V JORNADAS DE INVESTIGACIÓN

ASOCIACIÓN URUGUAYA DE HISTORIA ECONÓMICA

23-25 de noviembre, 2011, Montevideo

Sesión 5: Instituciones y Desarrollo

Economic development and institutional quality in Uruguay: contract enforcement, investment and growth since 1870[1]

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Abstract

Institutional quality constitutes a central concept in the recent economic development and institutionalist literatures. Our hypothesis is that difficulties to promote and sustain the enforceability of contracts and the security of property rights conditioned investment and, in consequence, economic growth in Uruguay in the long run. We first review the concepts and the approaches to define and measure institutional quality. We then adopt a measure of "institutional quality" based on the use of "contract intensive money" (the CIM indicator). Using our long series for the CIM indicator, we estimate a structural model to explore the plausibility of our hypothesis. In the estimation, based on the seemingly unrelated regression method (SUR), we find support for the thesis that institutional quality influences growth through its impact on investment. Put differently, our results suggest that poor contract enforcement played a significant role at the origins of the Uruguay's failure and its experience of long-run decline.

Keywords: Institutional quality, Contract intensive money, investment, Uruguay
JEL: N16, N26, N46, O43

[1] This paper is part of the Project "Instituciones e Inversión en el Uruguay", CSIC, I+D.

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Introduction

Institutional quality constitutes a central concept in the recent economic development and institutionalist literatures. Our hypothesis is that inadequate contract enforcement and insecure property rights affected investment and, in consequence, undermined long run economic performance in Uruguay. After discussing the literature, we estimate a measure of "institutional quality" using the "contract intensive money" indicator (CIM). We examine the long term series (from 1870 to 2010) and discuss it in light of the informed conventional wisdom among historians about Uruguay's development process. We find that the indicator's trajectory matches the intuitions about quality of institutions in Uruguay's long range. The we run some econometric exercises to explore further the hypothesis that the quality of institutions has been linked to capital accumulation and growth. The estimations based on the "seemingly unrelated regressions" method (SUR) suggest that poor contract enforcement played a significant role at the origins of the Uruguay's failure and its experience of long-run relative decline.

The structure of the paper is the following. The next section reviews the literature, concepts and summarizes the justification for the empirical work. The third section proposes our hypothesis about the relationship between institutions, investment and growth for Uruguay in the long run, and we describe the data we will use to test it. We then present our series to illustrate the economic growth, the capital accumulation and the institutional quality evolution in historical perspective. Following the methodology used by Prados de la Escosura and Sanz (2006 & 2009) and by Clague et al (1999) we then approach the analysis in a dual manner. The fourth section examines the CIM series against the backdrop of the economic and political/policy record for the period under study. The fifth section presents an exercise of estimation where we employ the seemingly unrelated regression method (SUR) to discern the empirical patterns of influence among variables. Finally, we provide some concluding remarks.

Background, concepts and justification [2]

Conceptual framework

The research on the effects of institutions on aggregate economic performance has grown very rapidly since the early 1990s, stimulated by the theoretical contributions of Douglass North and the New Institutional Economics (NIE) school as well as by empirical findings from "augmented" growth models (see North, 1990; Shirley, 2008). This growth of knowledge has

[2] This section relies heavily on Aboal, Noya and Rius (2011).

yielded no unanimity but there seems to be a strong consensus in the sense that institutions matter for the allocation of a society's effort and ingenuity, for the accumulation of productive assets and, ultimately, for growth. Yet, there is still a broad agenda for theoretical and empirical work, because there is a variety of institutions that could matter for a number of important economic processes, and testing plausible hypotheses requires potentially controversial interpretations, operationalizations, and measurement of key concepts. To specify the narrow portion of that agenda that this paper aims to address, it is then sensible to look back at one of its foundational texts (North, 1990) for organization of key concepts.[3]

According to North, economic exchanges inevitably involve transaction costs and asymmetries of information, and it is to make these manageable (and the fundamental exchange viable) that societies devise institutions. Institutions are "the humanly devised constraints that shape human interaction" (North, 1990, p. 3; all the following page citations from the same volume). They can be formal or informal, and their main difference is that formal institutions are written (and they may include a written code for how to reach settlement of disputes). For North, formal institutions only differ in degrees of strength, coercive power or broader legitimacy from informal ones (p. 46). "Formal rules include political (and judicial) rules, economic rules, and contracts" (p. 47). As with regards to informal institutions, they can be "(1) extensions, elaborations, and modifications of formal rules, (2) socially sanctioned norms of behavior, and (3) internally enforced standards of conduct." (p. 40). They may also stipulate enforcement mechanisms, as we will see.

The whole theory of institutions and economic performance advocated by North rests on the adoption of new institutional arrangements as the agents' response to the increasing complexity of economic transactions. In pre-modern societies, transactions were essentially personalized exchanges among "neighbors", and production and trade was in small scales. Reputation and the risk of isolation from a community could function effectively to prevent or address opportunism. Gradually, impersonal exchanges among more distant parties became more frequent and economically significant, which led to the emergence of informal institutions with more explicit enforcement arrangements (these would include, for example, the ostracism of those who violated agreements, stipulated in unwritten codes of commercial conduct; p. 43).

With complex contracts that contain many hard-to-measure attributes about exchanged goods and services, and that are plagued by information asymmetries; and with the geographic

[3] North's and mainstream NIE's frameworks are not free of conceptual problems (see, for example, Rutherford, 1994; Rodrik, 2000; Field, 2006). However, it is appropriate to borrow basic definitions from the original source, given that these definitions are widely used, and the framework provides a basic benchmark to which complications or refinements can be compared.

expansion of trade and the chances that transactions may never be repeated between the same two parties, it became necessary to devise third-party enforcement. In fact, it would be more appropriate to say that in modern societies the three forms of exchanges (and enforcement arrangements) co-exist, and even archaic and seemingly dysfunctional informal rules can have major impacts, as demonstrated by the evidence that the same formal rules introduced in different societies often produce different outcomes (p. 36).

> Enforcement poses no problem when it is in the interests of the other party to live up to agreements. But without institutional constraints, self-interested behavior will foreclose complex exchange, because of the uncertainty that the other party will find it in his or her interest to live up to the agreement. (p. 33)

Enforcement can come from societal sanctions, from second-party retaliation or from a coercive third party (typically, the State), and the long-range economic history of the world shows each of these forms prevailing in different times-places.[4]

As noted by Acemoglu and Johnson (2005), the NIE has persuaded many economists and political scientists that institutions are a primary determinant of economic performance. However, in much of the literature there has been a tendency to conflate a variety of economic institutions in a "cluster" that presumably defines a favorable business environment. In their work, Acemoglu and Johnson distinguish *contracting institutions*, which are the institutions supporting private contracts, from *property rights institutions*, which are the institutions constraining government and elite expropriation. With these authors, we also note that there is much overlap between the two types (inadequate enforcement of bilateral private contracts could result in expropriation, and constraints on governments' expropriatory powers could be contained in seemingly voluntary bilateral contracts such as those for a concession to build basic infrastructure).

There is a range of possible institutional innovations that may directly or indirectly impact on the enforcement of contracts. For example, in recent times, donor-funded legal and judicial reform programs have tackled a number of "problems" in the laws and their enforcement (for instance, removing perceived inconsistencies or flaws in the letter of the laws, creating non-judicial arbitration mechanisms, facilitating access by aggrieved parties to the judicial system, reducing various costs of litigation, strengthening the capacities of the courts and judges, etc.). All these have some bearing on the speed and effectiveness of contract enforcement, and more broadly on "the rule of law" (see, e.g., World Bank, 2001). Moreover, other policies not directly

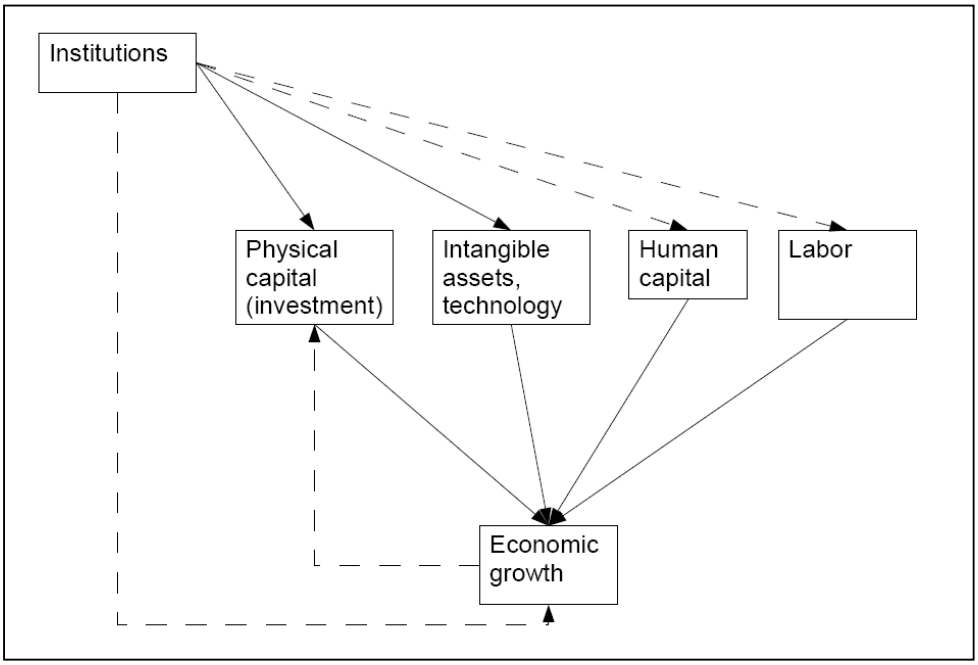
[4] Most of the empirical literature focuses on formal, third-party (state-backed) enforcement. However, there are more carefully executed, analytically rich and extremely interesting studies on informal institutions, such as Besley (1995).

connected to the contents or enforcement of written laws, may directly impact on the effectiveness of extant mechanisms for *contract enforcement*. Woodruf (1998), for example, identifies a more or less direct effect of trade liberalization on previously existing informal enforcement mechanisms.

The hypothesis that, if it exists, the effect of contract enforcement on growth occurs (directly or indirectly, but largely) through investment seems uncontroversial.[5] Diagram 1 shows how "institutions" have been added to conventional growth analytics in what are often called "institutions-augmented" growth models.

Diagram 1

Institutions, investment and growth: Causal pathways



The discontinuous lines originating in "institutions" show less focal effects for the purpose of this paper, but ones that have some presence in the literature. The line flowing back from growth to investment acknowledges the fact that there are "demand pull" effects on the latter that require attention in empirical analyses.

Analytically, weak enforcement of contracts has been found to impact on investment through a number of channels. First, it could most directly influence the uncertainty surrounding an investment project, or some of its critical activities or dimensions, and therefore influence

[5] It becomes less and less controversial when one broadens the definition of investment to go beyond accumulation of tangible assets to include, e.g., investments in R&D, or in human capital.

investors' decisions by reducing its net expected returns (note that we are not considering here the risk of expropriation of assets created by the investment, which would pertain to the effects of "property rights institutions"). Second, weak enforcement could inhibit lending, or otherwise influence financial markets in a way that hinders investment (Acemoglu and Johnson, 2005). In this line, some authors have found analytical grounds for the idea that "limited enforceability" not only affects the level of firms' investments but it also increases its "sensitivity to the arrival of new technologies and generates greater macroeconomic volatility" (Cooley, Marimon and Quadrini, 2004). To the extent that aggregate (output) volatility influences investment (a simple accelerator model could show this), there is here another causal channel from enforcement of contracts to rates/levels of capital accumulation. Others have argued that, through financial contracts, imperfect enforcement influences the size distribution and overall heterogeneity of firms, which could reflect on the level or rate of investment (Monge-Naranjo, 2009). These are just examples of relevant or conceivable impact channels, of which there are a wide variety in the literature but few that have been rigorously established.

Institutional quality and economic performance in Uruguay

Without attempting a thorough review, we can summarize the state of the debate on institutional quality and economic performance in Uruguay by commenting briefly on some of the most salient contributions.

In the field of economic history, there has been an increasing interest in institutional theories of economic performance. Part of the recent literature is based on analytical descriptions of the institutional frameworks while others reflect the institutions more explicitly in the empirical study.

From a very long run perspective, Bértola and Porcile (2000) made some first attempts to introduce the role of institutions within a convergence and divergence framework comparing the Southern Cone's performance with that of the core economies in the long run.

Another group of articles has studied the role of institutions mainly focused on the description of the land property system, especially in the agrarian sector. On the one hand, Álvarez, Bértola and Porcile (2007) collect several articles that introduced the impact of the land property system in the discussion about growth and income distribution during the First Globalization, comparing the experiences of Uruguay and Argentina with Australia and New Zealand. Within the same approach, Alvarez et al. (2010) and Álvarez and Willebald (2009) go deeper in a systematic description of the agrarian land ownership system. They identify some specific

features of the River Plate region, contrasted with the Australasian economies that may explain the worse performance of the first group in the long run. On the other hand, Moraes (2001) explained the long run performance of the livestock industry (cattle and sheep) during the period 1870-1970 focusing on the relation between technological change and institutional change.

An empirical study of the role of institutions on growth and income distribution is provided by Willebald (2011). This author introduces explicitly an indicator of institutional quality in historical perspective, the CIM indicator, to explain, among others factors, the diverse development process of the settler economies during the First Globalization. Siniscalchi (2010) is another prominent effort to introduce the quality of institutions in the long run performance, but focused on the institutions constraining government. This approach would complement some contributions coming form Political Science, such as Zurbriggen (2006), where the author proposes a political institutional approach to explain the effect of the rent-seeking behavior during the period of import substitution industrialization.

Oddone (2005) is another recent attempt to explain Uruguay's performance over more than a century giving a prominent role to "institutions". The definition of "institutions" used is broad and –most clearly in the empirical exercises— tends to focus on the "political rules" about who decides what and when or under what constraints. However, the author does discuss property rights and contract enforcement institutions, even if he does not attempt to reflect them more explicitly in the empirical study (mainly due to lack of readily available indicators covering a long enough span). He also partly chooses not to pursue the empirical research further because he somehow subordinates property rights and contract integrity institutions to a broader degree of "discretionary" power by governments (p. 179).

Interestingly enough, the "rules vs. discretion" debate had had an earlier and somewhat original expression in another widely cited study; namely, Rama (1990). Analyzing mainly the last two thirds of the 20th century, Rama had argued that Uruguay had done best when the governments had been most isolated from interest group pressures. Those pressures would translate in various forms of overt or hidden patronage, and taylor-made policies to favor specific groups or even companies. This "patronage cum rent-seeking" explanation, which was more systematically examined in other contributions by the same author, has to be understood as a weakening of the rule of law, and eventually disrespect for contracts. What is worth noting is that, in Rama, it is government "discretion" that favors economic growth rather than "rules" (perhaps because the former is assumed to be put to constructive use when available, while the latter are too often interest-group oriented).

Perhaps the study that goes deeper into the theoretical and observed complications in the protection of property rights and enforcement of contracts in the Uruguayan context is Bergara and Zipitría (2003), and its predecessor, Zipitría (2001). While the authors do not adopt a long term perspective, and essentially focus more on providing an account for the observed (contemporaneous) weak protection of investor's rights and contracts, they are the ones that identify these perhaps more decidedly as crucial to understanding the country's performance. The cited works focus on bankruptcy law and explaining its ineffectiveness more than exploring empirically its consequences. The lead author (Bergara) explores other institutional features of the country in the cited volume, generally with an important amount of detail about specific formal arrangements. Yet, they rightly point out more generally that formal rules alone cannot account for the weakness of those institutions, and that the effects of the law must be understood in a broader institutional context.

Measuring institutional quality

The last two decades have seen efforts to generate indicators and proxies to test those and other hypotheses (see, e.g., Knack and Keefer, 1995; Kaufman et al., 2004; Williams and Siddique, 2008). At the same time, proliferation of databases that include measures of institutional arrangements have also stimulated the generation and empirical investigation of new research questions (but also, sometimes, "data-driven" research that has not shed much light on the causal chains or the robustness of meaningful theoretical hypotheses; Aaron, 2000; Keefer, 2004; Pande and Udry, 2005).

As mentioned above, the enforcement of contracts can be "private" (Hamish et al., 2000). In these cases, it tends to be informal and will be affected by reforms to the formal enforcement mechanisms, but also by other policy reforms (as, e.g., in Woodruf, 1998). That said, at least since the consolidation of nation-states, national and subnational jurisdictions will have some form of third-party, formal enforcement mechanism, and that is why quality of contract enforcement is usually taken to be an attribute of those political entities (Djankov et al., 2003; Acemoglu and Johnson, 2005). For those reasons, the quantitative operationalization of quality or effectiveness of enforcement has largely been done by creating indicators that rate such quality jurisdictions at given points in time (typically, ratings for "country-time" observations).

Four broad approaches have been followed to generate cross-section and longitudinal variation in indicators for "quality of institutions". In roughly chronological order, they are:

(i) Experts' assessment: effectiveness, efficiency and/or fairness of the formal enforcement mechanism is assessed by practitioners and other key

informants and conveyed and aggregated through surveys (Knack and Keefer, 1995; but also La Porta et al. 1997, and Berkowitz et al., 2003; Staats et al., 2000). Since several of these have been carried out by investor advise companies, for a relatively long period of time, these indicators often permit to introduce a diachronical perspective spanning about four decades for major or more developed countries, and shorter periods for others.

(ii) Indirect measures based on "objective" data, such as the observed use of "contract-intensive" money: the relative use of currency relative to contract-intensive money is taken as an indicator of inadequate/weak contract enforcement (Clague et al., 1999; Prados de la Escosura et al, 2009). This is the strategy that is favored in this article, and probably the only one that permits to have really long series of "quality of institutions" data.

(iii) Surveys of economic agents in which questions about contract enforcement and protection of investors' rights are asked to those that most directly bear their effects (Brunetti et al., 1997, Dao, 2008). These have the advantage of eventually leading to the construction of pooled cross-sections of firms, if not proper panels; but suffer from the same constraint or a more binding one regarding the diachronical analysis.

(iv) Quantification of time and pecuniary costs to enforce standard contracts: Legal experts are not asked about their opinions but to estimate the time and financial costs incurred by a private party to get its rights established when facing breach of some universal and seemingly straightforward contracts (e.g., collect a bounced check, or evict a delinquent tenant; Djankov et al. 2003), or more complex lending contracts (Djankov et al. 2008). This approach has the advantage of relying in more "objective" basic data, but has to take jurisdictions as the unit of analysis (not economic agents) and there aren't yet any series of observations to introduce the time dimension.

A significant body of research has focused on exploiting these data sets and the variations over space and time of institutional factors and economic outcomes. This explains why most of the studies in the literature are cross-section, panel or longitudinal analysis, for countries, firms or sub-national jurisdictions as the units of analysis.[6] These studies are the ones that yield estimates of quantitative effects of (some measure) of institutional quality on aggregate economic outcomes. Le (2004) is a good example of the conventional approach.

[6] See Aboal, Noya and Rius (2011)

While there are good reasons to go beyond these readily available data sets (see the persuasive arguments in Pande and Udry, 2005; also Rehme, 2007; Rodrik, 2005), we are of the view that there is still value in extending the reach of studies undertaken with conventional and tried approaches. This paper extends the "indirect measures" strategy, by using the "contract-intensive money" (or CIM) indicator to study more than a century of a single country's history. The value added of the paper derives from (a) using a historical lens to critically analyze what the indicator supposedly shows about institutions' quality, (b) the "pull" effect on work to estimate longer-term investment data (to pair it up with farther-reaching monetary indicators), and (c) a conscious discussion of the econometric findings, looking as much for analytically interesting insights as well as for lessons on methods and their potential limitations.

Clague et al. (1999, p.187) argue that the government has four crucial roles to play in contract enforcement and the protection of property rights: (i) it provides third-party enforcement when no self-enforcing mechanism exists; (ii) it may be the source of information about branches of contracts; (iii) it may enforce the arrangement that private agents devise to constitute themselves as a formal group and thus "self-enforce" contracts; and (iv) it guarantees internal peace, preventing agents for acting as in a Hobbesian anarchy. These functions would be valuable in a variety of historical settings. The authors then argue that, to capture the effectiveness of contract enforcement through time, it is possible to use the societies' reliance on non-currency money, since such "means of payment" and "reserves of value" would not be chosen by agents that are skeptic about the government's willingness or capacity to enforce contracts.

The application of those ideas to developing economies is not new. Prados de la Escosura & Sanz-Villarroya (2006, 2009) use the same concept to evaluate the role of institutional arrangements in the long-run decline of Argentina, comparing the evolution of CIM with Australia and Canada. Both, Clague et al. (1999) and Prados de la Escosura & Sanz-Villarroya (2009), argue about the validity of the indicators and the evidence is convincing. "CIM is a reflection or measure of the type of governance that improves economic performance rather than a cause of that performance"(Clague et al., 1999, p. 189) and, in this sense, it can operate as an instrumental variable in the historical analysis.

The main advantages of the CIM indicator as a measure of quality of contract enforcement, and more generally as a proxy for institutional quality, are (i) that it relies on secondary quantitative measures that are not likely to be influenced (biased) by any expert group's subjective assessment of how institutions worked or are working in any particular setting, and (ii) that with

meticulous economic-historical effort, one can build rather long series for the indicator. There are, however, some potential downsides that must be acknowledged. On one hand, it can arguably be a reflection, for longer or shorter periods, of depth (or repression) of the financial system, for reasons unrelated to the respect of contracts, and it can reflect perhaps too directly the effects of changes in macroeconomic policies even while maintaining constant the quality of institutions (Williams and Siddique, 2008). Nonetheless, we understand that the advantages are powerful enough to merit its further investigation, including that about methods or estimation tactics to address the indicator's potential shortcomings.

Data and methods

Following the methodology used by Clague et al (1999) and Prados de la Escosura & Sanz (2006, 2009) we propose two approaches: a historical description of the evolution of the series and an exercise of estimation where we employ the seemingly unrelated regression method (SUR). Econometric exercises require long-run series that are typically not available in the national statistical system, so we propose original estimates of CIM, and other variables, for the period 1870-2010. [7]

With Clague et al (1999), we define *contract-intensive money* (CIM) as the ratio of non currency money to the total money supply, or $(M2-C)/M2$, where $M2$ is a broad definition of the money supply and C is currency held outside banks. The availability of monetary statistics for the 19th century in the case of Uruguay is limited. We use official surveys, other information and indirect indicators to fill gaps in the series, and we elaborate series of currency in circulation and total deposits for the period 1870-2010 in order to calculate the share of deposits in the total money supply. For the estimation of currency in circulation we consider different sources. From 1912 on we take the currency in circulation from Banco Central del Uruguay (1971; and on-line data available at www.bcu.gub.uy); for 1900-1911 we consider the variation of total emission from Banco Central del Uruguay (1971). For the period before 1900 we rely on the data of total emission reported in Eduardo Acevedo (1933, 1934) and Arocena Olivera & Graziani (1987). For the years where there is no information (1869, 1877, 1878, 1879 and 1881) we propose lineal interpolations.

For the estimation of the deposits we also consider different sources. From 1912 on we take the data of total deposits from Banco Central del Uruguay (1971 and data on line) calculated as

[7] Details about the methodology and data sources used to estimate the CIM (1870-2010) and the investment (1870-1954; from 1955 to the present we consider official estimates) are described in Román and Willebald (2011).

money supply less currency. For the previous period there is lack of systematized information of the series of total deposits in the bank system. For 1903-1911 we consider the variations of the deposits of the Banco de la República; for 1888-1903 we use the variation of the deposits of all banks reported in the Statistical Yearbook (several years). For the periods 1883-1887, 1870-1874 and 1869 we use the variation of the deposits reported in Acevedo (1933) (this is data of the emission banks). For the years with no information (1870, 1875-1882) we calculate lineal interpolations. The variables definitions and data sources are provided in Table 1.

Table 1

Variables: definitions and data sources

Variable and period	**Definition**	**Sources**
GDP 1870-2010	Gross Domestic Product at current and constant prices in millions of 2005 pesos	Aggregation of series made by Bonino, N., Román, C. and Willebald, H. (2011): "PBI y estructura productiva en Uruguay: Una revisión de las series históricas", mimeo, based on the following sources. 1870-1899: Bértola, L.; Calicchio, L., Camou, M., Rivero, L. (1998): *El PBI Uruguayo 1870-1936 y otras estimaciones*", Programa de Historia Económica, Facultad de Ciencias Sociales.
		1900-1955: Bertino, M. y Tajam, H. (1999): *El PBI de Uruguay 1900-1955*, Instituto de Economía, Facultad de Ciencias Económicas y de Administración.
		1955-2010: Banco de la República Oriental del Uruguay (1965): *Cuentas Nacionales*; Banco Central del Uruguay (1976): *Producto e Ingreso Nacionales. Actualización de las Principales Variables*, División Asesoría Económica y Estudios; Banco Central del Uruguay (1989): *Producto e Ingresos Nacionales*; and data on line from Banco Central del Uruguay www.bcu.gub.uy
POPULATION 1870-2010		1870-1995: Data base from the Economic History Program, Faculty of Social Science, Universidad de la República www.fcs.edu.uy 1996-2010: Instituto Nacional de Estadística, Uruguay www.ine.gub.uy
PER CAPITA GDP GROWTH 1870-2010	Annual growth rate of per capita gross domestic product at constant prices, in millions of 2005 pesos	See sources of GDP and population
CONTRACT INTENSIVE MONEY 1870-2010	The ratio of non-currency money to the total money supply.	1870-2010: Román, C. y Willebald, H. (2011). "Apuntes metodológicos para la construcción de indicadores de inversión y calidad institucional en el largo plazo: una propuesta para el caso uruguayo". A presentares en III Jornadas Académicas de la Facultad de Ciencias Económicas y de Administración, Universidad de la República.
ECONOMICALLY ACTIVE POPULATION 1870-2010	The percentage of population over 14 years old that is either employed or actively seeking employment	1870-1907: Williamson, J. (2000): "Land, labor and globalization in the pre-industrial third world", *NBER,* 7784. (We use the variation of labor force)

		1908-1996: Fleitas, S. y Román, C. (2010). "Evolución de la población económicamente activa en el siglo XX: un análisis de la estructura por sexo, edad y generaciones", *Boletín de la Asociación Uruguaya de Historia Económica*, Nº 9. (1908-1949 data every five years with linear interpolations; 1950-1996 annual data).
		1997-2010: CEPAL (2006): "Población Económicamente Activa", América Latina y el Caribe, Observatorio demográfico, Year 1, Nº2, (Data every five years, with linear interpolation)
PRIMARY AND SECONDARY ENROLLMENT 1870-2010	Proportion of population ages 5 to 18 in primary and secondary school	POPULATION 1870-1907: Interpolation with the movement of the total population. See sources of population. 1908 and 1909-1939: Fleitas, S. y Román, C. (2010). "Evolución de la población económicamente activa en el siglo XX: un análisis de la estructura por sexo, edad y generaciones", *Boletín de la Asociación Uruguaya de Historia Económica*, Nº 9 (1909-1939 Population by five-year age group) 1940-1945: Mitchell, B. R., (1993): *International Historical Statistics: The Americas 1750-1988,* MacMillan Publishers Ltd, England. (Population by five-year age group) 1950-2010: United Nations, Department of Economic and Social Affairs, Population Division, *Population Estimates and Projections Section* http://esa.un.org/unpd/wpp/unpp/panel_indicators.htm (Population by five-year age group) ENROLLMENT 1870-1875: Estimation of primary enrolment using a polynomial of third order. 1870-1899: Estimation of secondary enrolment using an exponential function. 1876 (from Primary) and 1900 (from Secondary) - 2003: Student by level. Bértola, L., Camou, M. Maubrigades, S., and Melgar, N. (2010). "Human Development and Inequality in the 20th Century: the Mercosur Countries in a comparative perspective", R. Salvatore, J. Coatsworth and A. Challú, *Living Standards in Latin American History. Height, Welfare and Development, 1750-2000*, Harvard University Press. 2004-2010 Own estimates from Ministerio de Educación y Cultura. Dirección de Educación, Uruguay www.mec.gub.uy
DEPENDENCY RATE 1870-2010	Percentage of population below 15 and above 64 over population ages 15 to 64	1870-1907: Interpolation based on own estimations using the data from the Census of Uruguay of 1852. 1908 and 1909-1939: Fleitas, S. y Román, C. (2010). "Evolución de la población económicamente activa en el siglo XX: un análisis de la estructura por sexo, edad y generaciones", *Boletín de la Asociación Uruguaya de Historia Económica*, Nº 9 (Population by five-year age group 1909-1939) 1955-1995: Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat (data every five years, with linear interpolation) 1996-2010: Instituto Nacional de Estadística, Uruguay. www.ine.gub.uy
INVESTMENT RATE	Investment ratio to GDP	Román, C. y Willebald, H. (2011). "Apuntes metodológicos para la construcción de indicadores de inversión y calidad institucional

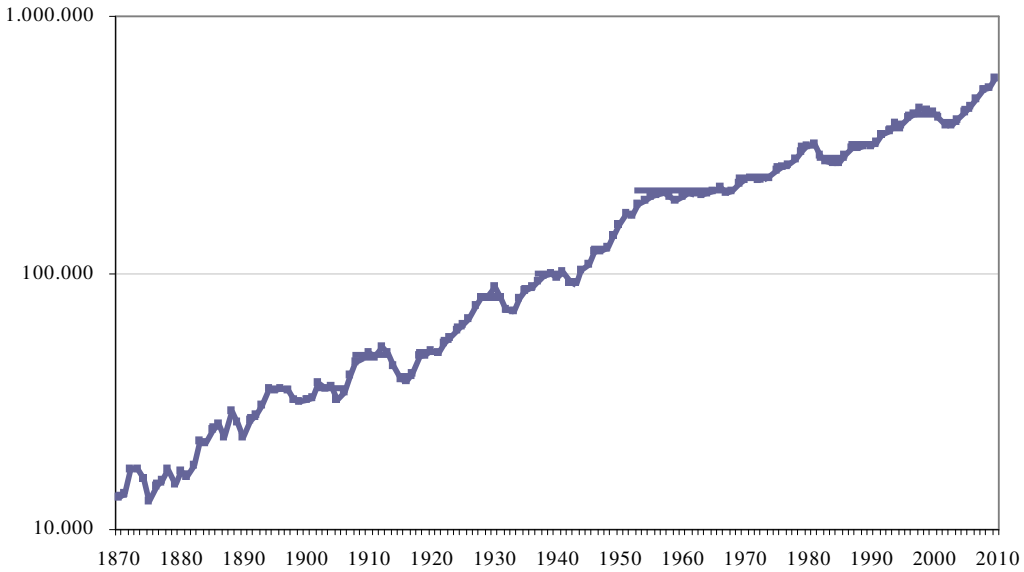
1870-2010		en el largo plazo: una propuesta para el caso uruguayo". A presentares en III Jornadas Académicas de la Facultad de Ciencias Económicas y de Administración, Universidad de la República. 1955-2010: Banco República Oriental del Uruguay (1965): *Cuentas Nacionales*, Banco Central del Uruguay (1976): *Producto e ingreso nacionales. Actualización de las Principales Variables*, División Asesoría Económica y Estudios, Banco Central del Uruguay; Banco Central del Uruguay (1989): *Producto e Ingresos Nacionales*; and data on line www.bcu.gub.uy
EXPORTS RATIO 1870-2010	Ratio Export/GDP	EXPORTS 1870-1928: Donnángelo, A y Millán, I (2006): Uruguay 1970-2003: "Un enfoque del crecimiento económico a través de la balanza de pagos", Monografía, Facultad de Ciencias Económicas y de Administración, Universidad de la República.
		1928-1969: Azar, P. y Fleitas, S. (2007): "Impulsos y frenos: las relaciones económicas entre Estados Unidos y Uruguay entre 1930 y 2005", *Cuadernos del CLAEH 93-94*. Montevideo.
		1970-2010: Banco Central del Uruguay. Data on line www.bcu.gub.uy
REAL INTEREST RATE 1870-2010	Lending interest rate adjusted for inflation as measured by price consumption index	1870-1872: We assume the same rate as 1872 1872-1897: Obstfeld, M. and Taylor, A. (2003): "Sovereign risk, credibility and the gold standard: 1970-1913 versus 1925-1931". *The Economic Journal* 113, pp. 241-275, April.
		1898-1954 Own estimations made by Carolina Román
		1955-2009: Fleitas y Rius (2010) "Determinantes de la Inversión en Uruguay", *IV Jornadas de Investigación del Instituto de Economía,* Facultad de Ciencias Económicas y Administración; and 2010 Banco Central del Uruguay, data on line www.bcu.gub.uy
		INFLATION 1870 assumed the same as 1871 1871-1936: Bértola, L; Calicchio, L; Camou, M. and Porcile, G. (1999): "Southern Cone Real Wages Compared: A Purchasing Power Parity Approach to Convergence and Divergence Trends,1870-1996", *Documento de Trabajo No. 44*, Montevideo: Programa de Historia Económica y Social, Facultad de Ciencias Sociales, Universidad de la Republica.
		1937-2010: Instituto Nacional de Estadística, Uruguay. www.ine.gub.uy
RELATIVE PRICE OF CAPITAL GOODS 1870-2010	The investment deflator ratio to the price consumption index	Investment deflator: See sources for investment rate and investment at constant prices.
INVESTMENT AT CONSTANT PRICES 1870-2010	Fixed Investment in million of 2005 pesos	1870-1955: Román, C. y Willebald, H. (2011). "Apuntes metodológicos para la construcción de indicadores de inversión y calidad institucional en el largo plazo: una propuesta para el caso uruguayo". A presentares en III Jornadas Académicas de la Facultad de Ciencias Económicas y de Administración, Universidad de la República.
		1955-2010: Banco de la República Oriental del Uruguay (1965): *Cuentas Nacionales*, Banco Central del Uruguay (1976): *Producto e ingreso nacionales. Actualización de las Principales Variables*, División Asesoría Económica y Estudios; Banco Central del Uruguay (1989): *Producto e Ingresos Nacionales*; and Banco Central del Uruguay data on line www.bcu.gub.uy

Growth, capital accumulation and institutional quality: observed historical trajectories

We first discuss Uruguay's economic behavior in the long run –since the end of the 19th century and up until 2010—, looking at the evolution of the GDP, and what happens with the CIM indicator and the investment ratio. We present an historical overview of the performance of the Uruguayan economy to identify some relevant stylized facts. We focus on the joint evolution of overall economic growth, fixed capital accumulation, and institutional quality.

In the long-run, Uruguay exhibits an irregular trajectory that alternates periods of important productive expansion with deep depressions. Graph 1 presents the evolution of GDP from 1870 to 2010 (in 2005 million Uruguayan pesos). Traditionally, national historiography recognizes three phases associated with different "development patterns". From the last quarter of the 19th century to the 1920s, the economy experienced significant export-led growth, based on a few primary products, and obtained welfare levels close to the core of the international economy.[8]

Graph 1.
Gross Domestic Product (logarithm scale)
(2005 Uruguayan pesos)



Source: See Table 1.

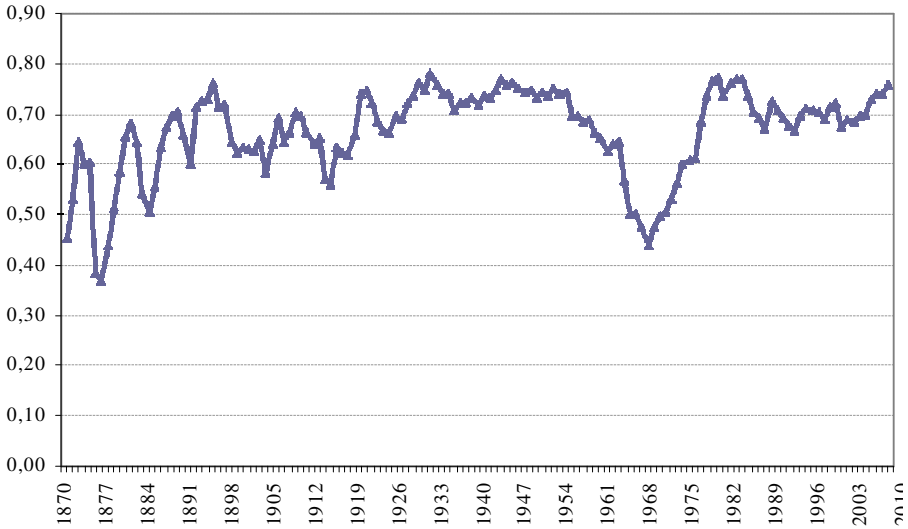
[8] According to Maddison (2003), in 1913 Uruguay was among the top-20 countries in the global per capita GDP ranking.

The Great Depression had a big impact in the economy and the poor performance extended practically until the middle of the 1930s. After the Second World War, the economy presented the second period of steady economic growth characterized by an increasing participation of the state in the economy and a (truncated) process of import substitution industrialization. However, the positive evolution was mostly exhausted by the end of the 1950s, and the economy entered in a long period of "stagflation" that lasted until the beginning of the 1970s. During the first half of the 1970s, and among deep social and political changes, the economy experienced important modifications that became a new development pattern. Increasing trade openness, financial liberalization, and new regional trade agreements gave place to a new phase of economic expansion that extended until the end of 20th century. The 21st Century begun with one of the deeper crisis of the last one hundred years and, from 2003, the economy recovered strongly to the present. In that context, our CIM indicator shows interesting insights (Graph 2).

Graph 2.

Institutional quality: Contract Intensive Money

Ratio (M2-C)/ M2



Source: See Table 1.

The "volatility" of the early trajectory coincides with a period of high institutional instability, when internal conflicts and scarce government enforcement characterized the Uruguayan economy at the beginning of the 20th century.[9] The dynamics change after the First World War and the indicator increases towards the 1940s and it maintains a relative stable level through the 1950s. During the stagflation period and the increasing political and social instability of the

[9] See Roman & Willebald (2010) for a review and Willebald (2011) for a comparison with settler economies.

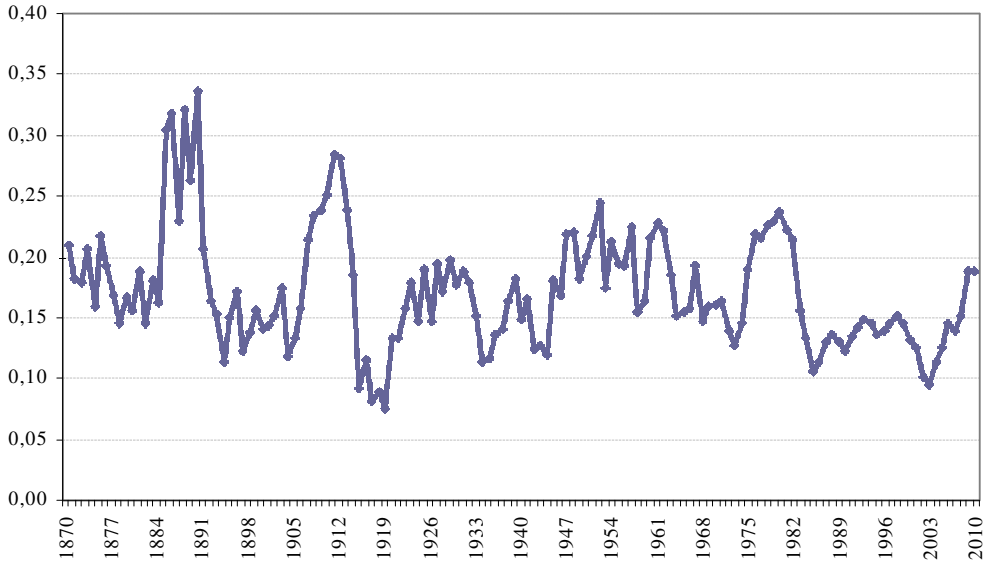
1960s, the CIM indicator shows a deep decreasing trajectory until the end of the decade. During the next 20 years, the CIM indicator recovered and approached its former levels of the 1940s, but fell again in 1985 and was relatively stable at levels around 0.7 until the present. Since 2007 the ratio is increasing coinciding with the strong economic growth.

What did happen with the investment in historical perspective? The evolution of the fixed investment rate was volatile and without clear trends. In the long run (1870-2010), the average rate was 18 per cent although this ratio was not representative of the historical performance. In the 1870s, the investment rate declined but, in the second half of the 1880s, the economy experienced the first boom of the construction that meant investment rates higher than 30 per cent. This boom finished with the 1890's Crisis, a critical period characterized by bankrupts and a general depression. Afterwards, the investment recovered slowly during the second half of the 1890s and quickly from 1904, during a period that coincided with a strong economic growth that closed abruptly with the First War World. The 1920s were years of recovering in several spheres of the economy, and the physical capital formation followed this process until achieving levels close to 20 per cent. However, the Great Depression constituted another strong negative shock and the investment rate went down until levels close to 10 per cent in 1934. It recovered in the second half of the 1930s, although the Second War World meant a new break in the evolution. Since 1944, and probably determined by the process known as industrialization by import substitution that dominated the Uruguayan economy during the 1950s, the fixed investment overcome the 20 per cent until the 1960s, when the capital formation experienced a new decreasing trend. Other new boom in the construction sector happened in the 1970s. It was an increasing cycle that, as in other periods, ended with a deep decline in the investment rate (the 1982'Crisis); the 1980s was a period of weak evolution and huge difficulties in the capital formation. The economy increased during the 1990s but showing low investment rates (below 15 per cent), and suffered another negative impact during the Crisis of the first years of the 21st century. Since 2003, the investment recovered significantly to perform a trajectory close to 20 per cent.

Graph 3.

Fixed Investment Rate

Ratio Gross Fixed Capital Formation / GDP



Source: See Table 1.

Growth, capital accumulation and institutional quality: an econometric exercise

Following Clague et al. (1999) and Prados de la Escosura & Sanz (2006 and 2009) we propose a structural model to provide an answer to our question about the relation between quality of institutions and economic performance in the long run for the case of Uruguay. We replicate the same equations as the latter authors based on a system of simultaneous equations and employ the seemingly unrelated regression method (SUR) that allows solving the problems of contemporary correlation between the equation's residuals and therefore increases in estimation efficiency.

We based the estimations on a conventional growth model where institutions have been added. First we estimate a regression in which the dependent variable is the level of real per capita GDP, and the right-hand-side variables are lagged per capita GDP, the economically active population (EAP) as an indicator of the growth of the labor force, the rate of enrollment in the education system –primary and secondary– representing the growth of human capital, the investment –at constant prices– as a proxy of the growth of physical capital, and finally the rate of variation of the exports ratio to GDP as the indicator of openness. For the specification of the equations we apply the logistic transformation on the enrollment rate, the CIM indicator, export

rate, and the dependency rate. In addition, we use a logarithm transformation for per capita GDP, the economically active population and the relative price.

Then, we estimate a set of three equations which attempt to endogenize each explanatory variable (investment, economically active population and enrollment). For example, we estimate an equation in which the investment depends on the real interest rate, on the relative price of capital goods, on per capita GDP growth, on the variation in the dependency ratio, and on CIM. In the third equation the explanatory variable is the EAP and the independent variables are per capita GDP growth, EAP lagged and CIM. Finally, the last equation with enrollment as the dependent variable, which depends on per capita GDP growth, enrollment lagged, and CIM.

The main statistics for the key variables are shown in Table 2 and the econometric results of the SUR model are presented in Table 3.[10]

Table 2
Statistics descriptive of the variables for the period 1890-2010

Variables	Mean	Standard Deviation	Obs
Per capita GDP level (logs)	11,061	0,478	120
Economically active population (in logs)	13,548	0,527	120
Primary and Secondary enrollment (logit)	0,127	1,156	120
Real interest rate	16,143	20,548	120
Openness (rate of variation)	-1,516	0,379	120
Dependency rate (rate of variation)	0,577	0,438	120
Relative price of capital goods (in logs)	0,705	0,697	120
CIM (logit)	0,793	0,331	120
Investment (constant prices in logs)	9,361	1,018	120

[10] We run the econometric estimates for the period 1890-2010 because we evaluate critically the CIM indicator for the previous decades and its high volatility probably derives from the debilities of our method of construction for those years. We hoped high variability although our initial results exaggerate the expected instability due to the historical context.

Table 3
Econometric results seemingly unrelated regression model (SUR) 1890-2010

	GDPpc (logs) (1)		Investment (logs) (2)		EAP (logs) (3)		Enrollment rate (logit) (4)	
	Coef.	*t ratios*	Coef.	*t ratios*	Coef.	*t ratios*	Coef.	*t ratios*
Constant	0,166	*0,090*	-1,237	*-0,320*	-0,246	*-1,15*	**10,592**	*3,310*
Trend	**0,002**	*1,330*	0,002	*1,010*	0,000	*1,92*	**-0,005**	*-2,970*
GDPpc (log) (-1)	**0,739**	*13,590*			-0,007	*-1,12*	-0,032	*-0,290*
EAP (log)	**-0,160**	*-2,040*						
EAP (log) (-1)					**0,970**	*105,81*		
Investment (logs)	**0,098**	*35,100*						
Investment (logs) (-1)			**0,729**	*13,130*				
Enrollment rate (logit)	**0,038**	*2,510*						
Enrollment rate (logit) (-1)							**1,232**	*21,100*
Openness rate of variation	0,025	*1,520*						
Dependency rate of variation			-0,009	*-0,150*				
GDPpc growth			**1,602**	*5,630*				
Real interest rate			**-0,003**	*-2,710*				
Relative price of capital (log)			**-0,258**	*-2,370*				
CIM (logit)			**0,127**	*2,180*	0,001	*0,39*	**0,127**	*2,840*
R^2	0,9816		0,9686		0,9997		0,9881	
Number observations	120		120		120		120	

Note: Coefficients significative at the 5 per cent are marked in bold

The first runs of our econometric exercise (column number 1 in Table 3) show that per capita current GDP relates positively and significantly to enrolment rate and investment and, in turn, investment depends on the quality of institutions as expected (and as measured by the CIM indicator, column number 2). The economically active population also appears as a significant, but negative, determinant of per capita GDP. Regarding the investment equation (column number 2), it confirms theoretical predictions by displaying significant positive coefficients for lagged investment, and per capita GDP growth, and shows a significant negative coefficient for the relative price of capital goods and the real interest rate. We also explored with other estimations methods, such as doing simple OLS regressions for each equation, and the results for the main variables were the same, so it seems that our results are robust to other estimation procedures.

Concluding remarks

This paper estimates and uses long term series of an indicator of institutional quality (the CIM indicator) and of total fixed capital accumulation, for the period 1870-2010, attempting to shed new light on the relationship between institutions and economic performance, in the case of Uruguay. The estimated CIM indicator shows a long term trajectory that seems to match intuitively and in broad terms the country's political and economic historical record. The evolution of the estimated long run investment series brings new insights of the historical capital accumulation process. Econometric results using seemingly unrelated regression models

suggest that institutional quality (and contract enforcement more specifically) influences aggregate economic performance through the accumulation of capital.

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