The Logic of Investment Booms in Latin America: The role of Institutions

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Abstract

Theorization and empirically-based knowledge regarding investment is far from being agreed. We believe this could be a consequence of the application of assumptions and methodologies which are not entirely suitable to understand some conditions, including institutional ones.

In this study we face the challenge from a different perspective, using the unusual but highly suitable tools from qualitative comparison analysis. Instead of focusing in the sum of contributions of individualized independent variables, we center on the study of the presence or absence of sets of favorable conditions.

We studied investment booms between 1970 and 2012 in 11 Latin American countries. We found that the existence of a high demand, macroeconomic stability and external funding were the conditions that individually aroused the most necessary in order to facilitate the presence of investment booms in the region. Also, an increasing demand and relative declines of investment costs proved pretty sufficient to thrust booms.

In turn, we found that several institutional conditions, such as trade openness, financial liberalization and legal security, acquire greater relevance when analyzed in conditions sets. The technique allows us to confirm the existence of a wide variety of sets leading to the presence of investment booms, where the presence or absence of certain conditions is important when studying the relevance of the remaining conditions. Therefore, the understanding of investment appears to need a multi-causation approach in order to look more broadly the conditions that may foster, hinder or have a neutral impact on it.

Key words: investment, sets relations, qualitative comparative analysis
JEL Classification: E22, N16, O43.
Índice

Introduction .......................................................................................................................... 5
2. From country-years to episodes ................................................................................. 6
3. Methodology .................................................................................................................. 7
   Episode compilation ........................................................................................................ 7
   Data and theory of investment determinants ................................................................. 9
   Procesamiento de datos en episodios ........................................................................... 11
4. Results .......................................................................................................................... 15
   Descriptive statistics of the episodes .......................................................................... 15
   Analysis of individual conditions .................................................................................. 21
   Analysis of set of conditions ........................................................................................ 26
   Some interesting configuration of conditions ............................................................... 28
5. Conclusions ................................................................................................................... 29
6. Bibliographic references ............................................................................................... 31
Introduction

Investment in productive assets is fundamental in order to understand economic growth and social development. As a behaviour connecting present and future, the acquisition or production of goods for their use in the production of further goods involves expectations regarding the evolution of offer, demand, prices, predictability of factors affecting the net returns of the productive assets and confidence on the rules regarding the latter. The impossibility of dividing much of the goods in which productive investment materialize, as the usual volatility of many of its determinants, make investment a pro-cyclic variable and more volatile than aggregate production. The hurdles for prediction and the interdependence between the agent’s decisions make investment prone to herd behaviour. All these considerations greatly explain that theorization and empirical-based knowledge about investment are far from being fully agreed.

Guided by specialized public discourses, an efficient investment promotion would demand sustained efforts and the creation of durable favourable conditions. Meanwhile, the determinants of greater levels of investment represent durable characteristics of societies. This perspective extended with the irruption of institutional study in growth economics. However, based in conventional econometric techniques, applied research trying to offer explanations for long-term patterns could be considered incomplete.

A characteristic which is not oftently incorporated in the studies of investment, as well as for production, is the fact that it tends to appear in sustained booms, intercalados by periods of volatility and/or recession. Although the inclusion of an auto-regressive component on empirical models could be considered to attend this characteristic, the decision of including or not responds mainly to model adjustments and not of the consideration of a phenomena which demands an explanation.

A second characteristics shown by empiric evidence about investment is that individualized variables that are considered as the main determinant in microeconomics (eg.: interest rate, cost of capital, etc) yield uncertain results in diverse empirical research. In other words, there are few correlations and/or causal relationships that remain robust to variations in the techniques and specifications. Despite these could be worrying, if we consider the result as a reflection of assumptions and methodologies, we can think of it as a manifestation that investment is effectively a multi-factorial phenomena in a sense that econometric techniques cannot fully explain adequately. Maybe the explanation involves the presence or absence of configurations of favourable conditions, as a contrast of the summation of partial effects of a set of independent variables.

In this paper we try to start a respond to the two previous concerns regarding the dynamics and multi-causation forms respectively, by rethinking the empirical challenge and responding to it with the infrequently used but highly pertinent tools of set theory. In the second section we expose the convenience of adopting a different look to the patterns of investment, in order to complement the empirical knowledge derived from econometric studies. The third section describes and fundamenta the alternative strategy based on set theory. The fourth section contains the empirical exercise and the results for eleven Latin American countries in 1970-2012. The final section resumed the implications of the results.
2. From country-years to episodes

Este artículo explora el rendimiento potencial de una estrategia analítica extendida en otras ciencias sociales pero infrecuente en economía, para dar cuenta de las condiciones que aparentemente determinan períodos de crecimiento significativo de la inversión. La teoría lógica de conjuntos (set theory), o análisis comparativo cualitativo (QCA por su sigla en inglés), se originaron en la necesidad de un marco de análisis para orientar la investigación empírica de fenómenos o episodios históricos (casos) de los que existen pocas observaciones, que admiten cuidadoso estudio de sus variadas facetas pero no se prestan fácilmente al análisis cuantitativo. Sin embargo, la metodología mencionada se descubre recientemente a sí misma como un enfoque complementario del análisis cuantitativo, mejor preparada para responder a algunas interrogantes cruciales para la disciplina y las políticas (Goerz y Mahoney 2012).

En breve, los métodos de la teoría de conjuntos usan la lógica booleana para articular, generalizando o deduciendo, sentencias contrastables que se vinculan entre sí por relaciones de verdad/falsedad. Por ejemplo, de la verificación de que un gobierno electo cuenta con mayoría parlamentaria propia y cultura de votación disciplinada puede deducirse lógicamente que tempranamente conseguirá pasar las leyes que haya promovido durante la campaña electoral. Ahora bien, si uno de los dos factores explicativos provoca sistemáticamente la concreción de la agenda legislativa, ese factor puede afirmarse que conforma una “condición suficiente” del resultado de interés, significando que la presencia del causante se asocia unívocamente a la ocurrencia del resultado. En cambio, si una condición se verifica toda vez que se da el outcome, es “necesaria” para el mismo pero no lo determina completamente si existen casos que verifiquen el outcome en la ausencia de esa causa.

En la metodología adoptada, la combinación de factores causales presentes/ausentes con resultados de interés trazan los contornos de modelos causales. La teoría de conjuntos tiene la fortaleza relativa a otros métodos de (i) poder reflejar efectos causales asimétricos, (ii) tolerar la equifinalidad (o el reconocimiento de que ciertos resultados pueden ser alcanzados siguiendo diversas trayectorias, y (iii) permitir representar relaciones de causalidad complejas.

La asimetría en los modelos de la teoría de conjuntos implica reconocer que la verificación de una conjunción causa-resultado no implica la ausencia del resultado en ausencia de la causa (a diferencia del marco estadístico-econométrico que usualmente especifica modelos de relación entre variables que se supone simétricos). De manera similar, mientras el análisis cuantitativo busca la mejor síntesis explicativa en términos de minimizar determinantes y simplificar especificaciones, el enfoque cualitativo de teoría de conjuntos estimula la detección de senderos alternativos que permitirían alcanzar un único outcome. Finalmente, la causalidad compleja no es ajena a la metodología de conjuntos, en tanto permite articular modelos con condiciones necesarias y/o suficientes, incluyendo relaciones condicionales entre factores (por ejemplo, “X no causa en general a Y, pero sí lo hace en presencia de Z”, etc.), además de los efectos asimétricos mencionados.

En nuestro caso, la metodología de teoría de conjuntos se justifica por algunas características del proceso de inversión y las políticas relevantes. Por ejemplo, numerosos estudios enfatizan la importancia de una constelación de políticas (y no un factor simple) como soportes necesarios para estimular la inversión, pero lo fundamentan en base a resultados de modelos empíricos donde no hay espacio para configuraciones complejas de condiciones (desplazadas por combinaciones “aditivas” típicas del análisis econométrico). Mientras el análisis cuantitativo se concentra en estimar precisamente el efecto de la variable X sobre los niveles de la variable de
resultados y, el análisis de conjuntos enfatiza detectar la arquitectura de condiciones que determinan el resultado de interés.

Adicionalmente, la literatura empírica sobre inversión está lejos de contar con una lista de factores explicativos incuestionablemente aceptados, a pesar de la variedad de estrategias analíticas cuantitativas que han sido ensayadas. Esto sugeriría que un cambio de enfoque podría ser una respuesta más apropiada que modificaciones en el margen a los modelos disponibles.

3. Methodology

**Episode compilation**

We collected time series of Gross Fixed Capital Formation adjusted for inflation for 11 countries of Latin America (listed in the Annex) for 1960-2012.

Based on these data, we analyzed the presence of investment booms and temporally delimited them. The criteria used for the compilation of the episodes were based on the study of Hausmann, Pritchett y Rodrik (2005) regarding growth accelerations. In this case, we adapted the criteria to fit the study of sustained growth of investment without requiring an increase in the annual rate of expansion. In sum and as stated in the following chart, we define the investment booms as periods in which Gross Fixed Capital Formation showed an important increase where both the levels achieved and timeframe are significant.

**Chart 1: Criteria for the compilation of investment booms**

<table>
<thead>
<tr>
<th>Objetivo</th>
<th>Criterio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Important increase</td>
<td>Annual increase of GFCF</td>
</tr>
<tr>
<td></td>
<td>Above 2% in the first and last year</td>
</tr>
<tr>
<td>Significant level achieved</td>
<td>GFCF flow in the last year of the boom is higher than the previous relative máximo of the time series</td>
</tr>
<tr>
<td>Significant timeframe</td>
<td>At least 4 consecutive years of annual increase of GFCF</td>
</tr>
</tbody>
</table>

In certain cases, the criteria adopted established the fragmentation of study cases that seemed to belong to a single boom or narrowed booms due to incidental contractions in investment. As the latter could imply a partial analysis of the booms, and in some cases the omission of several significant years, we decided to annex consecutive years of GFCF growth to the adjacent investment booms according to the criteria stated in the following chart.

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1 We used National Accounts data from Central Banks, Statistics Institutes and other pertinent agencies of the countries in our simple, compiled until 2008 by the United Nations Economic Commission for Latin American and the Caribbean in the ‘Cuaderno Estadistico 37’. Data for more recent years was taken from the original sources.
Finally, we exhaustively compiled for each country in our simple episodes of sustained growth of investment and periods of absence of the latter in 1970-2012.

Following the same argumentation previously stated to annex years of GFCF increase to the booms compiled, we analyzed the years previous to 1970 in those countries where that year was part of an investment boom in order to find the year were the investment growth actually started. In such cases, we annexed the years before 1970 to the already defined booms.

The criteria selection aims to delimit periods that clearly represent our study objet, that is investment surges that last in time, without excluding cases as a consequence of extremely restrictive criteria. Therefore, the selection of an ‘at least 4 years’ criterion intends to filter particular cases due to specific and transitory shocks.

In that sense, it is worth noting that we conducted robustness checks by loosening the quantity of years required in order to delimit an investment boom. The results confirm that many of the booms compiled are relevant, while shedding light over the information lost that could have been inflicted in case of tightening our selection criteria. By setting the limit in 3 years, all the booms we found are confirmed and 4 additional episodes corresponding to Colombia, Ecuador and Peru are added. By setting the limit in 5 years we lost 7 cases, including 2 from Argentina, one from Bolivia, Ecuador and Mexico and all of the cases of Venezuela. Finally, by setting the limit in 7 years for the selection of investment booms we found 20 less episodes than the actual criteria, although every country still shows at least one boom, with the exception of Venezuela.

### Chart 2: Criteria for annexing years to investment booms

<table>
<thead>
<tr>
<th><strong>Objective</strong></th>
<th><strong>Criterion</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Important increase</td>
<td>Annual increase of GFCF</td>
</tr>
<tr>
<td></td>
<td>Above 2% in the first and last year</td>
</tr>
<tr>
<td>Boom continuation</td>
<td>Non-existence of more-than-1 years of consecutive</td>
</tr>
<tr>
<td></td>
<td>contractions between original boom and the annexed period</td>
</tr>
<tr>
<td>Significant timeframe</td>
<td>At least 4 consecutive years of annual increase of GFCF in the</td>
</tr>
<tr>
<td></td>
<td>annexed period</td>
</tr>
</tbody>
</table>


Data and theory of investment determinants

We compiled a dataset for the 11 Latin American countries studied containing economic and political indicators that are usually considered as determinants of gross fixed capital formation.

In line with Torello (1992), we define our variables of interest based on the analysis of expected profit by investors. Investors would compare the discounted cash flow of their projects with the cost of carrying them out. The analysis also incorporates the uncertainty faced by investors to predict their profits. Therefore, investment faces four hurdles: demand, relative prices, financing possibilities and uncertainty.

First of all we consider the evolution of domestic and foreign demand. In his seminal study, Jorgenson (1963) states that the desired level of capital assets from a company trading in competitive markets depends positively in its production, which in turn can be approximated by its demand. Likewise, Samuelson (1939) stresses the relationship between investment and production in its acceleration hypothesis, in which fixed capital formation climbs when economic growth accelerate. In this study, we approximate domestic and foreign demand through Gross Domestic Product (GDP) growth and the variation of a Foreign Demand index respectively. The latter indicator was constructed by a weighted sum of the economic growth of the main trade partners of each country, based on annual export data to each of them.

Additionally, we add a Trade Openness indicator that complements the idea of the impact on investment through greater foreign demand. Two different effects over investment have been discussed in the related literature, through an increased demand and through a boost towards higher productivity². We will focus on the incidence channel deriving from an increased demand of production due to trade openness, using as an indicator a variable based on the calculation of tariffs as percentage of foreign trade of each country³. According to neoclassical theory, lifting trade restrictions, in this case price restrictions, would prompt a one-time-only rise of total demand by increasing penetration in external markets where the products are price competitive. These adds up with the growth in those foreign markets where goods and services are competitive in order to determine the increase of foreign demand.

Secondly, we take into account the relative price of investment. Related literature usually uses the interest rate in order to approximate the cost of capital formation. Nevertheless, different studies have not found a statistically significant relationship (i.e. Agosín, 1994 and Cruz & Texeira, 1999), which could be responding to the possibility that the impact of interest rates operates upon the level of desired capital and not over the flows of it, such as Jorgenso stressed. In consequence, in this study we adopted a different criterion to control investment cost of opportunity. Particularly, we approximate the relative cost of capital by measuring a ratio between the implicit deflators of Gross Fixed Capital Formation and Gross Domestic Product.

² En la literatura se encuentran efectos de la apertura comercial sobre la productividad que actúan en forma contrapuesta. Por un lado, en Balasubramanyam et al (1996) se encuentra un impacto positivo, derivado de un flujo de inversiones hacia los sectores transables donde hay espacio para mejoras en la productividad y competitividad. No obstante, la apertura comercial podría exponer a una exigente competencia a algunos sectores poco competitivos en el momento de la liberalización comercial, volviéndolos poco atractivos a la inversión (Serven, 2002).

³ El indicador, tomado de Economic Freedom of the World, normaliza para cada año el ratio de tarifas al comercio exterior sobre la suma de montos de exportaciones e importaciones en relación a la cercanía respecto a valores de 0% y 15%. En ese sentido, un valor de 10 representaría la ausencia de tarifas y uno de 0 surgiría de ratios iguales o superiores a 15%.
In order to consider the financing of projects, we incorporate indicators referring to international capital inflows into the economy and finance liberties in each country. The access to financing that each company will depend partly on the available credit within each economy, which in turn responds to the inward and outward capital flows (Villar Gómez et al., 2005). For its measurement we use the capital account and financial account of the balance of payments (which correspond to the broad definition of capital account) as percentage of GDP. They reflect the net currency exchange due to change in ownership of national assets. Thus, a positive capital account (in its broad definition from now onwards) implies in sum foreign financing of national-located projects, direct purchases of already installed ventures and/or acquisition of finance assets, among others.

Additionally, apart from the available cash flow in the economy, its allocation in productive projects will be determined by the financing structure of the economy and the access that investors have that structure (Ndikumana, 2000). In order to measure it, we incorporate 3 indicators regarding different characteristics of the financial market, taken from the financial reforms dataset compiled by Abiad et al (2010). According to Loungani & Rush (1995), some agents (typically small and medium enterprises) usually cannot access direct funding and, hence, are dependent of banking credit for their investments. Therefore, studying that market operation turns out to be important to understand investment.

The indicators from Abiad et al (2010) are constructed on the basis of a set of coding rules that provides a binary score on the presence or absence of certain characteristics and then adds up scores by different categories. On the one hand, we consider an indicator of Interest rate liberalization that measures the absence of restrictions in the determination of deposit and credit interest rates. On the other hand, we take into consideration the indicator regarding the Absence of entry barriers, signaling the extent in which new banks can enter the local financial system. In particular, the indicator accounts for how permissive is a country with the entry of foreign banks (analyzing if it’s allowed and if there is a restriction for nonresident equity share), the possibility of setting up a new bank, opening branches and engaging in certain range of activities. Lastly, we use an indicator referring to Financial Account transactions where points are awarded on the presence of a unified exchange rate system in the country and the absence of significant restriction on inward and outward capital flows4.

As far as investment decisions are also influenced by the capacity agents have to predict returns derived from it, uncertainty about the future is an important variable to explain investment. Moreover, investment decisions face problems of irreversibility and/or asymmetric costs of investing and disinvesting, which makes the capacity to project incomes and expenses particularly relevant (Pindyck, 1986 and Caballero, 1991). To approximate economic uncertainty we take into consideration two indicators. Firstly, we consider the change in annual inflation, based on the idea that an economy with a significantly volatile price system is not efficiently transferring the necessary information for an adequate allocation of resources (Beaudry et al, 2001). Moreover, high inflation is usually correlated with greater volatility (Kiley, 2007), prompting an increase of investors discount rate (Fama, 1977), which in turn hinders the fulfillment of investment projects. Secondly, we use the ‘Legal System & Property Rights’ index of Economic Freedom of the World. That index is constructed based on the answer of analysts regarding confiscation risk and ‘rule of law’5 in each country, thus representing expectations regarding the ability to appropriate returns generated by private goods.

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4 La construcción de los indicadores se encuentra descripta en mayor detalle en Abiad et al (2010)

5 Normalizado en cada año en relación a los valores para el mismo indicador de la muestra de países elaborada por Economic Freedom of the World.
Procesamiento de datos en episodios

Normalmente, en los estudios basados en correlaciones de variables, luego de tener definidos los agentes a estudiar, el horizonte relevante para el estudio y las variables dependientes e independientes de interés se procede a realizar el análisis, por ejemplo mediante técnicas econométricas.

En este trabajo nos distanciamos en cierta medida de ese tipo de procedimientos, centrándonos en un análisis cualitativo de casos definidos por poseer ciertas características de interés. Para ello, en un primer paso delimitamos temporalmente los augres entre 1970 y 2012. Luego, calculamos los valores promedio de los posibles determinantes de la inversión de los años que componen cada episodio en cada país⁶.

<table>
<thead>
<tr>
<th>Condiciones</th>
<th>Indicador</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crecimiento económico</td>
<td>Promedio anual de variación del PIB</td>
</tr>
<tr>
<td>Crecimiento de mercados externos</td>
<td>Promedio anual de variación del Índice de Demanda Externa</td>
</tr>
<tr>
<td>Apertura comercial</td>
<td>Promedio del nivel del Índice de Apertura Comercial</td>
</tr>
<tr>
<td>Descenso del costo relativo del capital</td>
<td>Promedio anual de variación del Índice de Costo Relativo del Capital</td>
</tr>
<tr>
<td>Liberalización de tasas</td>
<td>Promedio del nivel de Indicador sobre Liberalización de tasas en el sistema financiero</td>
</tr>
<tr>
<td>Ausencia de barreras a la entrada en el sistema financiero</td>
<td>Promedio del nivel de Indicador sobre Ausencia de barreras a la entrada en el sistema financiero</td>
</tr>
<tr>
<td>Apertura de cuenta capital</td>
<td>Promedio del nivel de Indicador sobre Transacciones internacionales en el sistema financiero</td>
</tr>
</tbody>
</table>

⁶Cabe señalar que si bien las series de tiempo utilizadas cubren en su amplia mayoría el período 1970-2012 de forma anual, los datos extraídos de Economic Freedom of the World (referidos a la apertura comercial y seguridad jurídica) tienen cobertura anual de 2000 en adelante y cada 5 años entre 1970 y 2000. En la medida que esos indicadores miden variables institucionales, las cuales tienen por lo general gran estabilidad en períodos reducidos de tiempo, tomamos como criterio operativo mantener los valores incambiados en las variables hasta la siguiente medición. De esta forma y como consideramos promedios anuales de cada variable en los distintos episodios, los niveles registrados en estas variables a comienzos de los episodios posiblemente influyan más en el valor promedio obtenido para la totalidad del episodio, lo cual resulta consistente con la búsqueda de condiciones que propicien la inversión y no consecuencias de la inversión.
Se puede observar que hasta ahora el procedimiento difiere únicamente de lo habitual en los estudios econométricos en la agregación temporal realizada. Mientras que usualmente en estudios econométricos de los determinantes de la inversión (como en Ribeiro y Teixeira (2001), Labarca y Hernandez (2003), Acosta y Loza (2005) y Fleitas et al (2013), entre otros de los hechos recientemente para países latinoamericanos) se toma como base de estudio una agregación temporal de años, realizándose los cálculos correspondientes para llevar los indicadores a dicha medida uniforme, en este trabajo consideramos como base los casos definidos con los criterios descriptos anteriormente, resultando en agrupaciones temporales de distinta duración pero en los cuales marcadamente se observa o no una característica relevante, en este caso un crecimiento sostenido de la inversión.

Teniendo definidos los episodios y los datos correspondientes a ellos que queremos analizar (expresados en su valor anual promedio), procedimos a re-escalarlos para poder categorizarlos en sets y realizar un análisis cualitativo. Para ello, nos basamos en la propuesta de Ragin (2008).

Los sets indican la pertenencia de un agente en un conjunto con determinada propiedad. En nuestro caso, las variables convertidas en sets nos dirán si un país cumplió en un episodio con algún atributo adicional que estamos buscando, como por ejemplo haber tenido una inflación inestable.

La calibración de los indicadores en sets es un proceso fundamental del análisis cualitativo, ya que encierra la determinación de valores para los cuales el indicador representa niveles en la variable subyacente que tienen diferentes impactos sobre la variable dependiente. Por lo tanto y a diferencia del estudio de correlaciones, en el análisis mediante sets está implícita la consideración de efectos asimétricos según el nivel de las variables independientes sobre la variable dependiente. De hecho, variaciones por encima o por debajo de los umbrales de pertenencia no afectan al indicador set, por lo que no se podrían percibir efectos sobre la variable dependiente.

A modo de ejemplo, si se define que una variación de 50 puntos porcentuales entre la inflación anual de un año y el anterior es suficiente para determinar que en un cierto año un país pertenece al conjunto de países con inflación inestable, un país A que muestra un salto de 75 puntos porcentuales en la inflación anual y un país B que presenta uno de 150 puntos porcentuales (75 puntos por encima del país A) pertenecerán indistintamente al mismo conjunto. En este ejemplo, se estaría entendiendo que cuando el indicador de inestabilidad económica (representado por la variación anual de la tasa de inflación) alcanza los 50 puntos, la falta de información contenida en el sistema de precios y su consecuente efecto en la eficiencia de la colocación de recursos alcanzan un impacto significativo sobre el crecimiento del flujo de formación bruta de capital fijo.

En ese sentido, es importante señalar que en el análisis cualitativo que realizamos no cuantificamos el impacto de las variables independientes sobre la variable dependiente. Nuestros resultados nos dirán sobre la relevancia de ciertas condiciones en su rol de posibilitar procesos de inversión.
sostenidos de la inversión y luego observaremos la importancia empírica de las mismas en los casos estudiados.

Para la definición de \textit{sets} re-escalamos los indicadores y trabajamos con un parámetro para la pertenencia de un país en el grupo de países con cierta característica a un valor superior a dos tercios en la escala convertida. Los valores seleccionados para re-escalar se basan en el entendimiento de los niveles en los cuales cada condición genera efectos sobre la inversión. Si bien los criterios y umbrales resultantes son discutibles, es preciso señalar que en la gran mayoría de los casos los valores empíricos registrados se encontraban marcadamente fuera o dentro de los \textit{sets} definidos. De hecho, los valores que son cercanos a los umbrales definidos son como máximo el 29% en el set inflación estable y como mínimo el 3% en Saldo de Cuenta Capital elevado. En el anexo se incluye un cuadro con estadísticas descriptivas sobre los valores cercanos a los umbrales para cada variable analizada.

Así, finalmente determinamos para cada país una serie de episodios alternando la presencia y la ausencia de crecimiento sostenido de la inversión en los cuales señalaremos la existencia o no de ciertas características que entendemos pueden ser determinantes\footnote{7}. Los valores que determinan el punto de quiebre entre la pertenencia y ausencia de las condiciones estudiadas se detallan en el cuadro 4.

\begin{table}[h]
\centering
\begin{tabular}{|l|c|}
\hline
\textbf{Indicador} & \textbf{Umbral} \\
\hline
Promedio anual de variación del PIB & $> 1\%$ \\
\hline
Promedio anual de variación del Índice de Demanda Externa & $> 3.7\%$ \\
\hline
Promedio del nivel del Índice de Apertura Comercial & $> 6.5$ \\
\hline
Promedio anual de variación del Índice de Costo Relativo del Capital & $< 0.7\%$ \\
\hline
Promedio del nivel de Indicador sobre Liberalización de tasas en el sistema financiero & $\geq 2$ \\
\hline
Promedio del nivel de Indicador sobre Ausencia de barreras a la entrada en el sistema financiero & $\geq 2$ \\
\hline
Promedio del nivel de Indicador sobre Transacciones internacionales en el sistema financiero & $\geq 2$ \\
\hline
Promedio del Saldo de la Cuenta Capital de la Balanza de Pagos como porcentaje del PIB & $> 1.4\%$ \\
\hline
Promedio anual de variación de la inflación anual & $< 1\ \text{p.p.}$ \\
\hline
Promedio del nivel del Índice de Seguridad Jurídica & $> 5.5$ \\
\hline
\end{tabular}
\caption{Cuadro 4: Puntos de quiebre para la presencia/ausencia de las variables dependientes}
\end{table}
La elección de un análisis dicotómico frente a uno de varios valores o de variables fuzzy responde al tamaño de la muestra y al nivel de matices que se considera necesario preservar en los datos estudiados. Se puede consultar un análisis más detallado de la temática en Rihoux (2006).

En concreto, nuestro interés radica en la observación de que la inversión se suele verificar en empujes de duración medianamente sostenible pero acotada, fundamentalmente en los países a analizar. Por lo tanto, en la medida que indagar sobre estos procesos contribuye al entendimiento de los determinantes de la inversión, nos importará centrarnos en la presencia o ausencia de dichos episodios, sin diferenciar entre las tasas de expansión registradas en episodios de expansión o ausencia de ella, respectivamente. Por otra parte, en lo que refiere a los posibles determinantes de estos procesos, buscamos explorar las condiciones económicas, así como también condiciones institucionales, de carácter más duradero y cuyo efecto en otras variables económicas suele materializarse no a través de cambios repentinios sino a partir de la persistencia de ciertas características. Las instituciones que rigen el comercio exterior, mercado financiero o cumplimiento de contratos y derechos de propiedad en una economía no suelen mostrar cambios observables con la misma frecuencia que las variables de resultados económicos medidas en su valor monetario. Asimismo, los efectos que causan sobre otras variables generalmente se deben a la existencia de alguna condición y no al efecto inmediato de un leve cambio. En tanto, las relaciones entre variables económicas y la presencia de procesos de aumento de inversión también se pueden entender de la misma manera. Independientemente de los valores numéricos que tomen dichas relaciones, la teoría económica nos señala condiciones que hacen que ciertas variables propicien o limiten la inversión. El objetivo de nuestro estudio consiste en testear esas hipótesis, al tiempo que continuar indagando en el entendimiento sobre la relación entre variables institucionales y la inversión.

En lo que refiere a la cantidad de casos, los procesos que pretendemos estudiar en América Latina no son muy abundantes, en parte debido a la agregación de años en mismos procesos que entendemos conveniente hacer. De hecho, muchos de ellos han sido ampliamente investigados de forma individual y generalmente cualitativa (se puede citar algo). En concreto, nuestro estudio se basa en el análisis de 58 casos, incluyendo auges de inversión y ausencia de los mismos. En ese sentido, cabe señalar que existen diversos estudios que se basan en el análisis dicotómico de la variables para números similares de casos (Williams y Farrell (1990), Rudel y Roper (1996) y Nomiya (2001) lo utilizan para analizar hasta 80 casos), como también para números mucho más elevados de casos (Drass and Spencer (1987) y Yonetani et al. (2003) lo aplican para más de 100 casos).
4. Results

**Descriptive statistics of the episodes**

The criteria previously explained allow us to define 33 investment booms in our sample of Latin American countries in 1970-2012. Figure 1 show the years belonging to booms for each studied country. It is important to notice that our methodology identifies many of the highly remarked growth periods in the region, such as the ones that took place in Brazil since the end of the 1960s and during the 1970s or in Argentina throughout the 1990s.

Figure 1: Years corresponding to investment booms, by country

Similarly, it is worth mentioning that every country in our sample experienced at least one investment boom throughout our study period. Moreover, the countries showing the least quantity of investment booms (Colombia and Venezuela) exhibit two different booms. Meanwhile, most of the countries in our sample feature three investment booms. In fact, only Mexico shows more investment booms, being five since 1970.

On the other hand, it seems important to consider the quantity of years spent during investment booms throughout the different episodes that took place in 1970-2012. As shown in Table 6, all the countries in our sample experienced on average more than 5 years per boom (being 4 years the minimum required by definition). In fact, investment booms seem to be quite lengthy, being the average length for the whole sample 9.1 years (the median is 8 years). Notwithstanding the latter, there are significant differences between countries. Venezuela and Mexico have rather narrow investment booms on average, expanding less than 7 years in both cases, although differing in the fact that Venezuela only exhibited two investment booms in our study period, while Mexico registered five. Meanwhile, Colombia and Paraguay show the longest booms on
average (of 14.5 years and 12.3 years respectively), which is explained partly because they are the countries featuring the longest individual investment booms (of 17 year and 18 years respectively).

Likewise, it proves relevant to analyze the growth registered in the flows of gross fixed capital formation in the defined episodes. Venezuela displays the highest annual growth per boom among our sample, while Colombia shows the lowest. However, it seems necessary to downplay the importance of these results, insofar they are the sole both countries with only two investment booms since 1970. Moreover, Venezuela is the country with the least years per boom in average, whilst Colombia is the one with the most. Excluding Venezuela, the average annual growth of investment per boom stands between 8% and 14%, which is remarkably higher than the threshold defined in order to determine the presence of investment booms. Thus, we can state that gross fixed capital formation show particularly rapid increases amid the context of growths which are sustained over time.

The evolution of investment throughout the years that were not classified among investment booms should also be regarded. We perceive stark differences between countries. On the one hand, in countries such as Venezuela, Peru, Ecuador, Brazil and Colombia the changes recorded are quite narrow in average, ranging between -2% and 2%. As those countries are the ones with the least years classified as part of investment booms (all with less than 25 years in 1970-2012 as part of booms), the latter could reflect a considerable number of years with positive variations in GFCF that were neither high enough to set the beginning of an investment boom or were not sustained enough in a consecutive and uninterrupted manner in order to be considered as part of a boom. The sole exception is Uruguay that, with only 24 years classified as part of investment booms between 1970 and 2012, shows in average a 7% fall in investment between booms. In the countries with more than 25 years elapsed in investment booms, average annual changes are negative in the periods between booms. It is remarkable the case of Chile, the country with the

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**Cuadro 6: Cantidad de episodios, años transcurridos en episodios y crecimiento de la FBFK dentro y fuera de episodios por país**

<table>
<thead>
<tr>
<th>País</th>
<th>Cantidad de episodios</th>
<th>Años transcurridos en episodios</th>
<th>Años promedio por episodio</th>
<th>Promedio de crecimiento anual de FBFK en episodios</th>
<th>Promedio de crecimiento anual de FBFK fuera de episodios</th>
</tr>
</thead>
<tbody>
<tr>
<td>Argentina</td>
<td>3</td>
<td>28</td>
<td>10.67</td>
<td>10.87</td>
<td>-4.22</td>
</tr>
<tr>
<td>Bolivia</td>
<td>3</td>
<td>26</td>
<td>8.67</td>
<td>10.57</td>
<td>-0.42</td>
</tr>
<tr>
<td>Brasil</td>
<td>3</td>
<td>24</td>
<td>9.33</td>
<td>9.71</td>
<td>-1.56</td>
</tr>
<tr>
<td>Chile</td>
<td>3</td>
<td>32</td>
<td>10.67</td>
<td>12.30</td>
<td>-10.01</td>
</tr>
<tr>
<td>Colombia</td>
<td>2</td>
<td>25</td>
<td>14.50</td>
<td>8.50</td>
<td>1.80</td>
</tr>
<tr>
<td>Ecuador</td>
<td>3</td>
<td>23</td>
<td>7.67</td>
<td>10.78</td>
<td>0.15</td>
</tr>
<tr>
<td>Mexico</td>
<td>5</td>
<td>26</td>
<td>6.80</td>
<td>10.10</td>
<td>-3.42</td>
</tr>
<tr>
<td>Paraguay</td>
<td>3</td>
<td>31</td>
<td>12.33</td>
<td>12.07</td>
<td>-5.92</td>
</tr>
<tr>
<td>Perú</td>
<td>3</td>
<td>22</td>
<td>7.67</td>
<td>12.73</td>
<td>0.35</td>
</tr>
<tr>
<td>Uruguay</td>
<td>3</td>
<td>24</td>
<td>8.00</td>
<td>13.10</td>
<td>-7.00</td>
</tr>
<tr>
<td>Venezuela</td>
<td>2</td>
<td>12</td>
<td>6.00</td>
<td>21.78</td>
<td>-0.85</td>
</tr>
</tbody>
</table>

*a En el período 1970-2012.
*b Incluye años entre 1960 y 2012 correspondientes a episodios que transcurren total o parcialmente en el período 1970-2012.
*c En porcentaje.
most years in 1970-2012 among booms, which experienced large drops in investment during the years where GFCF did not expanded significantly and in a sustained manner (by 10% in average).

In line with the latter, it seems interesting to dig further into the evolution of investment after episodes of sustained investment growth. By definition, booms must finish with a slowdown or a contraction in the flow of capital formation. Hereafter, we analyze the level of investment flows in the years immediately following investment booms and how long it took the countries to attain the level reached on the last year of the previous boom. Figure 2 shows the levels of GFCF after the end of episodes of sustained investment growth, while Chart 7 additionally details the other characteristics discussed. As we analyzed in more detail later, all the countries in our sample experienced episodes of sustained investment growth in the 21st century and even many of them carried on growing in the last year we studied, consequently we could not study what happened once finished recent booms.

Figure 2: GFCF flow as percentage of the level attained in the last year of the previous investment boom

![Graph showing levels of GFCF after the end of episodes of sustained investment growth.]

*Se toma como año base al último año del auge de inversión previo*

In most of the cases the flow of GFCF registered 5 years after the end of the investment boom was lower than the one reached in the last year of the episode. In fact, as shown in Figure 2, investment surpassed the previous register in only 5 cases (23% of the episodes analyzed), being 3 of them part of a following boom. When considering up to 10 years after the end of the booms, the number of cases climbs up to 10 (45%), including all-but-one of the cases after 5 years (the one excluded is that of Peru after the 1969-1975 boom). 8-out-of-10 of the cases are years which are included on another episode of sustained investment growth. It is worth noting that only 1 of those 10 cases is in the 1980s, dubbed as the ‘lost decade’ in Latin America (Barbera, 1990). Likewise, only 2 cases are in the 1990s, but that mostly respond to the fact that most countries did
not experienced investment booms ten years before. Therefore, 7 cases are years in the 21st century, covering great part of our sample. Linker, differences in the level on the years following booms seem to be paired with the years each country took in order to attain the same levels as in the end of the previous boom. In average, the countries in our sample took a decade to return to previous levels (the median is 9 years), which is a considerably long period of time, even more when considering that the criteria for the definition of investment booms did not demanded a priori that the end of a boom must coincide with a contraction of investment. In 9 cases (41%) it took 5 years or less to return to previous levels of investment, corresponding to Chile, Colombia, Ecuador, Mexico and Peru. In contrast, in 4 cases (18%) it took more than 15 years to achieve levels registered in the end of the last boom. All of the latter cases are following the investment booms that finished in end-1970s or early-1980s. Moreover, the longest wait until returning to previous levels occurs following that period in most of the countries and when solely considering those booms the average wait stretches up to 14 years (the median is 13 years).

The previous analysis briefly anticipated the particular characteristics of the investment booms according to the years in which they took place. As shown in Figure 1, there is a strong temporal correlation of the episodes of sustained investment growth in Latin America. In fact, there are clearly 3 periods in which most of the countries experienced booms in fixed capital formation: 1970s (although in some cases the sustained growth started in the previous decade and in others the beginning lagged until mid-1970s), 1990s and 2000s. Likewise, the two biggest crises
of recent years, when investment growth tendencies were interrupted in all countries, are clearly seen: 1980s and end-1990s.

The temporal overlapping of investment booms in Latin America could be reflecting different issues. On the one hand, it could be a consequence of common explanations that turn out to be very significant to explain investment in Latin America, but are exogenous to the region as a whole. Granting that investment consists largely of capital assets which are not produced in large scale in most of the countries we studied, investment appears to be conditioned by the capacity to import such assets. In that sense we could consider as an exogenous explanatory variable the trend in the demand of some important market (such as United States, Europe or China) over the goods that Latin American countries export, which appears as particularly important taking into consideration that Latin American countries tend to be prices-takers. The lower the inflow of foreign currency obtained from external trade, the lesser would be the capacity to import capital goods for investment without foreign indebtedness. What is more, in the case that countries incur into debt to finance investment, the magnitude in which they could do so in a sustained manner partly depends in the interest rates in the developed countries, which impact in the flow direction of international capital (Haggard y Kaufman, 1992).

However, despite the common international context in some cases, the magnitude of the effects over investment in the countries would depend on the policies adopted within borders. For instance, the impact over investment of the presence of extremely low interest rates in United States would certainly differ between a Latin American country with restricted entrance of foreign countries and one with a liberalized capital account. With this in mind, we could expect that a similar implementation of policies amid countries in a region could further strengthen the temporal correlation between investment booms. Alongside history the implementation of policies have spread among regions, in a process called policy diffusion (Weyland, 2005). Particularly, it is worth mentioning the import substitution industrialization wave of 20th mid-century and the trade and financial liberalization by the turn of the century in Latin America. Indeed, Weyland states that policy diffusion is particularly strong and immediate in geographically close areas. In that sense, the temporal overlapping of investment booms in Latin America could respond to the implementation of similar policies in different periods.

Finally, the temporal overlapping of booms could be explained by the economic integration of the countries, in the sense that the expansion in some countries could trigger through diverse channels, among which is the demand increase (Frankel & Rose, 1998), the start of a sustained growth of GFCF in other countries. Similarly, an important economic contraction in one country could spread to other, putting an end to different investment booms in the region. Although theoretically relevant, it is important to analyze as to which extent the region is economically integrated in order to evaluate empirically this latter explanatory variable. In the related literature it’s been stated that the impacts of economic integration over economic cycles overlapping is greater when this occur through intra-industrial trade or vertical integration (Kose & Yi, 2001). This type of trade is not the predominant between Latin American countries. Even more, total trade volume between them is not so significant. In fact, as shown in Chart 8, exports from countries in our sample directed to the region are usually low, with the exception of some periods where it gain relevance in the foreign trade of certain countries (such as 1990s in the

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8 Inasmuch it should be expected that countries experience more significant impacts from market changes emerging in markets relevant to their production; it seems intuitive that if economies are integrated, the effects stem from the larger ones to the smaller ones. For example, a crisis in a country within the region would probably affect in a greater extent a country that sells a significant share of its exports to it than country that although selling similar amounts, trades a much smaller share of its exports with the first country.
Southern Cone). As a consequence, it should be expected that the effect of economic integration over the temporal overlapping of investment booms in Latin America would be scarce.

**Chart 8: Exportaciones destinadas a países latinoamericanos de la muestra, como proporción del total de exportaciones**

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Argentina</td>
<td>20%</td>
<td>22%</td>
<td>23%</td>
<td>15%</td>
<td>21%</td>
<td>37%</td>
<td>47%</td>
</tr>
<tr>
<td>Bolivia</td>
<td>6%</td>
<td>31%</td>
<td>34%</td>
<td>46%</td>
<td>52%</td>
<td>44%</td>
<td>50%</td>
</tr>
<tr>
<td>Brazil</td>
<td>10%</td>
<td>9%</td>
<td>12%</td>
<td>11%</td>
<td>10%</td>
<td>19%</td>
<td>22%</td>
</tr>
<tr>
<td>Chile</td>
<td>10%</td>
<td>16%</td>
<td>23%</td>
<td>13%</td>
<td>13%</td>
<td>16%</td>
<td>19%</td>
</tr>
<tr>
<td>Colombia</td>
<td>7%</td>
<td>12%</td>
<td>8%</td>
<td>9%</td>
<td>7%</td>
<td>15%</td>
<td>19%</td>
</tr>
<tr>
<td>Ecuador</td>
<td>9%</td>
<td>15%</td>
<td>14%</td>
<td>10%</td>
<td>8%</td>
<td>14%</td>
<td>17%</td>
</tr>
<tr>
<td>México</td>
<td>6%</td>
<td>7%</td>
<td>5%</td>
<td>3%</td>
<td>2%</td>
<td>3%</td>
<td>3%</td>
</tr>
<tr>
<td>Paraguay</td>
<td>35%</td>
<td>34%</td>
<td>25%</td>
<td>33%</td>
<td>39%</td>
<td>53%</td>
<td>69%</td>
</tr>
<tr>
<td>Perú</td>
<td>6%</td>
<td>9%</td>
<td>13%</td>
<td>9%</td>
<td>13%</td>
<td>17%</td>
<td>16%</td>
</tr>
<tr>
<td>Uruguay</td>
<td>14%</td>
<td>24%</td>
<td>30%</td>
<td>22%</td>
<td>34%</td>
<td>52%</td>
<td>55%</td>
</tr>
<tr>
<td>Venezuela</td>
<td>6%</td>
<td>5%</td>
<td>5%</td>
<td>8%</td>
<td>5%</td>
<td>13%</td>
<td>16%</td>
</tr>
</tbody>
</table>

**Fuente:** Elaboración propia en base a datos de Feenstra et al (2005)
Analysis of individual conditions

As we mentioned in the methodological section, we compiled data regarding certain characteristics of Latin American countries during episodes of sustained growth of investment and in the absence of such a growth. Subsequently, we analyzed which conditions took place and which did not during the investment booms, which conditions were found in the absence of booms and how do these relationships evolve throughout the years.

The booms studied occurred amid different contexts of high demand. In fact, all the episodes of sustained investment growth in our sample took place in periods where the countries’ GDP was expanding. Therefore, domestic demand increase appeared to be a necessary condition for the presence of investment booms. Moreover, the absence of significant GDP growth is also highly correlated with the absence of booms, being the case in 64% of these latter periods. In fact, in 4 countries (Argentina, Paraguay, Uruguay and Venezuela) the relationship between GDP growth and sustained GFCF expansion is completely determinant, as in all investment booms there is an increase of domestic demand and in all the absence of investment booms there is not an increase of domestic demand. Thus, we can conclude that in the study period and for those countries, GDP growth was a necessary and sufficient condition for the existence of investment booms. In contrast, in Brazil and Colombia the expansion of domestic demand does not enable us to anticipate the presence of absence of investment booms in any way, as they occurred in every period considered. Finally, it is worth considering how this relationship evolved throughout the years. The lack of GDP growth is associated with periods with absence of investment booms in the 1970s (67%) and 1980s (73%), although this drops in the 1990s to 58%.
In line with the results found for GDP growth, foreign demand increase is present in most of the episodes of sustained growth of investment (73%). In particular, all the cases in Argentina, Bolivia, Colombia and Venezuela have this condition. Meanwhile, foreign demand did not climb in 56% of the absences of booms, being the case in all of the absences in Paraguay and Venezuela. Hence, in Paraguay and Venezuela both GDP growth and ‘Foreign demand’ index growth, our indicator for domestic and foreign demand increases, were necessary for the existence of investment booms. The incidence of a significant demand of foreign countries on investment remained unchanged thought the study period (75% of the booms of the 1970s, 70% of the booms of the 1990s and 73% of the booms of the 2000s). In turn, the lack of foreign demand increase was particularly relevant in the absence of investment booms of the 1980s (73%).

Nevertheless and in contrast to the above, the presence of trade openness is smaller in episodes of sustained growth of investment (61%) and not significantly different from the one registered in the absence of booms (60%). The countries in our sample increased their trade openness throughout the years. In the 1970s and 1980s, only 3 countries exceeded the threshold in order to determine the presence of trade openness, being Chile the only one that did more than once. Meanwhile, in the 1990s all the countries deepened their trade openness, being recorded the presence of the indicator in all of them at least sometime in the decade. In the 2000s Argentina, Ecuador and Mexico showed reversals in trade openness, although still experiencing investment booms. Although the latter can weaken the relationship between trade openness and investment, it is worth pointing out that the situation in the 1980s (when booms lacked and few countries had significantly opened to foreign trade) operates in the opposite direction.

Additionally, we considered the evolution of the cost of capital throughout the different countries and periods. In nearly half of the booms (52%) capital depreciated in comparison to the overall prices in the economy. That took place in all the episodes of sustained growth of investment in Chile and Peru. The clearest relationship can be appreciated when analyzing the absence of booms, as 80% occurred amid a context in which the cost of capital did not decrease. Furthermore, in all the periods in which an investment boom was not registered in Argentina, Brazil, Colombia, Paraguay, Peru, Uruguay and Venezuela a fall in the relative cost of capital was not observed neither. In consequence and in contrast to the conditions previously studied, the evolution of the cost of capital, and particularly a decrease in it, do not appear to be a condition particularly correlated with the presence of episodes of sustained growth of investment, but instead in their absence with the lack of investment booms. Thus, the decrease of the relative cost of capital seems to be a sufficient condition to foster investment booms, although scarcely observed in the totality of booms. A parallel lecture of this result is that the absence of decreases in the relative cost of capital is necessary for a lack of investment booms. The latter was significantly relevant in the 1980s, when 91% of the lack of booms took place within contexts in which the relative cost of capital did not drop. In contrast, it is worth noting that although the decrease of the relative cost of capital is not significantly associated with the presence of investment booms, the relationship has strengthened since the 1990s and this condition was present in 64% of the most recent booms.

The financial indicators show diverse relationships with the investment booms. Firstly, the indicator linked with the inflow of external capital is clearly present in the episodes of sustained growth of investment (91% of the cases). By definition, the indicator signals the lack of deficit in the capital account, thus the found relationship is indicating that in presence of sustained increases of investment capital flowed in net terms, in most cases, towards the local economies. In addition, it is interesting to note that the presence of non-negative capital account balances was a necessary condition for investment booms in the 1970s and 1990s. The sole cases in our sample when investment booms occurred amid contexts of capital outflows are the ones recently registered in Argentina, Ecuador and Venezuela. In the cases of absence of booms, the
relationship is not as clear as the one found in the presence of booms. Non-negative capital account balances appear in more than a half of the cases of absence of sustained growth of investment (56%). Moreover, if we distinguish among decades it can be seen that in the decades when episodes of sustained growth of investment was registered (1970s, 1990s and 2000s), the absence of investment booms were associated with the presence of the Inflow of external capital indicator in 100%, 67% and 70% of the cases respectively. Hence, although in presence of inflow of external capital 67% of the cases correspond to investment booms, the relevance of the condition seems to be more related to the necessity of it to the presence of investment booms than to its sufficiency to trigger them.

Secondly, the indicators referring to financial freedoms show a narrower presence in the investment booms. More precisely, the possibility of trade financial assets and the liberalization of the interest rate in credit markets are present in 67% and 64% of the cases of sustained growth of investment. Meanwhile, the absence of entry barrier in the financial market is present in only 52% of the cases. Nonetheless, these overall values hide a clear pattern throughout the years. In fact, in the 1970s the presence of the 3 indicators in investment booms was of 50%, 8% and 8% respectively, while in the most recent decade the presence climbed up to 91%, 100% and 100%. Similarly, when studying the overall presence of the indicators in the absence of booms, financial openness appears in 52% of the lack of booms, interest rate liberalization in 48% of the cases and the absence of entry barriers in 52%. If the same conditions are analyzed by decade, presences amount to 33%, 0% and 0% in the absence of booms in the 1970s respectively and in 70%, 90% and 90% of the cases in the 2000s.

It seems that financial liberties deepened in the countries of our sample independently of the presence or absence of episodes of sustained growth of investment. In particular, exchange rate unification and lifted restriction on international capital flows are the first of the institutional reforms we studied and referred to financing that established in most countries of our sample. Incipiently in the 1980s and in a more generalized manner in the 1990s, Latin-American countries liberalized financial markets (Lora, 2001; Brieger, 2002; Abiad et al, 2010), which with few exceptions maintained and even deepened throughout the first decade of the 21st century. Despite this trend in which the indicators signal presences or absences almost across-the-table depending of the years considered, differences can be appreciated between periods of sustained growth of investment and the lack of it. In the 1970s there is only 1 case where interest rate liberalization and absence of entry barriers are registered respectively, both corresponding to booms. Meanwhile, financial openness is observed in almost half of the countries in our sample, being 86% of the cases associated with investment booms. Towards 1990s, the results are at first sight contradictory, as the presence of the 3 indicators is larger in periods of absence of investment booms. Nevertheless, that result responds mainly to the timing of the financial reforms. Most countries registered sustained increases of investment in the beginnings of the 1990s and contractions towards the end of it. Meanwhile, financial liberalization gained momentum in the 1990s, definitely setting itself in many cases be the end of the decade. That is the case of Peru and Venezuela in interest rate liberalization, of Bolivia, Brazil, Colombia, Ecuador, Mexico, Peru and Venezuela in easing entry barriers in the financial market and of Brazil, Chile, Colombia and Mexico in financial openness. In fact, in the 2000s the countries in our sample showed a widespread presence of interest rate liberalization and absence of entry barriers in the financial market within investment booms, with the sole exception of Mexico in the aftermath of 2008 crisis. Financial openness is not present in Mexico’s latter case, in Ecuador’s end-90s crisis and since the 2001 crisis in Argentina (the only case in the decade in which it is associated with an investment boom), being present in the rest of the cases.
Lastly, we studied the presence of indicators referring to the uncertainty faced by investors when they estimate the returns of their projects. In the first place, we analyzed the stability of the price system, measured through the variation of annual inflation, in order to proxy macroeconomic stability. In most of the booms (94%) inflation remained stable, being after GDP growth the most observed condition in episodes of sustained growth of investment. Therefore, the stability of the price system seems to be a necessary condition for the existence of sustained increases of Gross Fixed Capital Formation during at least 4 years. Moreover, it seems to be totally necessary since the 1990s, as the only cases in which investment and annual inflation surged where the ones started in Argentina and Colombia in the 1960s and spanning through the 1970s. Nevertheless, price system stability is not much uncorrelated with the absence of booms, being the case in 42% of all, although mainly due to recent years. Two-thirds of the absence of booms in the 1990s took place amid a context of stable inflation. Despite being a high figure, it must be taken into consideration the worldwide generalized context of low inflation since 1990s (Bernanke, 2004), which spread to many Latin-American countries. In consequence, the recent relationship is caused by the fact that most of the countries in our sample have experienced stable inflation in every period since 1990, although not all being episodes of sustained growth of investment. In the whole sample, the absence of booms occurred within contexts of inflation instability in 58% of the cases. However, we can shed more light in the relationship by observing data since the 1990s. The few cases of inflation instability since 1990s are associated with periods of absence of investment booms. Thus, the narrow correlation responds mainly to the reduced number of cases with instability in the price system and not to a weak relationship between the former and unsustainable investment growth. In fact, in the 1980s the period with absence of investment booms are associated with stability in the price system in solely 27% of the cases, while in the 1970s inflation remained stable in 83% of the booms and in none of the absence of investment booms.

In turn, legal security, which is granted when surpassing the threshold set for the ‘Legal System and Property Rights’ index, appears scarcely in the periods when investment grew in a sustained manner (27%). Moreover, in five countries (Bolivia, Colombia, Paraguay, Peru and Venezuela) legal security is absent in all booms. Notwithstanding, it is important to notice that these countries never achieved legal security according to our measure in any period studied. However, in the 1990s legal security spreaded widely, being present in 63% of the booms, which includes the rest of the countries in our sample. From all those countries, only Chile and Uruguay were able to retain legal security on the following years and the only ones that met the criterion in the recent booms. The cases where legal security is present are scarce in our sample, but seem to show a clear pattern. Legal security established in the Latin American countries throughout the 1980s, when economies slugged, and remained along the 1990s when economic production and investment regained dynamism. As the end-90s crisis unleashed in the region, most countries receded in their legal security, with the sole exception of Chile and Uruguay that remained above the threshold set in this study. All in all, in the periods of absence of investment booms there is a clear lack of legal security (63% of the cases), although it may reflect a low presence of the condition in our sample (29% of the periods).

The scarce relationship between legal security and investment booms remains when robustness test are conducted. In fact, the presence or absence of the former when measured through other indicators does not seem to be related with the presence or absence of investment booms in Latin America. In that sense, we followed Acemoglu & Robinson (2003) and replaced our legal security indicator by one that reflects contracting institutions and another reflecting property rights institutions. It is worth remembering that the indicator used in our study in order to measure legal security is taken from Economic Freedom of the World and accounts for the simple average of ‘Rule of law’ and ‘Expropriation risk’. To test the robustness of our results, we replaced that indicator, firstly, by the ‘Rule of law’ measure of ICRG y, later, by Executive
constraints coded as part of Polity IV project. In that sense, we consider that “Rule of law” is related to the contracting institutions, while Executive constraints is linked to institutions that limit power abuse and expropriation risks.

Using the ‘Rule of law’ index, legal security is present in 36% of the investment booms. That takes place within a context of greater coverage of legal security, of 47% in all the defined periods. In fact, with this measure only Colombia fails to show at least one period with legal security. In turn, the absence of legal security is not linked to lack of sustained investment growth, being the case in 40% of them.

Meanwhile, when measuring legal security through the ‘Executive constraints’ index, the number of episodes in which legal security is attained climbs up to 60% of the total. They include all of the countries and, with the exception of Venezuela, is present in the last period studied. However, the relationship between the presence of this measure and investment booms does not appear to be decisive. In fact, legal security appears in 61% of the booms and 60% of the lack of booms. In turn, when legal security is present, the proportion of investment booms is 57%, same value as when legal security is absent.
Analysis of set of conditions

After studying the different conditions in an isolated manner, we will analyze the sets formed by the interaction of the conditions. The number of possible sets is very large. Therefore, the number of repetitions of these sets is scarce. Notwithstanding, if we reduce the number of conditions considered, more repetitions of sets arise while others fail to appear, shedding some light about the empirical possibility of the sets within our sample. In order to obtain more representative results, we will limit the number of conditions studied on the sets, as to obtain reasonable number of repetitions in order to contrast our results.

Firstly, we will analyze the institutional conditions in one-on-one interaction with the presence of the rest of the conditions in our study. In order to do so, we will consider as a total the number of cases where each condition is present and differentiate the cases where the institutional condition is present and when is absent. In that way, we can perceive the sufficiency of each sub-group of conditions to foster investment booms. The comparison between both sub-groups will allow us to analyze the effects of the institutional condition in interaction with the other condition.

Trade openness was not particularly relevant when studied independently; however, when studied in interaction with the rest of the conditions we appreciated that in its presence the correlation of the rest of the conditions with investment booms increases. In particular, it is interesting to notice the relationship with the periods of increasing foreign demand, understanding that the existence of lower tariffs can enable larger sales to the growing foreign markets. As seen previously, the sole existence of a significant growth of the main trade partners is quite sufficient to prompt investment booms. Hence, the proportion of booms is high even in the cases of increasing foreign demand and absence of trade openness (see chart A-1 in the Annex). Nevertheless, the proportion of investment booms in the cases where both conditions are present is slightly superior. If we additionally consider only the cases in which domestic demand increased (remembering that we found it is necessary for the existence of investment booms), the difference widens, as booms appear in 82% of the cases in which the 3 conditions are present and in 71% of the cases where both domestic and foreign demand climb but tariffs are elevated as percentage of foreign trade.

In the case of interest rate liberalization, we already noticed a moderate sufficiency in the previous analysis. When considering the proportion of sustained investment growth episodes in the different sets formed in interaction with other conditions we see that in almost all the cases the presence of the institutional condition trigger an increase in the sufficiency of the other condition (see chart A-1 in the Annex), thus confirming its relevance as in order to prompt investment booms.

In contrast, the absence of entry barriers in the financial market did not appear as relevant neither independently nor in one-on-one interaction with the rest of the financial conditions. It did cause a positive effect in interaction with domestic and foreign demand, particularly with the 'Foreign demand' as 78% of the cases when both were present where investment booms.

Financial openness, as interest rate liberalization, was present in little more than 50% of the investment booms. When studied in interaction with the rest of the conditions, in slightly more than the half its contribution to their sufficiency is positive. In particular, it financial openness increases the positive relationship of all the demand conditions and the rest of the financial

9 There are 1,024 possible configurations (2^10). However, the observed number of configurations is much lower (47), being almost the total number of cases (58).
liberties conditions. Additionally, it seems to strongly mitigate the low relationship between the absence of positive capital account balances and the presence of investment booms.

The case of legal security is particularly interesting. Independently we could not assure that its presence fostered the existence of investment booms. Moreover, its presence in episodes of sustained investment growth did not reach 30%, while in its presence slightly more than half of the periods corresponded to a investment boom. However, when we studied sets formed by legal security and the rest of the conditions, the presence of legal security and the other condition are related in a higher proportion with investment booms. That is the case of all the conditions that appear to be relevant individually, with the exception of Domestic demand increase, Relative cost of capital decrease (the two conditions that independently explain more significantly the presence of booms) and Financial openness.

The latter result seems to show that although the sole presence of legal security is not sufficient to explain significantly the existence of sustained episodes of investment growth, it reinforces the incentive prompted by some of the rest of the studied conditions. As an example, the proportion of investment booms in the totality of episodes when there is a lack of legal security, but Foreign demand, Inflow of external capital and Macroeconomic stability are present is of 63%, 66% and 71% respectively, while when Legal security is present the proportions climb to 88%, 75% and 82%.

The study of sets allows us to perceive in a better way the relevant of the conditions that when previously analyzed independently resulted as non-significant. In fact, by only studying sets formed by one-on-one interactions we were able to notice that although Trade openness does not seem very important when isolated it complements with demand conditions in order to prompt investment booms or that Legal security seems to foster a significant part of the individually relevant conditions. Expanding the number of conditions considered in the construction of sets enables us to study more interactions, but limits the number of case repetitions while increasing the number of theoretical combinations. As an example of the method, we will present an analysis of some sets among all the combinations of Financial conditions, Foreign demand, Trade openness and Legal Security (that is to say, we will exclude the three conditions with greater sufficiency to explain booms). Of the 128 possible combinations, we will show 5 that allows us to present some aspects in which this methodology help to shed light on (see chart 9).

We will start analyzing the configuration number 1 in which all conditions except Legal Security are present. This set corresponds to the case of Bolivia, Brazil, Peru and Mexico in the 1990s and to the first three countries and Colombia in the 2000s. The proportion of investment booms in the totality of cases of this configuration is 63%, which results as relevant but not as significant if we take into consideration the number of a priori favorable conditions for investment that are present.

The second configuration is the one in which all the conditions considered are present. This configuration is only observed in Chile and Uruguay. The proportion of cases that correspond to an investment boom is 100%. Although the reduced number of repetitions of the second set partly accounts for the large difference between set number 1 and 2, it seems that the second set is more sufficient to prompt investment booms than the first one. It is interesting to note that the difference between both is the presence or absence of Legal security for which we have seen previously that individually appears as irrelevant in order to explain investment booms but on one-on-one interactions gained relevance. The comparison between set 1 and set 2 reinforces the idea that Legal security is important for the presence of investment booms in its interaction with other conditions, possibly by strengthening their effect.
Moreover, if we study the fourth configuration (none of the conditions present, except Legal security), we find more evidence supporting the importance of multi-causality and interaction between the conditions, as Legal security without the rest of the conditions yields a 0% proportion of investment booms. Thus, if we study Legal security individually we could conclude that it is not relevant for investment, but if seen amid different interactions with other conditions (as in set 2) we perceive its relevance.

**Chart 9: A few interesting configurations of conditions**

<table>
<thead>
<tr>
<th>Configuración</th>
<th>Demanda Externa elevada</th>
<th>Apertura comercial</th>
<th>Liberalización de tasas</th>
<th>Ausencia de barreras a la entrada</th>
<th>Capitales inf'les</th>
<th>SCK</th>
<th>Seguridad Jurídica</th>
<th>Proporción de Auges</th>
</tr>
</thead>
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<td>1</td>
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<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>63%</td>
</tr>
<tr>
<td>2</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>100%</td>
</tr>
<tr>
<td>3</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>33%</td>
</tr>
<tr>
<td>4</td>
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<td>✓</td>
<td>✓</td>
<td>✓</td>
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<td>✓</td>
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</tr>
<tr>
<td>5</td>
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<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>0%</td>
</tr>
</tbody>
</table>

In turn, it is interesting to analyze the third configuration. It is the same as the configuration number 1, except that the increasing Foreign demand is absent. The result is a lower sufficiency for the existence of investment booms, being the case in only 33% of the total. The drop signals the existence of conditions that allow the sufficiency of other conditions to prompt investment booms. In fact, the growth of foreign markets seems to foster investment so that in its presence other conditions appear as sufficient enough to trigger investment booms. Meanwhile, when Foreign demand is not climbing enough, the same conditions that were previously sufficient, appear to be in a lower manner. Later we will analyze some empirical cases of interest, amid which we will study how the investment boom of Uruguay of end-90s aligns with this reasoning.

Finally, it is relevant to see that the configuration of total absence of the studied conditions (corresponding to cases in Argentina and Ecuador), as expected, is not associated with any investment boom.

**Some interesting configuration of conditions**

Finally, we will mention some interesting configuration of conditions seen in the Southern Cone countries of Latin America. The configurations are detailed in the chart A-6 in the Annex.

The investment booms in the Southern Cone in the 1970s showed mainly less favorable conditions than the ones registered recently. Argentina seems to be a clear example. The sustained growth of investment in Argentina took place amid a context of increasing Domestic and Foreign demand and Inflow of external capital. The sole combination of these conditions was sufficient to trigger a period in which gross fixed capital formation climbed in a sustained manner for a decade. The Brazilian case is similar, although the conditions associated with a greater certainty for investors considered in our study are present. In turn, in Chile we can observe the early financial liberalization of end-70s, as interest rate liberalization and financial openness are present.

As an example of the lost decade of the 1980s we analyzed the Uruguayan case. We register the absence of many economic conditions that are favorable for investment, such as GDP growth, ‘Foreign demand’ index increase, decrease of Relative cost of capital and inflation stability.
Nevertheless, in that period all the financial liberties conditions and the consolidation of the perception of legal security by investor are present.

In the following decade we clearly appreciate the application of neoliberal politics in the countries limited by the River Plate. We register an absolute presence of financial liberalization, inflation control and legal security. In Uruguay trade openness is also registered, while in Argentina due to data availability and processing the minimum threshold in that indicator is not reached. It is interesting to notice that the configuration of conditions in Uruguay in the 1990s differs from the one registered in the subsequent crisis only in the presence first and absence later of an increasing Domestic and Foreign demand and Inflow of external capital. That is to say, institutional conditions were the same during the economic contraction. Likewise, following the economic crisis registered in 2002, the configuration of conditions analyzed in these study remain alike, as the 3 economic conditions mentioned became present again.

In contrast, Argentina shows a clear shift after the crisis experienced in 2001. The configuration shown in the first years of the 21st century do not register Trade nor Financial openness, Legal security and Inflow of external capital. On the other end of the spectrum, Chile shows in the same years all the studied conditions favorable for investment. However, in both cases investment booms are registered, which reflects once again the diversity of ways to achieve investment increase.

5. Conclusions

Theorization and empirically-based knowledge regarding investment is far from being agreed. Empirical research explanations could be considered incomplete and individualized variables yield changing support in diverse papers. We believe this could be a consequence of the application of assumptions and methodologies which are not entirely suitable to understand some conditions of the studied object, which is a multi-factorial phenomenon.

In this study we face the challenge from a different perspective, using the unusual but highly suitable tools from qualitative comparison analysis. Instead of focusing in the sum of contributions of individualized independent variables, we center on the study of the presence or absence of sets of favorable conditions.

Investment seems to move in long cycles, differentiating periods of sustained growth separated by stagnation or low investment phases. Our study centered in the analysis of investment booms, defined as periods of at least four uninterrupted years of increase in the flow of gross fixed capital formation that reach levels above the last peak in the time-series. We found a high temporal correlation in the investment booms in Latin America, marking three periods in which most of the countries register booms: 1970s, 1990s and 2000s. Likewise, the two most important crisis in Latin America of recent years corresponding to 1980s and end-90s are signaled by the interruption of the investment growth pattern in all the countries.

The temporal overlapping of investment booms in Latin America could be reflecting different issues, among which we discuss: socio-economic and productive similitude resulting in common

and relevant investment determinants for all countries, similar implementation of policies amid countries in the region in time and economic integration of the countries.

As to the study of favorable conditions for investment, we began by analyzing each condition independently, in order to determine the necessity and/or sufficiency for the presence of investment booms.

We found that GDP growth was completely necessary for the presence of investment booms in the countries in our sample between 1970 and 2012, backing the acceleration hypothesis of Samuelson. Meanwhile, although in a lower manner than GDP growth, macroeconomic stability (measured through inflation stability) and the presence of external funding (signaled by a positive Capital Account balance) were necessary for the existence of investment booms. In that way, it is worth noting that despite we registered investment booms in the past amid a context of unstable inflation or capital outflow, they have been scarce and are not frequent recently. Moreover, the irruption of one of the latter two conditions is generally associated with booms interruptions.

In turn, the existence of GDP growth, a drop in the Relative Cost of capital and Inflation stability –and high Foreign demand and Inflow of external capital in a lower manner, showed by themselves a relevant sufficiency to foster sustained increases in gross fixed capital formation. Among them, it is interesting to note that GDP growth, being neccessary for the existence of booms, was all-in-all close to a necessary and sufficient condition for booms. In fact, that was the case for Argentina, Paraguay, Uruguay and Venezuela.

Afterwards, we studied the sufficiency of different configurations of conditions. Through that analysis we found the although Trade openness did not appeared significant individually, its presence enhances the sufficiency of high Foreign demand to foster booms while mitigating the drop when the latter is absent. Additionally, we confirmed the positive impact of Interest rate liberalization and Financial openness, which individually already seemed to be sufficient (although in a lower manner than the most relevant conditions). In the case of Financial openness the positive interactions centered in the Demand and Financial Liberties conditions, while for Interest rate liberalization the result appears to be more global. As to the Absence of entry barriers in the financial market, we did not find possitive and relevant effects both considering the condition independently as well as in one-on-one configurations with the rest of the studied conditions.

It is interesting to highlight the case of Property rights. Individually, we were not able to register a possitive association with the presence of investment booms. However, when studied in configurations with other conditions we appreciate a possitive impact. In fact, in most of the cases, the sufficiency of two conditions configurations increase when the 'Legal System & Property Rights' index is above the threshold considered in this study.

The latter shows clearly the multi-causation character of the investment phenomenon and the difficulty of analyzing the causality of such study objects. The technique allows us to confirm the existence of a wide variety of sets leading to the presence of investment booms, where the presence or absence of certain conditions is important when studying the relevance of the remaining conditions. Therefore, the understanding of investment appears to need a multi-causation approach in order to look more broadly the conditions that may foster, hinder or have a neutral impact on it.
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The Logic of Investment Booms in Latin America: The role of Institutions

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