta+n)*k]}{k} = \left[(1 - \tau) * A * \alpha \left(\frac{g}{k} \right)^{1-\alpha} - \frac{c}{k} - (\delta + n) \right] \quad (8)$$



Therefore, the tax rate is equal to,

$$\tau = \frac{g}{y} = \frac{g}{A * k^{\alpha} * g^{1-\alpha}} = \frac{1}{A} * \left(\frac{g}{k}\right)^{\alpha} = \frac{g}{k} = (\tau * A)^{\frac{1}{\alpha}} \quad (9)$$

Consequently, equation (9) is replaced in (7.4) resulting in the solution to the model, exhibiting that consumption growth depends on risk averse parameters, tax rate, capital elasticity, depreciation, and discount rate. In an endogenous manner for the technology variable derived from public and private goods, the solution to the problem is given by,

$$\frac{\dot{c}}{c} = \frac{1}{\theta} \left[(1 - \tau) * \alpha * A^{\frac{1}{\alpha}} * \tau^{\frac{1-\alpha}{\alpha}} - (\delta + \rho) \right] \quad (10)$$

The solution to the model reveals that the tax rate is the low determinant variable. In this scenery, the security policy proposes the following strategic focus problem not permitting the enlargement of military capabilities as a result of public debt certificates called ‘peace bonds,’ while holding territorial control, peace and military operations entails a permanent effort through time.

Recurrent spending demands constant effort financed in part via national budget, intended to fund personnel and administrative expenses; nonetheless, renovation efforts for military equipment and the modernization of armed forces has been accomplished through transitory income.

The fiscal structure presented by the government could make the strategy unfeasible, as seen in the acceleration and inflexion processes of violent acts beginning in 2010 which focused all the attention to public figures such as the Defense Minister. Such structure implies that the deployment of strategic capabilities depends on the nation’s fiscal constraints, considering tax restrictions from the first decade of the 21st century, the country could exhibit security conditions seen back in the 1990s producing negative results in economic growth.

Furthermore, the comprehensiveness of social policy encompassed by military plans could set off a chain of social assistentialism or even a ‘nanny state’ effect. The Uribe’s government in 2008 announced the increase of the program ‘Familias en Acción’ by a 100%⁷. Additionally, exhibited in Echeverry (2009)⁸, social policy must be constrained, otherwise, it would initiate a poverty trap as supported by Bhagwati (1988, p. 542), which signals that a successful social program must have constraints such as time, and not be utilized as means to remain in power. The program ‘Familias en Acción’ covers up to four children per family promoting high procreation rates in women between 16 and 25 years of age due to the ability to apply and be granted the benefits of the program. Consequently, and also argued by Gaviria, Medina, Morales and Nuñez (2008), areas with mothers between that age range present the highest crime rates.

7 More than two million of ‘Familias en Acción’ benefited by the year 2009 is the goal for the Colombian President, Álvaro Uribe. Agencia Presidencial para la Acción Social y la Cooperación. Retrieved from <http://www.accionsocial.gov.co>.

8 “Getting people used to receiving government money is dangerous,” says former director of National Planning, Juan Carlos Echeverry, highly knowledgeable of the ‘Familias en Acción’ program, considering he was one of the cofounder of the program during the Pastrana administration. “I am worried that we end up giving money away” (Ramírez, Gutiérrez, & Brigard, 2009).



Starting right after the 2010 elections, the public force left comprehensive action programs behind under the argument that its mission was not to be focused on managing social assistance, making it exempt from any responsibility related to agency problems whatsoever.

Empirical Evidence

The trade-off between social assistance and DSS programs is a debate presented among advocates of social policies versus those in favor of strengthening the military as means of reducing poverty. The discrepancy between DSS and social assistance is not a proven statistical rule through any empirical method; related research do not emphasize on the way how resources are allocated from the Defense Department to social assistance spending, leading to conclude that DSS and social assistance are substitute expenses. Income obtained by the government through the reduction in DSS cannot be destined to any other needs due to the high importance set in the constitutional law added to the economic structure and the conditions in the macroeconomic foundations of the country.

In this section, an attempt on proving Samuelson's theory (1953) for the Colombian case will be presented; this Nobel Prize winner developed a theoretical framework allowing to measure the degree of substitution believed to exist among fiscal expenditures on vulnerable citizens versus military spending which allows for the survival of the state. Political science literature claims that monies aimed for a coercive force draw in public spending which reduce poverty rates as a consequence.

In Colombia, public spending on health and education is bound to a statutory law called 'El Situado Fiscal'. The objective of having this public spending bound to a statutory law was to isolate it from the economic cycle, in other words, to shield it from any budgetary changes in the future and that no matter the economic situation resources will always be available for public spending on health and education. Expenses with designated purpose were crafted and included in the 1991 Colombian Constitution, generating fiscal inflexibilities as evidenced by Echeverry, Fergusson and Querubin (2004). Some Colombian researchers on economics are developing thesis involving the trade-off between social spending and military spending, however, empirical testing supporting such hypothesis has yet to be developed.

The development of the economic model supporting existence of Samuelson's efficient frontier (1954) will be presented henceforth. This mathematical formula is based upon *a canonical form of a difference equation* where the endogenous variable is the defense and security spending derived with respect to time as a function of the first difference of total spending divided with respect to the defense and security spending minus one period. The second is an exogenous variable, where the first difference of social spending is divided by the defense and security spending minus one period; the third variable is the spending among other sectors of the first difference divided by the defense and security spending minus one period. Consequently, a function is created allowing to evidence the dilemma between military spending and social spending.



Def: Defense and security spending

Tot: Total government spending

Soc: Social spending

Oth: Other spending

$$\frac{Def_t - Def_{t-1}}{Def_{t-1}} = \beta_0 + \beta_1 \left(\frac{Tot_t - Tot_{t-1}}{Tot_{t-1}} \right) + \beta_2 \left(\frac{Soc_t - Soc_{t-1}}{Soc_{t-1}} \right) \quad (11)$$

$$\frac{Def_t - Def_{t-1}}{Def_{t-1}} = \beta_0 + \beta_1 \left(\frac{Tot_t - Tot_{t-1}}{Def_{t-1}} \right) + \beta_2 \left(\frac{Soc_t - Soc_{t-1}}{Def_{t-1}} \right) + \beta_3 \left(\frac{Oth_t - Oth_{t-1}}{Def_{t-1}} \right) \quad (12)$$

The data utilized for the Defense and Security Spending variable was obtained and calculated through the NATO methodology (Defense, Security and Justice Division), the remainder of the variables are part of time series from the Colombian National Planning Department. The econometric estimation for the canonical form of the difference equation (12) is the trade-off in social spending versus the defense and security spending. It is estimated through the ordinary minimum squared method (MCO), this equation is a functional form of the first differences and autoregressive. First, the equation found in Samuelson's theory (1954) is calculated, then the canonical form of the equation (13) is estimated which also includes other government spending.

The results of the first estimate exhibit a positive correlation between DSS and social spending indicating that the two fiscal categories do not reveal any kind of substitution and increase in an inertial manner positively, demonstrating that the control and military actions are complementary to one another for the Colombian case. Also, social spending is not considered a meaningful variable, thus, decisions regarding the defense sector do not have a considerable impact on social spending. The second form is a variation of the original model proposed by Samuelson (1954), concluding that there is an inverse relationship between social spending and the DSS; however, other government spending generates a higher degree of substitution in relation to the defense sector, therefore, the statement that military spending causes low social coverage, is a value judgment.

Table 1 presents estimates with their corresponding auto-correlation tests, also displaying that the models do not violate this hypothesis, considering the Durbin-Watson statistic is close to 2 ruling out the presence of auto-correlation. Table 2 exhibits a multicollinearity test allowing to infer that the problem is not part of the estimates following the results obtained; moreover, considering the variance inflation rate is below ten (10) [criterion allowing to reject the existence of interdependency among exogenous variables].

**Table 1.** Dependent Variable: Defense and Security Spending

Variables	Model One	Model Two	Model Three	Model Four
Total Spending	0.354***	0.0919**		0.0970***
	-0.0599	-0.0434		-0.0278
Social Spending	-0.249**	0.0169	0.191**	
	-0.0982	-0.108	-0.0725	
Other Spending	-0.400***			
	-0.0753			
Constant	0.0532	0.141***	0.176***	0.142***
	-0.0369	-0.0422	-0.0403	-0.0409
Comments	46	46	46	46
R-Square	0.532	0.218	0.136	0.217
Durbin Watson Statistic	2.288388	2.194423	2.058759	2.193668

Significance level: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Source: prepared by the authors.

Table 2. Multicollinearity Variance Inflation Factors test

Variable	VIF	1/VIF
Total Spending	7.41	0.134898
Social Spending	3.73	0.267861
Other Spending	3.23	0.309814

Source: prepared by the authors.

The military spending border versus the military spending only work when such outlays are found within the efficiency limits, for this case, it must be over the limit of the narrow cone, as shown on figure 1, and that being the representation of the 'gun versus butter' dilemma. Conversely, this is not the case for Colombia since military spending is not up to its optimum level (Grautoff & Chavarro, p. 2009), in other words, the military spending is within the narrow cone and not at the borderline of such.



gm : military spending
 gs : social spending

$$z = gm^2 + gs^2 \quad (13)$$

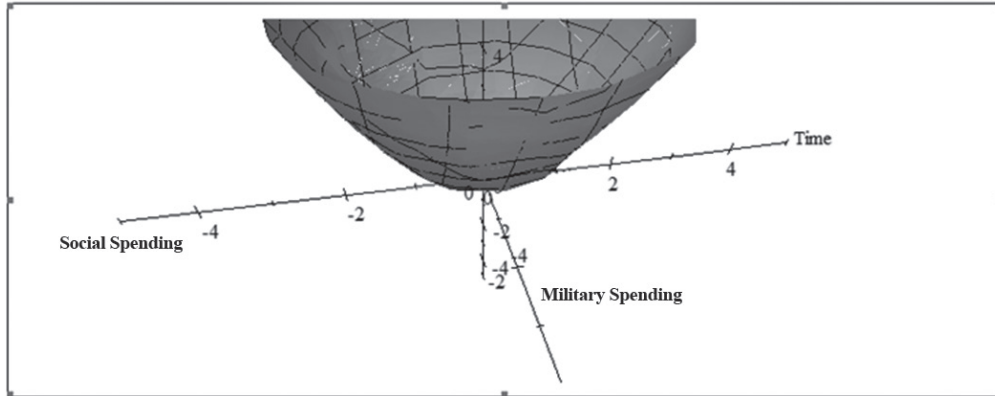


Figure 1. Social spending vs. Military spending dilemma in 3D.
Source: prepared by the authors.

Conclusions

The strategy developed by the Colombian military forces steps out of the classical militaristic model and blends together with the government provision of public goods admitting the nation's internal threats were born out of state's abandonment. Likewise, the strategic approach embraces the Clausewitzian 'trinity of war' (1984/1976) which interrelates the people, army and government.

Similarly, it is evidenced that in order to break the fighting will of irregular groups, it was necessary to cease the practice of the Lleras doctrine in which the military must face all potential threats. Social and updating programs focused on military doctrine and strengthening of military capabilities have allowed to recover Colombian territory previously controlled by the insurgency.

The development of a theoretical model for public spending and economic growth narrows the gap between appropriate taxation and economic growth. In Colombia, the investment on strategic resources as well as on doctrinal reforms in security has been financed with transitional income causing military equipment to become outdated, and in a cyclical pattern, the sustainment of public forces to become increasingly difficult. According the economic model, the absence of this public good is conducive to a drop in steady household consumption.

Consequently, what is required is a long term structural tax reform allowing to finance continuous defense and security spending through steady income. Similarly, the social policy that has been working together with the military strategy has produced positive outcomes, and has been demonstrated that the 'guns versus butter' dilemma is not evident in Colombia. Moreover, public policy must not be transformed into welfare programs condemning conflict zone inhabitants to



a poverty trap, triggering an increase in criminal activity, as it has been evidenced throughout former conflict zones, now recuperated by the DSP.

According Grautoff and Chavarro (2009), future research includes pursuing a line of study that delves into control action, defense economy, and strategic doctrine generation. From a more academic standpoint, public policy recommendations must be proposed regarding the topics mentioned above. The article presented above is compelling due to the fact that evident security advancements in Colombia have been the result of concerted action among economic growth and doctrinal update of the Colombian armed forces.

This article demonstrated that the military spending and social spending complement each other and do not substitute one another. As a result, the widening security agenda proposed by Buzan (1993) must be focused on social and economic aspects, acknowledged for the first time as public policy by the United Nations' Human Development Report (Programa de las Naciones Unidas para el Desarrollo Humano [PNUD], 1994). Consequently, the concept of 'security' not only includes the core strategic military concept but also the food and human security.

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