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**To leave or to stay? Uruguay and Paraguay within the
Mercosur**

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Abstract

The main objective of this paper is to show that when countries conforming a block that makes what some specialists have called: regionalism or integration -- having between them big asymmetries -- the policy to threat to leave the block can be a very efficient policy for those countries more harmed by the presence of such asymmetries. In particular in this article we analyze the current situation inside of the Southern Common Market or at it is better known in Latin America as MERCOSUR.

Keywords: Asymmetries, Integration, Nash Equilibria

JEL Clasification: F42, F51

Resumen

El principal objetivo de este trabajo es el de mostrar que en el caso en que varios países conformen un bloque comercial con grandes asimetrías, puede ser de gran utilidad para los países menos favorecidos por ellas, usar una estrategia que amenace con retirarse del acuerdo. Es el caso de economías pequeñas que no pueden tomar represalias contra las grandes economías en casos en que éstas, guiadas por su propio interés, no cumplan acuerdos previamente establecidos. Ciertamente esta amenaza tiene que ser creíble.

En el trabajo se muestra que en el caso del MERCOSUR puede ser esta una estrategia conveniente para Uruguay, desde que este puede firmar tratados de libre comercio.

Palabras clave: Asimetrías, integración, equilibrio de Nash

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Introduction

In this article we argue that under certain circumstances, when countries that face big asymmetries compose a block, the policy to threaten to leave the block can be, for them an optimal policy to avoid non-fulfillment of commitments (or defections in terms of the game theory) on the part of the large and powerful economies that feel unpunishable. The argument comes from the theory of games in particular of the so called: "strategies with credible threats". In this sense, the existence of big asymmetries with unequal relative economic weight within block, big differences in the level of development among the states involved in the agreement, or not equal shared information, is a source of weakness or impossibility of long existence for these blocks. It is possible to argue that the strength of the European Union (UE) is based on what is known as European values which mean equality among the members of the Union towards adequate development, shared information and social welfare, and that the source of weakness of MERCOSUR and the North American Free Trade Agreement (NAFTA) is the big asymmetries between the members that compose these blocks, as well as, the remarkably poor compromise of the big economies towards the development of the small economies, that make asymmetries even worse among American countries. Certainly several sentences of the Treaty of Rome of 1957 allude that some of the main objectives of the EU are to impel prosperity and social welfare among the members states of the Western Union, fomenting the pace, prosperity and equilibrium among them, that in the short and long term created what some social scientists have called after the end of the Cold War: economic security (1). As is well known, some institutions of the EU such as: the European Central Bank (ECB), the Structural Funds, the Cohesion Funds, the European Investment Bank, and the European Investment Funds, play a very important role to smooth asymmetries among the member states of the Union. For example, the ECB consolidates the banking businesses between European countries, provides grants derived of credits and assess market risk. It is important

to mention that these institutions have made extraordinary contributions towards the less developed economies of Western Europe, in particular: Spain, Portugal, Ireland, Greece (2) and now towards the new members of the Union from the former ex socialist Eastern European block (3). Furthermore, these kinds of institutions cannot be observed in any other type of regionalism outside the old continent which as consequence created unequal development among neighboring countries that shared common borders as it can notably seen in North America with NAFTA and South America with MERCOSUR. In the context of MERCOSUR it is a case of a commercial agreement between divergent countries. On the one hand, there are Brazil and Argentina; both of them are powerful economies with high levels of technological development. On the other hand, Uruguay and Paraguay are relatively small economies and much less powerful in the economic and political scenario in comparison to their neighboring countries. Furthermore, there is a remarkable lack of assistant institutions that contribute to obtaining equal levels of development among MERCOSUR's member states, and the economies of the small countries depend strongly of the economical behavior of the larger ones. Often the economic and political interests of these two types of economies are in deep contradiction. In this scope, a well defined strategy to continue or not within the block, could have high potential as a source of power and negotiation for the weakest members, or as the theory of game epithet for the countries with "imperfect information". This strategy must be chosen by them, as a consequence of the fact that big economies could ignore some norms established within the agreement, so if small countries continue within the block it could seriously encumber them, particularly in their economic and social welfare. In this scenario the following questions arise:

(A) How can small countries punish or avoid deviations of the most powerful members of an economic or political block, when these blocks have weak institutions or a panel of controversies to punish or reproof their deviations? (4).

(B) How could small countries such as Uruguay and Paraguay indicate their interest when they face such an enormous asymmetry with respect to Brazil and

Argentina (5), or in the case of North America, how can a medium economy such as Mexico defend what was agreed when it is relatively weak compared to the economic or technological interests of United States or Canada?

In this context we assess this conflictive situation in the framework of game theory. In particular we will introduce the concept of Nash equilibrium, to define an optimal strategy for the small economies. The Nash equilibrium is a rule that requires that each player chooses a strategy maximizing its returns, assuming that the other players would play in accordance with the established equilibrium. Nobody regrets to have taken a decision made when all players agreed with this rule. The reason an equilibrium could not be established is given by the existence, in the equilibrium path, of an information set which is not reached, but if it is attained, then to play according to the equilibrium implies some kind of irrationality. If an information set is reached and the possibility is established to do so, then there is an equilibrium path; that which could continue within the equilibrium path is a strategy that does not maximize its utility (6). According to the Treaty of Asuncion of 1999 it was agreed that all member states of MERCOSUR should coordinate their monetary policies, as well as, other common economic policies (7), that could seriously affect not only the smallest economies, but also the larger ones. Nevertheless, this compromise was broken in 2001, when Brazil devaluated its currency, despite the fact that, as mentioned before, it was agreed in the treaty that it was prohibited to do so. In this case the best thing to do for Argentina was also to devaluate. Nevertheless, it did not do so because at that moment the Argentine government had a strong commitment to the so called "the convertibility policy" i.e. one Argentine peso was equivalent to one American dollar (8). This economic measure made by Brazil could imply strong and bad repercussions towards the economy of Uruguay and Paraguay. For this reason is not clear at least, if it is optimal or not for an economy as large as Brazil's, to continue within MERCOSUR and to maintain economic highly preferential agreements with two small economies such as the aforementioned ones, due to the fact that, as mentioned before, could seriously harm its economy (9). Without

doubt Brazil will respect some agreements fulfilled with Argentina because in some industrial branches they have similar levels of development (10). So it is mutually beneficial for both countries to maintain and to develop agreements for the production in scale of different goods, like those of the automotive industry. However, in the short or in the long term, if for big economies such as Argentina and Brazil, to maintain agreements with two small economies such as Uruguay and Paraguay, would hamper them, then the most likely thing to happen is that they will not respect what was agreed in any the Treaty of Asuncion. In this context, from the game theory it suggests that the best rational choice for small economies such as Paraguay and Uruguay is to threaten developed economies as Brazil and Argentina to leave MERCOSUR and to join some other types of regionalism as well as to build strong economic partnerships with other regions like the UE or north American countries such as Canada, the US or Mexico, as a sine qua non element in order that the Treaty must be respected. In this vein, Uruguay and Paraguay can seriously hamper Brazil in the sphere of its foreign policy. As it underlined by [Soarez de Lina, M. (2007)] one of Brazil's major priorities today is to be the leading power of South America, therefore, if Uruguay and Paraguay leave MERCOSUR and for instance join NAFTA or become very close partners of the EU, it could seriously damage Sao Paulo's foreign policy.

The game theory: Cases with asymmetric information

The concept of sub game perfect equilibrium (SGPE) is a perfection of the concept of Nash equilibrium, for extensive game models [Fudenberg, D. and J. Tirole (1991)]. In order to play according to the framework of the SGPE, implies that in each information set, that is a singleton (i.e. and information set with only one node), each player would play in a rational way, maximizing its utility understanding that all players would play according to this strategy. In some cases, in which some type of asymmetries between players exists, the concept of SGPE is not satisfactory, see [Selten, R. (1975)]. This situation is particularly clear

for games with no perfect information in these cases, the SGPE may involve irrationality. The concept of Nash equilibrium is related to a strategic profile such that every player maximizes its utilities when the other player play according with this profile, however to be a more restrictive concept, the same is true for the SGPE. Moreover, it is possible that a SGPE prescribe a no maximizing strategy from any information set such that will be not reached if everyone plays according to the equilibrium. Hence to play according with this equilibrium-strategy could be not rational if this information set is reached. Suppose that some player deviates from the equilibrium strategy and that, from this deviation one information set such that would not be reached if all players follow the equilibrium path is actually reached. So the rational player that plays in this information set does not need, necessarily, to choose according to the previously established equilibrium path. Moreover to defect can be even better. Therefore, this kind of Nash equilibrium is generally not sensible; the well-known cases involving not credible threat have this kind of irrationality. It is true that the concept of SGPE allows us to eliminate many cases of Nash equilibrium which have irrationality in some information set, but it is not enough to eliminate all cases of irrationality in information sets with null probability to be reached following an equilibrium strategy. The concept of SGPE prescribes irrationality at each information set which is a singleton. In each of these nodes each player would play according to this equilibrium path choosing according to the principle of maximization of utility. This restriction to a singleton information set is necessary to ensure that the utility after this information set is well defined. But this restriction has as consequence that the payoff will be not well defined after this information set and so, this opens the possibility of irrationality after any information set with multi-nodes. It can happen that if this set is reached, a player playing according to the equilibrium path does not maximize its utility, so and incentive to deviate appears, i.e. it can happen that if a player continues to play according to the equilibrium strategic profile, then it could be not playing according to the maximizing utility strategy, therefore it would be better to deviate. This situation represents the case in which Brazil devaluates and Argentina devaluates

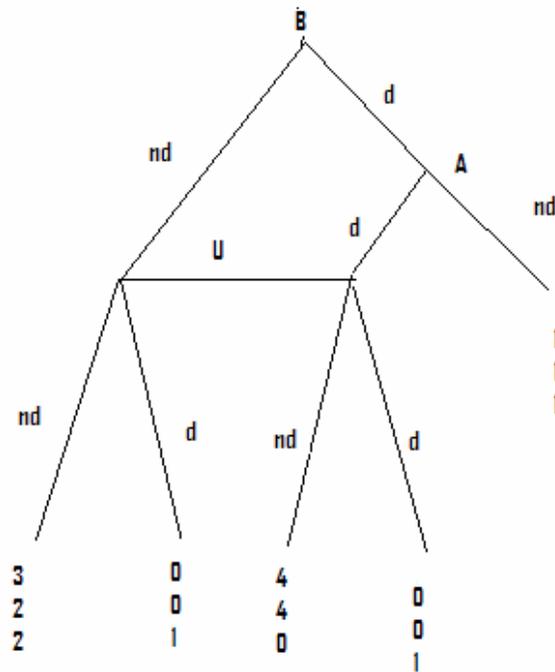
but, neither Uruguay nor Paraguay has known this deviation of the Asuncion agreement.

We suppose that the players involved in an extensive-form game agree to play according a Nash- equilibrium ϕ where there is perfect equilibrium in its sub-games. We also assume that at a given moment a player faces a situation (information set, in terms of game theory) which cannot be achieved if all the players had agreed ϕ . The player, before continuing the game will try to understand this deviation. But many times the player will not be able to construct what led him to this situation. This happens when the player has not enough information, in order to make a decision on the different alternatives regarding the present situation. In terms of game theory, we say that a player is under a set of information formed by several nodes, in other terms there are different ways -one or some- that could lead to that condition and that he cannot evaluate. In front of this possibility, he will assume rationally a probability distribution on the set of possible nodes, or on the set of alternatives to end this situation. This probability distribution represents its beliefs or uncertainty on the game for the player about the node in which he stands. From this point, he will play according to these beliefs searching the maximization of expected utility. If each player acts according to this rule, none of them will have incentives for a bias from the expected path. The possibility of a bias from this path of equilibrium ϕ is in the possibility that he supposes the existence of a set of information that is not achieved when the game is played according to the equilibrium, but a deviation allows to achieve this, when the player acts according to the equilibrium previously agreed upon, implying an additional gain for the bias player. In this sense, it will be better for the players to follow the game according to a given probability system (mixed strategies, in game theory terms) that do not uncover totally their plans, than do so following an alternative strategy strongly defined (pure strategy, in game theory terms).

Modelling economic and political facts

The prospect of the game theory Suppose that a country, U , receives an important flux of tourists coming from two large nearby countries, B and A . Also let us suppose that these three countries were committed to the policy of to not devalue their respective currencies. If A and B devalue their currencies with respect to the dollar, and if U does not follow this policy then, the flux of tourists from A and B to U decreases and consequently the income of U decreases also but the economy of A and B improve because the investment of the possible tourists remains now in their own countries. So, it can happen that A and B have incentives to deviate. In this case the alternative for U in order to maintain the flux of tourists would be to devalue also. But if fourth countries will devalue, all the economies will be worse off than in the case where these countries follow the policy of not devaluing. However the worst scenario for U is to play according to the agreement when A and B have devaluated. If B does not devalue, then the consequence of this policy followed by A will be for U of smaller importance, because the flow of originating tourists from B will be received for U and we are assuming that B is the greater economy. If B devaluates, and A does not devalue U will receive the flow of tourist coming from A this situation indeed is not the best but it is not the worst of U . Suppose that A and B can defect and this situation could be unknown by U . Then U needs to build a policy that allows it to prevent this possibility, because this defection can be very bad for their interests. As we can show the best policy for small countries is to threaten big economies to leave the block. This recommendation is inspired in [Selten, R. (1975)]. These threats, if credible, would protect the countries with incomplete information (or less developed economies) to possible defections.

Suppose that in a commercial block there are three countries, A , B and U (see figure).



(nd, nd, nd) is a nonsensible SGPE

$(d, nd, (p_1, p_2))$ with $p_1 < 1/4$ is a sensible SGPE

Suppose also that A and B are big countries sharing information. U is a small or poorly informed country. Each one needs to choose between devaluating d or not devaluating nd his own money. Suppose that the countries have agreed to play $\phi = (nd, nd, nd)$ and this strategic profile is a SGPE. Assume that starting the game B plays, and that it must to choose between d or nd . But only A knows the election of B , because the information set of A is reached if and only if B has followed the action of d . In this moment A must to make his election. If this election is nd the game is over and every country has and utility equals 1. In another case, U plays, but it does not know if its information set is reached from an history starting with B choosing nd (does not matter the elections of A because in this case the information set of A is not reached) or from the history (d, d) . In the first case its optimal election to play nd according to ϕ , and the returns for each country (R_B, R_A, R_U) are given by the vector $(3, 2, 2)$. In the

second case it is better for U to choose d , i.e. to deviate with respect to the agreement ϕ . Suppose that U plays d , then the vector of returns is $(4,4,0)$ and if he plays d this vector is $(0,0,1)$. Note that if U maintains in all cases, the agreement, then B prefers to play d , because it knows that A knows that it has played d , because only in this case the information set of A is reached. On the other hand, A knows that U has no form to know if his information set is reached because the agreement was respected or because B and A are defecting. Despite that the better situation is that nobody devaluates given that the other players playing do not devalue, and that ϕ is a SGPE, players have incentives to deviate. For each country, to follow the strategic profile $\phi = (nd, nd, nd)$ is optimal if the others are playing according to ϕ . Nevertheless players have incentive to deviate. This incentive originates from the imperfection in the information of U , i.e., because it has two nodes, and then in the moment to play, it does not know where it is exactly. It knows that it is its turn to play but it does not have perfect information about the previous history so, B and A can deviate from the strategy ϕ and each one plays d and U is not able to know this deviation. If this deviation is played and U maintains the agreement because it ignores such defection, then the payoff will be $(4,4,0)$ and this is the worst result for U and the best for B and A . Hence, an agreement to play (nd, nd, nd) is not self-enforcing, and therefore, the equilibrium (nd, nd, nd) is not sensible. Therefore, to obtain a self-enforcing equilibrium U needs to play according to a mixed strategy, i.e. to follow a strategy implying to play with positive probability does not maintain the agreement equivalently, to threat with to play nd with positive probability. To do this with success it needs to choose a mixed strategy where the probability to maintain the agreement is smaller than $\frac{1}{4}$. In this case the result of the game will be that B plays d , A plays nd and U plays a mixed strategy with $p(nd) < \frac{1}{4}$, i.e. the strategic profiles $\phi = ((1,0);(0,1);(p(d), p(nd)))$ with $p(nd) < 1/4$ are sensible SGPE.

This means that B plays d , A plays nd and U plays with a strictly mixed strategy. The returns for each country will be $(1,1,1)$. Certainly this is not the best situation, the payoff associated with the strategy ϕ are $(3,2,2)$ but, it is the best self-enforcing strategy for U , given the structure of the game, in particular the fact that U has no perfect information. This loss of welfare is a consequence of the existence of asymmetric information. We can conclude that for a poorly informed country it is preferable to announce an ambiguous political strategy with respect to its fidelity with the block. In this way the big economies will play according to the previous agreement; certainly this solution implies a second best optimal result, but this is the price of the fidelity.

Conclusions

In cases when there exist asymmetries (for instance in information) among countries that had signed economic or political agreement, or that join regional blocks, there can exist incentives for the big countries to deviate from the norms established within the agreement. If there are not panels of controversies strong enough to establish penalties for deviating, the most probable result is that, in cases when big economies can be seriously hurt if they maintain the agreements then, they will not respect the rules previously established (8). Hence, for countries that can be affected by political or economic decisions of the other, better informed countries, their optimal choice could be to threaten well informed countries or big economies, when for political and economic reasons, such blocks are of extreme importance, to leave the block and join another. This is what in game theory is called a mixed strategy with a credible threat. Certainly, for this threat to have a response it needs to be extremely credible for the big economies. Alternatively to this situation agreements must force all players involved to make public all information available or to create institutions that main objectives to create order, equilibrium and prosperity among countries that shared such an

agreement, as we tried to show within the case of the EU. After this threat large countries will be not sure if small countries will be staying or leaving the agreement so, the great economies facing this threat will also follow a policy that is transparent for everyone so there will be no incentives to deviate. Without this threat the better informed countries could have incentives to deviate and hurt the less informed countries. Nevertheless, to have a profound impact these threats must be credible. In the case of Uruguay and Paraguay within MERCOSUR the optimal strategy is the following: to stay or to leave MERCOSUR, join for instance NAFTA, or become very close in the economically or politically with the EU. This is a credible threat, particularly now when Brazil is transforming its foreign policy in an effort to become the leading and major power of South America.

Footnotes

(1) The term economic security connotes what some social scholars underline as economic growth, equal foreign trade, join economic blocks and not be isolated from foreign trade. All these factors will contribute to stability and prosperity, to be excluded from them, could mean civil wars, military conflicts between neighboring countries, and social instability. The Complex Security Theory is a theory that took remarkably importance after the end of the Cold War, it was created by the Copenhagen School of thought, and its author is Wojciech Kostecki, this theory allude to new forms that could create insecurity between neighboring countries, and one of the most important issues that assesses Kostecki is the big differences between economic growth and prosperity among economies that shared common borders. More information in [Kostecki, W. (1996)].

(2) After the fall of communism in Europe the Central European countries such as Poland, Hungary, Slovenia, Slovakia and the Czech Republic face weak and poor economic growth in the framework of their transition period, after joining the EU their economic growth increase even to 7 of their GNP. Furthermore, according to AT Korneev in 2005 they were considered among the fourth most attractive emerging markets in order for direct foreign investment, *El Financiero*, December 17th, Mexico, 2007.

(3) Among another EU's institutions that assist the Union's member states to accomplish the objectives of an economic and social equilibrium between the largest and the smallest countries are the following: The European Investment Bank (EIB), and as aforementioned before, the Structural and Cohesion Funds, and the European Regional and Development Fund (ERDF). The first institution provides financing for capital investments towards regional development in the framework of transport, telecommunications, energy, research, education, health

and environment improvement. Another of its tasks is to facilitate integration, and to find balance in terms of development and economic cohesion among the member states. The second constitutes one of the Union's main strategies for supporting social and restructuring across member states. Between both institutions manage for over one third of the EU budget. In short, one of their main tasks is used to minimize regional disparities and support regional development towards the development of infrastructure, human resources, telecommunications, research and development. In addition, these assist geographical areas that are in a very different level of development in comparison to the developed regions of the Union. Finally, the third institution, the European Regional Development Fund (ERDF), which its main objective is to provide assistance in the form of grants towards project, costs.

(4) The Argentina's decision to change the agreement in order to import cars, goods information, and capital goods at the beginning of July, after de Asuncion Meeting puts under high tension in the relations among the members of the MERCOSUR. For example, Brazil stooped all bilateral talk negotiations with Argentina and requested the Ministry of Economy of Argentina to rethink about its new importation rules.

(5) Brazil is today one of the biggest economies in the world, according to the World Bank it is ranked as the eight economy of the world, see Global Economic Prospect, published by the World Bank in 2007.

(6) The basic assumption underlying the concept of rational behavior is the concept of rational behavior given in [Savage, L. J. (1954)]. Every player who has make a choice under uncertainty will construct a personal probability for every future event about him is uncertain and he will maximize expected utility given these Probability.

(7) It was agreed to coordinated macroeconomic and structural policies among MERCOSUR member states in the following areas: foreign Trade, agricultural, fiscal, services, transport, communications, custom s union, and industrial policies, monetary and exchange rates policies, among others that assure equal competition towards MERCOSUR member states. Likewise, as in the European Union, it was agreed the legal harmonization of MERCOSUR member states in order to strength its further integration.

(8) The devaluation in Brazil, the fall of the Convertibility in Argentina and the chaotic devaluation of the 2000, did not affect commercial relations between its greater partners. It is important to underline that the weight of commercial relations between Argentina and Brazil, represents an important percentage of their respective GDP.

(9) The government of Brazil, accepted the proposal of Argentina in order to established a compensation mechanism, in order to minimize the economic impact that Brazil evaluation could have towards its currency, as well as, towards the currencies of Uruguay and Paraguay. The decision to make common steps was made because of the following deviation faced by Brazil's currencies, for example between January and the dollar yesterday happened to cost 1.95 real ones to 2.72

real ones. Thus in which it goes of the year, in Brazil the dollar increased in price a 39.5% In the same period raises it of the internal prices (inflation) was of as soon as 5%. This way, measured in dollars, the Brazilian production costs lowered the price of around 30% [Clarín.com. (2001)].

(10) The official panels of controversies of MERCOSUR are focus to react towards any controversies that could arise between its member states, or between private individuals, arising of noncompliance with the provisions of the Asuncion Treaty, or from the agreements executed under its scope, or even from decisions made by the Common Market Council and resolutions taken by the Common Market Group. In 1994, member states established a definitive system for the settlement of disputes that could be explained as follows. First, direct a negotiation, which in short means bilateral negotiations between member states. Second, intervention of the Common Market Group (CMG), that means that if direct negotiations an agreement is not reached between the member states, member states may submit the matter for the examination to the CMG, and request outside advice from specialists; and four the arbitration procedure, that means that if an agreement is nor reached through the CMG, any of the member states may request the Administrative office of the Common Market Group institute for its arbitration. In this case, each member state will appoint ten arbitrators to be placed on a list to be filed at the Administrative Office of the Common Market Group.

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