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Presentación

Es con gran alegría que el Instituto de Investigaciones Socio-Económicas (IISEC) de la Universidad Católica Boliviana "San Pablo" presenta el número 27 de la Revista Latinoamericana de Desarrollo Económico (LAJED). La revista cumple catorce años de publicación bianual ininterrumpida y más de 140 artículos académicos nacionales e internacionales. Actualmente está indexada a Revistas Bolivianas, Latindex y SciELO Bolivia, y próximamente se indexará a Redalyc y DOAJ.

El interés de académicos nacionales e internacionales por publicar sus contribuciones en la LAJED, el apoyo del Consejo Editorial Internacional y el trabajo comprometido de arbitraje externo realizado por la Academia Boliviana de Ciencias Económicas (A.B.C.E.) son los responsables por el nivel de excelencia de la revista; a ellos les manifestamos nuestro profundo agradecimiento.

En este número, la LAJED cuenta con cinco artículos académicos sobre temas económicos muy pertinentes para América Latina: tres dedicados a las políticas económicas (monetaria, fiscal y de prohibición de la exportación de carne) en Bolivia, uno orientado a la estructura y dinámica del mercado de trabajo en Colombia y Bolivia, y uno dirigido a la experiencia de los Bancos de Desarrollo en el marco de políticas industriales en Argentina y Brasil.

El primero "Bolivianización, demanda de dinero y señoreaje en Bolivia: evidencia empírica y una propuesta teórica" aborda el nivel de señoreaje en el periodo 2002-2015, los factores que explican su incremento y las condiciones para su mantención. En el segundo, "On graduation from fiscal proclyclicality: The case of Bolivia", los autores modelan la respuesta de la política fiscal a los ciclos económicos con la superación de los problemas de especificación de los modelos más utilizados en la literatura especializada. El tercer artículo, "Informality and Mobility in the Labor Market: A pseudo-panel's approach", analiza los patrones de movilidad entre sector formal e informal en Colombia y Bolivia, e identifica la direccionalidad y el volumen de la movilidad con base en un pseudo-panel, para el caso colombiano, y la encuesta trimestral de empleo, para el caso boliviano.

El cuarto artículo, "Análisis de control sintético al impacto doméstico de la restricción a la exportación de carne en Bolivia", presenta un estudio sobre el impacto de la política de restricción de las exportaciones de carne bovina en Bolivia en el año 2008, en los resultados posteriores de recuperación de la producción para el mercado interno. El quinto artículo, "Twilights and rebirths of National Development Banks in Latin America: understanding factors that could have affected different trajectories in Argentina and Brazil", busca comprender los factores de economía política que explican las distintas trayectorias de los bancos de desarrollo en la región desde su creación en los años cincuenta.

A tiempo de invitarlos a leer el presente número de la LAJED, expresamos nuestro agradecimiento a la Universidad Católica Boliviana "San Pablo" por su constante apoyo y confianza.

Fernanda Wanderley
Directora IISEC-UCB

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Bolivianización, demanda de dinero y señoreaje en Bolivia: evidencia empírica y una propuesta teórica

Bolivianization, Demand for Money and Seigniorage in Bolivia: Empirical evidence and a theoretical proposal

Sergio M. Cerezo **
Ulises A. Ticona ***

Resumen***

En los últimos años, Bolivia ha experimentado un crecimiento importante en la cantidad de dinero, lo que, junto a una inflación controlada, han permitido alcanzar niveles elevados de señoreaje. En efecto, para el periodo 2002-2015 el señoreaje promedio fue del 2% del PIB; del cual 1.6% es atribuible a incrementos en los saldos reales de dinero de los agentes privados y solo el 0.4% atribuible al impuesto-inflación.

En ese sentido, el presente trabajo examina los factores que han hecho posible este incremento en el señoreaje libre de inflación y responder a la interrogante de si Bolivia podrá mantener niveles altos de señoreaje. Para este efecto, se estima una función de demanda de dinero tipo Cagan que tome en cuenta también elementos propios de la economía boliviana.

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*** El presente documento no necesariamente refleja la visión de las instituciones donde trabaja o es miembro cada uno de los autores. Las conclusiones son de su exclusiva responsabilidad.

Los resultados muestran que el ingreso, las tasas de interés pasivas y la bolivianización financiera habrían contribuido en gran manera al incremento de la demanda de dinero, en especial desde 2006. Por otra parte, el impulso de la bolivianización a la demanda de dinero y señoreaje no cuenta con márgenes al encontrarse cerca de su límite superior. Finalmente, el documento presenta una propuesta teórica, que, a diferencia de una curva de Laffer-Bailey que relaciona inflación con señoreaje, propone una relación entre bolivianización y señoreaje.

Palabras clave: Bolivianización, demanda de dinero, señoreaje.

Abstract

In recent years, Bolivia has experienced a significant increase in the stock of money, which, along with subdued inflation, have led to higher levels of seigniorage. In fact, during the period 2002-2015 the average ratio of seigniorage was about 2% of GDP (1.6% attributable to increases in the real money balances of private agents and 0.4% attributable to the inflation tax).

In this sense, the present paper examines the factors that explain this increase in seigniorage without originating higher rates of inflation and analyzes whether Bolivia can maintain high levels of seigniorage in the future. For this purpose, a Cagan function of money demand is estimated taking into account intrinsic features of the Bolivian economy. The results show that income, deposit interest rates and financial dedollarization would have contributed greatly to the increase in money demand of national currency, especially since 2006. On the other hand, the boost of dedollarization to both, the demand for money and seignorage, is weak because it is near its upper limit. Finally, the paper presents a theoretical proposal, which unlike a Laffer - Bailey curve that relates inflation to seigniorage, proposes a relationship between dedollarization and seigniorage.

Keywords: Bolivianization, demand for money, seigniorage.

Clasificación/Classification JEL: E40, E41, E52.

1. Introducción

Uno de los elementos más importantes del mercado monetario en Bolivia, desde mediados de la década pasada, ha sido el acelerado crecimiento de la emisión monetaria[1], lo que, junto a

1 La emisión monetaria son los billetes y monedas en poder del público más la caja del sistema financiero.

tasas de inflación bastante controladas, habría permitido un notable incremento del señoreaje. Entre 2005 y 2015, la tasa de crecimiento promedio interanual de la emisión monetaria fue de 26.8%, que podría ser atribuible en parte al comportamiento de los determinantes más importantes de la demanda de dinero. Por su parte, en este mismo periodo, la inflación interanual promedio fue de solamente 6.2%. Ambos elementos habrían contribuido al incremento del señoreaje, que representa en promedio alrededor de 2% del PIB.

El objetivo del presente trabajo es explicar por qué Bolivia experimentó un nivel de señoreaje tan alto en los últimos años, tomando en cuenta su descomposición entre incremento en saldos monetarios reales e impuesto-inflación; así como establecer si sus determinantes continuarían impulsándolo. Para abordar el tema, se debe necesariamente analizar la demanda de dinero y sus determinantes, como el ingreso, las tasas de interés pasivas y también, en el caso particular de Bolivia, el fenómeno de la bolivianización (remonetización de activos financieros).

La estructura de este trabajo pionero en la temática procura seguir una secuencia lógica dirigida al análisis del señoreaje en Bolivia. La sección 2 presenta el concepto de señoreaje y su cálculo a partir de un desarrollo cuantitativo estándar y como porcentaje del PIB para Bolivia y para países de la región. La sección 3 desarrolla un modelo econométrico de demanda de dinero para Bolivia, que incluye la bolivianización. La sección 4 desarrolla una propuesta teórica que establece una relación cuantitativa entre el señoreaje y saldos monetarios reales, con la bolivianización. Finalmente, la sección 5 expone las principales conclusiones.

2. Señoreaje en Bolivia y en la región

El señoreaje es un ingreso real disponible a las autoridades (gobierno y autoridad monetaria) que proviene del monopolio que tienen en la emisión de dinero. Bajo este concepto se procura caracterizar el señoreaje en Bolivia, así como realizar una comparación respecto a varios países de Latinoamérica, para posteriormente analizar sus propias características y determinantes.

2.1. Comparación en Latinoamérica

Para tener una idea del tamaño relativo del señoreaje, consideramos esta variable entre 10 países de la región[2]. Para facilitar la comparación, usamos la medida más común de señoreaje:

2 No se considera esta variable para Argentina y Venezuela debido a que sus procesos inflacionarios generaron un crecimiento atípico en la creación de dinero.

la ratio de la variación de la emisión o base monetaria y el PIB nominal, como promedio anual del periodo 2000-2014[3]. Los gráficos 1 y 2 muestran la comparación como porcentaje del PIB para cada uno de estas dos medidas.

Gráfico 1: Señoreaje a partir de base monetaria en Latinoamérica (% del PIB)

Fuente: Elaboración propia en base a datos del FMI y bancos centrales

Bolivia cuenta con el señoreaje más elevado entre los países de Latinoamérica considerados, ya sea tomando la definición de emisión o la de base monetaria. El señoreaje como porcentaje del PIB para Bolivia, en el periodo 2000-2014 y considerando base o emisión monetaria, fue en promedio de 2.9% y 2.4%, respectivamente, ubicándose como el país con el más alto señoreaje de la región.

3 Se considera este periodo por la información disponible para los países con los que se procuró realizar la comparación.

Gráfico 2: Señoreaje a partir de emisión monetaria en Latinoamérica (% del PIB)

Fuente: Elaboración propia en base a datos del FMI y bancos centrales

Este elevado nivel de señoreaje en Bolivia habría sido impulsado por un cambio importante en la demanda de dinero, debido a temas estructurales. En este periodo de análisis se identifican algunos elementos importantes en Bolivia, como son las elevadas y sostenidas tasas de crecimiento económico, los niveles de inflación controlados y la recuperación del uso de la moneda nacional, conocida como bolivianización (remonetización)[4].

4 Estos elementos serán analizados más adelante, a partir de un modelo econométrico de demanda de dinero.

2.2. Caracterización y aproximaciones cuantitativas del señoreaje en Bolivia

2.2.1. Definición conceptual de señoreaje

Es preciso aclarar la medida de señoreaje a ser analizada en el resto del documento. Si se toma la definición más puntual de señoreaje –la diferencia entre el valor nominal del dinero y su costo de producción– entonces solo el dinero debe ser tomado en cuenta. Por otra parte, con la gestión que realizan los bancos centrales en la actualidad, es posible que para estimar el señoreaje se considere la emisión monetaria o la base monetaria. Si las reservas de las entidades financieras no generan rendimientos, el señoreaje puede ser calculado a partir de la base monetaria[5].

En el caso boliviano, para calcular el señoreaje es conveniente considerar la emisión monetaria, ya que las reservas de encaje legal en títulos (que forman parte del Fondo de Requerimiento de Activos Líquidos, RAL[6]), gestionadas en el Banco Central de Bolivia, generan rendimientos. En función de la administradora de los Fondos RAL, las tasas de rendimiento oscilan entre 0.1% y 1%, siendo por ejemplo, para el primer semestre de 2016, la tasa de rendimiento para los Fondos RAL en moneda nacional alrededor de 0.14%.

2.2.2. Desarrollo cuantitativo para el cálculo del señoreaje

La definición de señoreaje que toma en cuenta el flujo de dinero puede ser descompuesta en una parte de financiamiento y otra de impuesto inflacionario. Se parte de la definición de saldos reales $m = \frac{M}{P}$, donde M es un agregado monetario y P el nivel de precios. Tomando logaritmos y derivando respecto del tiempo, se llega a:

$$\frac{d\ln(m)}{dt} = \frac{d\ln(M)}{dt} - \frac{d\ln(P)}{dt}$$

Esta ecuación refleja el comportamiento de las variaciones en los saldos monetarios reales, y se puede re-escribir como:

5 Una discusión de la medición de señoreaje se puede encontrar en Drazen (1985), Honohan (1996) y Dupuy (1993).

6 Es un fondo de inversión cerrado, constituido únicamente por los recursos aportados por las entidades financieras mediante el encaje legal en títulos. Cada entidad financiera tendrá registrado su aporte al Fondo RAL en forma individualizada. Este fondo está constituido por las siguientes denominaciones: moneda nacional, unidad de fomento a la vivienda y moneda extranjera.

$$\frac{dm}{m} = \frac{dM}{M} - \pi$$

donde π es la tasa de inflación. Ahora, multiplicando esta expresión por m (que es igual a $\frac{M}{P}$), se tiene:

$$dm = \frac{dM}{M}\frac{M}{P} - \pi m$$

Reordenando, tenemos la descomposición del señoreaje:

$$S = dm + \pi m$$

Entonces, el señoreaje es la cantidad de recursos, en términos reales, disponible a las autoridades cuando emiten dinero (dM), equivalente a la variación de saldos reales (dm) más el impuesto-inflación (πm).

Entre 2002 y 2015, el señoreaje promedio como porcentaje del PIB fue de 2%, donde se destaca el componente de variación de saldos monetarios reales más que el impuesto-inflación. En promedio, en este periodo, la contribución al señoreaje de la variación de saldos reales respecto al PIB fue de 1.4%, y del impuesto-inflación fue solamente de 0.6%. El señoreaje más elevado se lo experimentó el año 2007, cuando llegó a un nivel de 5.6% del PIB, periodo en el cual la variación de saldos monetarios reales fue de 4% y el impuesto-inflación de 1.6% (Cuadro 1).

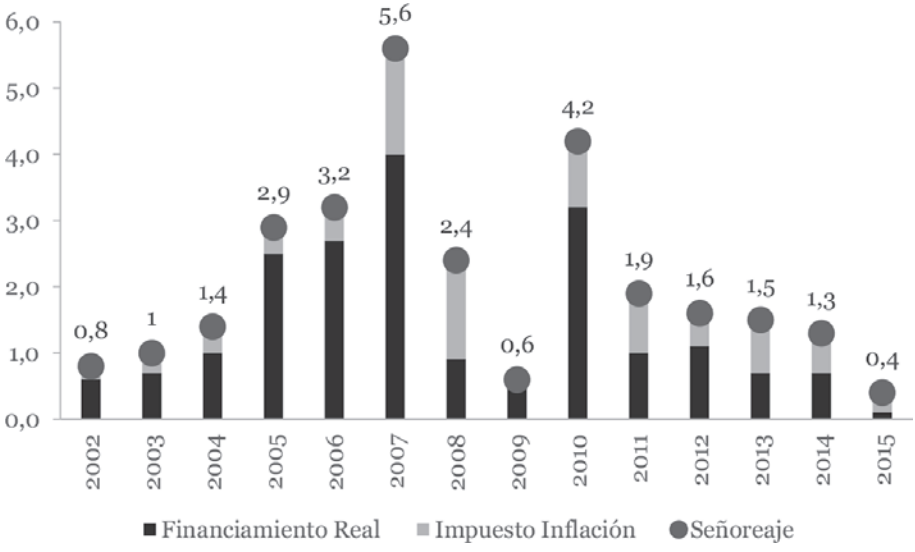
Cuadro 1
Señoreaje de emisión monetaria: variación de los saldos reales e impuesto inflación
(% del PIB)

Año	π	S	dm	π*m
Promedio	5.5	2.0	1.4	0.6
2002	2.5	0.8	0.6	0.2
2003	3.9	1.0	0.7	0.3
2004	4.6	1.4	1.0	0.4
2005	4.9	2.9	2.5	0.4
2006	5.0	3.2	2.7	0.5
2007	11.7	5.6	4.0	1.6
2008	11.9	2.4	0.9	1.5
2009	0.3	0.6	0.6	0.0
2010	7.2	4.2	3.2	1.0
2011	6.7	1.9	1.0	1.9
2012	4.5	1.6	1.1	0.5
2013	6.3	1.5	0.7	0.8
2014	5.1	1.3	0.7	0.6
2015	2.9	0.4	0.1	0.3

Fuente: Elaboración propia en base a datos del BCB e INE

El Gráfico 3 también muestra el señoreaje como porcentaje del PIB, para el periodo 2002-2015, dividido en sus componentes: el financiamiento real y el impuesto inflación. Comparado con la tasa de inflación promedio de 5.5% para el periodo analizado, el impuesto-inflación de la emisión monetaria (πm) es bajo: 0.6% del PIB. Del mismo gráfico se desprende que el señoreaje se comportó de manera creciente en el periodo 2002-2007, se contrajo entre 2008 y 2009, producto de la ralentización de la expansión monetaria por la crisis financiera internacional, y posteriormente se mantuvo en una tendencia decreciente, luego de su recuperación en 2010. También se observa que el componente más preponderante del señoreaje es el financiamiento real (variación de los saldos monetarios reales), el cual, al igual que el impuesto-inflación, replica la tendencia histórica del señoreaje.

Gráfico 3: Señoreaje: variación de los saldos monetarios reales e impuesto-inflación (% del PIB)



Fuente: Elaboración propia en base a datos del BCB e INE

En suma, el señoreaje en Bolivia exhibe dos características sobresalientes: a) su tamaño en porcentaje del PIB es superior al de los países de la región, además en un contexto de tasas de inflación moderadas; y b) por su descomposición, dado que es atribuible más a temas de cambios en los saldos monetarios reales que al impuesto inflación, sugiere examinar temas relativos a la demanda de dinero de los agentes privados, al ser el principal factor que sostiene el alto señoreaje. Para corroborar este segundo elemento, a continuación se presenta un análisis sobre la demanda de dinero según los fundamentos sugeridos por la teoría y otro propio de la economía boliviana, como es la bolivianización.

3. Modelo de demanda de dinero para Bolivia: el rol de la bolivianización

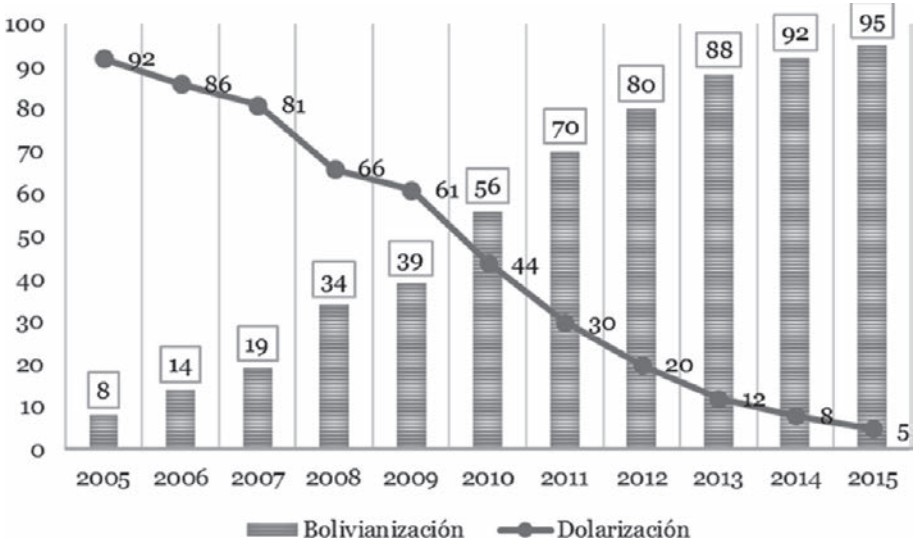
En esta sección, en inicio se revisa el tema de la bolivianización y se mencionan, sin ser el objetivo principal del trabajo, los factores que lo han promovido. Posteriormente se realiza una revisión bibliográfica de estudios de la demanda de dinero en Bolivia, para luego establecer algunas regularidades empíricas entre la emisión real, como variable proxi a la demanda de

dinero, y algunas variables que la determinan, sugeridas por la teoría o por hechos estilizados. Posteriormente se plantea una especificación de la demanda de dinero tradicional más la inclusión de un indicador de bolivianización.

3.1. Bolivianización (desdolarización)

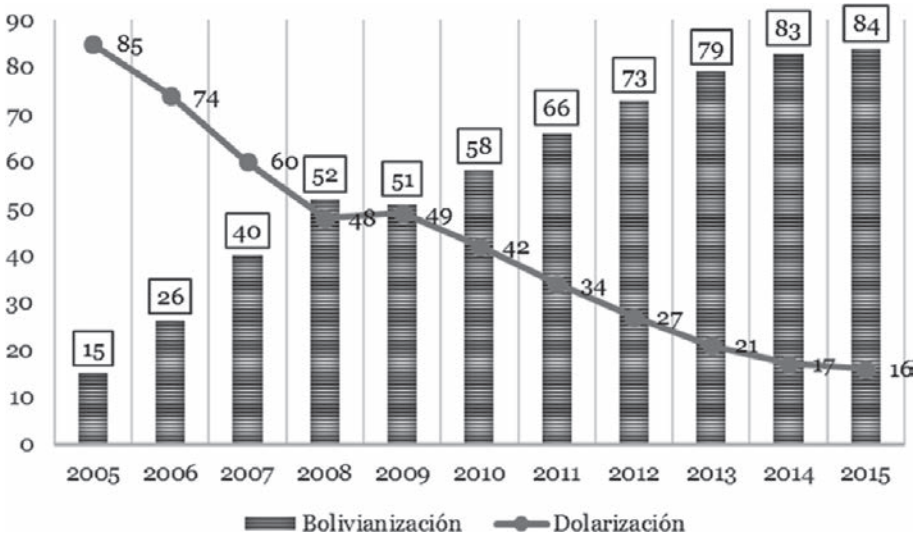
La bolivianización podría ser definida como el proceso por el cual la población usa más la moneda nacional para comprar y vender y también para ahorrar y prestarse. En 2005, el 8% de los créditos eran en bolivianos, es decir que el restante 92% estaba en dólares americanos (Gráfico 4). Desde entonces hubo un continuo avance en el proceso de bolivianización, tanto en los préstamos como en los ahorros. En el caso de estos últimos, pasaron del 15% en bolivianos en 2005 al 84% en 2015, es decir, en 2015 sólo el 15% del ahorro se encontraba en dólares (Gráfico 5).

Gráfico 4: Bolivianización de cartera (%)



Fuente: Elaboración propia en base a datos del BCB

Gráfico 5: Bolivianización del ahorro (%)



Fuente: Elaboración propia en base a datos del BCB

La bolivianización fue el resultado de muchas políticas económicas (orientación de la política cambiaria hacia apreciación y posterior estabilidad, ampliación de la diferencia entre tipo de cambio de compra y venta, encaje legal diferenciado por monedas, operaciones del BCB en MN, impuesto a las transacciones financieras, entre otras medidas) en un contexto de bonanza económica que hizo que la población vuelva a depositar su confianza en la moneda nacional (MN)[7].

3.2. Revisión de literatura sobre la demanda de dinero en Bolivia

El siguiente cuadro resume las investigaciones sobre demanda de dinero para Bolivia, tomando en cuenta los autores, año del estudio, método, periodo de estudio y algunos de los principales resultados. Con los distintos estudios podemos abarcar un periodo de tiempo desde 1980 hasta 2006, aunque no siempre se encontraron relaciones de largo plazo en todos los casos, en parte debido a los métodos utilizados.

7 Es importante resaltar que esta investigación no procura explicar los determinantes de la bolivianización, sino el efecto de ésta sobre el señoreaje vía mayor demanda de dinero en MN.

Cuadro 2
Algunos estudios de la demanda de dinero en Bolivia

Autores	Año	Método	Periodo de estudio	Resultados
Carlos Asilis, *et al.*	1993	Vectores de cointegración y GARCH	1980M9 – 1988M12	Relación estable de LP. Se toma en cuenta BM, M1 y M2. El modelo de corrección de errores de CP contiene términos que varían en el tiempo. Determinantes significativos: inflación esperada e incertidumbre de la inflación.
Julio Humérez, y Fernando Rojas	1996	Modelo de ajuste parcial y MCO	1986T1 - 1994T1	No se puede verificar la existencia de una relación de LP bajo cointegración; sin embargo, es cuestionable, ya que la muestra es reducida. Determinantes significativos: PIB y devaluación de la moneda nacional.
Walter Orellana	1999	MCO y vectores de cointegración	1986T3 – 1997T4	Estabilidad y significatividad de la elasticidad, ingreso de la demanda de dinero y depreciación. Apoyan la política monetaria basada en emisión con metas de inflación y crecimiento económico.
Luis Arce	2003	Vectores de cointegración y modelo de corrección de errores	1990T1- 2002T2	Existencia de relación de LP entre M1 con tasa de devaluación, TEP en MN y ME. Elasticidad M1-PIB es más alta que lo indicado por la teoría. Todos los determinantes anteriores son significativos.
Javier Cossío *et al.*	2008	Dowd (1994)	Datos mensuales: 1990-2006	Elasticidad positiva de LP entre emisión y bolivianización, además de los otros componentes: IGAE, TEP. Incluyen volatilidad de la inflación. Estos determinantes son significativos.

Fuente: Elaboración propia

Tal cual sugiere la teoría, independientemente del método a ser aplicado, casi todas las investigaciones incluyen como determinantes a una medida de ingreso real y a las tasas de interés. Además, según el momento coyuntural que atraviesa la economía, las estimaciones econométricas incorporan como factores explicativos a sucesos como, por ejemplo, la incertidumbre y alta volatilidad de la inflación en el episodio hiperinflacionario de los 80', la devaluación respecto al dólar estadounidense cuando la economía estaba altamente dolarizada y sensible a sus cambios exógenos, la tasa de interés extranjera, entre otros. Ya en

estudios más recientes, como el de Cossío ***et al.*** (2008), se reconoce que la preferencia por la moneda nacional (bolivianización) tiene un impacto significativo sobre la demanda de dinero en Bolivia.

3.3. Hechos estilizados

La relación entre la demanda de dinero y sus determinantes guarda estrecha relación con lo sugeridos por la teoría. El grafico de dispersión (Gráfico 6a) de la emisión monetaria real con respecto al ingreso, medido a partir del Índice Global de Actividad Económica (IGAE), muestra una relación directa con una correlación de 0.93 en niveles y de 0.17 en tasas de crecimiento interanuales; en cambio, la relación con la tasa de interés, aproximada a partir de la Tasa de Interés Efectiva Pasiva (TEP[8]), muestra una relación inversa aparentemente no lineal con una correlación de -0.82 en niveles y en tasas de crecimiento interanual de -0.10 (Gráfico 6b).

El indicador de bolivianización[9] guarda una relación directa y muy estrecha con la demanda de dinero. El gráfico de dispersión entre emisión real y bolivianización muestra la relación directa y más estrecha entre las variables, con una correlación de 0.997 en niveles y de 0.86 en tasas de crecimiento interanuales (Gráfico 6c).

8 La TEP (Tasa de Interés Efectiva Pasiva) es la remuneración total que percibe un depositante, expresada en porcentaje anualizado, incluyendo capitalizaciones y otras remuneraciones. Para su cálculo, primero se procede al cálculo de esta tasa como:

$$TEP = \left(1 + i\frac{PPI}{360}\right)^{\frac{360}{PPI}} - 1$$

donde i es la tasa nominal anual y PPI es la periodicidad del pago de intereses. Luego, el BCB es el organismo encargado de consolidar y calcular el promedio ponderado de esta tasa, diferenciando por tipo de entidad, operación y plazo, con la siguiente fórmula:

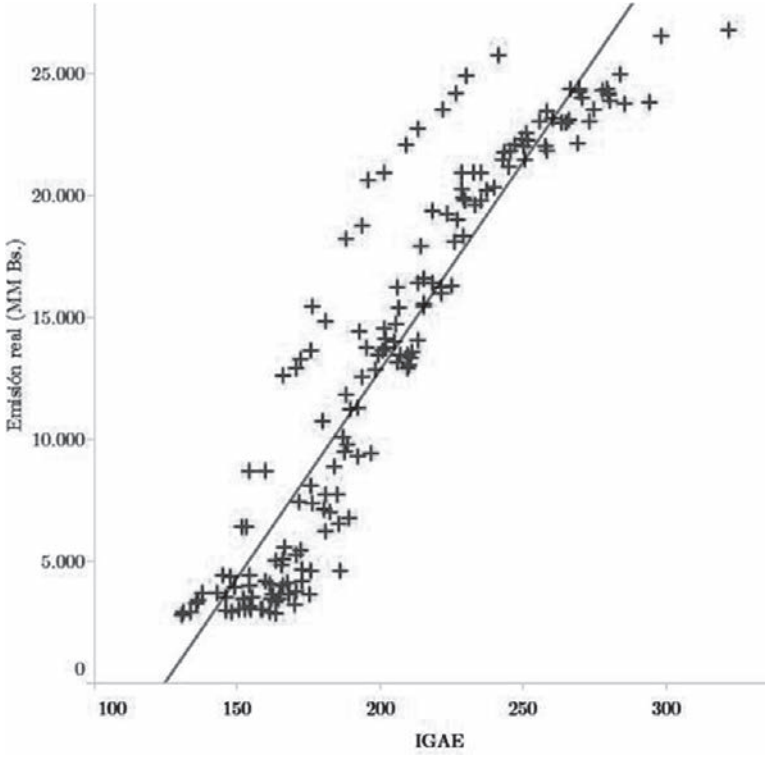
$$Promedio\ ponderado_j = \sum \frac{Tasa\ operación_{kj} * Monto\ operación_{kj}}{Monto\ total\ de\ la\ agrupación_j}$$

donde k es la operación individual reportada y j el identificador del agrupador de conceptos.

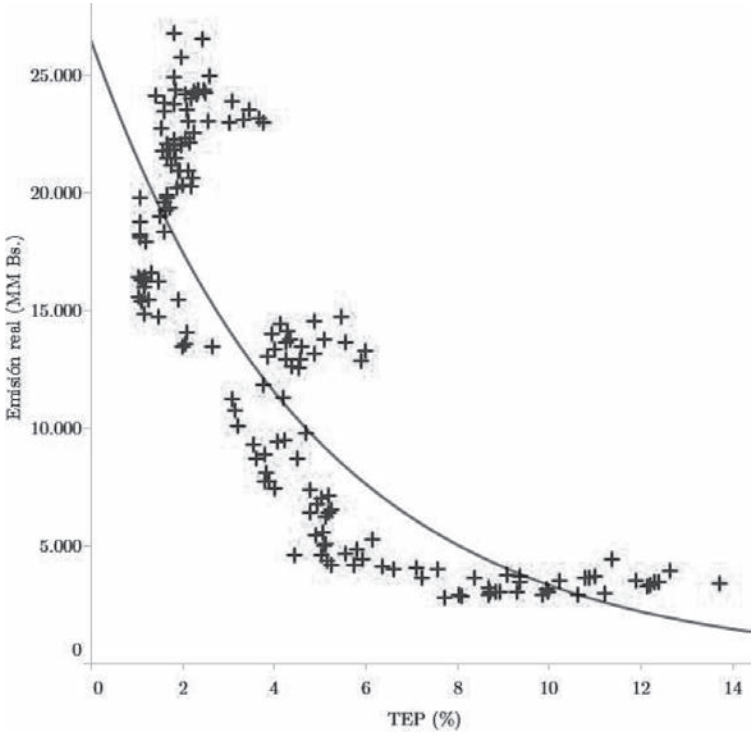
9 El índice de bolivianización es la ratio entre los depósitos en moneda nacional y los depósitos totales (moneda nacional y moneda extranjera).

Gráfico 6: Relación entre la demanda de dinero y sus determinantes

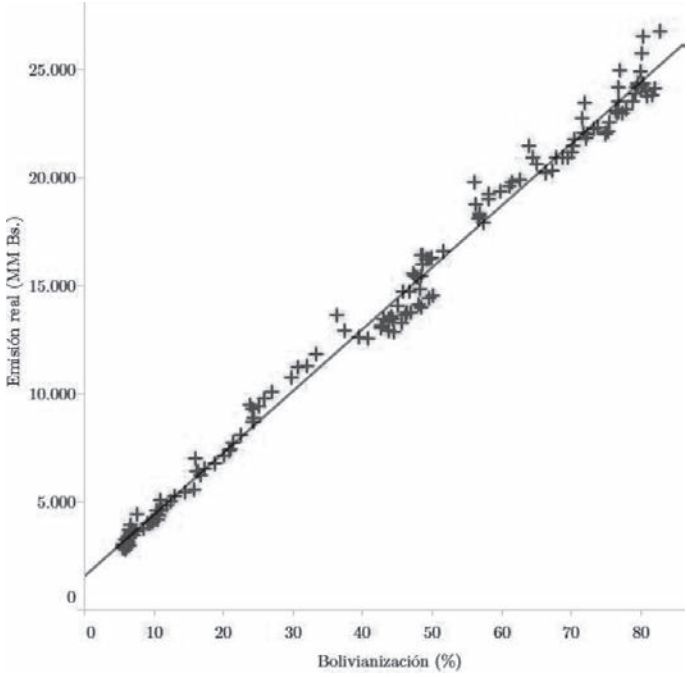
a) Índice Global de Actividad Económica (IGAE)



b) Tasas de interés pasivas (TEP)



c) Bolivianización



Fuente: Elaboración propia en base a datos del BCB e INE

3.4. Planteamiento de una función de demanda de dinero

La tradicional demanda de dinero de corto plazo debe ser ajustada por una característica específica a Bolivia: el proceso de bolivianización. De esta manera, la función aumentada de demanda de dinero tradicional o tipo Cagan de corto plazo está dada por:

$$\ln\left(\frac{M_t}{P_t}\right) = \beta_0 + \beta_1 \ln\left(y_t\right) + \beta_2 \ln(i_t) + \sum_{h=0}^{n} \beta_{3h} \ln\left(boli_{t-h}\right) + \sum_{h=0}^{n} \beta_{4i} \left[\ln\left(boli_{t-h}\right)\right]^2 + \sum_{h=1}^{n} \beta_{5h} \ln\left(\frac{M_{t-h}}{P_{t-h}}\right)$$

Donde:

M: emisión monetaria

P: nivel de precios (Índice de Precios al Consumidor, IPC)

y: variable de transacciones (Índice Global de Actividad Económica - IGAE)

i: tasa de interés pasiva, en moneda nacional, del sistema financiero
boli: bolivianización de depósitos en el sistema financiero
n: número de rezagos significativos

En esta especificación, proponemos introducir la bolivianización al cuadrado debido a la conjetura de que su aporte a la demanda de dinero tiene un máximo. De hecho, si bien la bolivianización se ha incrementado notablemente en los últimos años, su aporte marginal a la demanda de dinero podría haber sido decreciente.

Para obtener la ecuación de demanda de dinero de largo plazo, se asume que las variables no se modifican en el tiempo. De este supuesto hallamos la siguiente ecuación de largo plazo:

$$\ln\left(\frac{M_t}{P_t}\right) = \delta_0 + \delta_1 \ln\left(y_t\right) + \delta_2 \ln(i_t) + \delta_3 \ln(boli_t) + \delta_4 \left[\ln(boli_t)\right]^2 \qquad (1)$$

La estructura de los coeficientes de largo plazo y sus signos esperados son:

$$\delta_0 = \frac{\beta_0}{1-\sum_{h=1}^{n}\beta_{5h}} \qquad \delta_1 = \frac{\beta_1}{1-\sum_{h=1}^{n}\beta_{5h}} > 0 \qquad \delta_2 = \frac{\beta_2}{1-\sum_{h=1}^{n}\beta_{5h}} < 0$$

$$\delta_3 = \frac{\sum_{h=0}^{n}\beta_{3h}}{1-\sum_{h=1}^{n}\beta_{5h}} > 0 \qquad \delta_4 = \frac{\sum_{h=0}^{n}\beta_{4h}}{1-\sum_{h=1}^{n}\beta_{5h}} < 0$$

Donde:

δ_1: elasticidad saldos reales – ingreso

δ_2: elasticidad saldos reales – tasa de interés pasiva

$\delta_3 - \delta_3\,[2\ln(boli_t)]$: elasticidad saldos reales – bolivianización, dependiente del nivel de éste.

3.5. Estimación de la demanda de dinero de corto y largo plazo[10]

Los coeficientes de la ecuación de largo plazo son completamente coherentes con la teoría. Además, el coeficiente de bolivianización es muy importante en línea con los exámenes previos. El Cuadro 3 expone los resultados de las estimaciones econométricas del apartado 3.3, donde se puede apreciar que la elasticidad de largo plazo de la demanda de dinero respecto al ingreso (IGAE) es cercana a 1 y la elasticidad respecto a la tasa de interés pasiva es -0.08. Por otro lado, la elasticidad respecto al índice de bolivianización es de 0.69.

También se estima la demanda de dinero aumentada para capturar algunas relaciones no lineales entre las variables bajo estudio. En este caso, los coeficientes del término no lineal de la bolivianización son estadísticamente significativos y en el largo plazo presentan el signo negativo esperado (-0.31). Este resultado da indicios de un aparente efecto marginal decreciente y dependiente del grado de bolivianización, sobre la demanda de dinero y el señoreaje.

Cabe mencionar que los resultados son sensibles a las especificaciones de demanda de dinero utilizadas en la literatura, cuando se aumentan características de las economías. Por ejemplo, en el trabajo realizado por Boyreau-Debray (1998), se estima una demanda de dinero que incluye monetización y profundización financiera para la economía china, donde encuentran elasticidades considerablemente superiores a la unidad en el caso del ingreso. Sriram (2000) compila numerosos estudios de demanda de dinero en el mundo y presenta funciones de distribución para las elasticidades del agregado monetario utilizado con el ingreso, la tasa de interés y otras variables propias de cada economía. Dependiendo de la especificación, estas elasticidades muestran diferentes magnitudes en la literatura.

10 Las pruebas de raíz unitaria y de diagnóstico de los modelos estimados a partir de Mínimos Cuadros Ordinarios se encuentran en el Anexo.

Cuadro 3
Estimaciones econométricas: 2001M3-2015M12[11]

Variable dependiente:	Demanda de dinero tradicional		Demanda de dinero aumentada	
$Ln(m)_t$	Corto plazo	Largo plazo	Corto plazo	Largo plazo
Variables independientes:				
$Ln(m)_{t-1}$	0.6531 (0.0671)		0.7560 (0.0903)	
$Ln(m)_{t-2}$	0.1446 (0.0549)		0.2104 (0.0863)	
$Ln(y)_t$	0.2332 (0.0493)	1.1532	0.1479 (0.0691)	4.3900
$Ln(i)_t$	-0.0153 (0.0085)	-0.0758	-0.0057 (0.0029)	-0.1679
$Ln(boli)_t$	0.8020 (0.0715)	0.6860	-0.2388 (0.0888)	2.1483
$Ln(boli)_{t-1}$	-0.6632 (0.0825)		0.3111 (0.0902)	
$[Ln(boli)]^2_t$			0.0889 (0.0178)	-0.3070
$[Ln(boli)]^2_{t-1}$			-0.0821 (0.0202)	
$[Ln(boli)]^2_{t-2}$			-0.0171 (0.0080)	
Constante				
	3.9229 (0.3307)	19.3963	3.9120 (0.3729)	116.1409
Adj R2	0.9976		0.9995	
Obs	178		178	
Jarque-Bera				
Breusch-Godfrey Serial Correlation LM Test	289.2310 (0.0000)		4.1821 (0.1236)	
Heteroskedasticiy Test: ARCH	0.3206 (0.8519)			
	0.2918		0.2677	
	(0.5891)		(0.6049)	

Notas: Las regresiones de corto plazo incluyen tendencia.
La regresión aumentada está corregida con una estimación de varianza GARCH (1,1). Esta especificación recupera la esfericidad de los residuos.
Errores estándar entre paréntesis.
Fuente: Elaboración propia

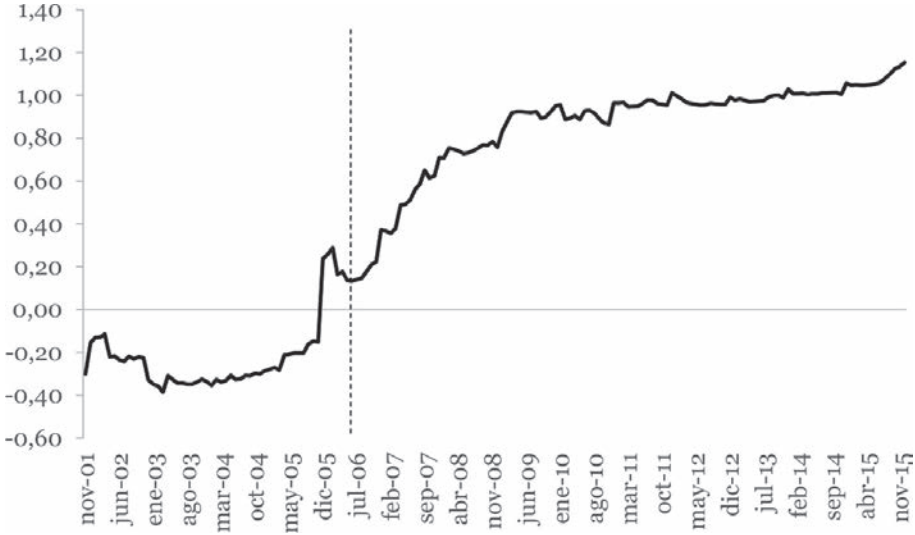
Adicionalmente, se presentan las elasticidades recursivas de las variables determinantes de la demanda de dinero, obtenidas a partir de regresiones recursivas al modelo (*rolling*

11 Queda pendiente considerar en esta parte econométrica algunas metodologías para tratar temas de endogeneidad y/o la posibilidad de tratar quiebres estructurales en las series.

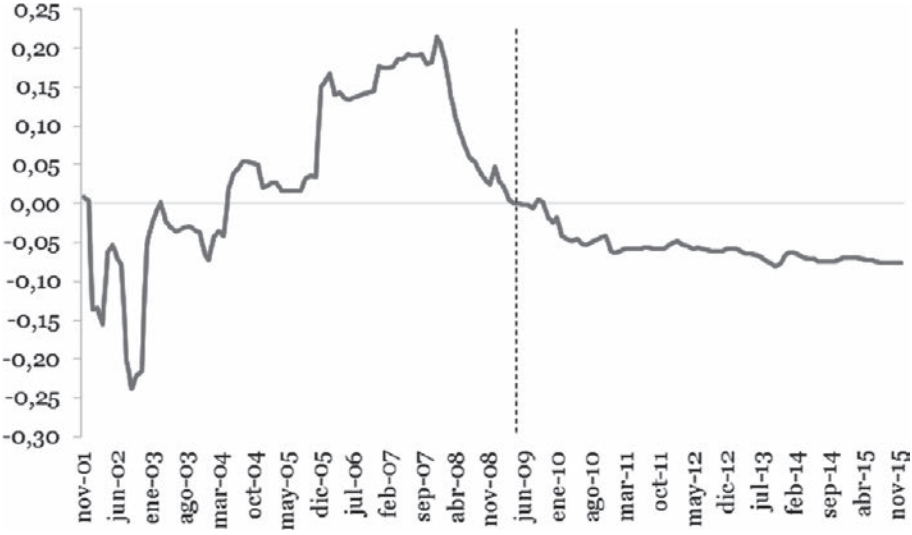
regressions). Se puede observar que la elasticidad que acompaña al ingreso tomó relevancia a partir de 2006, que es cuando se inició la bonanza económica en Bolivia (Gráfico 7a). A su vez, la elasticidad que acompaña a la tasa de interés pasiva tendió a ser negativa a partir de 2009, pero con una elasticidad bastante moderada (Gráfico 7b). Finalmente, la elasticidad que acompaña a la bolivianización tuvo una tendencia creciente en el tiempo, con un comportamiento bastante estable a partir de 2008 (Gráfico 7c). Lo evidenciado refuerza la conjetura de que, a medida que la bolivianización avanza, las elasticidades se reducen, y que cuando la bolivianización se estabiliza, las elasticidades también lo hacen.

Gráfico 7: Elasticidades recursivas de los determinantes de la demanda de dinero

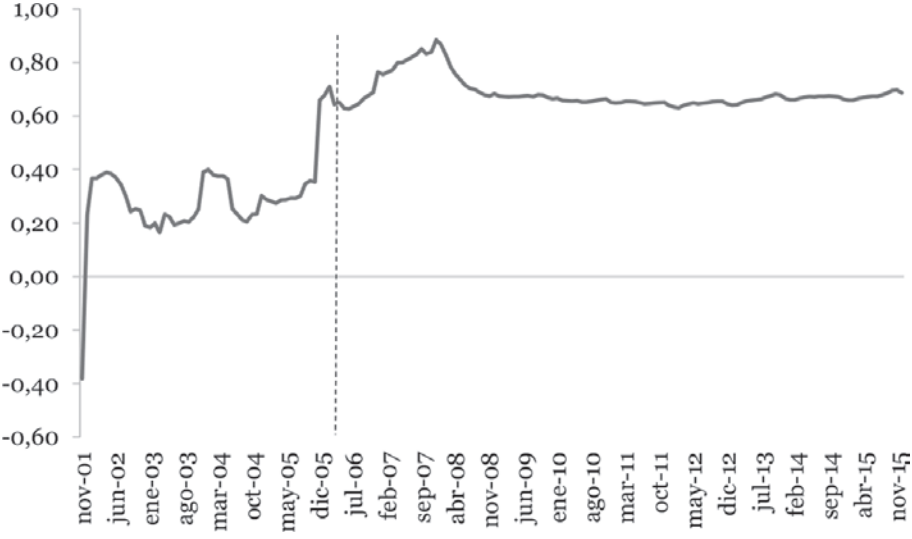
a) Índice Global de Actividad Económica (IGAE)



b) Tasas de interés pasivas (TEP)



c) Bolivianización



Fuente: Elaboración propia

4. Aproximación teórica a un modelo de señoreaje- bolivianización

Este modelo está basado en la literatura de la maximización del señoreaje de Cagan (1956), con la diferencia de que en vez de analizar la relación entre señoreaje y tasa de inflación, se considera la dinámica con la bolivianización. Se asume que el mercado de dinero está en equilibrio y que la inflación esperada es igual a la observada, recurriéndose a la especificación de demanda de dinero de la sección anterior.

Se retoma la ecuación que refleja la definición de flujo de dinero de señoreaje:

$$S = \frac{dM}{P} = \frac{dM}{M} m \tag{2}$$

Además, se considera la siguiente equivalencia:

$$\ln(M) - \ln(P) = \ln(m) \tag{3}$$

Reemplazando la ecuación de demanda de dinero propuesta en la ecuación (1) y asumiendo equilibrio en el mercado de dinero:

$$\ln(M) - \ln(P) = \delta_0 + \delta_1 \ln(y_t) + \delta_2 \ln(i_t) + \delta_3 \ln(boli_t) + \delta_4 [\ln(boli_t)]^2 \tag{4}$$

Diferenciándola:

$$\frac{dm}{m} = \delta_1 \frac{dY}{Y} + \delta_2 \frac{di}{i} + \left[\delta_3 + 2\delta_4 * \ln(boli)\right] \frac{dboli}{boli} \tag{5}$$

Donde la elasticidad de saldos reales con bolivianización varía según el nivel de bolivianización:

$$Elasticidad_{m,boli} = \delta_3 + 2\delta_4 * \ln(boli) \tag{6}$$

Reemplazando la ecuación (5) en el señoreaje (2), se obtiene una expresión del señoreaje basada en la demanda de dinero estimada:

$$S = \left[\delta_1 \frac{dY}{Y} + \delta_2 \frac{di}{i} + Elasticidad_{m,boli} \frac{dboli}{boli} + \pi \right] * m \qquad (7)$$

Logaritmizando la expresión anterior:

$$\ln(S) = \ln\left[\delta_1 \frac{dY}{Y} + \delta_2 \frac{di}{i} + Elasticidad_{m,boli} \frac{dboli}{boli} + \pi \right] + \ln(m) \qquad (8)$$

Finalmente, diferenciando $\ln(S)$ respecto a $\ln(boli)$, y todo lo demás constante $(dy = di = dP = 0)$:

$$\frac{\partial \ln(S)}{\partial \ln(boli)} = \frac{\partial \ln\left[\delta_1 \frac{dY}{Y} + \delta_2 \frac{di}{i} + Elasticidad_{m,boli} \frac{dboli}{boli} + \pi \right]}{\partial \ln(boli)} + \frac{\partial \ln(m)}{\partial \ln(boli)} \qquad (9)$$

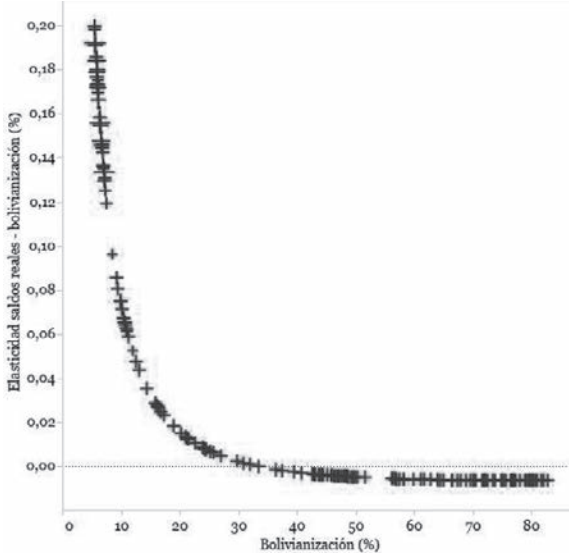
Finalmente, se deriva la elasticidad del señoreaje respecto a la bolivianización, con pendiente negativa, por el coeficiente reportado de δ_4. Se utilizarán las estimaciones de la emisión monetaria real derivadas del modelo de demanda de dinero ($\hat{m}$), para el cálculo de esta elasticidad:

$$\frac{\partial \ln(S)}{\partial \ln(boli)} = -\frac{1}{\hat{m} + \pi} * (2\delta_4 * boli) + Elasticidad_{m,boli} \qquad (10)$$

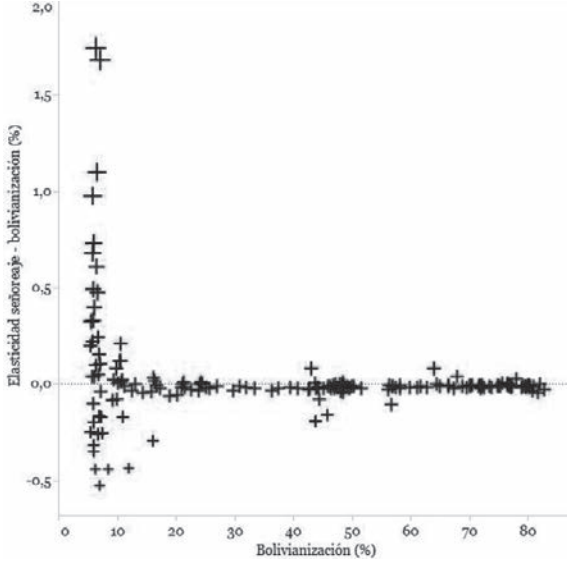
A continuación, según las ecuaciones derivadas, se expone la evolución de las estimaciones de la elasticidad emisión monetaria real-bolivianización (Gráfico 8a) y elasticidad señoreaje-bolivianización respecto a distintos niveles de bolivianización (Gráfico 8b). En ambos casos, el efecto marginal (elasticidad) de un incremento de 1% en la bolivianización es decreciente y cercano a cero, a medida que la bolivianización se acerca a su hipotético máximo (100%).

Gráfico 8: Elasticidades estimadas entre bolivianización y

a) Saldos reales



b) Señoreaje



Fuente: Elaboración propia

Los efectos marginales (elasticidades) decrecientes encontrados están en línea con la relación no lineal propuesta por la curva de Laffer. Haciendo extensiva la teoría de Laffer (1981) a este estudio, se entiende que cuando se inició el proceso de bolivianización, el impacto sobre el señoreaje era muy importante, a diferencia de lo que sucede en la actualidad, que es cuando se encuentra próximo al límite. Es decir, los avances en bolivianizar el sistema financiero, en la actualidad, tendrían un impacto muy pequeño sobre la posesión de saldos monetarios reales, y por tanto sobre el señoreaje.

En resumen, en este apartado se presenta una propuesta teórica que relaciona la elasticidad señoreaje-bolivianización para distintos niveles de esta última variable. Lo que se evidencia es que esta elasticidad es decreciente respecto al nivel de bolivianización. La implicancia de este hallazgo es que, dado que en la actualidad la bolivianización se encuentra en niveles muy altos, por encima del 90%, el efecto marginal de un cambio en esta variable tiene poca relevancia en la emisión monetaria real, y por tanto en el señoreaje.

5. Conclusiones

Uno de los elementos más importantes del mercado monetario en Bolivia, desde mediados de la década pasada, ha sido el acelerado crecimiento de la emisión monetaria, lo que, junto a tasas de inflación bastante controladas, habría permitido un notable incremento del señoreaje. El señoreaje como porcentaje del PIB para Bolivia, en el periodo 2000-2014, considerando base o emisión monetaria, fue en promedio de 2.9% y 2.4%, respectivamente, ubicándose como el país con el más alto señoreaje de la región.

De la descomposición del señoreaje se obtiene que los cambios en los saldos monetarios reales son mucho más importantes que el impuesto-inflación, lo que sugiere examinar temas relativos a la demanda de dinero de los agentes privados al ser el principal factor que sostiene este alto señoreaje. En efecto, para el periodo 2002-2015, el señoreaje promedio fue del 2% del PIB; del cual 1.6% es atribuible a incrementos en los saldos reales de dinero de los agentes privados y solo el 0.4% atribuible al impuesto-inflación.

Para analizar la demanda de dinero se realizó una estimación econométrica tipo Cagan que tomó en cuenta también elementos propios de la economía boliviana. Los resultados muestran que el ingreso, las tasas de interés pasivas y la bolivianización financiera habrían contribuido en gran manera al incremento de la demanda de dinero, en especial desde 2006. Por otra parte, el impulso en la demanda de dinero atribuido a la bolivianización no cuenta

con márgenes, al haber alcanzado este último ya niveles importantes. Este hecho también tiene repercusiones sobre el comportamiento del señoreaje en el futuro, puesto que, al no poder contar con impulsos por el lado de la bolivianización, o al menos ser muy marginales, la variable que condicionaría su evolución seria fundamentalmente la actividad económica (ingresos).

Finalmente, el documento presenta una propuesta teórica que, a diferencia de una curva de Laffer-Bailey que relaciona inflación con señoreaje, propone una relación entre señoreaje y bolivianización. La evidencia empírica sostiene esta relación, ya que cuando se inició el proceso de bolivianización, el impacto sobre el señoreaje era muy importante, a diferencia de lo que sucede en la actualidad, que es cuando se encuentra próximo a su límite. Es decir, los avances en bolivianizar el sistema financiero en la actualidad tendrían un impacto muy pequeño sobre la posesión de saldos monetarios reales, y por tanto sobre el señoreaje.

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Anexos

Test de raíz unitaria

Los resultados del test Augmented Dickey-Fuller (ADF) y Phillips-Perron (PP) muestran que no rechazamos la hipótesis nula de que las series presentan raíz unitaria, es decir, son integradas de orden uno, incluyendo una constante y/o tendencia. El periodo considerado es 2001M01-2015M12.

Cuadro A1
Test de raíz unitaria (ADF y PP)

	ADF		PP	
	Estadístico – t (valor – p)	Rezago*	Estadístico – t (valor – p)	Bandwidth**
Ln(boli)	-1,02 (0.74)	2	-1,11 (0.71)	7
$[Ln(boli)]^2$	-0,65 (0.86)	2	-0,61 (0.86)	8
Ln(m)	-1,80 (0,38)	0	-1,42 (0,57)	8
Ln(y)	1,60 (1,00)	3	2,60 (1,00)	12
Ln(i)	-1,20 (0,67)	2	-1,14 (0,70)	5

Variables ajustadas estacionalmente X-12
*Basado en el SIC con un máximo de 10 rezagos
**Basado en Newey-West, usando el kernel Bartlett
Fuente: Elaboración propia

Test al modelo de demanda de dinero clásico

Cuadro A2
Test de correlación serial

Breusch-Godfrey Serial Correlation LM Test:			
F-statistic	0,1515	Prob. F(2,168)	0,8595
Obs*R-squared	0,3206	Prob. Chi-Square(2)	0,8519

Test Equation:
Dependent Variable: RESID
Method: Least Squares
Sample: 2001M03 2015M12
Included observations: 178
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0,0236	0,3353	0,0705	0,9438
Ln(y)	-0,0122	0,0581	-0,2112	0,8330
Ln(i)	0,0003	0,0087	0,0381	0,9697
Ln(boli)	-0,0048	0,0740	-0,0652	0,9481
Lnboli(-1)	-0,0068	0,0861	-0,0798	0,9364
Lnm(-1)	-0,0142	0,1098	-0,1300	0,8967
Lnm(-2)	0,0316	0,0853	0,3702	0,7117
@TREND	5,07E-06	0,0003	0,0128	0,9898
RESID(-1)	0,0077	0,1445	0,0534	0,9574
RESID(-2)	-0,0672	0,1242	-0,5414	0,5889
R-squared	0,0018	Mean dependent var		-2,73E-15
Adjusted R-squared	-0,0516	S.D. dependent var		0,0385
S.E. of regression	0,0395	Akaike info criterion		-3,5702
Sum squared resid	0,2621	Schwarz criterion		-3,3914
Log likelihood	327,75	Hannan-Quinn criter.		-3,4977
F-statistic	0,0336	Durbin-Watson stat		1,9872
Prob(F-statistic)	0,9999			

Fuente: Elaboración propia

Cuadro A3
Test de heterocedasticidad

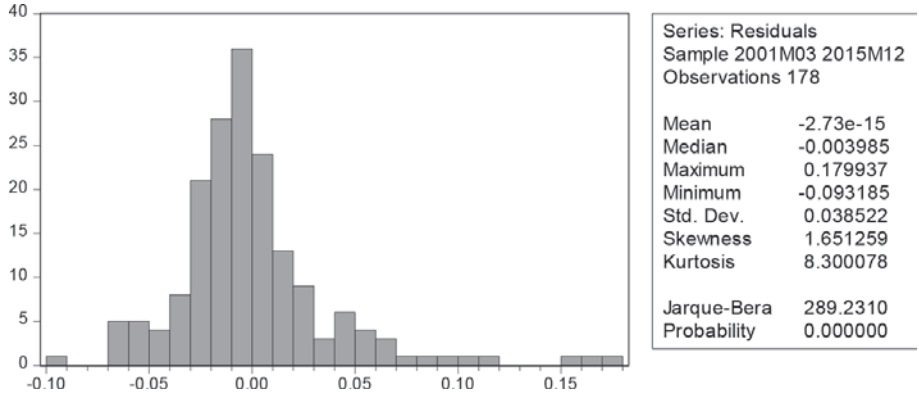
Heteroskedasticity Test: ARCH			
F-statistic	0,2889	Prob. F(1,175)	0,5916
Obs*R-squared	0,2918	Prob. Chi-Square(1)	0,5891

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Sample (adjusted): 2001M04 2015M12
Included observations: 177 after adjustments

Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
C	0,0014	0,0003	4,3876	0,0000
RESID^2(-1)	0,0406	0,0755	0,5375	0,5916
R-squared	0,0016	Mean dependent var		0,0014
Adjusted R-squared	-0,0040	S.D. dependent var		0,0040
S.E. of regression	0,0040	Akaike info criterion		-8,1852
Sum squared resid	0,0028	Schwarz criterion		-8,1493
Log likelihood	726,3929	Hannan-Quinn criter.		-8,1706
F-statistic	0,2889	Durbin-Watson stat		1,9948
Prob(F-statistic)	0,5915			

Fuente: Elaboración propia

Cuadro A4
Test de normalidad



Fuente: Elaboración propia

Test al modelo de demanda de dinero aumentado

Cuadro A5
Test de heterocedasticidad

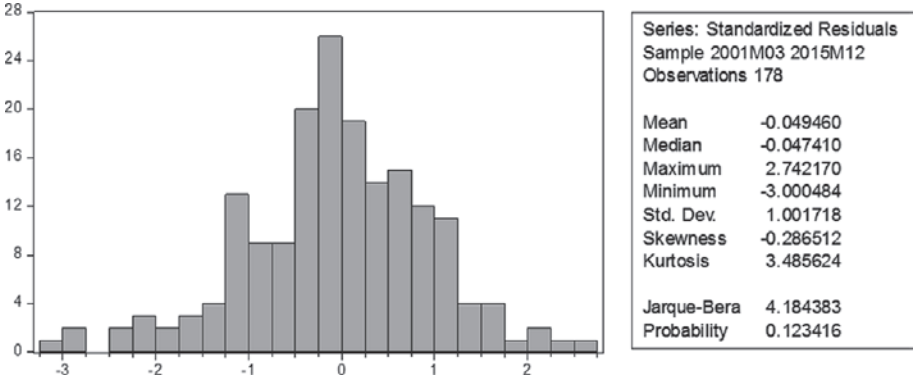
Heteroskedasticity Test: ARCH			
F-statistic	0,2652	Prob. F(1,175)	0,6072
Obs*R-squared	0,2679	Prob. Chi-Square(1)	0,6047

Test Equation:
Dependent Variable: WGT_RESID^2
Method: Least Squares
Sample (adjusted): 2001M04 2015M12
Included observations: 177 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1,0369	0,1426	7,2686	0,0000
WGT_RESID^2(-1)	-0,0389	0,0755	-0,5150	0,6072
R-squared	0,0015	Mean dependent var		0,9977
Adjusted R-squared	-0,0041	S.D. dependent var		1,6027
S.E. of regression	1,6060	Akaike info criterion		3,7967
Sum squared resid	451,4178	Schwarz criterion		3,8326
Log likelihood	-334,0097	Hannan-Quinn criter.		3,8112
F-statistic	0,2652	Durbin-Watson stat		1,9885
Prob(F-statistic)	0,6071			

Fuente: Elaboración propia

Cuadro A6
Test de normalidad



Fuente: Elaboración propia

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On Graduation from Fiscal Procyclicality: The case of Bolivia

Sobre la graduación de la prociclicidad fiscal: el caso de Bolivia

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José Miguel Molina Fernández **

Abstract

Since Frankel *et al.* (2013), many authors have sought evidence of the so-called *graduation from fiscal procyclicality*; this concept refers to the direction change experienced by a number of developing countries regarding the implementation of destabilizing procyclical policies in the past.

While the cyclicality of fiscal policy in Bolivia has been evaluated by multiple authors, we believe that our contribution is relevant because it models the response of fiscal policy in a much more intuitive way, that is also less prone to some specification problems frequently cited in the literature.

Keywords: Business cycles, fiscal policy, graduation from fiscal procyclicality.

Resumen

Desde el trabajo de Frankel *et al.* (2013), muchos autores han buscado evidencia de la llamada *graduación en el manejo contracíclico de las políticas;* este término hace referencia al

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cambio de dirección experimentado por una serie de países en desarrollo con respecto a la implementación de políticas procíclicas desestabilizadoras en el pasado.

Si bien la ciclicidad de la política fiscal en el país ha sido evaluada por múltiples autores, creemos que el análisis que presentamos a continuación es relevante porque modela la respuesta de la política fiscal de una manera mucho más intuitiva y robusta a ciertos problemas de especificación frecuentemente citados en la literatura.

Palabras clave: Ciclos económicos, política fiscal, graduación de la prociclidad fiscal.

Classification/Clasificación JEL: E62, E32.

1. Introduction

The debate about the role of government in reducing or amplifying economic fluctuations is one of the most heated, not only among economists, but also between external analysts and the public at large. By its controversial nature, the arguments involved, should always be supported by evidence.

The purpose of this paper is to contribute to this debate by assessing the cyclicality of fiscal policy in Bolivia in recent years. In the fiscal sphere, we say that the implemented policies are procyclical if they are expansive (contractive) in the expansive (contractive) phase of business cycle and are countercyclical if they are expansive (contractive) in the recessive (expansive) phase of business cycle.

Although there is no total theoretical consensus on this[1], it is said that fiscal policy is optimal when it is countercyclical. Why? Because if fiscal policy is countercyclical, government can accumulate resources in times of prosperity to drive the weak demand for goods and services in crisis episodes by expanding current spending and public investment[2].

We focus on the last administrations (2000-2014), since we seek to confirm if Bolivia is part of what the recent literature has called the *graduation from fiscal procicality*; this term makes reference to the direction change experienced by a number of *developing countries* with regard to the implementation of destabilizing procyclical policies in the past.

1 We examine this question in more detail in the section devoted to literature review.

2 Economists have not been the first or only ones to take an interest in the subject. See Genesis 41: 1-36.

While the cyclicality of fiscal policy in Bolivia has been evaluated by multiple authors, we believe that the analysis presented below is relevant because of two marked differences from previous research:

i. The definition of procyclicality is modelled more intuitively and, in our view, in a much more convincing way, since we do not rely on the existence of a full employment growth rate (or our ability to know it with certainty). Instead, we answer the following question: How does fiscal policy respond to product accelerations and decelerations?

ii. The typical problem of simultaneity in estimating the cyclicality of fiscal policy is overcome with a specification where the independent variables are predetermined (and the potential problems of endogeneity not solved by the proposed specification are dealt with valid instruments).

The structure of the document is as follows. In Section 2, we make a brief review of the literature with emphasis on discussions on the optimality of countercyclical fiscal policy and evidence for *developing countries* and for Bolivia. Section 3 describes the specification of the econometric models used in the empirical evaluation. In section 4, we describe the data used in the subsequent econometric analysis, and with them a first inspection is made to the relation between fiscal policy and economic activity in the country. In section 5, the results of the estimates are presented. In section 6, we summarize our main conclusions.

2. Literature review

Recent literature has documented significant improvements in several developing countries in relation to the implementation of countercyclical fiscal and monetary policies in a context marked by two important facts: the boom in prices of export commodities and the Great Recession[3].

Since Frankel *et al.* (2013), many authors have sought evidence of the so-called *graduation from fiscal procyclicality*; this concept refers to the direction change experienced by a number of *developing countries* regarding the implementation of destabilizing procyclical policies in the past.

3 For example, Vegh and Vuletin (2014 and 2016), Alberola *et al.* (2016), Fernández-Arias and Pérez (2014), Céspedes and Velasco (2013) and Frankel *et al.* (2013).

Klemm (2014) finds evidence of procyclicality in Latin America and Bolivia instead (when internalizing the automatic stabilizers in the primary structural budget balance). The disparity of conclusions on the cyclicality of fiscal policy may be due in large part by the definitions of cyclicity on the one hand and empirical methods used by another[4].

Following Ilzetzky and Vegh (2008), in the present work we use fiscal variables that can be considered as instruments of policy action to attenuate the cycle from the *policy maker`s* perspective. For example, we discard the use of the budget balance of the government because its evolution is conditioned to the business cycle, and when evaluating the cyclicality of fiscal policy, there are endogenous components that prevent to see the clear sign of the response.

In terms of tax revenue, the policy instruments are the tax rates and not tax revenues as such.

On the side of fiscal expenditures, the rigid components such as expenditure on salaries or debt service should not be analysed. We identify three policy instruments on the expenditure side: public investment, government spending on goods and services, and transfers.

In general, the literature has identified three possible explanations for the procyclical behavior of fiscal policy:

i. *External credit restrictions and financial depth* that would limit the borrowing capacity of governments to smooth the business cycle[5].

ii. *Political economy problems and institutional quality of governments* to deal with rent-seeking pressures, which is a common problem in countries that export commodities mainly[6].

iii. *Economic inequality* that prevents the correct functioning of automatic stabilizers, since changes in the tax base during the cycle are unequally concentrated in the sectors[7].

The desirability for a contrary reaction of government to the level of economic activity corresponds to the traditional Keynesian approach based on the intuition of the IS-LM model.

4 This point is treated by Halland and Bleaney (2009) and Fatás and Mihov (2009).

5 The pioneering paper of Gavin and Perotti (1997) was followed by several papers such as Riascos and Vegh (2003), Khamisnky *et al.* (2004), Caballero and Krishmamurthy (2004), Mendoza and Oviedo (2006), Calderón and Schmidt-Hebbel (2008) and Alberola *et al.,* (2016).

6 For example, Lane (2003), Talvi and Vegh (2005), Alesina and Tabellini (2005), Alesina *et al.* (2008), Ilzetzky (2011) and Calderón *et al.* (2012).

7 However, there is few evidence that support this argument; for example, see Woo (2009).

In the presence of nominal rigidities and without money neutrality, product fluctuations are undesirable and can be corrected through countercyclical fiscal and monetary policies.

However, from the neoclassical perspective the desired direction of fiscal policy is not clear. If Ricardian equivalence is fulfilled, spending as a policy instrument is ineffective and therefore irrelevant during the cycle. On the income side, smoothed taxation *à la* Barro suggests maintaining constant tax rates (against transient shocks) as an optimal policy[8]. In sum, in the neoclassical world the tax rates policy should be acyclical.

The studies that have attempted to evaluate the cyclicality of fiscal policy in Bolivia have been based on the relationship between the fiscal impulse and the output gap[9]. The fiscal impulse is an indicator derived from the fiscal balance adjusted by cyclical factors (or full employment balance budget) that allows to characterize the fiscal policy as expansive or contractive.

Both, fiscal impulse and output gap estimates requires time series filters to separate cyclical and trend components. As Klemm (2014) mentioned, the Hodrick and Prescott (HP) filter has been conventionally used for this purpose[10].

3. Econometric models

In this section, we develop the specification of two econometric models that allow us to characterize the cyclical behavior of fiscal policy.

We understand the cyclicality of fiscal policy as the response of the variables of public expenditure to changes in the rhythm of real GDP growth. The reasoning behind this definition is that positive growth rates are not necessarily "good" and may even coexist with episodes of "crisis" in the sense of the perception of the term by the general public. For our purposes, growth rates represent the state of economic activity better.

The world of causal relationships we try to model to assess the cyclicality of fiscal policy goes in one direction: we say that product accelerations (decelerations) cause some

8 However, Barro's (1979) argument is disputed by Chari, Christiano and Kehoe (1994), who argue that wages are impacted by product fluctuations and therefore the tax policy is relevant in cycle mitigation.

9 For example Ugarte (2016) and Valdivia (2014).

10 About this important point, Hamilton (2016) demonstrates the inconsistent dynamic relationships that are generated by using the HP filter.

fiscal policy response. However, there may also be causality in the opposite direction, since government spending is a direct component of aggregate demand[11].

The two models that we consider for estimating the cyclicality of fiscal policy –detailed below– take into account this potential endogeneity issues.

3.1. Ordinary Least Squares (OLS)

Under our definition of expenditure cyclicity, its direction and magnitude can be estimated by a simple regression as the following:

$$g_{it} = \beta_0 + \alpha * gpib_{t-1} + \sum \beta_i z_{it} + u_t \qquad (1)$$

Where:

g_{it} is the logarithm of government spending or some of its components.
$gpib_{t-1}$ is the annual growth rate of real GDP in the previous period[12].
z_{it} is a group of exogenous controls.

Since the annual growth rate of GDP can't depend on government spending in the future, it's hard to think of any endogeneity problems. A channel through which endogeneity bias problems can arise is explored in Appendix A.

The OLS estimate will be consistent, since the annual growth rate of lagged GDP is predetermined.

The regression includes deterministic components (including structural breaks), a lag of the dependent variable and a lag of the external debt/GDP ratio as control variables. The Quandt-Andrews structural break test determined the inclusion of structural breaks and their occurrence periods. A lag of the dependent variable is included to control for inertia and

11 Causality in the second direction has to do with the multiplier of fiscal policy (for Bolivia, see Puig, 2015). The phenomenon "when it rains, it pours" argues that the causal relationship is fulfilled in both directions (Khamisky *et al.*, 2004 and Ilzetzky and Vegh, 2008).

12 As we work with quarterly data, the GDP growth rate is defined as follows:

$$gpib_t = \left(\frac{\sum_{j=0}^{3} PIB_{t-j}}{\sum_{j=4}^{7} PIB_{t-j}} - 1 \right)$$

reduce autocorrelation problems. The external debt/GDP ratio controls the constraints on fiscal policy response to the business cycle phase in the presence of financing constraints.

3.2. Structural Vector Autorregression Model (SVAR)

In the spirit of Ilzetzky and Vegh (2008), we start from the following SVAR:

$$\mathrm{A}\left(I_K - \mathrm{A}_1 L - \mathrm{A}L^2 - \ldots - \mathrm{A}_P L^P\right) Y_t = \mathrm{A}u_t = \mathrm{B}e_t \qquad (2)$$

The vector $Y_t = \begin{bmatrix} g_{it} \\ gpib_t \end{bmatrix}$ contains the logarithm of the components of public expenditure (g_{it}) and output rate growth $(gpib_t)$. The A matrix, relates contemporaneously the variables in vector Y_t. And following Blanchard y Perotti (2002) idea, we are going to assume that fiscal policy does not react contemporaneously to changes in the level of activity, but does so after a quarter.

This constraint is imposed by defining the B matrix as a lower triangular, resulting from a Cholesky decomposition, so, the vector of orthogonalized errors e_t is iid. We have:

$$\mathrm{B} = \begin{bmatrix} b_{11} & 0 \\ b_{21} & b_{22} \end{bmatrix}$$

4. The data

The study period covers the years 2000-2014, following other authors who have documented graduation from fiscal procicality. We use quarterly data[13].

The Bolivian tax system has differentiated tax rates for different taxable bases[14], with a virtually constant evolution. Both facts make it difficult to assess the cyclical response of tax rates.

13 Due to the annual availability of some data, we used the Denton–Cholette temporal disaggregation procedure (from the tempdissag package in R).

14 In Bolivia there are 13 types of taxes (IVA, IT, IUE, RC-IVA, ICE, TGB, ISAE, IEHD, IDH, ITF, IJ, IPJ and IVME)

Consequently, and without loss of generality, we decided to evaluate cyclicality on the expenditure side only. Data on capital expenditures (public investment), expenditure on goods and services and transfers[15] is obtained from the consolidated operations of the non-financial public sector. We then define total expenditure as the sum of the three:

$$Total\ Expenditure_t = Public\ Investment_t + Goods\ and\ Services\ Expenditure_t + Transfers_t$$

The variables are expressed in real terms. Public investment has been deflated using the public gross fixed capital formation deflator index, while the remaining two components have been deflated by the public administration final consumption expenditure deflator index. Both indexes (base year = 1990) are available on the website of the National Institute of Statistics (INE)[16].

The external public debt to GDP ratio comes from the International Operations Department of the Bolivian Central Bank (BCB)[17].

5. Estimations results

5.1. Ordinary Least Squares (OLS)

We have estimated four equations, one for each component of public expenditure and another for total expenditure. The variance-covariance matrix has been estimated by the HAC Newey-West method to correct the problems of autocorrelation and heteroscedasticity. The cyclicality of fiscal expenditure is assessed by the coefficient α from equation (1). A positive and significant coefficient would indicate procicality and a negative and significant counterciclicality.

15 Data extracted from UDAPE–Statistics Dossier.

16 For the trimestralisation of the series we used as reference indicator the public administration final consumption expenditure of GDP by expenditure type, base 1990.

17 The frequency of this indicator has been also changed to quarterly.

Table 1

Cyclicality estimation of fiscal policy		
Dependent variable: Logarithm of total expenditure (LG)		
Ordinary least squares (OLS)		
	α	**P-value**
GPIB(-1)	1.31	0.0867
Intercept	0.89	0.0002
Intercept break (2006Q4)	-0.23	0.0240
Trend break (2006Q4)	0.01	0.0028
LG (-1)	0.66	0.0000
Debt (-1)	-0.25	0.0218
Adjusted R2 = 0.9883		

We can say at a 95% confidence level that Bolivia's fiscal policy has actually been *acyclical* (although there are indications of procyclicality at 90% confidence level).

As for total expenditure, the equations for the relevant components of fiscal expenditure have been estimated following the specification of equation (1). Table 2 shows that public investment, goods and services expenditure and transfers are also *acyclical*.

Table 2

Cyclicality estimation of expenditure relevant components		
	α	**Valor-p**
Investment	-	0.1297
Goods and services	-	0.2078
Transfers	-	0.9215

5.2. Structural Vector Autoregression model (SVAR)

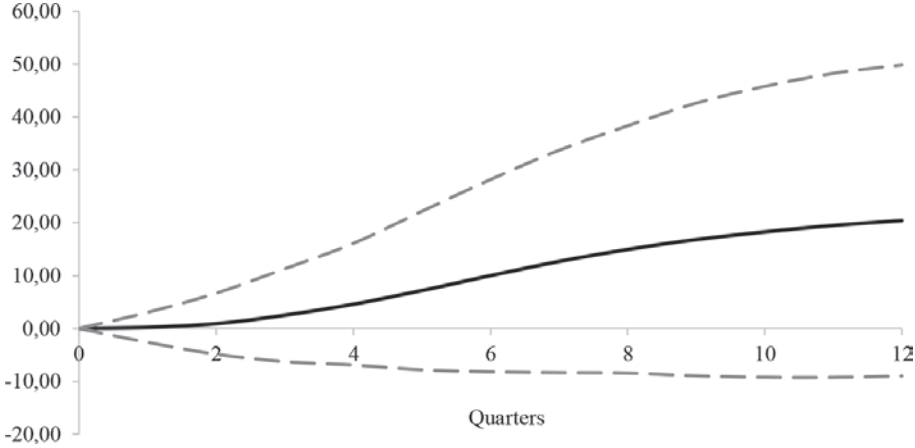
Although we are interested in knowing the general direction of the cyclicality of fiscal policy, getting to know how it reacts to unexpected changes in the annual GDP growth rate is perhaps the most relevant question.

The cumulative impulse response functions (CIRF) allow us to see how fiscal expenditure responds to a structural shock in the output growth. We have estimated the CIRF for 20 periods (5 years) horizon. The optimal number of lags election has been guided by

information criteria (as corrected by Lütkepohl). In order to make the results of the OLS and SVAR models comparable, we have included as exogenous variables the external debt/GDP ratio and the trend in the equations of the logarithm of fiscal variable and of the product growth; and only in the first equation the breaks (in intercept and trend) as they correspond in the specification of OLS equation. In addition, the confidence intervals were simulated by 2000 bootstrap replicates at 95% confidence level[18].

Showing up next, graph 1 presents the response of the logarithm of total expenditure to a structural shock in product growth:

Graph 1: Cumulative impulse response function (response of total expenditure to a structural shock in GDP growth)



The response is not significant. This estimate supports the result found by the OLS regression and adds evidence to affirm that fiscal policy in Bolivia is *acyclical* indeed.

For the estimation of the response of public investment, goods and services expenditure and transfers, a similar procedure has been followed. The results are presented in appendix B, along with the corresponding LM autocorrelation tests and Jarque-Bera tests for all estimations.

18 It is important to mention that the equations in the SVAR model were estimated by the SUR method and not by OLS since we imposed the presence of the control variables only on GDP`s equations.

6. Conclusions

Several studies have documented improvements in fiscal policy management in relation to economic activity in several *developing countries*, including Bolivia. This has been attributed mainly to improvements in public finance institutions and to greater financial integration.

However, there is also some evidence that this has not really happened. The diversity of methodologies on cyclicality of fiscal policy led us to think of a more intuitive definition for modeling it. We analyze the cyclical response of three components of government expenditure and aggregate expenditure, and in all cases we find that *fiscal policy in Bolivia is acyclical*, in support of Puig's (2015) conclusions and in disagreement with the ones in Valdivia (2014), BCB (2014) and Ugarte (2016) who assert that fiscal policy is countercyclical.

How can we interpret these results in the Bolivian context? We believe that the *acyclical* behavior of fiscal policy in Bolivia during the period 2000-2014 is explained by at least three factors:

i. The absence of fiscal rules.

ii. The fact that the nationalization of hydrocarbons (and industrialization projects), the increasing spending on infrastructure, health and education, or the process of regional decentralization, were due to social issues rather than due to business cycle smoothing objectives.

iii. The lag and coverage of automatic stabilizers. Given the high levels of informality in labour markets and with many companies in the informal sector, there are difficulties to adjust the tax base throughout the cycle (worth mentioning even if we haven't explored the ciclicality of revenue).

The fact that fiscal policy in the country is acyclic merely reflects the fact that reducing short-term fluctuations in economic activity has not been a priority objective on the agenda of the policy makers of the new millennium. Whether this economic policy decision can be considered good one or not is left to the reader's judgment.

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Appendix A
The Endogeneity Problem – IV/2SLS

The endogeneity problem may not be fully solved in equation (1). If government expenditure depends on the expected government expenditure in the previous period, it is possible that $E(gpib_{t-1} \mid u_t) \neq 0$, in which case the estimate by OLS would be inconsistent.

In order to deal with the problem of endogeneity bias, we estimated Instrumental Variables (IV) models by Two Stage Least Squares (2SLS).

We instrument the lagged annual GDP growth rate for the four estimated equations of fiscal expenditure components, namely, total expenditure, public investment, goods and services expenditure, and transfers. The results of the 2SLS estimates are presented below:[19]

Table 3

Instrumental Variables Estimation			
Two Stages Least Squares (2SLS)			
Equation	**Cragg-Donald F statistic**	**Stock-Yogo critical value (size)**	**Endogeneity Test**
Total expenditure	52.85	16.38	0.5720
Public investment	28.74	16.38	0.1002
Goods and services	19.23	16.38	0.4942
Transfers	21.96	16.38	0.3336

In all cases the instruments are valid (the null hypothesis that the instruments are weak is rejected) and the null hypothesis of non-endogeneity is not rejected.

The instruments used for the lag of product growth are described below. For the total expenditure equation, we use a lag of China consumer price index[20]. This is justified by the fact that China has conditioned global growth patterns in recent years and, under the accelerationist inflation hypothesis, deviations in the rate of inflation from their expected level translate directly into output growth rates above its full employment level. This undoubtedly affects output growth in Bolivia and there are no clear reasons to think that the exclusion restriction is not met.

19 For all the equations the variance-covariance has been estimated by matrix HAC (Newey-West).

20 Series extracted from the OECD database.

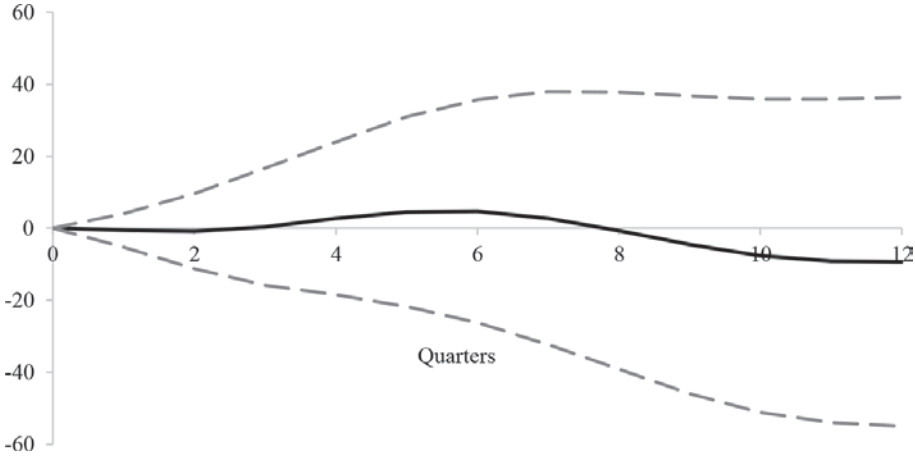
In the public investment equation we used the third lag of S&P index[21], while in the equation of goods and the equation of transfers, the instrument is the Shanghai Stock Exchange Composite Index, lagged one and nine periods respectively[22]. Instrumenting with stock indexes is supported by the fact that Bolivia is a small open economy, so it is a price-taker.

The instrument varies from equation to equation by the fact that in each one there are different structural breaks that alter the estimation of the first stage.

Appendix B
Structural Vector Autoregression (SVAR)

In this appendix, we show the cumulative impulse response functions (CIRF) for the main components of fiscal expenditure and the respective LM and Jarque-Bera for the VAR models.

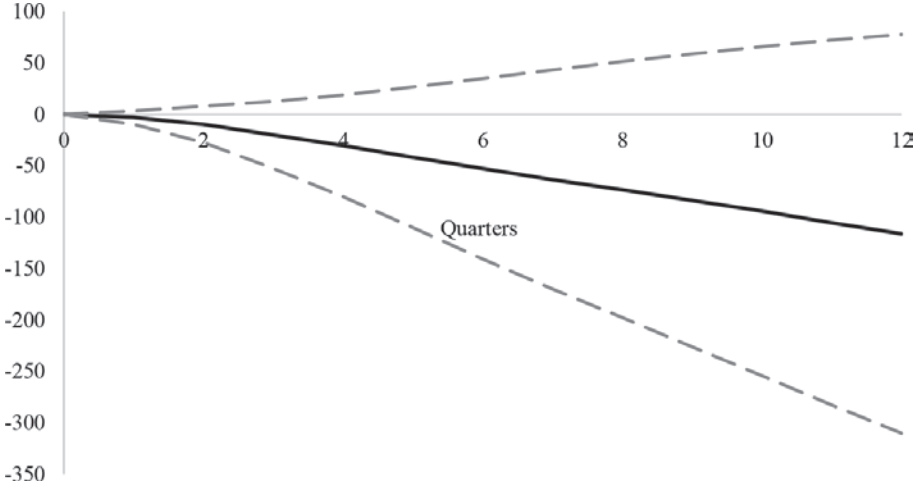
Graph 2: Cumulative impulse response function (response of public investment to a structural shock in GDP growth)



21 Series extracted from Robert Shiller online database.

22 That is to say, affecting the annual GDP growth rate contemporaneously and with a two year lag respectively.

Graph 3: Cumulative impulse response function (response of goods and services to a structural shock in GDP growth)



Graph 4: Cumulative impulse response function (response of transfers to a structural shock in GDP growth)

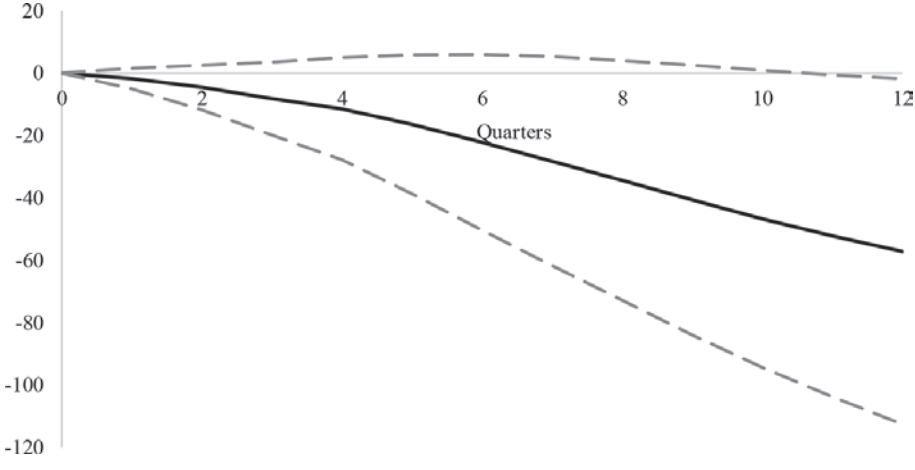


Table 4

LM Autocorrelation test				
	Prob. Chi Squared for each system:			
Lag	Total Expenditure	Public Investment	Goods and Services	Transfers
1	0.5122	0.3421	0.8493	0.1785
2	0.8934	0.7695	0.5253	0.7176
3	0.1810	0.2934	0.1832	0.4924
4	0.1719	0.1675	0.1197	0.0186
5	0.4953	0.3965	0.9108	0.0497
6	0.0608	0.2237	0.4368	0.3839
7	0.3217	0.1427	0.5794	0.2907
8	0.3637	0.7560	0.6266	0.8897
9	0.4658	0.9149	0.8708	0.2131
10	0.1436	0.1752	0.2194	0.2412
11	0.9013	0.7706	0.2945	0.7109
12	0.1525	0.8854	0.6059	0.0565

Table 5

Jarque-Bera Residual Normality Test	
Equation	Prob. Chi Squared for each system:
Total Expenditure	0.8261
Public Investment	0.8778
Goods and Services	0.8797
Transfers	0.9820

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Informality and Mobility in the Labor Market: A pseudo-panel's approach

Informalidad y movilidad en el mercado laboral: una aproximación de pseudo-panel

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Abstract

One of the main limitations of labor market analysis in developing countries is the lack of appropriate panel data information. This paper extends the methodology of Dang *et al.* (2014) to examine labor market mobility between the formal and informal sectors in Bolivia and Colombia building consistent pseudo panels from repeated cross-sectional survey data. After testing the robustness of the methodology, we identified confidence intervals for mobility's group in Bolivia and Colombia (formal to formal, informal to informal, formal to informal and informal to formal). The results provide evidence that in Bolivia and Colombia mobility between labor sectors is relatively low, which can explain the low variability of the informality rate in those countries. Results suggest that the number of people who move to the informal sector tends to be larger than those who scape from the informal market to the formal, or at least there is more variability across years for the first ones. This implies that public policies focused on labor market in Latin America would not lead to significant improvements if mobility patterns do not change.

Keywords: Mobility, Informality, Pseudo-panel, Labor, Bolivia, Colombia.

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Resumen

Una de las principales limitaciones del análisis del mercado laboral en los países en desarrollo es la falta de información apropiada de datos de panel. Este documento extiende la metodología de Dang *et al.,* (2014) para examinar la movilidad en el mercado laboral entre los sectores formal e informal en Bolivia y Colombia, construyendo un pseudo-panel consistente a partir de datos de encuestas de corte transversal repetidas. Después de poner a prueba la robustez de la metodología, identificamos los intervalos de confianza de los grupos de movilidad en Bolivia y Colombia (formal a formal, informal a informal, formal a informal e informal a formal). Los resultados proveen evidencia de que en Colombia y Bolivia la movilidad entre los sectores laborales es relativamente baja, lo cual explica la baja variabilidad de la tasa de informalidad en estos países. Los resultados sugieren que el número de personas que se mueven al sector informal tiende a ser más grande que la cantidad de trabajadores que escapan del mercado informal hacia el formal, o por lo menos existe más variabilidad entre años para los primeros. Esto implica que las políticas públicas enfocadas en el mercado laboral en América Latina no llevarían a mejoras significativas si los patrones de movilidad no cambian.

Palabras clave: Movilidad, informalidad, pseudo-panel, trabajo, Bolivia, Colombia.

Classification/Clasificación JEL: J6, J46, C83, C52

1. Introduction

In a simple theoretical labor market, participants face a dichotomous labor force decision, namely, to either work or remain unemployed. In real-life economies, however, especially in developing countries, labor force participation is less straightforward due to the existence of both informal and formal labor markets, with the main difference among countries being the degree of this segregation (Meghir *et al.,* 2011). In Latin American, the informal sector typically holds greater importance because the majority of the population holds informal jobs. In Colombia, almost 56% of the active population is employed in the informal sector (Galvis, 2012), while in Bolivia, this figure is over 60% (Evia & Pacheco, 2010). This bias towards the informal sector not only affects social cohesion; regulations are also more difficult to formulate and implement and government budgets are directly affected (Gómez & Morán, 2012).

In this context, movements to and from the informal sector are of extreme importance to understanding labor markets in developing countries and, more specifically, in Latin America.

It is not usually possible to measure this movement, however, mainly due to the lack of data following individuals' behavior over time, especially in developing countries. Therefore, the objective of this paper is to overcome this limitation by expanding Dang *et al.* (2014) methodology and by using cross sectional data to estimate movements in and out of the informal labor market. To test this method, we use an employment panel household survey for Bolivia and apply it to the Colombian case (where the panel structure is unavailable).

The principal results of this analysis show that labor market mobility is reduced in both countries. People who remain in the informal sector represent over 36% and 54% of the working population in Colombia and Bolivia, respectively. However, what is most important is the proportion of the population that escapes the informal sector (in Colombia, between 0.28% and 8.6%; in Bolivia, approximately 7%) compared to the proportion that enters it; the last figure can be larger than first one.

The remainder of this paper is organized in six sections. In the next section, we briefly review the literature on informality in Latin America and the suitable methodologies to analyze it. The third section explains the methodology used, while sections four and five present the dataset and main results. Robustness checks are described in section six, and the conclusions of the research are drawn in section seven.

2. A brief literature review

Informality in labor markets is characteristic of both developed and developing economies and, therefore, generates significant social costs in all nations. Schneider (2004 and 2007), for example, showed that the informal sector represents between 8% and 23% of GDP in developed countries compared with 23% and 60% in developing nations. Other authors (Bourguignon, 1979; Galvis, 2012) have found that informal workers tend to generate a lower proportion of physical capital and earn lower average wages than formal workers. Furthermore, because the formal sector usually contracts the most qualified workers, it is characterized by an excess labor supply that it cannot employ. Therefore, the informal sector must employ these residual workers (Raunch, 1991; Maloney, 2004).

Education is considered one of the principal barriers to mobility between the formal and informal sectors. Uribe *et al.* (2007) showed that if access to education were equal for all population groups, all individuals could access better job opportunities in the formal sector.

Maloney (2004) used longitudinal data for Argentina, Brazil and especially Mexico to estimate individual optimal choice in selecting a market in which to work, subject to the level of human capital attained and average productivity in the formal and informal sectors. The economic cycle and minimum wage are also related to the optimization of labor market mobility. In recessions, the proportion of the active economic population typically increases, but the minimum wage is a barrier for the formal sector, and after the formal sector has absorbed as many workers as it can, people generally turn to the informal market.

Bosh & Maloney (2010) used similar data to Maloney (2004) but with the objective of examining mobility between markets; their study characterized people who chose the informal sector as their best option. Bosh & Maloney (2010) showed that mobility is more volatile in the informal sector; the jobs of salaried informal workers typically last for approximately one year, while the jobs of formal workers last approximately 4.5 years. In addition, the flow of workers between markets is almost asymmetrical; the proportion of people who move from the informal to the formal market is larger than the flow in the opposite direction. However, Bosh & Maloney (2010) did identify an additional sector in the labor market: self-employment. Their conclusions show that people move from the informal and formal sectors to self-employment. This third option behaves similar to a "workers' bag", where the other two-segmented markets can take their employees.

Gagnon (2009) defined four categories of employment: inactive, bad jobs in the informal sector, good jobs in the informal sector and employment in the formal sector. The author identified a principal incentive for movements between sectors. People who work in the informal sector only prefer to move if the increase in earnings will compensate the increased cost of working in the formal sector; in contrast, those who work in the formal sector would earn more money if they moved to the informal sector. These findings are strictly related to poverty and individual conditions. Gagnon (2009) showed that mobility depends on education, networks and a healthy economic, institutional and social environment. Moreover, the author proved that greater mobility is a mechanism to improve the living conditions of the poor who work in the informal sector.

Gagnon (2009) found similar results to those of Bosch & Maloney (2010) in research on Mexico. The proportion of the population who moved from the informal sector to the formal sector over the course of that study was 19.7%. Nevertheless, approximately 18.2% of the subjects entered the informal sector over the same period. The proportion of those who

remained in the informal sector in Mexico in 2005 was 42.1%, although the level of informality in Mexico was 18.8%.

Bosch, Goni & Maloney (2007) developed another case study using Brazilian data. One conclusion of this work is based on job to job transitions, and they find that mobility between the formal and informal sectors behaves similar to the United States' scenario, where the proportion of people who escape from the informal sector is similar to the proportion who enter it.

Slonimczyk & Gimpelson (2015) investigated informality mobility in Russia, where longitudinal data surveys are available. Their research shows that approximately 50% of people remain in the informal sector, while approximately 26% escape it; however, the proportion of people who worked in the formal sector in 2002 and moved to the informal sector by 2011 are different across gender, 7% for males and only 4% for females.

It is not always possible to study these dynamics with the available data; most household surveys are cross sectional and do not follow individuals across time.

This is probably the reason why papers about labor mobility in Colombia and Bolivia are still scarce. In Bolivia, Villarroel *et al.* (2011) study mobility patterns in labor market. However, their focus is on entrepreneurship, self-employment, and employer. They found that self-employment behaves more like a "casual job" that a form of entrepreneurship (it supports our definition used for informality in the next section). Therefore, we propose a simple method following Dang *et al.* (2014) approach to poverty analysis to characterize movements in and out of informal labor markets.

3. Methodology

Dang *et al.* (2014) method can be used to estimate the probability of remaining, escaping, or entering into any socio-economic phenomenon. Since this method is based in household survey, its applications are not limited to some specific topics. As an example, Cruces *et al.* (2013) noted its failure to predict income mobility in relation to poverty in Chile. These authors reviewed the construction of pseudo-panels and found that Dang *et al.* (2014) approach provides biased results related to the proportion of the population considered to be below the poverty line.

Although these results have been found in the study of poverty in Chile that not implies that it has the same bias when we study other countries or other types of situations, specifically given than the poverty line is exogenous and this reduces the flexibility of the methodology to move the threshold. However, this paper aims to give us information about the study of labor mobility. Applying this method to labor outcomes has its own structural differences respect to poverty analysis, one particularly relevant is the definition of the threshold which determines if someone works in the informal market, over the cutoff, or in the formal one, below the threshold.

For the initial analysis in this study, a cross-sectional estimation was carried out using the Colombian household survey (GEIH, its acronym in Spanish) for 2008 and 2011 *(t = 1; 2)* and the Bolivian employment panel survey (ETE, its acronym in Spanish) for the first quarter of 2010 and second quarter of 2011. The Colombian household survey is representative for the main metropolitan areas of the city, including their rural and urban areas. It surveys about 200,000 and 300,000 households across the country. The GEIH is annual and its main focus is socio-economic variables. For Bolivia, we used the employment survey. Although, the ETE is not a household survey, it indeed provides the relevant information we need to study labor market. The Bolivian survey focuses in the urban area of the country, particularly La Paz, Cochabamba and Santa Cruz.

To begin, we define that someone is informal when the person work in a firm with less than 10 employees and she/he has less than complete secondary education. Furthermore, we defined a probability cutoff (c) that categorized under what conditions each individual could be informal, which remained the same for each survey and individual. The cutoff is a probability level that is applied after the primary estimation of the probability to be informal. This first stage is applied to transform the bivariate dependent variable into a continuous variable, which provides the probability of being informal for each observation. A higher cutoff is the threshold that determines under what point individuals are informal. The cutoff can be thought of as exogenous, but its empirical distinction will be shown later in the text.

Consistent with the approach of Dang *et al.* (2014), we define the following four groups. The first is given by:

$$\Pr\left(\hat{\rho}_{i2} > c \quad and \quad \hat{\rho}_{i1} > c\right) \tag{1}$$

Where $\hat{\rho}_{it}$ represents the individual and i's probability to be informal during the period t. This group includes the people who remained in the informal sector in both surveys. The next group is:

$$\Pr\left(\hat{\rho}_{i2} < c \quad and \quad \hat{\rho}_{i1} < c\right) \tag{2}$$

This group is comprised of workers who remained in the formal sector in both surveys. The third group includes individuals who entered into the informal sector. This measure indicates that they were in the formal sector in the first survey, but in the informal sector in the second survey. This group can be written as:

$$\Pr\left(\hat{\rho}_{i2} > c \quad and \quad \hat{\rho}_{i1} < c\right) \tag{3}$$

The last group is defined as:

$$\Pr\left(\hat{\rho}_{i2} < c \quad and \quad \hat{\rho}_{i1} > c\right) \tag{4}$$

This group is the opposite of the third group, namely, those people who moved from the informal sector to the formal sector between surveys.

In the next step, we estimate a linear probability model (LPM), where the informality condition is the dependent variable and the exogenous variables are defined by characteristics considered to be invariant in the short run:

$$\hat{\rho}_{it} = \beta_{1it} X_{1it} + \beta_{2it} X_{2it} + \varepsilon_{it} \quad t = 1, 2 \tag{5}$$

Where:

X_{1it} is a matrix of individual characteristics, such as education, gender, experience, and employment, and X_{2it} is a matrix of household characteristics, such as household head gender, poverty, location, and overcrowding.

Because this equation is estimated using an LPM, the predicted values can be larger than 1 or even negative. Therefore, we use different cutoff values to find the most appropriate form for the data generation process. In this regard, the first approach is given by the level at which the methodology can replicate the real data, as follows:

$$k_1 < \Pr\left(\hat{\rho}_{i2} > c \quad and \quad \hat{\rho}_{i1} > c\right) < k_2 \quad k \in \left[k_1, k_2\right] \tag{6}$$

$$m_1 < \Pr\left(\hat{\rho}_{i2} < c \quad and \quad \hat{\rho}_{i1} < c\right) < m_2 \quad m \in \left[m_1, m_2\right] \tag{7}$$

$$g_1 < \Pr\left(\hat{\rho}_{i2} < c \quad and \quad \hat{\rho}_{i1} > c\right) < g_2 \quad g \in \left[g_1, g_2\right] \tag{8}$$

$$n_1 < \Pr\left(\hat{\rho}_{i2} > c \quad and \quad \hat{\rho}_{i1} < c\right) < n_2 \quad n \in \left[n_1, n_2\right] \tag{9}$$

where k, m, g and n are the real proportions of each of the four groups defined earlier. Empirically, we find a particular frequency that the cutoff satisfies:

$$F\left(c\right) = \Pr\left(\hat{\rho}_i < c\right) = Real\ Informality\ Rate \tag{10}$$

In other words, the proportion of people below the cutoff level in the two surveys is approximately equal to the average real informality rate in recent years. By using this definition, we thus calculated the cutoff for each country.

Then, because we know that both household surveys are applied to different individuals, we use the coefficients obtained in the LPM regression to predict the probability of being informal in the first survey for individuals in the second survey. We build an estimated vector of informal probability by using the first survey coefficient and the invariant characteristics in the second survey. Further, we define how to trade the residuals. Dang *et al.* (2014) found a non-negative relationship between the residuals of each survey, suggesting that the bound that can be obtained for the model depends on the assumptions of that correlation.

The first assumption is necessary to estimate the upper bound of the four groups. We assume that the correlation between each error term is equal to zero. Thus, to estimate the probability of working in the informal sector in the second survey, we generate random residuals by using the distribution of the residuals in the first survey. We can thus write equation 11 as follows:

$$\hat{\rho}_{it}^{2u} = \hat{\beta}_{1i1} X_{1i1}^{2} + \hat{\beta}_{2i1} X_{2i1}^{2} + \tilde{\varepsilon}_{i1} \quad t = 1, 2 \tag{11}$$

where

$\hat{\rho}_{it}^{2u}$ is the estimated probability of working in the informal sector in the first survey (upper bound) for individuals in the second survey, X_{1i1}^{2} and X_{2i1}^{2} are individual and household characteristics in the second survey, respectively, which we use as retrospective variables, $\tilde{\varepsilon}_{i1}$ is the residual error term for individuals in the second survey that is generated by using the distribution of the error term in the first survey.

The lower bound is estimated under the assumption of perfect autocorrelation between the residuals in both surveys. Hence, we use the predicted values for the second survey derived from equation (5) to estimate the residuals. Then, we use these residuals without changing any elements, such as the approach for calculating the error term in the first survey for individuals in the second survey.

Formally:

$$\hat{\rho}_{it}^{2L} = \hat{\beta}_{1i1} X_{1i1}^{2} + \hat{\beta}_{2i1} X_{2i1}^{2} + \overline{\varepsilon}_{i2} \quad t = 1, 2 \tag{12}$$

where

$\overline{\varepsilon}_{i2}$ is the error term obtained in the estimation of equation (5) for the second survey.

Thus, we can rewrite the four groups for the estimation as follows:

$$\Pr\left(\hat{\rho}_{i2}^{2} > c \quad and \quad \hat{\rho}_{i1}^{2v} > c\right) \tag{13}$$

$$\Pr\left(\hat{\rho}_{i2}^{2} < c \quad and \quad \hat{\rho}_{i1}^{2v} < c\right) \tag{14}$$

$$\Pr\left(\hat{\rho}_{i2}^{2} > c \quad and \quad \hat{\rho}_{i1}^{2v} < c\right) \tag{15}$$

$$\Pr\left(\hat{\rho}_{i2}^{2} < c \quad and \quad \hat{\rho}_{i1}^{2v} > c\right) \tag{16}$$

where v is composed by $\{U, L\}$, where U refers to the upper bound and L to the lower bound.

Finally, we define the number of repetitions necessary to calculate the upper bound. Given that the upper bound is built as a function of the random residuals and that only the final one depends on the distribution of the estimated error term in the first survey, the process should be repeated n times to provide real significance to the model (for main estimation $n = 10$). This process is not applied to the lower bound, which assumes the same error term in both surveys for all individuals.

4. Dataset

As discussed above, we use ETE data (Bolivia) for 2010 and 2011 and GEIH data (Colombia) for 2008 and 2011 to estimate the mobility bounds of informality. Cruces *et al.* (2011) found that the methodology of Dang *et al.* (2014) did not change significantly depending on the time gap between surveys, implying that the mobility bounds do not change regardless of whether short-run or long-run data are used. In our case, three years is useful to identify movement into or out of the informal sector.

First, we apply the methodology presented in section three to our Bolivian employment survey data (ETE). The most important advantage of this survey is that it makes at least two observations for the same individual, thus providing us with insightful job mobility information.

In terms of our individual and household variables, their principal characteristics should be invariant, which is essential in the short run (*i.e.*, fewer than five years). These variables included education level, gender, experience, age, location, whether the house (apartment) was in the city or near towns, labor characteristics, and second sources of income. The other regression variable is poverty condition (*i.e.*, position with respect to the poverty line).

From the Colombian dataset, we sampled 327,669 individuals in the first survey (2008) and 357,901 in the second (2011). The percentage of informal workers was similar in both surveys (55.52% and 55.69%, respectively). The situation in Bolivia was comparable. In the first quarter of 2010, 63.4% of the sample was working in the informal sector, compared with 63.6% in the second quarter of 2011. The Bolivian data sampled 21,504 individuals for the first quarter of 2010 and 8,262 for second quarter of 2011.

In terms of the gender divide, no difference was notable in Colombia: 56.4% of men were informal workers versus 54.3% of women in 2008. For 2011, the respective percentages were 56.6% for men and 54.6% for women. However, we found a real relationship between informality and poverty. Altogether, 80.3% of people living below the poverty line in 2008 were informal workers, while 54.8% of people considered to be non-poor were formal workers. This situation did not change in 2011.

With respect to the number of children under the age of six in a household, 55.2% of households with one child under six years old were employed in the informal sector in 2008 compared with 72.5% for households with three children under six. This proportion grew to 87.9% for households with six children, implying that the propensity to work in the informal sector increases with household size. The conclusion is the same when using data from the second survey.

Another important factor to analyze is the relationship between informality and part-time work (defined as working fewer than 40 hours per week). As expected, 68.3% of part-time workers were employed in the informal sector, while 47.8% of full-time workers were employed in the formal sector.

5. Main Results

From the Bolivian household data, we used equation (1) to estimate the number of observations (m = 1816). If we know the real distribution of the population between the different groups, we can then replicate the real data using Dang *et al.* (2014) methodology. From that estimation, we found that the probability distribution for working in the informal sector was biased to the left, as there were many values above 0.5, including those above 1. This was one reason for using different cutoff levels. Finally, we found that a cutoff level equal to 0.9 allows that percentage of people behind it is equal to informality rate and that cutoff better replicated the real mobility bounds in Bolivia. Table 1 shows the results of the principal estimation of the mobility bounds. The real data are included in the estimated bounds for each group.

These results suggest a significant incidence of informality in Bolivia; indeed the majority of the population was working in the informal sector in both surveys. Further, we found that more people enter the informal sector than escape from it, implying a positive variation in the

informal population, but the bounds show that the variation in people who escape from the informal sector is greater.

We found that the population beneath the cutoff level of 0.9 was approximately 61%, close to the average informality rate over recent years in Bolivia. The relationship between the cutoff level and average rate of informality is an important basis on which to choose the cutoff for Colombia, where we found that the probability distribution was biased to the right, including some values less than 0. Based on a cutoff level of 0.6, the population below this threshold was approximately 55% (*i.e.*, the average informality rate over recent years). In the next section, these bounds are estimated by using other cutoff values.

These results are shown in the lower half of Table 1. In contrast to Bolivia, the proportion of people who remain in the informal sector is lower than that for people who retain their formal employment. The bounds for mobility between sectors are thus similar, which explains the low degree of variation in informality in Colombia. In addition, the rank of the bounds is similar in the both groups (formal to informal and informal to formal).

The mobility bounds for Colombia are similar to those for Bolivia, but the difference in the average informality rate is also significant. The problem is the same; mobility within the labor market is low, and it is more likely that an informal worker remains and new formal ones enter to informal sector than an informal worker will leave the informal sector.

Table 1
Real Mobility vs. Estimated Mobility

	Real	Lower-Bound	Upper-Bound
Panel Bolivia: 2010q1 and 2011q2			
Formal-Formal	28.38	35.60	23.37
Formal-Informal	6.57	1.98	10.02
Informal-Formal	6.88	0.21	12.44
Informal-Informal	55.18	62.21	54.77
Panel Colombia: 2008 and 2012			
Formal-Formal	-	55.16	46.85
Formal-Informal	-	0.15	7.97
Informal-Formal	-	0.28	8.59
Informal-Informal	-	44.40	36.59

The first part of the table corresponds to the estimations for Bolivia. The bottom part of the table is for Colombia's dataset. Column Real is only available for Bolivia, given the structure of the dataset the Real mobility values can be calculated just for Bolivia.

6. Robustness Check

Three variations of the model are presented in this section to verify that the main results do not change. Similar to Cruces *et al.* (2011) performed important checks of the methodology employed in our study using data from Latin American countries. For our robustness check, we made changes to the cutoff level, panel length, and the number of iterations for the upper bound, as described in the upcoming subsections.

A. Cutoff level

By using Bolivian data, we found that the cutoff represented the threshold beneath which lies the same percentage of informal workers in the sample and the proportion according to the official rate. However, to prove that this approach provides a good approximation, we estimated different bounds using two other cutoff levels, namely, five percentage points above and below the original cutoff.

Table 2 displays the results. The upper half shows results for Bolivia and the lower half for Colombia. Columns identified with [1] present the results for a cutoff level of 0.85 for Bolivia and 0.55 for Colombia, columns [2] are the main estimation, and columns [3] present the results for a cutoff level of 0.95 (Bolivia) and 0.65 (Colombia). These results suggest that the bounds change little when using a lower cutoff and move closer to the actual values when using a higher cutoff. That is most apparent when we look mobility groups that what happen with remain groups (formal to formal and informal to informal).

Furthermore, while the bounds of the formal-formal group move to the left as the cutoff level increases, the proportion of this population that remains in the formal sector decreases as the cutoff increases. Likewise, the proportion of workers that remains in the informal group in the second survey increases when the cutoff rises.

In relation to bounds that represent mobility between the two sectors, the changes are not significant and are similar to the principal estimation, namely, different cutoff levels present similar bounds for people who escape from and enter the informal sector.

Table 2
Sensibility to Cut-off

	[3] LB (+0.05)	[2] LB (0)	[1] LB (-0.05)	[1] UB (-0.05)	[2] UB (0)	[3] UB (+0.05)
Panel Bolivia						
Formal-Formal	28.99	35.60	43.75	34.13	23.37	14.39
Formal-Informal	2.31	1.98	1.69	9.26	10.02	8.28
Informal-Formal	0.10	0.21	0.15	9.77	12.44	14.70
Informal-Informal	62.63	62.21	54.40	46.83	54.17	68.61
Panel Colombia						
Formal-Formal	52.72	55.16	57.45	51.65	46.85	42.03
Formal-Informal	0.46	0.15	0.20	8.44	7.97	6.73
Informal-Formal	0.32	0.28	0.50	6.34	8.59	11.00
Informal-Informal	46.50	44.40	41.85	33.61	36.59	40.24

The columns [2] show the main estimation. Columns [1] employ principal cut-off minus a factor of 0.05; that means, for Bolivia the cut-off is 0.85 and for Colombia is 0.55. Likewise, columns [3] show the estimation with a principal cut-off plus 0.05. So for Bolivia is 0.95 and for Colombia is 0.65.

B. Panel length

In a second robustness check, we used different panel lengths. For Bolivia, we examined the differences brought about by having a longer gap between surveys using the surveys from the second quarter of 2009 and the second quarter of 2011. This difference in length compared with the principal estimation is sufficient to assess changes in bounds when the gap between surveys increases.

We found that the changes in the bounds for Bolivia were small (Table 3). Similar to the changes in the cutoff level discussed in subsection 6.1. However, while the estimate of people who escape from or enter the informal sector does not change significantly, the variation is less than one percentage point. For Colombia, we used the surveys from 2006 and 2011 and found similar results to those for Bolivia. The changes were not significant, especially the mobility bounds, confirming Cruces *et al.* (2011) findings that panel length does not change the principal results when using the presented methodology.

Table 3
Sensibility to Panel Length

	[2] LB	[1] LB	[1] UB	[2] UB
Panel Bolivia				
Formal-Formal	38.91	35.60	23.37	24.13
Formal-Informal	0.63	1.68	10.02	10.13
Informal-Formal	1.10	0.21	12.44	15.88
Informal-Informal	59.36	62.21	54.17	49.86
Panel Colombia				
Formal-Formal	48.62	55.16	46.85	43.19
Formal-Informal	0.43	0.15	7.97	11.77
Informal-Formal	1.11	0.28	8.59	6.54
Informal-Informal	49.84	44.40	36.59	38.49

The columns [1] contain the results of the principal panel and the columns [2] display the results of alternative length panel. For Bolivia we used data of 2009q2 and 2011q2; and for Colombia, 2006 and 2008.

C. Number of iterations for upper bound

As noted earlier, the calculation of the upper bound assumes that there is no correlation between the error terms of the first and second surveys, but we can use the distribution of the residuals in the former to generate estimated residuals for the individuals in the latter. For this check, however, it is crucial to repeat this exercise many times to observe the strength of this assumption.

Table 4 displays the changes in the upper bound for the four groups in Bolivia and Colombia. The principal estimation is given by 10 repetitions and since this number seems low, we repeat the process with 100 and 200 repetitions. We found that the differences are minimal, but greater in the Bolivian data than in the Colombian one. Additionally, when using 100 or 200 iterations, the upper bound values in Colombia are equal. Thus, the main conclusion is the theoretical assumption that the zero correlation between error terms in each survey are robust; the principal conclusion concerning the methodology is not affected by the number of iterations of the upper bound.

Table 4
Sensibility to Number of Repetitions

	LB	UB	UB-100	UB-200
Panel Bolivia: 2010q1 and 2011q2				
Formal-Formal	35.60	23.37	23.62	23.60
Formal-Informal	1.68	10.02	10.14	10.08
Informal-Formal	0.21	12.44	12.19	12.20
Informal-Informal	62.21	54.17	54.05	54.11
Panel Colombia: 2008 and 2011				
Formal-Formal	55.15	46.85	46.87	46.87
Formal-Informal	0.15	7.97	7.94	7.95
Informal-Formal	0.28	8.59	8.57	8.58
Informal-Informal	44.40	36.59	36.61	36.61

The column UB-100 represents the estimation of upper bounds using 100 repetitions of the exercise and the column UB-200 is using 200 repetitions.

7. Conclusions

In this study, we used the methodology of Dang *et al.* (2014), which is suitable for explaining job mobility, to describe recent trends in the informal sector in Colombia, particularly with regard to the number of people who move into or out of the informal sector. We found that the proportion of people who remain in the informal sector was high, implying that it is difficult for an informal worker to alter his or her labor situation. Additionally, the mobility bounds show low intersectoral mobility over time. This finding indicates that although some people are able to leave the informal sector, the proportion of people who escape is similar to the proportion of those who enter, meaning that the informality rate does not change over time.

The overall suitability of Dang *et al.* (2014) approach is important for conducting research in countries, such as those in Latin America, where data are not always readily available. This methodology allows researchers to investigate people mobility and characterizes the driving forces that affect the lack of advances in any phenomenon. Performing a synthetic panel would also be a good option for improving the research output in these countries.

This paper shows one of the most relevant characteristic of any socio-economic phenomenon: persistence. Identifying and monitoring the level of persistence in informality over time will helpful for public policy design. Making the labor market more dynamic

will improve the informal rate in Colombia and Bolivia, thought the more significant improvements are likely to happen in the long-run than in the sort-run.

In conclusion, the findings of this study suggest than policymakers need to focus on the mobility capabilities of the market at the time they implement interventions. Then, they can use the persistence characteristic of the market to switch labor outcomes-moving from high rates of informality to larger rates of formality-, making those who are in the formal sector remaining over time and bringing more informal workers to the formal sector. It is extremely important to ensure that the proportion of people who escape informality overcome the proportion of people who enter it, before focusing on reducing the proportion of people who remain in the informal sector. This will lead to reduce informality over time.

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Análisis de control sintético al impacto doméstico de la restricción a la exportación de carne en Bolivia

Synthetic control analysis of the domestic impact of beef export restrictions in Bolivia

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Alejandro Herrera Jiménez **

Resumen***

Este documento analiza el impacto de la política de restricción a las exportaciones de carne bovina establecida en Bolivia en 2008, a consecuencia de los efectos adversos del fenómeno de 'La Niña', sobre la oferta doméstica del mismo producto alimenticio. Para realizar nuestra estimación aplicamos el método de control sintético, con un panel de datos conformado por 128 países entre 1995 y 2013, incluido Bolivia, con información macroeconómica, comercial, de infraestructura y mediterraneidad, con el fin de construir un contrafactual 'sintético' para comparación con el país que permita aproximar el impacto de dicha política sobre los resultados del mercado interno del producto en cuestión. Empíricamente y en línea con similares estudios, encontramos que la implementación de esta política comercial restrictiva

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fue contraproducente a su objetivo de reabastecimiento paulatino del mercado doméstico de carne bovina. Argumentamos que la política de restricción a la exportación implicó un desincentivo para los productores ganaderos, ralentizando la recuperación de su actividad productiva posterior a los eventos climáticos adversos que motivaron su implementación.

Palabras clave: Control sintético, restricción a las exportaciones, producción de res, oferta doméstica.

Abstract

This paper analyzes the impact of the restriction policy on beef exports applied in Bolivia in 2008, as a result of the adverse effects of the phenomenon of 'La Niña' over the domestic supply of the same foodstuff. To carry out our estimations, we applied the Synthetic Control method with a data panel with 128 countries, including Bolivia between 1995 and 2013 including information on macroeconomic indicators, commercial, infrastructure and landlocked conditions, in order to construct a 'synthetic' counterfactual of comparison with Bolivia and then to approximate the impact of this policy over the results of the domestic market of the product. Empirically and as the conclusions of similar papers, we find that the implementation of this restrictive trade policy was counterproductive to its objective of gradually replenishing the domestic beef market. We argue that the export restriction policy implied a disincentive for beef producers, slowing the recovery of their productive activity after the adverse climatic events that motivated this policy implementation.

Keywords: Synthetic control, quantitative restrictions to exports, beef production, domestic supply.

Clasificación/Classification JEL: F13, F42, O24, Q37, H23

1. Introducción

A principios de 2008, Bolivia enfrentó un considerable desabastecimiento en el mercado interno de la carne bovina, producto alimenticio con alta ponderación en la canasta familiar básica del país. Esta escasez se suscitó a consecuencia de efectos hidrometereológicos y climáticos adversos provocados por el fenómeno de 'La Niña' entre los años 2007 y 2008,

que afectaron a las principales zonas de producción pecuarias del país[1]. Frente a este escenario de desabastecimiento de carne bovina en el mercado interno, el precio de este bien registró esperados incrementos con impactos negativos sobre el nivel de consumo de carne bovina por parte de los hogares.

Ante esta situación, el gobierno central de Bolivia decidió aplicar una restricción a la cantidad exportable de animales vivos de la especie de res y de carne bovina, mediante el Decreto Supremo Nº 29460, de 27 de febrero de 2008. Con esta medida se buscaba impulsar el reabastecimiento paulatino del mercado doméstico de carne y precautelar la seguridad alimentaria, estipulada como prioridad del Estado en el Plan Nacional de Desarrollo 2006-2010, vigente para aquella época. Sin embargo, las consecuencias de esta decisión de política no necesariamente se reflejaron en resultados esperados, como se desarrolla en este documento.

Frente a este escenario, en este documento empleamos el uso de la metodología de *control sintético* para brindar una aproximación del impacto de dicha restricción comercial aplicada en Bolivia[2]. Esta metodología consiste en construir y estimar variables relevantes para un país "sintético", es decir, un contrafactual simulado en base a ponderaciones óptimas de países que presenten similar comportamiento *ex ante* el país donde se aplica la política (*i.e.,* Bolivia). A partir de esta estimación, se procede a una comparación *ex post* de los resultados de la política de restricción de exportaciones entre Bolivia y la *Bolivia sintética* sobre variables de interés, posterior a un análisis de balanceo entre tratamiento y contrafactual.

Para poder aproximar el impacto de la política de restricción de carne bovina en Bolivia y aplicar la metodología mencionada, empleamos un panel de datos con información comercial para 128 países, incluido Bolivia, entre 1995 y 2013. Para esto, seguimos el análisis de García Lembergman, Rossi & Stucchi (2015), ampliando el estudio mediante la inclusión de variables complementarias relevantes sobre infraestructura y la mediterraneidad del país, que refuercen el análisis de la política. Los resultados empíricos de este documento se contrastan con el resultado esperado determinado en la teoría estándar del comercio internacional. Nuestros resultados dan cuenta de una discrepancia entre estos escenarios (empírico y teórico), que incentivan a la exploración de causas y factores que además pudieron incidir en el resultado de la política.

1 El Decreto Supremo N° 29438, de 12 de febrero de 2008, declara situación de desastre nacional por la presencia de dichos fenómenos naturales adversos que ocasionaron daños graves en diferentes regiones del país.

2 La misma es ampliamente utilizada en la evaluación de políticas.

Este documento se divide en cuatro secciones. La primera describe la situación del mercado de carne bovina en 2008, año del tratamiento. En la segunda sección se plantean las bases teóricas y metodológicas que se aplican y contrastan en el modelo. Para ello se hace una breve recapitulación de la literatura económica referente a comercio internacional y se propone la metodología basada en control sintético. En la tercera y cuarta sección se presentan los resultados y se plantean las principales conclusiones.

2. Análisis del mercado de carne bovina

Durante los años 2007 y 2008, el territorio boliviano fue afectado por eventos hidrometereológicos y climáticos adversos, provocados por el denominado "Fenómeno de la Niña", llegando a causar daños significativos no sólo en las poblaciones sino también en la oferta de alimentos, entre estos, la carne bovina. De acuerdo a la CEPAL (2008), las pérdidas en el sector de la ganadería sobrepasaron los siete millones de dólares estadounidenses. Las pérdidas económicas en el mencionado sector se explican principalmente por las grandes inundaciones suscitadas en los departamentos de Beni y Santa Cruz, principales centros pecuarios del país, que redujeron el número de ganado vacuno en más de treinta y cinco mil cabezas de res.

Si bien el objetivo del presente trabajo no es ahondar en la cuantía de los daños específicos en el sector ganadero, el Cuadro 1 que se presenta a continuación presenta algunas magnitudes de las perdidas suscitadas por mencionado fenómeno climático. Este cuadro tiene el objetivo de justificar la significatividad de las consecuencias sobre la actividad productiva del sector y la relevancia de analizar este particular fenómeno. Como se aprecia en el cuadro, los desastres naturales suscitados entre fines de 2007 e inicios de 2008 derivaron en pérdidas cuantiosas en el sector ganadero, disminuyendo en consecuencia la producción de carne bovina en el país.

Según los fundamentos de la teoría económica estándar, frente una contracción en la oferta de cualquier bien a consecuencia de un shock exógeno (*e.g.,* severidad en eventos hidrometereológicos), se espera que esto presione para un incremento en el precio y una reducción en la cantidad del bien asociada al equilibrio de mercado. La contracción de la oferta en el mercado de carne bovina frente al shock climático suscitado entre 2007 y 2008 resultó en el efecto esperado. Los precios en los mercados locales se incrementaron en aproximadamente 25%, de acuerdo a los datos del Instituto Nacional de Estadística (INE). En

consecuencia, el desabastecimiento y escasez de la carne bovina se evidenció en los mercados de consumo local.

Cuadro 1
Pérdidas en el sector ganadero a consecuencia de 'La niña' 2007-2008

Componentes del sector ganadero	En dólares estadounidenses
Ganado de carne en Beni	
Cabezas de res muertas	7,075,600
Pérdida en producción de carne de res	19,189,408
Producción de leche	
Pérdida en la producción de leche en Santa Cruz	2,484,106
Pérdida en la producción de leche en Beni	7,920
Ganado equino	
Caballos muertos en Beni	646,800
Ganado de granja en Beni	245,793
Cultivos forrajeros	
Pastos cultivados en Santa Cruz	18,000,000
Infraestructura ganadera	
Caminos interiores de predios ganaderos	350,000
Instalaciones y equipos ganaderos afectados	4,264,000
Total	**52,263,627**

Fuente: CEPAL (2008)

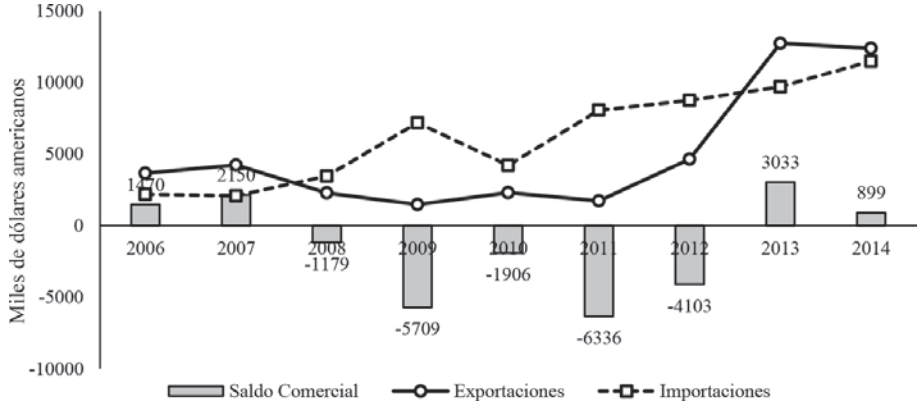
Frente a este escenario de elevación de precios y desabastecimiento de carne en el mercado doméstico, el gobierno boliviano, con el objetivo de precautelar la seguridad alimentaria de la población boliviana, decide establecer una restricción extraordinaria en las exportaciones de la carne bovina. Para cumplir este objetivo, el Poder Ejecutivo promulgó el Decreto Supremo N° 29460, en fecha 27 de febrero de 2008, por el cual prohibió por periodo indefinido la exportación de animales vivos de la especie res y de carne bovina.

Como resultado de estas restricciones, en el período 2008–2012, la balanza comercial de Bolivia para los productos cárnicos fue en general negativa[3]. Claramente, la principal causa para este resultado comercial fue la prohibición de exportación de carne bovina aplicada en 2008. Sin embargo, el año 2013 se caracterizó por una reversión en dicha tendencia, como

3 Según el IBCE (2015), la exportación de carne bovina representa el 81% del total de exportaciones cárnicas de Bolivia.

se aprecia en el Gráfico 1. Dicha reversión se debió al incremento de las ventas de la carne en cuestión, una vez reducidos los shocks climáticos (IBCE, 2015).

Gráfico 1: Comercio exterior de cárnicos de Bolivia



Fuente: Elaboración propia en base a IBCE (2015) e Instituto Nacional de Estadísticas (INE-Bolivia).

Si bien el impacto de las restricciones sobre la exportación de carne bovina es bastante claro, no sucede lo mismo cuando se indaga sobre los resultados de la política en términos de seguridad alimentaria. Es por esto que el presente trabajo analiza estas cuestiones a partir de la metodología de control sintético. Antes de aplicar dicha metodología, es importante conocer los aspectos importantes de la misma, así como una revisión teórica de la relación entre las variables en cuestión.

3. Marco teórico

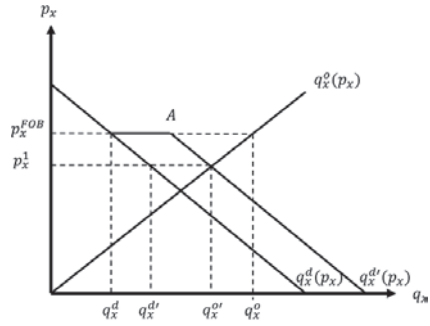
3.1. Revisión metodológica

Las consecuencias económicas de las restricciones cuantitativas a las exportaciones son un tópico relativamente poco explorado dentro de la literatura económica. Generalmente, se busca encontrar los efectos de las restricciones a las importaciones, que generalmente se asocian a políticas proteccionistas de la industria nacional. Sin embargo, esto no significa que no existan estudios acerca de lo que se analiza en el presente trabajo: restricciones cuantitativas a las exportaciones. Entre los principales estudios, se pueden encontrar los de Abbott (2011),

Gandolfo y Trionfetti (1998), Liefert, Westcott y Wainio (2012), Mitra y Josling (2009) y Sharma (2011).

Como se puede observar en el Gráfico 2, estos estudios muestran de forma general que las restricciones a exportaciones en economías pequeñas (como en el punto A en el gráfico), causan una disminución en las exportaciones y un incremento en la producción del bien en cuestión, dentro de un esquema de efectos sobre el mercado doméstico. Por supuesto, esto conlleva a una reducción en el precio doméstico. Como se puede esperar de cualquier análisis de bienestar de este tipo, el consumidor del país doméstico es el principal ganador. Los productores registran en consecuencia pérdidas en su nivel de bienestar, y de forma general, en el mercado se presentan pérdidas irrecuperables de eficiencia.

Gráfico 2: Restricción cuantitativa a exportaciones en un país pequeño



Fuente: Elaboración propia

Asimismo, los estudios arriban a la conclusión que este tipo de restricciones son utilizadas por los gobiernos para incrementar la producción destinada al mercado doméstico y disminuir los precios de los bienes restringidos a exportar (Krugman y Obstfeld, 2006).

Sin embargo, no todos los estudios relacionados llegan a las mismas conclusiones. García Lembergman, Rossi y Stucchi (2015) encuentran que este tipo de política genera una disminución en la producción destinada al mercado doméstico. Precisamente, estos autores utilizan el caso de la carne bovina para llegar a dichas conclusiones. Aunque en primera instancia es sugerente que la relación encontrada por estos autores sea contraria a la que plantea la mayoría de los estudios teóricos acerca de este tema, el resultado podría no ser tan contradictorio como aparenta inicialmente.

Se debe considerar que estos últimos autores, por las características de su abordaje metodológico, no sólo se concentran en el efecto de la política a corto plazo. Lo que realmente sucede con la restricción a la exportación de carne bovina podría inicialmente generar el efecto esperado de un incremento de producción destinada al mercado doméstico. Sin embargo, cuando la restricción continúa por un plazo extendido, el incentivo termina distorsionando completamente el comportamiento de los productores. En el largo plazo, existe la posibilidad de cambiar de rubro de producción, lo que conlleva una disminución de la producción del bien inicialmente ofertado en el mercado doméstico.

En resumen, la diferencia del trabajo de García Lembergman, Rossi y Stucchi (2015) respecto a los anteriores se encuentra en los enfoques utilizados. Los primeros manejan un análisis más de largo plazo. En cambio, el resto de estudios se dedican principalmente a los efectos de corto plazo. Para confirmar esas conclusiones, el presente trabajo utilizará la misma metodología de García Lembergman, Rossi y Stucchi (2015), incluyendo variables relevantes para el caso de Bolivia y ampliando el periodo de evaluación, lo que se explicará en el siguiente acápite.

3.2. Estimación de control sintético

La metodología de *control sintético* fue desarrollada inicialmente en el documento seminal de Abadie y Gardeazabal (2003) y luego en Abadie, Diamond, y Hainmueller (2010). En este documento aplicamos esta metodología con el objetivo de estudiar el impacto de la restricción de exportaciones aplicada en Bolivia en 2008, sobre la producción total y resultados de mercado doméstico. Para realizar esta evaluación de política es necesario que sólo exista una unidad tratada. Es decir, que se identifique una unidad individual sobre la cual se aplica la política (en este caso, un país).

El método de control sintético está basado en el planteamiento de que una combinación ponderada de unidades no tratadas puede configurar las características de la unidad tratada de mejor forma que una única unidad no tratada. A partir de las características principales de la unidad tratada se construye lo que se denomina *unidad sintética,* con base en un amplio conjunto de información individual de las demás unidades (*i.e.,* unidades individuales) que no fueron objeto de la política. Dicha unidad sintética se construye en base a ponderaciones que minimicen el cuadrado de las diferencias entre los valores *ex ante* o pre-tratamiento de las características de la unidad tratada y de las unidades sin tratamiento. Es decir:

$$w^* = \text{argmin}\left[\left(Z_{11t} - \sum_{i=2}^{J} w_i Z_{1it}\right)^2 + \ldots + \left(Z_{k1t} - \sum_{i=2}^{J} w_i Z_{kit}\right)^2\right] \quad (1)$$

Donde w* representa la ponderación óptima, y Z_{kit} es el valor de la característica k correspondiente a la unidad individual i en el período t. Cabe aclarar que la unidad tratada es definida como el primer elemento de la sucesión i $(i.e.\ i{=}1)$.

Una vez obtenidas las ponderaciones óptimas, se puede calcular el promedio ponderado de cada variable antes y después del tratamiento. Sin embargo, lo más útil es encontrar el efecto de la política. Para ello se utiliza la siguiente ecuación:

$$\hat{\alpha} = Y_{1t} - \sum_{i=2}^{J} w_i^* Y_{it} \quad (2)$$

Es decir, el efecto del tratamiento es la diferencia entre lo que sucedió con las variables de la unidad tratada y el promedio ponderado de las variables no tratadas. Dicho de otra manera, se trata de medir la diferencia entre lo que sucedió con el tratamiento y lo que hubiera pasado de no existir dicho tratamiento, incluyendo la situación de comparación o contrafactual.

Finalmente, para encontrar si las estimaciones son significativas, se utiliza la denominada técnica de placebo. La misma consiste en aplicar la metodología a todas las unidades no tratadas como si hubieran sido tratadas. Esta técnica se la aplica de manera iterativa. De esta manera se logra construir la distribución de la variable para compararla con los resultados de la unidad tratada.

4. Aplicación empírica y resultados

4.1. Fuente de datos

Para la aplicación del modelo se obtuvieron los datos tanto de la Organización de las Naciones Unidas para la Alimentación y Agricultura (FAO) como del Banco Mundial (BM). Más específicamente, empleamos datos de la FAO respecto a la producción de carne bovina por país, las exportaciones de este producto y la proporción de producción destinada

al consumo interno. En cuanto al Banco Mundial, se obtuvieron los datos sobre el PIB *per cápita* en PPP (valores nominales), la cantidad de habitantes por país y el índice de facilidad de acceso a los puertos[4].

Para tener una mayor precisión, se construyó una base de datos de panel, que contiene información para 128 países[5] en el período 1995–2013. Para una mejor compresión del modelo y los resultados, a continuación se detallan las variables y siglas correspondientes, utilizadas en la estimación.

- *Prod*: Producción total de carne bovina.
- *Exp*: Exportaciones de carne bovina.
- *Cons*: Producción de carne bovina destinada al consumo doméstico.
- *Pop:* Población.
- *PIBpc:* PIB *per cápita*.
- *Inf:* Índice de infraestructura para acceso a los puertos[6].
- *Med:* Si el país es mediterráneo.

Se aplicó la metodología del control sintético para encontrar los efectos del tratamiento mencionado en acápites anteriores sobre la producción total de carne, exportaciones y producción de carne destinada al mercado interno. A continuación se presentan los resultados respectivos.

Con el fin de seleccionar un grupo de control comparable que pueda proporcionar un contrafactual razonable (es decir, cómo habría evolucionado Bolivia si no hubiera habido tratamiento), restringimos el grupo de países del panel de varias maneras. Primero, si hay valores *missing* para la variable del resultado en el panel de la muestra, entonces ese país se excluye. Segundo, se considera a países que no tuvieron similares políticas restrictivas de comercio durante el periodo. Finalmente, construimos la unidad de control sintética con base en una combinación convexa de unidades de comparación que se aproxima a las características de

4 El apéndice suplementario a este documento (base de datos, do file de STATA e instrucciones), está completamente disponible mediante solicitud a los autores.

5 Seleccionados según su disponibilidad de datos, y cuyo listado se presenta en la sección de Anexos.

6 Para los países mediterráneos, el índice se calcula en base al grado de accesibilidad a puertos marítimos más cercanos.

Bolivia *ex ante* la política aplicada, y para cada caso se realiza el test de placebo, que se describe en las siguientes secciones[7].

4.2. Impacto de la política sobre las exportaciones

Para encontrar el efecto del tratamiento en las exportaciones, inicialmente se deben encontrar las ponderaciones óptimas. Para ello se consideraron como variables características el Producto Interno Bruto (PIB) *per cápita* entre los años 2003 y 2007, las exportaciones de carne bovina entre los años 1995 y 2007, el promedio del PIB *per cápita* entre 1995 y 2007, la población total en el año 1997, la población total en el año 2007, el índice de infraestructura portuaria construida por el Banco Mundial para el año 2007 y si el país tiene acceso a puertos marítimos libres y soberanos en el año 2007. Los resultados se plantean en el Cuadro 2.

Cuadro 2
Ponderaciones para construir el país sintético

País	Ponderación
Jamaica	0.893
Letonia	0.028
Etiopía	0.026
México	0.022
Emiratos Árabes Unidos	0.022
República Dominicana	0.005
Polonia	0.004
Reino Unido	0.001
Guatemala	0.001

Fuente: Elaboración propia

En base a esta selección de países con ponderaciones significativas, podemos construir el promedio ponderado para la unidad de tratamiento sintética. Como se aprecia en el cuadro anterior, la mayor ponderación la presenta Jamaica, con el 89.3%. A partir de estos resultados que minimizan la diferencia del error, se pueden obtener las estimaciones del país sintético y compararlas con los resultados registrados en el país tratado, Bolivia.

7 Una combinación de unidades de comparación a menudo proporciona una mejor comparación para la unidad expuesta a la intervención que cualquier unidad de comparación individual.

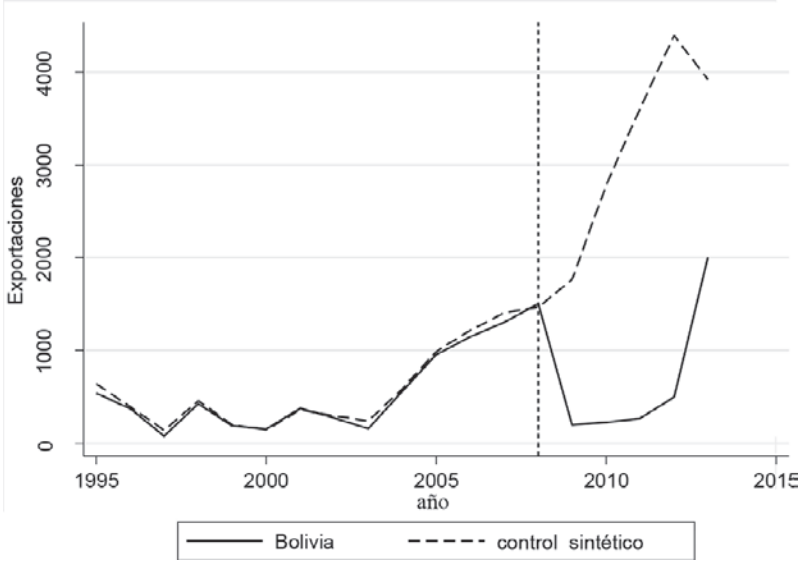
Cuadro 3
Balance de las variables

Variable	Bolivia	Bolivia sintética
Exportación 1995	539	640.181
Exportación 1996	370	391.073
Exportación 1997	78	138.521
Exportación 1998	423	457.587
Exportación 1999	185	196.985
Exportación 2000	152	142.869
Exportación 2001	377	359.417
Exportación 2002	272	292.708
Exportación 2003	154	239.611
Exportación 2004	555	582.176
Exportación 2005	953	988.507
Exportación 2006	1143	1214.065
Exportación 2007	1300	1403.078
PIB *per cápita* 2003	3753.051	9012.351
PIB *per cápita* 2004	3946.709	9358.476
PIB *per cápita* 2005	4180.32	9608.03
PIB *per cápita* 2006	4438.619	10075.89
PIB *per cápita* 2007	4684.928	10285.02
PIB *per cápita* promedio 1995-2007	3684.274	8672.191
Índice infraestructura 2007	65.3	88.1901
Índice mediterraneidad 2007	1	0.026
Población 1997	7870860	6390336
Población 2007	9441482	7438808

Fuente: Elaboración propia

En el Cuadro 3 se observa que las variables se encuentran balanceadas. Si bien existen ciertas diferencias en el PIB *per cápita*, este aspecto no implica mayor dificultad, pues lo importante de este modelo es minimizar el cuadrado del error y que el ajuste de la variable sobre la que se medirá el efecto sea alto (Abadie y Gardeazabal, 2003). Claramente, ambas condiciones se cumplen en este caso. Una vez constatado el balanceo, ya se puede llevar a cabo el análisis del efecto del tratamiento sobre las exportaciones de carne bovina. Los principales resultados se presentan a continuación.

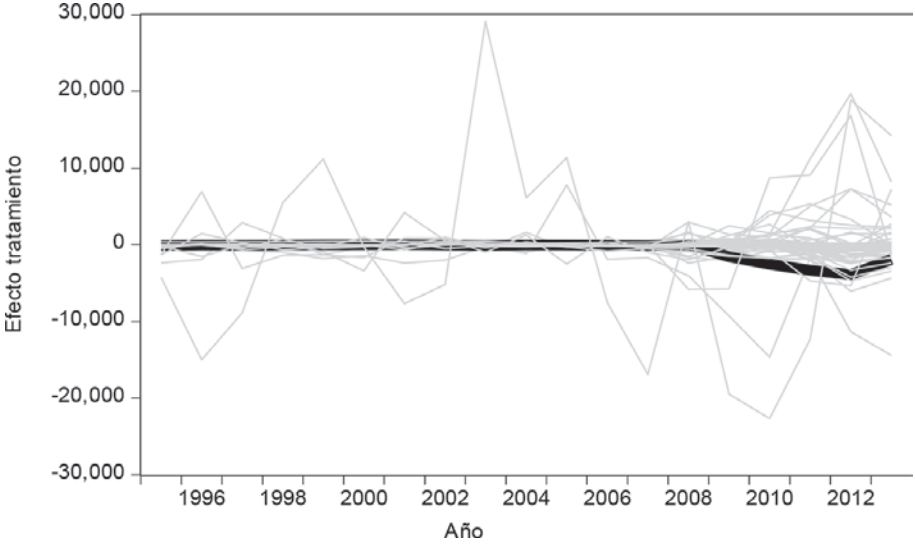
Gráfico 3: Efecto del tratamiento sobre las exportaciones de carne bovina



Fuente: Elaboración propia

En el gráfico anterior se aprecia que, efectivamente, la política planteada causó una disminución en el volumen de exportaciones. Este resultado es el que se preveía en la literatura económica explicada anteriormente. Asimismo, se observa el contrafactual. Si no se aplicaba el tratamiento, las exportaciones hubieran crecido al menos hasta el año 2012. Cabe aclarar que en la unidad tratada se observa un aumento de las exportaciones desde el año 2013, debido a que se retiraron las restricciones que el presente trabajo estudia. Para poder confirmar los resultados anteriores, es importante analizar la significancia de los mismos, para lo cual en el Gráfico 4 se presenta la distribución a partir de los efectos placebo.

Gráfico 4: Efectos del tratamiento versus efectos placebo



Fuente: Elaboración propia

El anterior gráfico permite observar que el efecto del tratamiento no sigue ninguna distribución preestablecida por los efectos placebo. Dicho de otra manera, se puede afirmar que el efecto encontrado es producto del tratamiento y no de otros efectos que pudieran haber afectado a otros países más. Por tanto, los resultados encontrados anteriormente son significativos.

Hasta el momento se puede afirmar que los resultados coinciden con lo que establece la teoría económica al respecto. Para continuar el análisis, se calcula el efecto del tratamiento sobre la producción de carne bovina.

4.3. Impacto de la política sobre la producción de carne bovina

En base al marco teórico explicado en líneas anteriores, se esperaría que la producción no varíe en demasía, manteniendo la tendencia anterior al tratamiento, pues todo lo que se deja de exportar debería ser destinado al mercado doméstico. Para confirmar o refutar dicha hipótesis, primero se calculan las ponderaciones.

Para cumplir este objetivo se construye un modelo bastante parecido al planteado en el caso anterior. Se consideran como variables características el Producto Interno Bruto (PIB) *per cápita* entre los años 2003 y 2007, la producción de carne bovina entre los años 1995 y 2007, el promedio del PIB *per cápita* entre 1995 y 2007, la población total en el año 1997, la población total en el año 2007, el índice de infraestructura portuaria construida por el Banco Mundial para el año 2007 y si el país tiene acceso a puertos marítimos libres y soberanos en el año 2007. Los resultados son los siguientes.

Cuadro 4
Ponderaciones para construir el país sintético

País	Ponderación
Vietnam	0.510
Hungría	0.206
Nigeria	0.099
Pakistán	0.097
Turquía	0.037
Polonia	0.028
Corea del Sur	0.023

Fuente: Elaboración propia

A diferencia del caso anterior, la mayor ponderación (51%) la tiene Vietnam, seguido por Hungría, con el 20.6%. Cerca del 30% restante de las ponderaciones corresponde a cinco países que se aprecian en el Cuadro 4. Para constatar que a partir de las anteriores ponderaciones se puede calcular el efecto del tratamiento, previamente se analiza el balanceo de las variables en el siguiente cuadro:

Cuadro 5
Balance las variables

Variables	Bolivia	Bolivia sintética
Producción 1995	139597	140471.5
Producción 1996	143199	141954.7
Producción 1997	147250	149649.5
Producción 1998	155230	152625.7
Producción 1999	155252	156780.7
Producción 2000	159794	159121.8
Producción 2001	160943	159775
Producción 2002	164551	164682.5
Producción 2003	168226	164908.3
Producción 2004	172000	173235.1
Producción 2005	175000	179503.6
Producción 2006	200000	202594.1
Producción 2007	244375	239992.9
PIB *per cápita* 2003	3753.051	6258.626
PIB *per cápita* 2004	3946.709	6777.883
PIB *per cápita* 2005	4180.32	7230.764
PIB *per cápita* 2006	4438.619	7840.419
PIB *per cápita* 2007	4684.928	8310.434
PIB *per cápita* promedio 1995-2007	3684.274	5721.218
Índice infraestructura 2007	65.3	84.566
Índice mediterraneidad 2007	1	0.206
Población 1997	7870860	6.82E+07
Población 2007	9441482	7.98E+07

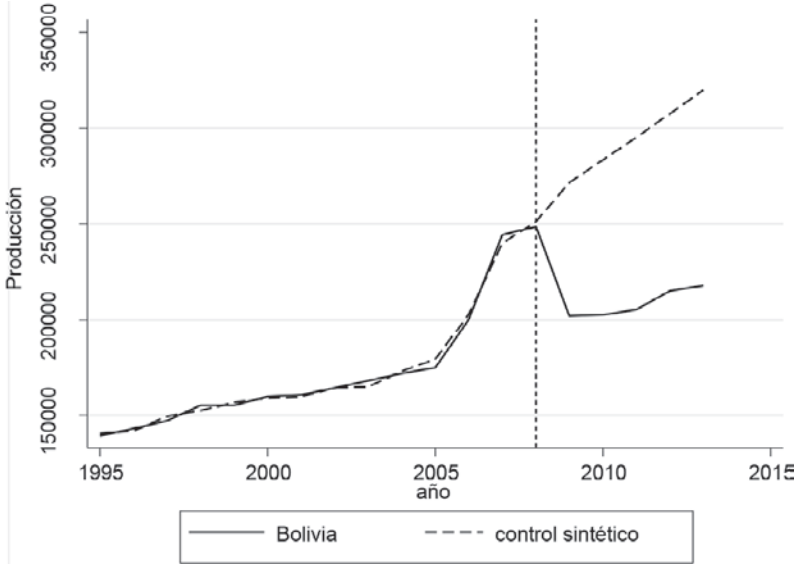
Fuente: Elaboración propia

Al igual que en el caso anterior, lo importante es que el grado de ajuste sea mayor en la variable sobre la que se estudiará el impacto de la política. Claramente, esto sucede en este caso. Los valores de la producción son similares entre la unidad tratada y la unidad sintética. Por tanto, se puede proceder al estudio del efecto del tratamiento, cuyos resultados se reflejan en el Gráfico 5

A diferencia de lo que se esperaría, el tratamiento causó una caída abrupta en la producción de carne bovina. Recién en el año 2009 se registró un leve crecimiento en la producción, pero

que de ninguna manera logra alcanzar los niveles previos al tratamiento. Contrastando esta situación respecto al contrafactual, se nota claramente que la producción hubiera continuado en un continuo ascenso, pese a los desastres naturales acaecidos.

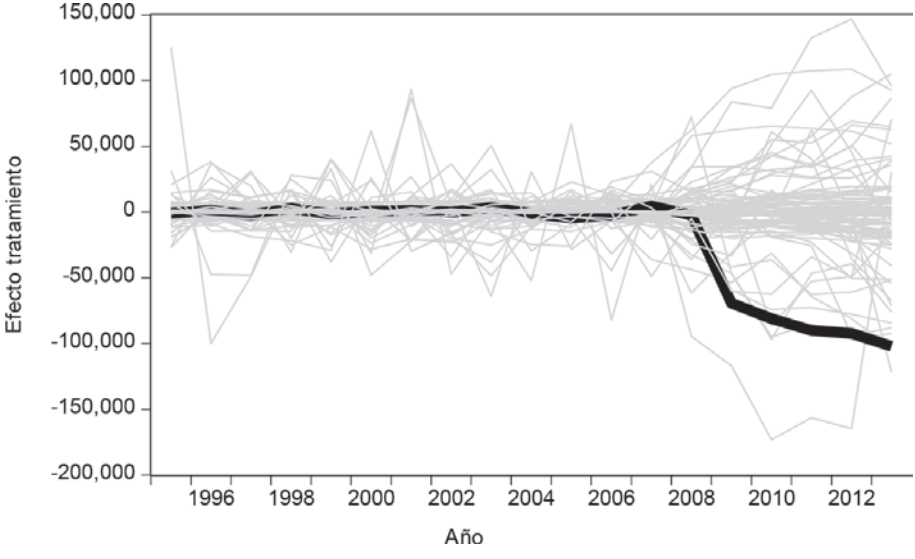
Gráfico 5: Efecto del tratamiento sobre la producción total de carne bovina



Fuente: Elaboración propia

Nuevamente, para que los resultados sean significativos, deben superar la prueba del placebo. Para este análisis, previamente se construye la distribución a partir de los efectos placebo.

Gráfico 6: Efectos del tratamiento versus efectos placebo



Fuente: Elaboración propia

En el Gráfico 6 se nota claramente que el efecto del tratamiento no presenta ninguna relación con los efectos placebo. Al igual que en el caso anterior, se confirma que los efectos son causados por la política y no por otros sucesos que pudieron haber sucedido alrededor del año 2008. Entonces, los resultados anteriormente obtenidos son significativos.

Para terminar el análisis de los resultados, se presenta el efecto de la política sobre la cantidad de producción destinada al mercado doméstico.

4.4. Impacto de la política sobre la producción destinada al consumo interno

El modelo a construir para la obtención de las ponderaciones es similar a los elaborados anteriormente. Se consideran como variables características el Producto Interno Bruto (PIB) *per cápita* entre los años 2003 y 2007, la producción de carne bovina destinada al consumo entre los años 1995 y 2007, el promedio del PIB *per cápita* entre 1995 y 2007, la población total en el año 1997, la población total en el año 2007, el índice de infraestructura portuaria construida por el Banco Mundial para el año 2007 y si el país tiene acceso a puertos marítimos libres y soberanos en el año 2007. Los resultados se detallan en el siguiente cuadro.

Cuadro 6
Ponderaciones para construir el país sintético

País	Ponderación
Vietnam	0.523
Hungría	0.144
Turquía	0.079
Pakistán	0.077
República Dominicana	0.061
Paraguay	0.045
Nigeria	0.037
Australia	0.012
Polonia	0.011
Corea del Sur	0.01

Fuente: Elaboración propia

Al igual que en el caso de la producción, las mayores ponderaciones las tienen Vietnam y Hungría. El restante 30% de las ponderaciones se encuentra repartido entre ocho países. Una vez obtenidas las ponderaciones que minimizan el error, se analiza el balanceo de las variables.

Cuadro 7
Balance de las variables

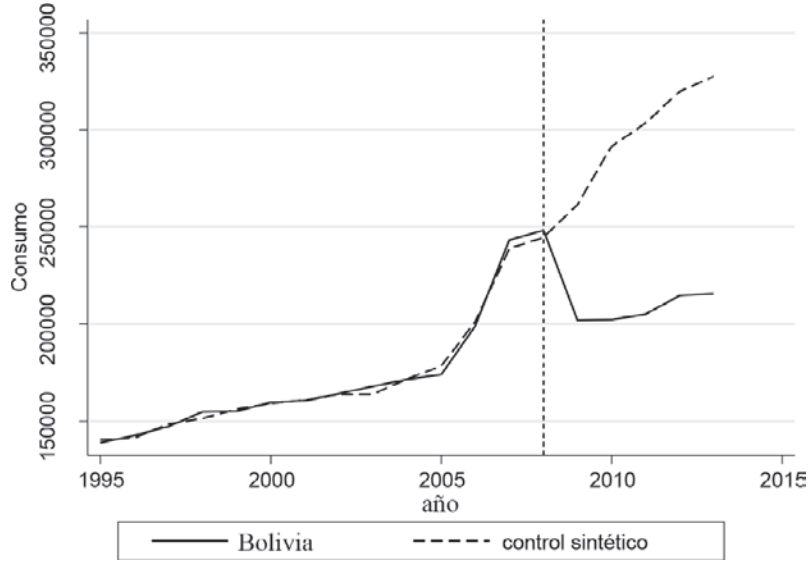
Variable	Bolivia	Bolivia sintética
Consumo 1995	139058	140432
Consumo 1996	142829	141442.7
Consumo 1997	147172	148598.6
Consumo 1998	154807	151652.2
Consumo 1999	155067	156203.4
Consumo 2000	159642	159355
Consumo 2001	160566	160709.1
Consumo 2002	164279	163921
Consumo 2003	168072	163886.9
Consumo 2004	171445	171778.7
Consumo 2005	174047	178374.6
Consumo 2006	198857	201202.2
Consumo 2007	243339	239060.6
PIB *per cápita* 2003	3753.051	5993.557

Variable	Bolivia	Bolivia sintética
PIB *per cápita* 2004	3946.709	6465.75
PIB *per cápita* 2005	4180.32	6949.666
PIB *per cápita* 2006	4438.619	7570.779
PIB *per cápita* 2007	4684.928	8065.543
PIB *per cápita* promedio 1995-2007	3684.274	5579.665
Índice infraestructura 2007	65.3	85.1549
Índice mediterraneidad 2007	1	0.189
Población 1997	7870860	6.11E+07
Población 2007	9441482	7.07E+07

Fuente: Elaboración propia

Como en todos los casos anteriores, el grado de ajuste en la variable sobre la que se analizará el efecto de la política es bastante alto. Por tanto, es posible continuar con el cálculo del impacto del tratamiento sobre la cantidad de producción destinada al mercado doméstico.

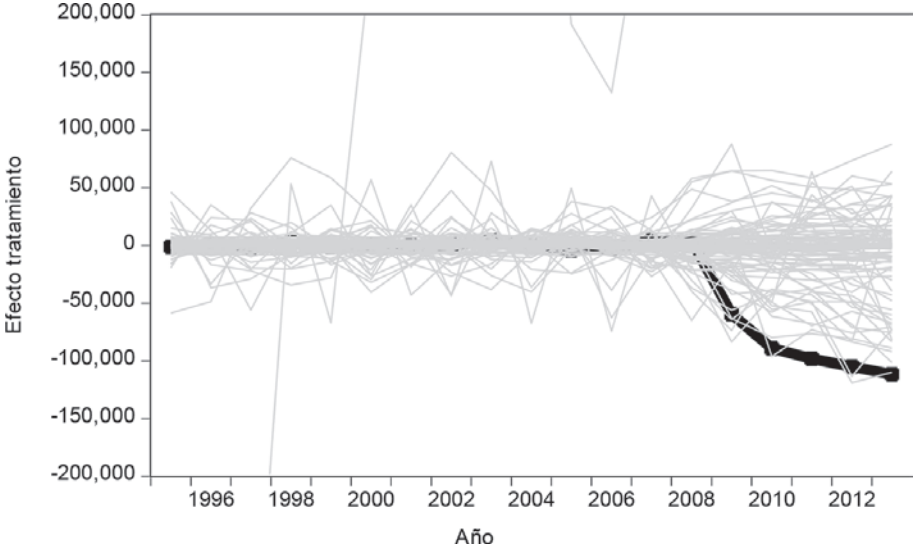
Gráfico 7: Efecto del tratamiento sobre la producción dirigida al consumo interno



Fuente: Elaboración propia

Como era previsible a partir del resultado encontrado en el caso de la producción, la cantidad destinada al mercado doméstico disminuyó a partir del tratamiento. Si no se hubiera aplicado la política, la cantidad destinada al comercio interno habría incrementado constantemente. Claramente, este resultado se contrapone a lo propuesto en la teoría económica. Finalmente, en semejanza a los casos anteriores, se obtiene la distribución a partir de los efectos placebo.

Gráfico 8: Efectos del tratamiento versus efectos placebo



Fuente: Elaboración propia

El gráfico 8 muestra que el efecto sobre la producción destinada al consumo doméstico es netamente causado por el tratamiento del año 2008. Por tanto, los resultados son significativos. A partir de todos los resultados obtenidos, se puede alcanzar una serie de conclusiones.

5. Conclusiones

En primer lugar, se confirma que la imposición de restricciones a la exportación causó un desmedro en el volumen de exportaciones. Es decir, los resultados coinciden con lo que la teoría sostiene al respecto. Sin embargo, esto no sucede cuando se analiza el efecto de la política sobre la producción y la cantidad destinada al consumo doméstico. De acuerdo a la

teoría, el consumidor local debería encontrarse en una mejor situación por una disminución de precio causada por el incremento de la oferta doméstica. A diferencia de este planteamiento, se encontró que las restricciones llevaron a una disminución de la oferta doméstica.

Estos resultados pueden ser explicados por el cambio de actividad económica que pudieron haber tenido algunos ganaderos frente a las considerables pérdidas ocasionadas por los fenómenos hidrometereológicos de 2007 y 2008, pero además por la misma política de restricción a la exportación. Verosímilmente, estos productores consideraron que ya no era tan rentable producir carne y migraron a otras actividades agrícolas, utilizando sus tierras para ello. Como se conoce, un principio económico básico es que los individuos responden a incentivos. En este caso, los ganaderos respondieron a las restricciones, cambiando de actividad económica.

Nuestros resultados confirman las conclusiones obtenidas por García Lembergman, Rossi y Stucchi (2015), considerando que en el presente estudio se incluye los índices de infraestructura y mediterraneidad, relevantes para el caso de Bolivia, además de ampliar el horizonte temporal de evaluación. De esta forma, la recomendación principal de este documento es que el gobierno central debe buscar otras estrategias para precautelar la seguridad alimentaria frente a los efectos adversos de fenómenos naturales. La vía que se eligió el año 2008 mediante la adopción y la extendida vigencia de la política restrictiva no tuvo los resultados esperados sobre la oferta doméstica, dado que pudo ralentizar la recuperación de la actividad ganadera en el país y por ende la seguridad alimentaria.

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Anexo

Países para el panel construido		
Antigua y Barbuda	Grecia	Pakistán
Australia	Guatemala	Panamá
Austria	Guinea-Bissau	Papúa Nueva Guinea
Bahamas	Guyana	Paraguay
Bahrein	Honduras	Perú
Bangladesh	Hungría	Polonia
Barbados	Islandia	Portugal
Belarus	India	Katar
Belize	Indonesia	República de Corea
Bolivia	Irán	República de Moldavia
Botswana	Irlanda	Rumania
Brasil	Israel	Federación Rusa
Bulgaria	Italia	Samoa
Burkina Faso	Jamaica	Arabia Saudita
Cabo Verde	Japón	Senegal
Camboya	Jordania	Seychelles
Camerún	Kazajistán	Eslovaquia
Canadá	Kenia	Eslovenia
Chad	Kuwait	Sudáfrica
Chile	Kuirguistán	España
China, continental	Letonia	Sri Lanka
Colombia	Líbano	Suazilandia
Congo	Lesoto	Suecia
Costa Rica	Liberia	Suiza
Costa del Marfil	Lituania	Tailandia
Croacia	Madagascar	Macedonia
Cuba	Malawi	Trinidad y Tobago
Chipre	Malasia	Túnez
Dinamarca	Mali	Turquía
Djibouti	Malta	Uganda
República Dominicana	Mauricio	Ucrania
Ecuador	México	Emiratos Árabes Unidos
Egipto	Mongolia	Reino Unido
El Salvador	Marruecos	Tanzania
Estonia	Namibia	Estados Unidos de América
Etiopía	Nepal	Uruguay
Fiji	Holanda	Vanuatu
Finlandia	Nueva Zelanda	Venezuela
Francia	Nicaragua	Vietnam
Gabón	Niger	Yemen
Georgia	Nigeria	Zambia
Alemania	Noruega	Zimbabue
Ghana	Omán	

Fuente: Elaboración propia

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Twilights and rebirths of National Development Banks in Latin America: Understanding factors that could have affected different trajectories in Argentina and Brazil

Ocasos y resurgimientos de los Bancos Nacionales de Desarrollo en Latinoamérica: entendiendo factores que pudieron haber afectado las diversas trayectorias en Argentina y Brasil

María Luz Martínez Sola *

Abstract

National Development Banks (NDB) could be pictured as engines pushing backward economies through the developmental ladder´s rungs. After being key protagonists of industrial policy after Second World War, most NDBs were dismantled during the 1980's and 90's. Notable exceptions to this trend exist, however. The goal of this study is thus to understand the political economy issues; Institutional Capacity, International Bargaining Power and Domestic Political Coalitions; that explain those trajectories, by taking the cases of Argentina (BANADE) and Brazil (BNDES). When analysing these three dimensions of political economy, the paper concludes that the main difference between BANADE and

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BNDES´ trajectories seems to stem from the diverse Domestic Political Coalitions crafted by Argentina and Brazil, in each historical period. Understanding the underlying conditions to create a cohesive and solid NDB is fundamental to reassess their roles in the XXI century industrial policy.

Keywords: Finance for Development, National Development Banks, Political Economy.

Resumen

Los Bancos Nacionales de Desarrollo (BND) pueden representarse como motores que impulsan a las economías emergentes a través de los peldaños de la escalera de desarrollo. Luego de haber sido protagonistas de las estrategias de política industrial luego de la Segunda Guerra Mundial, la mayoría de los BND fueron desmantelados durante los 1980s y 90s. Sin embargo, existen notorias excepciones a esta tendencia. El objetivo de este estudio es entender los asuntos de política económica; capacidad institucional, atributos relativos de poder a nivel internacional, coaliciones de gobierno; que explican cada una de estas trayectorias, tomando los casos de Argentina (BANADE) y Brasil (BNDES). Al analizar las tres dimensiones de política económica, el estudio concluye que la principal diferencia entre las trayectorias del BANADE y el BNDES emerge de las diversas coaliciones de poder conformadas por los gobiernos de Argentina y Brasil. Comprender las condiciones subyacentes para constituir un BND sólido y eficaz es fundamental para delinear qué rol deben cumplir en la política industrial del siglo XXI.

Palabras clave: Finanzas para el desarrollo, Bancos Nacionales de Desarrollo, política económica.

Classification/Clasificación JEL: O11, G20

1. Introduction

During the 2000s, Polanyi´s (1944) pendulum swung back towards State intervention, in what emerged as a natural countermovement against the failed ´Washington Consensus´ recommendations in Latin America. In that context, industrial policy debates re-emerged and many Latin America centre-left governments pushed for a ´renewed developmentalist´ agenda. In their role as catalysers for sustainable economic development, National Development Banks (NDBs) became a part of this picture (Ketterer, 2016). For instance, in

2011 the Banco Nacional de Desarrollo Económico y Social´ (BNDES) assets represented 15% of the national gross domestic product (GDP) (Chandrasekhar, 2014). Thus, the current interest on the matter gives this study the perfect context to further analyse the role that NDBs have had in two of the largest economies in Latin America, as well as its implications for innovation-led industrial policy after the 2000s (Mazzucato & Penna, 2015b).

The point of departure of this study is the shared belief that NDBs have been essential for spurring developmental outcomes in ´late´ and ´late late´ industrialised countries in the XIX and XX centuries (Gerschenkron, 1962; Hirschman, 1968), or, in Amsden´s (2001:285) words that they have been the "flagship of the Developmental State". However, after the Import Substitution Industrialisation (ISI) model failed and balance of payment, fiscal deficits and debt crises emerged, severe critiques to sectorial industrial policy became widespread. Neoliberal economists argued that ´financial repression´ –the preferential credit allocation to selected beneficiaries– was inefficient and led to rent-seeking behaviour, and advocated for ´financial liberalisation´ (Díaz Alejandro, 1984; McKinnon & Mathieson, 1981). Against the backdrop of this hostile theoretical environment, many developing countries dismantled their NDBs during the 1980's and 1990's. Yet others where preserved, as the 550 developmental financial institutions that remained in place by 1998 testify (Bruck, 1998:66). Our goal then is to understand the underlying political economy factors that explain these divergent trajectories, as well as to explore the implications that follow therefrom for industrial policy in the XXI century. We thus formulate the following research question:

Why could Brazil preserve its National Development Bank, BNDES, while Argentina dismantled its Banco Nacional de Desarrollo (BANADE) during the 1990s? What were the political economy factors at play, that differentiate both trajectories?

Some readers may think that the answer is straightforward when looking at the non-performing loans level of BANADE before its liquidation, which amounted to over 90%. However, the purpose of this study is to go beyond that figure, exploring the historical, political-economy factors that resulted in the different outcomes. Understanding their historical configurations is essential to gain a deeper insight into the necessary conditions for a developmental institution to be effective. Thus, the question that this study ultimately answers is what the appropriate local and international conditions are for NDBs to develop effectively. In a second step, we then explore what difference the financing via NDBs made, when compared to other public funding tools of industrial policy in the 2000s.

To do so, this paper proposes to compare three spheres of political economy[1] that could have affected differently each bank, to understand if the banks' divergent trajectories stemmed from any of these. First, we look into differences among their institutional structures, where we find that while both NDBs had highly trained and qualified employees, BANADE´s Board of Directors did not have enough autonomy and was co-opted by private interest during the last period of our analysis. Second, we compare State-Society relations, which we claim to be the middle puzzle piece that merges the whole picture together. In other words, we conclude that while the successive Brazilian governments have been able to craft a unified and strong societal class, interested in its developmental project, Argentina has largely failed to do so. Third, we analyse the international scenario during the 1980s and 1990s, assessing the extent to which it played a role in deciding whether or not to dismantle the NDB. In doing this, we observe differences in each country´s bargaining power, but find that international negotiations are ultimately defined by local class´ demands, which diverged the most. Finally, we analyse the consequences of not being able to configure a solid NDB, on the 2000s' industrial policy. Although we acknowledge the implications that this can have at different levels –such as at deploying counter-cyclical policies after the 2008 crisis– we limit our analysis to innovation policies in the biotechnology sector.

The remainder of this study is structured as follows. We first present our methodology in section 2, then explain the theoretical framework used to construct our hypothesis in Section 3. Then follows the analysis of our case studies, Argentina and Brazil in Section 4. In Section 5 we foresee the implications of the cases´ different trajectories for ´renewed developmental´ government´s innovation policies. The last section presents the conclusions.

2. Methodology

This study intends to understand what political economy factors (Institutional Capacity, International Bargaining Power and Domestic Political Coalitions[2]) could affect the consolidation of a NDB with a clear and cohesive mandate, and the implications that its absence had for Latin American developing countries´ industrial policies in the XXI century.

1 This paper understanding of Political Economy is based on Hira´s (1998) description of traditional approaches. It encompasses the International-Level Approach (which dominant variable is 'International Distribution of Power', referred by this paper as '*International Bargaining Power*'), the Domestic Coalitions approach (which dominant variable are 'Domestic Interest Groups', referred by this paper as '*Domestic Political Coalitions*') and the Statist (which dominant variable is 'State Capacity and Institutional Arrangements', referred by this paper as 'Institutional Capacity').

2 Idem footnote 1

To do so, we use the "most similar case study" (Berg-Schlosser, 2001) and compare the cases of Argentina and Brazil, to explore why Brazil could constitute a solid NDB whereas Argentina did not. Case studies are specially well fitted to answer why questions in explanatory research because they offer a holistic view (Saunders *et al.*, 2011:139). Specifically, the most similar approach is useful to explore the theoretical reasons that could account for different outcomes in similar cases. Thus, we chose Brazil as the successful case that accomplished to develop and preserve its NDB and Argentina as the case with the opposite result.

The case selection was done considering both countries´ representativeness in Latin America and the variation on our variable of interest. Also, both present similar political economy characteristics in the timeframe analyzed to answer our research question, since 1930 until mid-1990s. Due to the lack of consistent information during the first three periods, Table 1 summarizes some comparable cross-national indicators for the last cluster of the periodization described in Section 4c, to show the common patterns between both countries. Most importantly, their political economy processes have been alike, as we detail in depth on Section 4c. Both countries started to develop their industries during the ISI period, experienced more outward oriented developmentalist governments in the late 1950s and had military regimes during the decades that followed. In 1982 debt crises erupted in both and resulted in the 'lost decade'. Finally, in the 1990s they underwent stabilisation programmes, following the ´Washington Consensus´.

Table 1
Economic and Growth Indicators (1976-1992)

Indicators	Argentina	Brazil
Gross savings (% of GDP)	20.41	19.57
GDP per capita (current US$)	3,227.29	2,049.54
Exports of goods and services (% of GDP)	8.63	9.25
Imports of goods and services (% of GDP)	6.36	7.93
Inflation, consumer prices (annual %)*	672.22	626.91

* Data not available from 1976-1980.
Source: World Development Index, World Bank.

Following a ´pattern matching´ (Yin, 2003), we constructed three hypotheses, based on our theoretical framework. These hypotheses (dependent variables) will give three alternative theoretical explanations that could account for the different trajectories of BNDES and BANADE (independent variable). When analyzing secondary data that looks into to each

of our hypothesis, in a systematic way, we will be able to understand what historical political factors could have played a role in differentiating both trajectories. That is to say, they would enable us to explore the historical reasons that enabled Brazil to constitute a solid and cohesive NDB while Argentina failed to do so.

In other words, if the secondary data shows that each banks' international or domestic political economy process was similar, during the same historical time-period, it would probably imply that the factor is not driving the difference between them both. In case of different trajectories, the author will analyze in depth where could they stem from and present its conclusions.

To be sure, the explanation for the divergent trajectories may result from a combination of factors, as the hypothesis are not mutually exclusive. Furthermore, the analysis focuses on political economy issues, but other factors may also be playing a role, but will not be accounted for here. It is also worth to notice that the main value added of this paper is to use the already existent secondary data to answer a new question, by analyzing it in a comparative manner.

The three hypothesis look into the potential political economy factors at play when governments pretend to perform industrial policy with a developmental approach. The first and second hypotheses were designed to explore domestic variables that affect the NDB´ performance, both within the institution and between it and the society. The third one completes the previous two, by analyzing the international scenario. While the first one does not make a clear time division, it comprehends the whole period of analysis since each NDB was created and until BANADE was liquidated, detailing time-variations when necessary. The second analyses four time clusters from 1930 to 1990s and the last one focuses on the 1990s, when the decision to dissolve the BANADE was taken.

To test our hypotheses, we analyzed secondary sources, such as reports and previous literature, and conducted interviews, to complement the analysis with the interviewees´ visions and experiences. The interviews performed are not our main source, but serve as ´key informant interviews´ (Evans, 1995:19) from some of those who have worked at a highly-ranked position in the respective NDBs, and from bureaucrats of the agencies responsible for the biotechnology financial programmes in the 2000s. We have interviewed nine civil servants and used two different models, as detailed in the Appendix. The interviews were semi-structured and the questions open-ended. The results are presented as translated extracts to

exemplify our arguments. Finally, to explore the implications on the 2000s industrial policies in Argentina and Brazil, we contrasted their main biotechnology financial programmes.

The shortcoming of the most similar methodology is that while its internal validity is strong, its external validity is less so. Extrapolating the findings of our case studies to the regional population requires further research. Moreover, other factors that we have not considered may have had a decisive impact and be omitted variables. However, we do not pretend to perform an exhaustive study, given the limited scope and specific aims of this research.

3. Theoretical framework

3.1. Industrial Policy in the XXI century

Different dimensions of development have been prioritised by scholars throughout time. Chang (2013) shows how, after the rise of neoliberalism during the 1980s and 1990s, the discourse focused on the ´humanitarian´ perspectives, neglecting the production side. Put differently, the main goal was to alleviate poverty by ensuring the basic needs, without empowering individuals with the necessary tools to self-sustain their livelihoods in an independent and sustainable manner (Amsden, 2010). However, the last decades have witnessed the re-assessment of industrial policies as growth levers, even among mainstream scholars (Rodrik, 2008; Lin and Chang, 2009). It is therefore one of the main goals of this paper to understand the role that NDBs could play in the re-appearance of industrial policy[3] after the 2000s, as a policy tool of ´new or renewed developmental´ centre-left governments in Latin America (Bresser-Pereira, 2011; Hochstetler and Montero, 2013)[4]

While a recent consensus is emerging on the role the State should have in steering resources into high value added activities that could catalyse sustainable economic growth in developing countries (Whitfield, 2015), the industrialisation path still remains to be an issue mired in conflict. On the one hand, scholars identifying with ´New Structuralism´ such as Lin (2012:205), point out that the market ought to allocate resources and the State should provide infrastructure and coordinate firms when information is incomplete or in presence

3 This paper´s definition of industrial policy goes beyond targeting ´manufacturing´ (Palma, 2005) and drives its attention to innovative activities that yield increasing returns to spur sustainable growth, regardless of it being in the manufacturing, non-traditional agriculture or services sector (Whitfield *et al.,* 2015; Rodrik, 2008).

4 In opposition to ´old developmentalism´ of the ISI period, it differ in its currency policies, outward orientation and focus on innovation.

of other externalities. On the other hand, Chang (in Lin and Chang, 2009:489) defends that the State should defy the country´s comparative advantages to be capable of catching up. This paper contends that if the State act as a mere facilitator, private actors will prefer to pursue safe investments that do not jeopardize their capital and thus, development leaps will be eluded, especially in developing countries with frequent macroeconomic imbalances. In words of Mazzucato (2015), the State should take those risks, by creating rents that aim to ´shape and create new markets´.

This study will base the case for industrial policy after the 2000s on Mazzucato´s and Chang´s frameworks and stress the key role that NDBs have in pursuing sectorial industrial policy, by granting financial support to certain sectors considered strategic for technological and industrial upgrade, such as biotechnology. To be sure, this study acknowledges that during the 2000s, many others industrial policy tools have been used, such as tax exemptions, patent regulation, free economic zones and currency policies.

Unlike New Institutionalist Economists, who stress that public institutions´ main role is to secure property rights and market freedom (Chang, 2011), we contend that they should take a step further. In this sense, we will invoke the figure of the ´Entrepreneurial State´ (Mazzucato, 2015), who supports strategic, dynamic and innovative sectors to push the country towards the next ´techno-economic paradigm´, a concept introduced by Pérez (1984) to *describe* "… the most effective ways of using the new technologies within and beyond the new industries (…) to become the engines of growth.…" (Pérez, 2010a:189).

That said, we now turn our attention to the broader international arena and its consequences on national autonomy. Despite having gained more space on the current debate, the formal instruments available for industrial policy have been constrained by international regulations, limiting ´renewed developmental´ available strategies. The new international trade structure has tilted the balance in developed countries´ favour (Wade, 2003; Chang, 2002). However, this paper observes that emerging countries still have formal policy space to foster structural transformation. Not only macroeconomic and exchange rate policies (Mayer, 2009; Rodrik, 2008), but also supporting specific sectors ´picked´ by the government. We contend that NDBs are particularly well suited to pursue strong industrial policy (Khan and Blankenburg, 2009), due to its institutional capability to demand reciprocity by requiring performance standards and monitoring its compliance. Amsden (2001:140) showed that "Development banks influenced the efficiency of their clients by subjecting them to performance standards related to (…) national policy goals (…) (1) exporting; (2) localizing the production…".

However, the examples are before the World Trade Organization's (WTO) rules were imposed. This suggest the need to further investigate whether these performance requirements can still be pursued, in the XXI century industrial policy scenario.

Based on BNDES´ current loan policies, whose subsidized credits have a national content restriction if funded through one of their main sources (FAT)[5], we could jump into the conclusion that public funding institutions could still demand reciprocity in their loan conditions, without being restricted by WTO´s rules. The same conclusion may arise from examining the export credits offered through BNDES Exim programmes, granted exclusively to exporters, at an interest rate below the minimum established by OECD (CIRR) (Moreno Caiado, 2010). However, the Subsidies and Countervailing Measures (SCM) Agreement prohibits granting subsidized loans contingent to export performance or local content, and establishes as ´actionable´ any subsidy that could hamper external competitors on a discriminatory basis. Thus, it seems that the whole role of NDBs could be potentially disputed. It is not the intention of this paper to fully answer this aspect of the analysis, but just to delineate a potential path for future research.

3.2. The Role of National Development Banks

The scholarly conceptualization of development banking as a source of long-term funding has evolved along with the school of thoughts of development processes. Industrial Banking practices emerged in early history (XIX century) when the ´relative backward countries´ (Gerschenkron, 1962) were developing industrialising strategies. After the Second World War, when the ideas of Early Development Economists ideas flourished, both multilateral and NDBs started playing a central role in steering funds to large investment projects, with potential transformational impacts on the economy. They were a key element of the ´Developmental States´ (Amsden, 2001) and had leading roles in many countries such as Brazil, South Korea, India and México (Culpeper, 2012). This is to say, they were essential in the catching-up process of both ´late´ industrialisers in the XIX century and ´late late´ industrialisers[6] in the XX century. However, during the 1980s and 1990s State-owned banks received severe critiques from neoliberal economists, who argued that ´financial repression´

5 According to one to the interviewee Participant C "...when using the local Workers Support Fund (FAT, Fundo de Amparo ao Trabalhador), national content is a condition".

6 See Hirschman (1968:8) on the differences between ´late´ industrialized countries (Russia, Italy and Germany) (Gerschenkron, 1962) and ´late late´ industrializers, called by Amsden (2001) ´the rest´ (Argentina, Brazil, Chile, Mexico, Turkey, India, China, South Korea, Taiwan, Malaysia, Indonesia).

(Mc Kinnon and Mathieson, 1981) mechanisms encouraged uncompetitive firms, ´picked´ by the government to receive political favours, and contributed towards fiscal and balance of payments imbalances. In this context, this paper aspires to understand why, after the 1990s, Brazil has been capable of maintaining BNDES, while Argentina dismantled BANADE.

Since then, the role that the State should have on the banking system has been highly contentious. This paper rejects the position adopted by authors who neglect State-owned banks as growth catalysers, grounded on political favoritism arguments (La Porta *et al.,* 2002; Sapienza, 2004); sustaining that their role is essential. Not only to passively complement ´incomplete markets´ (Stiglitz, 1994:27) for long-term project, when externalities compensate for public costs (Levi-Yeyati *et al*., 2004), but to discover new markets with high growth potential and encourage their development. Our argument invokes Mazzucato and Penna´s (2015a:5) concept of "… market shaping and creating roles of state investment banks". Hereafter, we will adopt their heterodox framework, to understand the role of NDBs, which not only cover missed long-term contracts, grant counter-cyclical loans and fund public goods, but also fund projects with the specific aim to increase employment rates, encourage the development of new techno-economic paradigms and coordinate public and private actors to create social capital (Mazzucato and Penna, 2015a:36-39). Drawing on Keynes´ concept, Mazzucato and Penna (2015a:41) claim that NDBs "… pave the way for a ´Great Transformation´, as described by Polanyi (…) (which) will not arise from market forces, because markets are ´blind´, and even if they do not fail in a Pareto sense, they are incapable of providing a new, qualitatively different direction to economic development".

Henceforth, we will define NDB as State-owned banks, whose mandate is to provide long-term funds for real economy investments with positive externalities in terms of job creation, productivity, exports, environment and social inclusion.

3.3. Institutions Structures and State-Society Relations

In the following, we will try to provide a thorough description of the necessary features that an Entrepreneurial State should have in order to lead an industrialization process. Features that describe both its structure and its ability to craft domestic political coalitions with external actors engaged in the developmental project. The figure of the ´Entrepreneurial State´ stems from the concept of ´Developmental State´ and goes beyond by pointing out its risk-taking role (Mazzucato, 2015). When describing Developmental States, Doner *et al.* (2005:328)

highlights the public-private relations as a key characteristic. Similarly, Evans (1995:36) reinforces the importance of focusing not only on State´s structures but also on State-Society relations.

Mazzucato and Penna (2015a:38) show that NDBs have a key role in coordinating societal actors in backward economies planning to forge ahead. Hence, we need first to analyze their ideal bureaucratic structure as well as bureaucrats' relations with the private sector and politics. To do so, we will base our claims on Evans´ (1995) concept of ´embedded autonomy´, drawn from the Weberian ideal bureaucracy, which has been defined as an ´autonomous´ technical and highly qualified body of State employees, whose meritocratic recruitment and long-term career gives them a sense of belonging and identification with the public interests. These organizational features aim to restrict bureaucrats from being easily co-opted by private interests and from responding to political interests. Other feature that we deem essential is ´higher ranks´' autonomy (Evans, 1995:52). Meritocratic agencies could still be co-opted if members of the Board of Directors are politically appointed or ´colonised´ (O'Donnell, 1984) by speculator industrialists, and lack the necessary control mechanisms.

Notwithstanding, as Evans correctly observes, isolated government experts cannot perform industrial policy in an effective manner. They need to be ´embedded´, to relate to private firms in ´joint projects´, and so identify their specific sectorial constrains. In the case of NDBs, this ´connectedness´ is essential, to consider sectorial particularities when evaluating the loan projects, especially for innovative firms that would otherwise remain unattended. Also, when assessing NDBs capabilities to pursue ´strong´ industrial policy[7], it is essential to consider whether they have sufficient ability to demand ´reciprocity´ from the private sector. This design feature is a necessary condition to attain smooth State-Society relations that translate into a win-win situation in public-private relations. Governments that create monopoly rents (Schumpeter, 1934 [1912])[8] to foster specific innovative sectors, must have enough capacity to manage them to avoid private sector capture, and accomplish public sector development strategies. In words of Khan and Blankenburg (2009:8), the State should impose sanctions to non-performing firms so as to have enough credibility. However, we note here that NDBs abilities to impose many of these standards, which would highly contribute towards developmental goals have been hindered by WTO´s rules.

7 See Khan and Blankenburg (2009:6) for a further illustration on the differences between ´strong´ or ´sectorial´ and ´weak´ or ´horizontal´ industrial policy.

8 Schumpeterian rents result from a process of ´creative destruction´, where the discovery of new innovative productive processes replace old ones and create new markets.

Fully embracing the concept of ´embedded autonomy´ also implies to acknowledge its limitations. On this respect, critiques can be made on both halves of the concept. On the one hand, creating autonomy by guaranteeing long-term careers to its members could potentially undermine employees´ motivation to collaborate with the incumbent government´s strategy. As stated by Rauch and Evans (2000:53) themselves, civil servants in Weberian bureaucracies could lack motivation and be hard to fire. Additionally, it could also be argued that underdeveloped regions cannot build effective autonomous institutions, because they do not have enough resources, where ´patron-client´ relations (Whitfield and Buur, 2014) are necessary for primitive accumulation. However, this paper remains skeptical of this claim, and contend that these kind of relations should be avoided, even if "… the effect of (…) the corrupt transaction is positive …" in developmental terms (Khan, 2006). Relations that are solely embedded, but based on incumbent´s self-ambitions will probably result in rent-seeking behaviors, plundering State´s resources. Ironically, it is precisely this kind of argument that is most widely used by orthodox scholars to oppose to industrial policy and State intervention. Therefore, this paper advocates for the careful construction of a committed bureaucracy with independent motivations that prevents the kind of behavior that could grant valid arguments to tear apart Developmental States missions.

Regarding ´embeddedness´, it is important to consider that, regardless of the institution´s features and ambition to discover the best strategy to support the industrial sector, it will ultimately depend on the demands that the counterpart poses. It could be the case that long-term projects are not prioritized, even if subsidized. Finally, strong institutions with enough political power are also crucial to confront potential resistance from other sectors that are not receiving benefits and see their privileged positions jeopardized. In this regard, Evans (1995:37) calls on Migdal´s (1988) ´zero-sum´ game between the State and the society to explain why on some occasions granting power to the State implies to diminish elite´s power. However, if the adequate private counterpart finds a loud voice on societal spaces and the State helps to reinforce their emergence, the aforementioned ´joint projects´ can be smoothly deployed over this ´mutually reinforcing relation´.

In sum, this study considers that the analysis of State agencies´ features is key to understand the potential scope of their action to foster industrial upgrade. In our case studies, we attempt to provide a detail analysis of both the NDB´s structures and State-Society relations, to investigate whether these differences could help us understand why Brazil was successful in constituting a NDB with a clear mandate, while Argentina could not. Nonetheless, it is

essential to bear in mind that the same institutional structure could result in totally different outcomes. We claim that there is no ´one-size-fits-all´, and invoke Öniş (1991:125) when arguing that the action of autonomous developmental institutions´ could result in positive or negative outcomes, depending on historical conditions. In other words, it is not only important to determine the agencies´ structure, but also to understand both internal and external political coalitions and their historical conformation.

3.4. International Bargaining Power and the Washington Consensus

The previous section of this theoretical framework looked into domestic variables that affect developmental outcomes, related with features within the developmental institution and between it and the domestic political coalition, which frame our first two hypotheses. Against the backdrop of which we can then formulate our third hypothesis, to review the effect that the international ´outer wheel´ could have when defining the role of the NDBs.

After the international rate level peaked during 1982, many emerging economies collapsed into severe debt crisis. Later on, in 1989, as part of the ´Washington Consensus´, International Financial Institutions (IFIs) such as the International Monetary Fund (IMF) designed Structural Adjustment Programmes (SAP), subject to conditionalities, which mainly consisted on fiscal austerity, privatization and liberalization of the trade and financial systems. However, within Latin American region, country´s responses varied widely, incorporating neoliberal economic policies to different extents and at different paces. It is in this context that we attempt to explore the international conditions under which Argentina dismantled its NDB, while Brazil preserved it.

Seeking to understand how the international economic regime during the ´Washington Consensus´ could have affected the configuration of the financial mechanisms to encourage development, embraced in the figure of NDBs, we analyze the room of maneuver that Brazil and Argentina had to negotiate with the international actors in the Global North. To do so, we will follow Putman´s (1988) theoretical approach of the ´two-level game´, according to which the domestic and international spheres interact to determine one another on political economy matters and revise the international conditions that may have influenced domestic economic policies decisions on both countries.

4. A Comparative Approach: National Development Banks in Argentina and Brazil 1930s-1990s

4.1. Introduction

The objective of this chapter is to examine the political economy factors at play when trying to understand why two seemingly similar economies, such as Argentina and Brazil, adopted such different strategies regarding their NDBs, when exposed to similar conditions, delimited by the surge of neoliberal reforms in Latin America during the 1990s. To do so, we draw on Hira´s (1998:3) approach to political economy, which include the ´Statist´, ´Domestic Coalition´ and ´International Level´ level of analysis, constituting them as alternative hypothesis that contribute to explain our research question.

Argentina founded its NDB as soon as 1944, it was initially called Banco de Crédito Industrial Argentino (BCIA), then relaunched as BIRA in 1967 and as BANADE in 1971, finally liquidated in 1993. In the case of Brazil, the BNDES was created in 1952 during Vargas presidency and is currently the second largest development bank in the world, its annual disbursements being higher than the Inter-American Development Bank´s (IADB) and the World Bank´s (WB) together (Armijo, 2013).

The decision to dismantle BANADE came as a natural one given that the non-performing loan portfolio skyrocketed to over 99% and 50% of the debt belonged to only 20 firms. That is why, the ultimate purpose of our research question is not limited to understand why BANADE was dismantled while BNDES survived. Rather we explore the historical reasons that enabled Brazil to constitute a solid and cohesive NDB, which was and continues to be the ´flagship´ (Amsden, 2001) of its developmental strategy, while Argentina failed to do so.

4.2. Institutional Capacity

The main interest in this section is to compare the institutional features of the BCIA/BANADE and the BNDES, to explore the extent to which these differences could have had a decisive influence on their divergent trajectories and success as industrial policy tools. To do so, we examine their structural features by first looking into their financial structures, their level of autonomy and embeddedness and finally their discipline mechanisms.

When referring to financial structure, we analyze the funding sources and lending policies in terms of maturity and sector, as these define the bank´s capability to fulfill its mandate as a development agency. The BCIA´s main initial sources were funds provided by the public treasury. After the first year, however, short-term deposits were authorized (Rougier, 2011). This hampered the BCIA´s capabilities to successfully grant long-term loans, without stressing the bank´s balance sheet. The BNDES, instead, has never taken short-term funds, thus being capable to avoid maturity mismatches and preserve its mandate. Furthermore, in 1974 they were held responsible to manage a worker´s fund for unemployment insurance (PIS/PASEP), which gave them a ring-fence from the Treasury, essential to gain autonomy. In relation to the lending policies, while the BNDES has always granted long-term loans and pursued strong sectorial industrial policy supporting heavy industry, infrastructure and energy sectors, the BCIA started granting short-term loans in 1945 and its sectorial support was not developmentalist (Sikkink, 1991:199).

With regard to their ´autonomy´, while the BNDES has been largely recognised as a ´pocket of efficiency´ by many scholars, Sikkink (1991) contends that Argentina did not have such insulated State agencies. When looking into the BNDES´ Annual Reports (1956:33), we notice that a recruitment system to forge long-term careers for professionals was already at place in 1956, still being recognised nowadays as one of the most competitive public bureaucracies (Doctor, 2015:210). In the case of the BCIA/BANADE, Sikkink (1991:198) and Schvarzer (1981:35) show the high levels of education and continuing training of their employees, which is compatible with the declarations of our interviewees from the BANADE, who claimed that ´An interview and exam are necessary to be pre-selected´ (Participant B, interview, August 8, 2016). Thus, it seems rather clear that the lack of meritocratic careers is not the variable that explains the different trajectories.

The most significant difference seems to stem from the composition of their Board of Directors. According to a BNDES´ interviewee, ´ … most of the time executive directors are selected in academia and the private sector. Political appointments are rare … ´ (Participant E, interview, June 26, 2016). Likewise, Sikkink (1991:204) highlighted that directors were professional economists, who did not represent specific sectorial interests. Conversely, when referring to Argentina, Sikkink (1991:178) claims that the "… state had little autonomy from dominant classes …". This is also perfectly illustrated when exploring the composition of the Board of Directors of the BCIA/BANADE during this period and the following (Table **2**), when members of the most traditional families of the country, like Companc and Bulgheroni,

were appointed. What is more, Bulgheroni´s pulp firm ´Papel del Tucumán´, was the most indebted company when the bank was dismantled (Gonolbek, 2008). In words of Castellani (2008:96) the bank was "prone to serve business demands …". This is an undisputable piece of evidence of the lack of transparency and prejudicial dynamics that may result from patron-client relations that benefit private interest, neglecting collective objectives and jeopardizing the whole role of Developmental States.

Regarding ´embeddedness´, we found that whereas the BNDES is acknowledged for its reciprocal relations with industrialists, there is not such evidence for the BCIA/BANADE. According to the interviewees, the BNDES works as an ´… important bridge, promoting healthy and strong dialogue between the government and business´ (Participant C, interview, July 22, 2016), where ´Bank employees tend to specialize and become very close to private parties in specific sectors´ (Participant E, June 26, 2016). On the contrary, it is difficult to picture any kind of real ´embeddedness´ between BCIA/BANADE and the private sector, in a context of institutional instability in which the main authorities lasted less than one year in average, from 1944 to 1976 (Rougier, 2011). Also, during Frondizi´s government, industrial policies were taken in isolation from industrialists (Sikkink, 1991:107) and during the 1970s relations with the local companies happened on a personal level, creating a ´precarious and instable´ system (Rougier, 2011:97).

Finally, we explore the extent to which these institutions exert discipline to the beneficiaries of the subsidized loans, an essential component of Developmental State´s success. Amsden (2001:142) showed that BNDES´ loans were conditioned to ´techno-standards´, that demanded reciprocity in terms of local-content, technological upgrade and others. Even currently, despite subject to potential WTO´s demands, export loans prioritize producers with 60% of local content (Anderson, 2011). On the contrary, in the BCIA/BANADE the business class threatened politicians´ governability capacities and only promised to maintain employment levels (Rougier, 2011:98). Inexistent monitoring processes enabled private firms to deviate the long-term funds and use them to cover operational costs (Brennan and Rougier, 2009:52). The lack of control mechanisms was so serious, that the liquidation of the institution is recalled by authors such as Quintela (2005:231) as one of the largest depletions in the Argentinean financial system. On the contrary, when asked about corruption scandals around the BNDES during the 1990s, none of the interviewees recalled any. Internal control mechanisms for loan approval could provide part of the explanation for the different outcomes in this regard, as declared by an interviewee from the BNDES, ´… decision making process

is collective (so, it is) difficult to get your own ´deal´ … ´ (Participant C, interview, July 22, 2016).

All in all, our findings show a considerable variance between the financial structure and level of autonomy of the BCIA/BANADE and the BNDES´ Boards of Directors, along with different capacity to impose discipline to the beneficiaries. However, it is at this point essential to ask where do this dissimilarities spring from. In other words, building institutional capacity is not a one-size-fits-all model that every country should copy, but each institution mirrors its surroundings and "… reproduce the pre-existent contradictions and power distributions …" (Rougier, 2011:57). Therefore, in the next section we analyse both the domestic and international political interactions to gain a deeper understanding of the divergent trajectories´ origin.

5. Domestic Political Coalitions in Argentina and Brazil

This hypothesis explores the domestic configuration of vested interest groups in Argentina and Brazil and attempts to understand the role they played in defining the existence of a NDB. To do this, we will define three domestic actors, industrialists, agriculturalists and workers, and attempt to acknowledge their influence on economic policy matters. Our timeframe in this section will cluster four different periods, adapting Rougier´s (2011) division for the BCIA/BANADE, to compare it with the Brazilian case. Our first period, 1930s to 1955, focuses on the government of Perón in Argentina and Vargas in Brazil. The second period, 1955 to 1966, on the governments of Frondizi and Kubitschek. The third, 1966 to 1976, will contrast military governments´ alliances. Finally, we will briefly review the period from 1976s to 1990s, to understand the political economy scenario that resulted in BANADE´s liquidation and BNDES resilience. We will contend that while Brazil crafted a government coalition capable of supporting its developmental strategies, such as the consolidation of a NDB, the Argentinean government failed to do so. In this sense, Evans (1995:72) draws our attention to the importance of finding and shaping a compatible ´societal counterpart´ to perform structural transformation effectively.

5.1. First Period: 1930–1945

During the first period, Perón´s government in Argentina, extensively recognised as an industrialising government (Brennan and Rougier, 2009), failed to engage industrialists for

two causes. Firstly, the strategy depended on plundering a still dominant agricultural sector, and was reluctant to create a win-win situation, as Brazil did. Secondly, the government´s failed to design mechanisms that encourage a more fluent relation between businessmen and the labour force, which Brazil managed to do.

Regarding the first claim, we suggest that a successful redistributive strategy would require to either diminish rural power before carrying it out, such as East Asian countries did through land reform (Kay, 2002) or to create win-win situations, such as Brazil did. Otherwise, creating a public ´enemy´ figure in a still powerful agriculturalist sector (O´Donnell, 1984:21), entails the risk of encountering an effective opposition for industrial policies. In Argentina, the BCIA was in opposition to landlord interests, whose crops were bought at a below market price for redistributive purposes by the Instituto Argentino para la Promoción del Intercambio (IAPI), which used the BCIA as their ´financial agent´ (Schvarzer, 1981:33). Agriculturalists´ opposition hampered the whole industrial strategy, because the government was highly dependent on the commodities´ foreign exchange. Hence, after the 1949´ balance of payment crisis, the government was forced to improve IAPI´s prices, implying a backlash for the grounds on which the coalition with industrialists relied. For instance, metalworkers´ chamber, Perón´s main powerful industrialists´ allies[9], attempted to withdrew their support at the time (Rougier, 2001:80). On the contrary, Vargas, whose historical traditional landlord oligarchy used to dominate national politics, managed to prevent their uprise by creating win-win situations and avoiding direct confrontation. Vargas did also intervene on commodities´ exportations, but by guaranteeing coffee producers a minimum price, which created a win-win situation. What is more, many studies recognise that Vargas´ had an intentional ´hidden´ pact with rural producers to avoid conflict (Welch, 2016).

Regarding the second claim, we contend that the social fragmentation created in Argentina by opposing workers´ benefits to industrialists´ interests, further undermined the consolidation of a coalition to support a cohesive NDB. To be sure, we do not claim that defending workers´ rights without capitalist's opposition is an overall feasible strategy. However, somehow Vargas attempts to smooth its relations proved more effective. Brazil´s industrialists' confederations, such as Federação das Indústrias do Estado de São Paulo (FIESP), accomplished to merge workers´ and industrialists´ interests (Bárbara Weinstein in Rougier, 2001). For instance, they created a special social programme, administered by confederations, to qualify industrial workers (Schneider, 2004:101).

9 One of the few allies from UIA.

Also, fragmentations within industrialists contributed to their lack of engagement in supporting the NDB. Perón´s industrialisation programme was not supported by the largest industrial representatives, Unión Industrial Argentina (UIA). The only confederation who consistently advocated for the existence of the BCIA was the Confederación General de Empresas (CGE), representatives of Small and Medium Enterprises (SMEs) from the interior of the country. On the contrary, FIESP and the Confederação Nacional da Indústria (CNI), represented the vast majority of both big and small businesses and were the largest promoters of Vargas´ developmentalist policies. Consequently, we contend that BCIA´s immediate turn to short-term credits, was related to the characteristics of the CGE, which had small scale projects due to their firms´ size. Also, they were permeable to the demands of the strongest allies of Perón, the workers, who demanded working capital to cover wage increases (Rougier, 2011:79). These elements greatly contributed to the bank´s lack of coherence as a solid developmentalist instrument, since the very beginning. In opposition, "Brazilian (…) industrial groups in the 1940s and 1950s (….) saw themselves as protagonists and leaders of the process of industrialization…" (Sikkink, 1991:154). Hence, a unified industrial sector in Brazil was able to advocate for a solid NDB with a clear long-term funding mandate.

5.2. Second Period: 1955–1966

During the second period, Frondizi followed Prebisch´s recommendations and tried to recover the role of the BCIA as a genuine Development Bank, but failed. He could not gain support from UIA, its natural ally to expand heavy industry, because they were suspicious about his alliance with Perón´s coalitions. Also, his plan to attract foreign capital received clear opposition from CGE´s ´nationalist´. UIA´s representatives paradoxically defended free-market ideas, despite the potential material benefit that State protection may have given them. Thus, instead of promoting State´s industrial policies, they chose to ally with the landlord oligarchies represented by the Sociedad Rural Argentina (SRA) and the Stock Market Association to form a new entity, ACIEL (Sikkink, 1991:106).

Contrarily, in Brazil, industrialists´ support for Kubitschek´s ´*Target Plan*´ was always straightforward. Again, during this period we can see how Brazil´s State incumbents reached political harmony due to their belonging to a merge of political parties (PSD and PTB), that represented, apart from industrialists, landed oligarchies and workers. What is more, while Kubitschek´s governmental coalitions of industrialists enabled his decision to reject the IMF Stabilization Plan, UIA´s representatives advocated for IMF´s Stabilisation

Plan, which pressured Frondizi to downsize his developmental strategy (Sikkink, 1991). In sum, we cannot but conclude that in Argentina domestic political coalitions did not enabled Prebisch´s plan to reinstall BCIA as a real development bank to succeed. Conversely, BNDES role was essential for Kubitschek´s economic policy plan, as it was responsible not only for implementing, but also for coordinating and advising in the formulation of the ´Target Plan´.

5.3. Third Period: 1966–1976

In the third period both countries were ruled by military governments. In Argentina, in 1966, Onganía overthrew Illia´s mandate, with an initial overwhelming support from both popular and business sectors. Later, Onganía´s ´State Reorganization´ plan responded to the industrial elite´s interests, as it shrunk almost every State activity, but sought to provide them the necessary support (O´Donnell, 1982). Thus, in opposition with the previous period, the UIA formed coalition with the government. In this context, with the support of a powerful domestic coalition, BCIA managed to get rid from its commercial loans, prioritizing medium and long-term ones (Rougier, 2011:77) and even receiving additional funding sources from the Central Bank (López and Rougier, 2013:11). Local industrialists used State´s benefits to build new industrial plants, produce intermediate inputs and pursue infrastructure works (Rougier, 2011:78). In 1971, with Lanusse as president, the BCIA was renamed into the BANADE, with extensive support from the dominant class and mandate to boost basic industries and energy infrastructure. However, the Board of Directors was soon captured by the private interests of the industrial establishment (Golonbek, 2008:13). In Brazil, Castelo Branco assumed through a coup d'état in 1963 and after a period of stabilisation policies, opposed by the business class, he turned to expansionary policies (Massi, 2014). For instance, the BNDES launched FINAME in 1964, a funding agency to incentivise the machinery and equipment local industry and coordinated the Programa Estratégico de Desenvolvimento (PED) in 1968.

5.4. Fourth Period: 1976–1990s

Finally, from 1976 to the 1990s, the BANADE´s operations suffered a staggering decline and were highly concentrated on foreign currency and big companies, which became the main protagonist of the governmental coalition during the period. However, the industrial elite businessmen´s higher profits, in a period of global financial liberalisation, originated from financial endeavours (Kaufman, 1990:82). In 1983, the BCIA was the banking institution

with the highest external debt in the country, a time when over a 50% of the loan portfolio was non-performing (Rougier, 2011:86), figure that skyrocketed further to 99% towards the 1990s. With companies from the industrial establishment, such as ´Papel de Tucumán´, among the larger debtors, this period appears to be one of plundering and co-option of public interest. Once again, the political economy features of the BNDES were radically different. Geisel (1974–1979), launched the Plan of National Development (PND II), whose objective was to strengthen private national capital and increase technological capacity with a focus on heavy industry. Brazilian industrialists, unlike Argentineans, had large investments in the real economy and advocated for concessional loan policies (Kaufman, 1990:2). Thus, far from decreasing the volume of operations, the BNDES designed a new financial mechanism to expand the available resources, PIS/PASEP.

What is more surprising and essential to answer our research question, is that the BNDES´ existence was not questioned even when the neoliberal recommendations of ending ´financial repression´ flourished. Not even during the presidencies of Collor (1990–1992) or Cardoso (1995-2002), who defended neoliberal conceptions and shrunk many State functions, did the existence of the NDB become subject to hard scrutiny. The BNDES was not dismantled, but it did change its mandate in 1990, being made responsible of coordinating the privatisation programme called Programa Nacional de Desestatização (PND) and for granting loans to modernize and increase the international competitiveness of previously State-Owned Enterprises (SOEs). While the bank´s structure was shrunk, it continued to support the industrial sector under the ´nova política industrial´ (BNDES, 1990:44), maintaining its mandate. When asked about the reasons of BNDES continuity, most of the interviewees just said the reason was simple, the BNDES ´was a Development Bank´ after all. It seemed indisputable, from those on the left and those on the right, that the government should still encourage long-term development, even in a context of generalised liberalization of the global economy.

To sum up, whereas the BNDES´ had a clear support from a cohesive industrial class, represented by FIESP and CNI with a developmentalist ideology, generally opposed to stabilisation plans and defenders of soft credit policies, the BCIA/BANADE could not craft a government coalition with UIA, the industrialists´ representatives with the capacity to perform long-term projects, except from 1966 to 1969. We contend that the major factor at play, which differentiates both NDB´s trajectories, is the high fragmentation within industrialist´s representatives and between them, agriculturalists and workers. Unlike Brazil, where since

Vargas´ government social harmony was sought, Argentina had a highly-fragmented society. In the run-up to the 1992´ the BANADE liquidation, we see that, the project of a NDB firstly received support from an actor (CGE) without sufficient leverage or interest to stand up for preserving the long-term mandate. Then, when it had the support from a powerful actor, UIA, their firms soon diverted their investment priorities to financial activities in the 1970s, ´colonising´ and plundering the institution. The only exception was during Onganía´s period, when the bank attained a successful mandate due to large industrialists´ commitment with real economy projects and developmental positive externalities.

6. International Bargaining Power and the Washington Consensus

Authors such as Hochstetler and Montero (2013) argue that Brazil entered later than most countries in Latin America into neoliberalism, and that the ´Washington Consensus´ was never fully adopted. On this subject, Kearney (2001) suggests that one possible explanatory variable is the level of national power that Brazil has had, to prevent stabilisation policies that would not report an immediate positive effect on the wellbeing of the society. Hence, we will compare Argentina´s and Brazil´s international bargaining power by analyzing their debt and current account indicators during the 1980s and 1990s, to understand if Brazil has had more maneuver room in the international arena, and thus, greater ability to defend the existence of a highly interventionist institution, as was the BNDES. To be sure, we will analyse the macroeconomic hard data, but contend that negotiation capabilities with creditors who impose conditionalities, are also a product of soft power capabilities.

The size of both economies and the contagious impact of their defaults gave Argentina and Brazil considerable bargaining power with the international creditors. However, when looking closer into the figures we can note that the leverage to negotiate could have vastly differed. For instance, Figure 1 shows how, after 1985, the current account balance over GDP recovered faster in Brazil than in Argentina, what signals a more vulnerable position to negotiate the conditions for fresh capital inflows for Argentina. Also, Figures 2 and 3 denote that Argentina´s total debt service and paid interests in terms of its exports were significantly higher than in Brazil, what indicates that its balance of payment was more stressed, what has probably undermined its negotiating capabilities vis a vis Brazil. Figure 4 depicts IMF outstanding debt level, including loans relating to any Structural Adjustment Facility (SAF), and reflect that from late 1980s, while Brazil´s outstanding level plummeted, Argentina´s

soared. These divergent trends very much illustrate the different positions that each country could have assumed when negotiating the content of the conditionalities imposed by the IMF.

We contend that bargaining power could have influenced, to some extent, the capacity to resist external pressure and negotiate the design of local industrial policy tools. However, we claim that international bargaining power cannot be effective, unless domestic political coalitions provide a clear support for the developmentalist instrument. When the BANADE was dismantled, the elite industrialists in Argentina, with more inherence in the institution during the last two periods, far from advocating for its remaining, preferred it to be liquidated. As declared in the interview, elite businessmen whose companies were largely indebted ´ … were the largest beneficiaries of the bank´s liquidations, as it gave them the opportunity to diminish their debts´ (Participant A, interview, August 12, 2016). To be sure, the BANADE´s non-performing portfolio during the last decade, was reason enough for local and external actors to demand its liquidation, however, as explained above we intend to look into the reasons for such mismanagement. To sum up, international bargaining power does not seem to be the decisive element on its own in our analysis, even if it has granted differential maneuver room in each case.

7. Renewed Developmental State: Biotechnology Policies in Argentina and Brazil

Up to this point we have analysed the reasons that explain why Brazil was capable of developing a coherent and effective NDB while Argentina could not. Now, we attempt to account for the relevance of such institutions, as policy tools for industrialisation, during the XXI century, when many center-left governments in Latin America re-established developmentalist policies with an outward orientation and a focus on innovation (Bresser-Pereira, 2011; Hochstetler and Montero, 2013). Specifically, we will examine how industrial policies with focus on innovation may differ when conducted by NDBs, looking into the case of biotechnology.

Biotechnology has dynamic characteristics and large complementarities with multiple activities in which many Latin American countries are already competitive, such as agriculture, human or animal health. Thus, authors such as Pérez (2010b) suggest that these kind of technologies could lead to the next techno-economic paradigm. However, this kind of innovative projects have limited access to traditional financial sources due to their

particular characteristics. Their future cash flows and success probabilities are uncertain, their projects´ maturity extremely lengthy, they lack physical assets to use as collateral and their technical specificities are difficult to monitor and assess for credit rating evaluators. All the aforementioned is reinforced when the company is a start-up that cannot provide any track record.

Both Argentinean and Brazilian governments have designed special funding mechanisms to, on the one hand, help biotech companies overcome their financial restrictions and on the other hand, forge new dynamic industries. In Brazil, the main financial programmes for biotech, implemented by BNDES and FINEP (a public agency that depends from the Ministry of Science, Technology and Innovation) are PAISS, PADIQ, BNDES Profarma Biotecnología, and CRIATEC. In Argentina, in the absence of a NDB, the biotech programmes are conducted by a public agency dependent on the Ministry of Science, Technology and Productive Innovation (MINCyT). The main programmes are ANR Bio-Nano-TICs, ANR TEC and FS Biotecnología.

In Brazil, PAISS, launched jointly by BNDES and FINEP, encourages the production of biofuels from sugar cane (Nyko *et al.,* 2013). One outstanding feature is that they focus not only on the pilot plants, but also on the industrialisation and commercialization stages (Nyko *et. al*, 2013: 67). BNDES also acts as coordinator and decides which financial instrument is more suitable for each project. This programme was so successful that it achieved to create an internationally competitive new market, previously inexistent as shown in Figure 6 (Milanez, 2014), with positive spillovers to other technological industries, such as flex fuel vehicles. Given the success of this model, it has been copied by other programmes, such as PADIQ, which supports the chemical industry. In this case, BNDES requested a sectorial research to outline which areas within the chemical industry have the greatest potential and designed a financial mechanism accordingly, which exemplifies the capacity of a NDB to discover new sectors that could help the country to catch-up in development. Also, the programme launched an innovative financial mechanism called THAI, a hybrid equity instrument that participates in the project´s performance and shares its risks, to enable industrial scale-up (BNDES, 2016). BNDES Profarma Biotecnología also contemplates scale-up activities to take the product into the market and has successfully provided R$ 400 million to Bionovis, to develop biotech medicine for cancer treatment. Finally, CRIATEC is an equity fund that depends on the BNDES and invest in seed capital and start-up projects, mostly directed towards ICT and biotech (Mazzucato and Penna, 2016:43).

In opposition to BNDES and as declared by an interviewee, MINCyT only ´ … covers up to the pilot stage, no programme covers the scale-up (…) historically, the implementation of a productive project was never covered … ´ (Participant H, interview, July 27, 2016). For instance, ANR-Bio-Nano-Tec only covers up to the pilot stage or prototype and most programmes focus exclusively on R&D activities, without covering scale-up projects to take the product to the market. FS Biotecnología programme is a sectorial fund that encourages the creation of public-private associations to develop biotech platforms for human health, also focused on research and diagnosis. Lastly, it is noteworthy that none of the programmes are well suited to encourage the creation of new biotech companies, which have no alternative source to fund the costs not strictly related to R&D or pilot plants, such as operational costs. As declared by the interviewee from MINCyT ´ … for new companies it is not enough … ´ (Participant H, interview, July 27, 2016).

All in all, by comparing the design and potential scope of the programmes designed by the Argentinean public agency and the BNDES, we note some remarkable differences that could potentially account for a differential impact on the ´renewed developmentalist´ strategies. Firstly, the NDBs have the required financial expertise to design special financial mechanisms, adapted to the reality of the sector, as shown with the THAI mechanism. Also, having a wide range of credit lines available, they can work as coordinating agencies and allocate the project to the most suitable line, as the BNDES did with PAISS´ projects. Most importantly, NDBs can cover all the stages of the project for it to be successful in the market and go beyond the R&D and pilot stages. As noticed above, MINCyT does not cover nascent firms, nor scale-ups to industrialise their prototypes and launch the product to the market, because the expenses that the projects would need to cover in these stages, are not specifically related to innovative activities and, are thus not part of their mandate. The case of BNDES shows how a NDB could cover those functions by the creation of seed capital funds, such as CRIATEC and by focusing on the scale-up and industrialisation stages, such as BNDES does with Profarma Biotecnologia and PAISS. We contend that covering the whole range of stages of innovative projects, is a key aspect for any innovation-led mission-oriented policy, which intends to shape and create competitive sectors. This study suggests that NDBs are the adequate institutions to conduct this kind of missions, because they have the necessary resources, ability and knowledge to devise what sector could be competitive, as illustrated with the case of the chemical industry. Finally, it seems to be the case that NDBs are better equipped to shape and create new markets, as was the case with Bioethanol, beyond merely covering market failures.

8. Conclusions

After at least two decades of being a shadow player, industrial policy debate re-emerged within the XXI century academic and policy making landscape (Lin and Chang, 2009; Rodrik, 2008). In particular, many centre-left Latin American governments resumed interventionist economic policies with a special focus on innovative sectors. Thus, the role of NDBs as sustainable growth catalysers, ought to be reassessed. After the alleged failure of the ISI model, several critics pointed out that State intervention favoured rent-seeking behaviours and advocated for global financial liberalisation. In this context, many NDBs with fiscal constraints and non-performing loans were eliminated during the 1980s and 1990s (Culpeper, 2012), but others were resilient. Why? In an attempt to shed light on this issue, this study took the cases of Brazil, who could establish a long-standing NDB resilient to these critiques, and Argentina, with opposing results. To answer the research question we have compared political economy factors related to institutional capabilities, domestic political coalitions and international determinants.

The main finding of this study is that all the three hypothesis that served as independent variables to explain the different decision making of Argentina and Brazil regarding their NDBs (dependent variable). Therefore, the three political economy factors interplayed to explain why Argentina failed to develop and effective NDB, resilient to the 1990s neoliberal policies, while Brazil succeded.

However, even if all the elements may have some explanatory power in determining the endurance or elimination of the NDB, we understand that the indispensable middle puzzle piece is the consolidation of committed domestic political coalitions, engaged in the developmentalist plan. In a nutshell, we contend that the central answer to our question is that Argentina, unlike Brazil, was not capable of crafting a long-standing societal counterpart with enough leverage to advocate for long-term loans, and an interest in investing in the real economy. Thus, even if we have demonstrated that Brazil had more international bargaining power than Argentina after the debt crisis, this variable by its own has no explanatory power to answer our research question. Why would the government negotiate the maintenance of a policy instrument that was not advocated for by the societal class that it intended to benefit? Actually, exactly the opposite was true, as the elite businessmen sought its liquidation, to diminish their liabilities. During the financial globalisation, many Argentinean industrialists profited from the money market and had their interests aligned with those of international

actors, who advocated to end the so-called ´financial repression´, as they themselves would have probably favoured more from higher interest rates than from long-term subsidized credits. On the contrary, the Brazilian industrial sector, with high sunk costs real investments on the real economy, ´…was inclined to push hard for easy credit policies and to resist orthodox approaches´ (Kaufman, 1990:82). Thus, we claim that the explanatory power of the international bargaining power argument must be understood against the backdrop of domestic coalitions. To be sure, the reader may well be thinking that BCIA´s non-performing loans level would suffice to explain its liquidation. However, that fact alone does not account for the reasons why one country could avoid those results while the other did not.

The explanation partly relies on the level of institutional capacity to avoid plundering by disciplining the beneficiaries and having enough autonomy from the executive elites, who could co-opt the institution with their private interests. As mentioned above, while BNDES is commonly recognised as a ´pocket of efficiency´ with the appropriate discipline and monitoring capabilities, BCIA´s Board of Directors lacked the sufficient autonomy and granted loans to an industrial establishment who was not contributing towards sustainable growth. However, here once again, it is important to analyse not only the institutional capabilities, but first and foremost, the class interests of the domestic counterpart, whose characteristics will be significant to define the final outcomes. After all, if the government supplies developmental plans with appropriate institutional capabilities, but the firms do not demand long-term credits, what market can we expect?

Thus, we claim that the most relevant factor at play, when trying to understand NDB´s outcomes, are the characteristics of the political coalition advocating for their existence. In the case of Argentina, during the first period the coalition was with CGE, who represented small projects and had no capacity to demand long-term loans, having also to satisfy its workers demands, who pushed for working capital loans to increase their wages. During the second period, Frondizi had no support either from UIA nor from CGE. It was only during Onganía´s government, when UIA, a powerful ally with the capacity to pursue long-term investments, had an interest in the bank. This was the only period when the BCIA was capable of fulfilling its mandate of granting long-term loans with positive externalities, without being co-opted. Thus, we claim that crafting a powerful domestic coalition, with long-term projects in the real economy, occupies the central stage as the middle puzzle piece. It is the cornerstone for NDBs´ to have a cohesive mandate, the necessary and minimum condition. To be sure, this study has not looked into the factors that explain the different levels of commitment

from industrialists to long-term real economy projects, which remains as an interesting question for a future cross-country research. Possible explanations may arise from exploring macroeconomic vulnerabilities or relation with foreign markets.

After reaching this conclusion, we continued to analyse the implications that the elimination of NDBs had for ´renewed Developmental States´ seeking to perform innovative-led mission oriented policies (Mazzucato, 2015) by comparing some outstanding differences in the biotechnology policies performed by the BNDES in Brazil and by the MINCyT in Argentina. We showed that NDBs, unlike government innovation agencies, have an overarching capacity to design financial mechanisms that adapt to the specific needs of innovative and highly uncertain projects. BNDES can also cover all the stages of a project, from seed capital to scale-up and production stages, unlike MINCyT. This is crucial to create and shape new markets that could potentially lead the country to forge ahead in the next techno-economic revolution.

All in all, we suggest that crafting the necessary societal coalition, with an immanent interest in advocating for the consolidation of a NDB is indispensable for it to pursue its mandate and encourage developmental outcomes. In this sense, and given the renewed interest in industrial policies from both academy and government, we suggest that innovative entrepreneurs could be a fruitful engaged counterpart to conform NDB in the XXI century in Latin America, due to their restricted access to other kind of funding sources and the high endowment of natural resources and human capabilities in the region. To be sure, it would be necessary to conduct interviews with the entrepreneurs to understand their main needs, their potential growth and to fully engage them. Finally, the crafting of the societal counterpart ought to be complemented with the appropriate discipline mechanisms and enough international bargaining power to turn the puzzle into a glittering picture.

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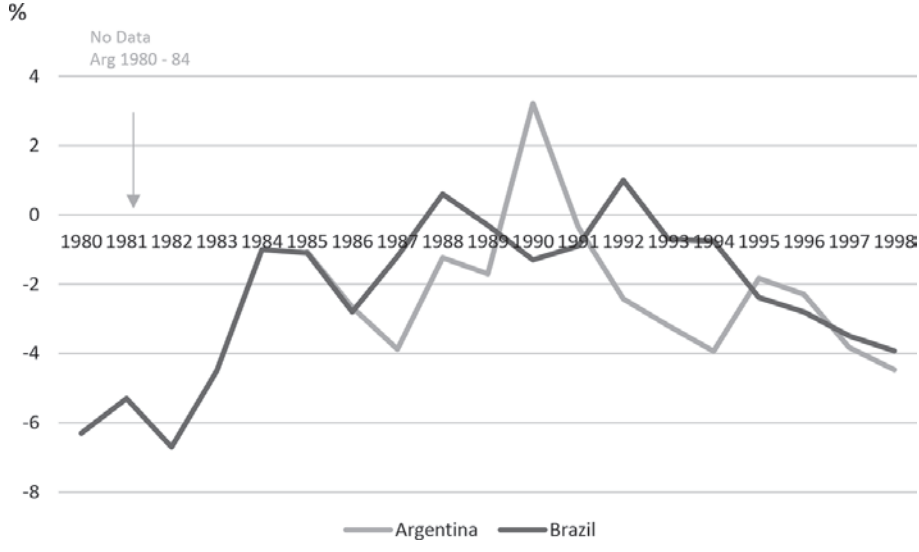
Appendix

Figure 1: Current Account Balance/GDP (%)
1980 - 1998

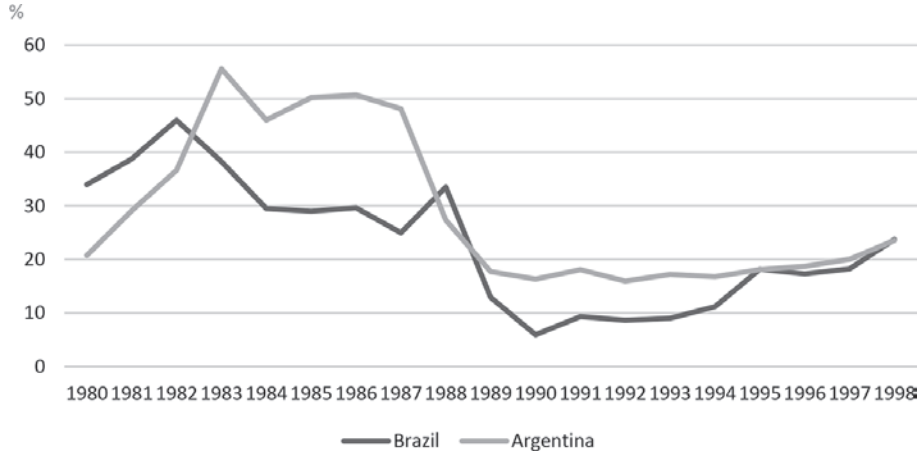


Source: Economist Intelligence Unit (EIU Country Data).

Figure 2: Total external debt service due as a % of exports
1980 - 1998

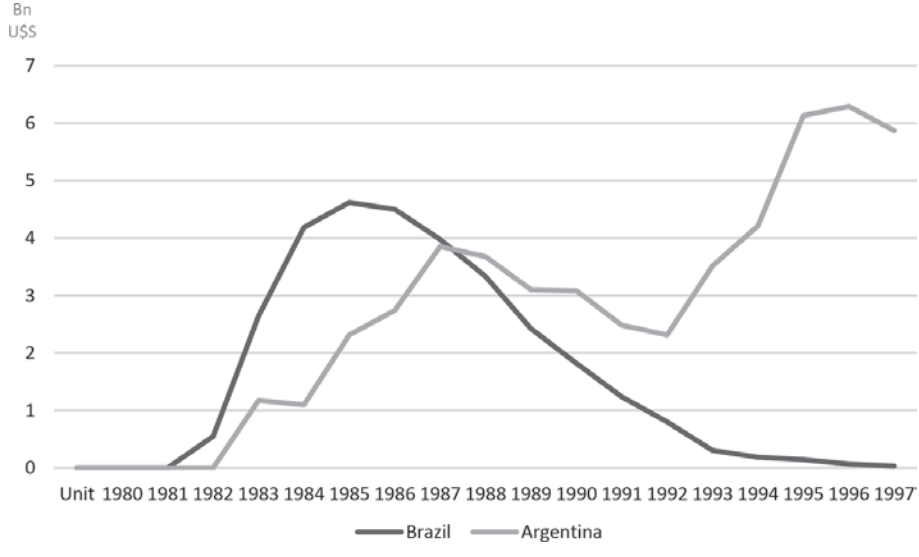
Source: Economist Intelligence Unit (EIU Country Data).

Figure 3: Interest paid on external debt as a % of exports 1980 - 1998



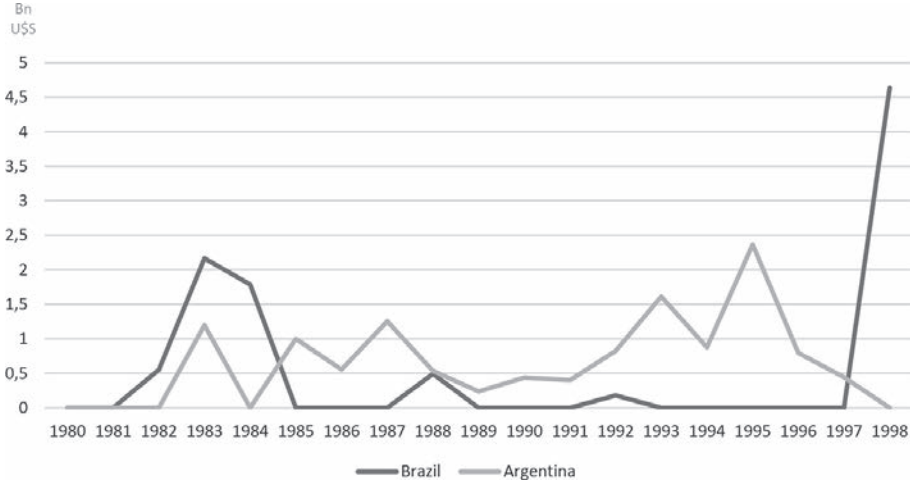
Source: Economist Intelligence Unit (EIU Country Data).

Figure 4: Debt Outstanding to IMF (SAF, ESAF, TFL) 1980 - 1998



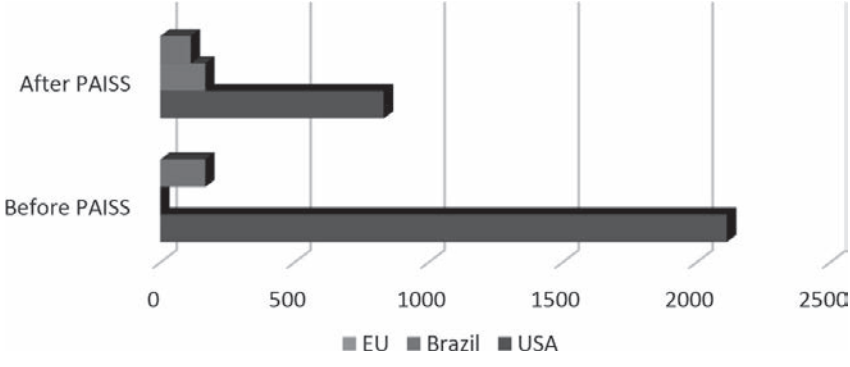
Source: Economist Intelligence Unit (EIU Country Data).

Figure 5: IMF Purchases and Loan Disbursements
1980 - 1998



Source: Economist Intelligence Unit (EIU Country Data).

Figure 6: PAISS: Impact on Production
Estimates of cellulosic ethanol production for 2015
(million liters)



Source: FO Licht, Nyko et al. (2010) and BNDES.

Table 2
Businessmen with a position in the Board of Directors of BCIA/BANADE from 1967 and 1975

Businessmen	Firms	Role	Period
Emilio Van Peborg	Rigolleau	Presidente	1967-1968
Alberto Nougues	Nougues	Vicepresidente 2do	1967
Carlos Otto Franke	Alejandro Llauró	Director	1967-1968
Enrique Stegmann	Anglo Argentina	Director	1967-1968
Rodolfo Martelli	Ducilo	Presidente	1968
		Vicepresidente 1ro	1968
Luis María Garrasino	Arriazu	Director	1968
	Moure y Garrasino		
Carlos Perez Companc	Cia Naviera Perex Companc	Presidente	1969-1970-1971
Alejandro Bulgheroni	Bridas	Vicepresidente 1ro	1969
Enrique Patrón Costas	San Martín del Tabacal	Director	1969 -1970
Jorge de Carli	Vialco	Vicepresidente	1971
Horacio Paolini	Paolini	Vicepresidente	1974-1975
Luis Montemuri	La Cantábrica	Director	1973-1974
Florencio Casale	Fabril Casale	Director	1974-1975

Source: Castellani (2008) from Rougier (2004).

Revista Latinoamericana de Desarrollo Económico
Instituto de Investigaciones Socio Económicas de la Universidad Católica Boliviana "San Pablo"
Política Editorial

Sobre la revista

La Revista Latino Americana de Desarrollo Económico (LAJED, por sus siglas en inglés) fue presentada por primera vez en septiembre de 2003, por el Instituto de Investigaciones Socio-Económicas de la Universidad Católica Boliviana "San Pablo", como iniciativa de un grupo de expertos preocupados por la difusión de investigación e información relevantes que apoyen a las políticas públicas y al sector académico.

La revista genera dos números por año, los mismos que son publicados en mayo y noviembre. Sin embargo, existen publicaciones no periódicas correspondientes a números especiales, cuyos artículos obedecen más a la necesidad de información y/o análisis actualizado y a la coyuntura nacional y regional en un momento del tiempo.

La revista tiene la misión de investigar la realidad económica y social de Bolivia y la región, con el objetivo de generar debate en la sociedad civil y aportar criterios técnicos a los diversos hacedores de políticas públicas . Está dirigida a académicos en ciencias del desarrollo, hacedores de política pública y sociedad civil.

Los trabajos que se publican son originales y de rigor académico-científico, los cuales cubren una amplia gama de temas socio-económicos; trabajos principalmente de naturaleza teórica y aplicada centrados en problemas estructurales y coyunturales de América Latina y el mundo. En estos últimos años las principales líneas de investigación que se han abordado son:

1. Desarrollo económico.
2. Análisis macroeconómico.
3. Diseño de políticas públicas.
4. Políticas de integración comercial.
5. Políticas de integración energética.
6. Cambio climático.
7. Análisis sociológico de la realidad.

Actualmente las nuevas exigencias del medio han originado que se planteen nuevas líneas de investigación, como:

8. Cohesión social.
9. Crecimiento inclusivo.
10. Economía de la felicidad.
11. Economía de la innovación, emprendedurismo y micro-financiamiento inclusivo.
12. Seguridad y soberanía alimentaria.

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2. Pertinencia del artículo en relación a la coyuntura actual.
3. Claridad del texto, incluso para no expertos en el tema tratado (debe incluir en la evaluación la ortografía y la redacción, con el fin de mejorar la calidad del artículo).
4. Rigor científico y conclusiones fundamentadas del trabajo.
5. Todo comentario, objeción o crítica debe ser formulado claramente y por escrito.
6. La decisión final del árbitro, aceptando o rechazando el artículo, debe ser sustentada con los argumentos respectivos de manera escrita.
7. El evaluador debe tener presente que otros evaluadores del mismo artículo pueden tener diferentes puntos de vista, y que el editor tomará la decisión de publicarlo con base en informes con diferentes recomendaciones. Por lo tanto, es de gran utilidad para el editor la explicación de las causas de la decisión propuesta por el examinador.

Latin-American Journal of Economic Development (LAJED)
Instituto de Investigaciones Socio-Económicas (IISEC)
Bolivian Catholic University "San Pablo"
Editorial Policy

About the Journal

The Latin American Journal of Economic Development (LAJED) was first presented in September 2003 by the Socio-Economic Research Institute of the Bolivian Catholic University "San Pablo", as an initiative of a group of experts concerned about the dissemination of relevant research and information that support debate related to public policies and academia.

The LAJED produces two numbers per year, which are published in May and November respectively. However, there are non-recurrent special issues, that ensemble articles satisfying the needs for information and/or updated analysis, in the national and regional contexts at a specific point in time.

This journal has established the mission to investigate the economic and social realities of Bolivia and the region, aiming to generate debate in civil society and providing technical criteria available to public policy makers. It is directed to academics in development sciences, decision makers and civil society.

The works that are published are original and show academic-scientific rigor, covering a wide range of socio-economic topics; these are mainly of theoretical and applied nature, focused on structural and cyclical problems of Latin America and the world. In recent years the main lines of research that have been addressed are:

1. Economic development.
2. Macroeconomic analysis.
3. Public policy design.
4. Commercial integration policies.
5. Energy integration policies.
6. Climate change.
7. Sociological analysis of reality.

The new requirements of the media have now originated new lines of research, such as:

8. Social cohesion.
9. Inclusive growth.
10. Economy of happiness.
11. Innovation Economics, entrepreneurship and inclusive micro-financing.
12. Food security and sovereignty.

The journal has the ISSN register and published articles are classified according to the classification system of the Journal of Economic Literature (JEL), which is why they obey the ISO690 quality standards. At the same time, the LAJED is indexed to Latindex, RePEc-ideas, Bolivian magazines and Scielo Bolivia.

Intructions for Authors

All authors wishing to submit a document for publication in the LAJED journal must take into account the following specifications:

A. Initial Considerations

1. The concepts emitted in the manuscripts are sole responsibility of the author(s). The submission of the manuscript to LAJED implies that the authors agree that, in case of acceptance for publication, the Bolivian Catholic University "San Pablo" will have the copyright for dissemination in both printed and electronic format to this related. The total or partial reproduction of the articles in this journal is permitted, since the complete source is explicitly quoted.
2. The documents sent for publication in the journal must be original and unpublished. In the case of submission of a document to the journal, the author must guarantee that it has not been published and/or submitted for consideration in order to be published by other media.
3. The publication of previously evaluated articles related to the discussion and dissemination of knowledge should not exceed 20% of the total articles in the journal.
4. The documents received will be evaluated anonymously by specialists in the field, attending aspects such as quality of the article, originality, relevance, methodology and literature review.

5. The articles received will be analyzed by the editorial board, which reserves the right to define whether or not they satisfy the profile of the journal. In a negative case, the authors will be informed of the decision taken via email. In a positive case, the authors will be notified of the item's receipt by email, and the work will be sent to the evaluators (members of the International Editorial Committee). According to the review, articles will be returned to the authors so that corrections suggested by the evaluator be included within a period of up to two weeks, specifying in a note and/or letter the changes made in relation to the observations performed. Later, the author will be notified by the editor regarding the final decision, accepting or rejecting the submitted article.
6. If your article was received until May of the current year, it will be published in the number corresponding to the month of November; however, if it was received until November its publication will enter the May issue of the following year as long as the item waiting list does not exceed the maximum of documents for that number. If there are surpluses of articles for a certain number of LAJED, they will automatically be considered in a next issue, if the article has already been accepted.
7. Ideas and opinions issued in the articles are the sole responsibility of the authors, so they do not necessarily reflect the opinions of the editor and/or the LAJED.

B. Review and decision process

The Latin American Journal of Economic Development (LAJED) is a peer-reviewed journal in double-blind mode, where articles are reviewed at least by two evaluators after the internal editorial board evaluation. As a general rule, the evaluators are members of the International Editorial board and beginning from the 13th edition the process is directed by the Bolivian Academy of Economic Sciences (ABCE) as an independent instance, with the aim of providing greater impartiality and technical quality to the articles presented and to avoid any conflict of interest by the authors, the evaluators and the institution in reference to aspects generally of economic, institutional or personal matters. In turn, each article is submitted for review and evaluation to a specialist in the field prior to publication; that is to say until May and November of each year with a margin of up to a month after the indicated dates.

Once the internal and external arbitration phases are carried out, formal notes are sent to the authors with the corresponding dictum. If there are controversies in the verdicts of the

two external arbitrators, the Internal Editorial Committee shall make the final decision on the acceptance or rejection of the document in question.

C. Manuscript format

1. The articles can be sent either in Spanish or English to the following emails: iisec@ucb.edu.bo and mgantier@ucb.edu.bo. They may also be sent in some magnetic and handwritten way to: Instituto de Investigaciones Socio-Económicas; Bolivian Catholic University "San Pablo"; Av. 14 de septiembre 5369, La Paz, Bolivia, Casilla No. 4850.
2. The Institute of Socio-economic research reserves the right to publish articles that are written in languages other than Spanish or English depending on the rigor and relevance of the article.
3. The document must be presented in Microsoft Word, paper size 8.5 x 11 inch, Times New Roman, font size 12 and line-spacing of 1.5. The tables and charts used must also be added to a Microsoft Excel file for editing purposes, as well as the used data. All pages must be numbered consecutively. Titles and subtitles must be numbered with Arabic and bold numbers (ex.: 1. or 2.1 or 2.1.1). Both titles and subtitles must be placed on the left hand side of the page.
4. The first page must contain the following information: (i) the title of the document (in Spanish and English), (ii) the name or names of the author (s) accompanied by a "*" calling at the foot of the page, which contains information about its affiliation (title, position, institution, physical address and contact address). The first page should also contain an abstract of no more than 150 words in both languages (in Spanish and English). The JEL code (s) (up to 5 codes can be attached to the document) and the keywords in both languages (Spanish and English).
5. The following page must include the title of the study albeit the authorship will be omitted to ensure anonymity during the evaluation process.
6. The extension of the document shall be 35 pages maximum including: Bibliographical references, annexes, tables/charts, figures/graphs and photographs.
7. The footnotes must be listed consecutively according to the text as superscript and in Arabic numerals. They should be in times New Roman size 10, simple line-spacing and justified.

8. Formulas must be processed in the Microsoft Word Equation Editor. They must also be listed consecutively in accordance with the text as: (1), (2), etc. on the right hand side of the page.
9. The figures/charts, photographs and tables/charts must follow the APA standards and be presented in high definition for better editing.
10. Bibliographic references must follow the APA regulations and must be numbered consecutively with Arabic numerals on the left side according to the page margin and in alphabetical order.

    - For newspapers:
      Oates, W., P.R. Portney, and A.M. McGartland (1989). The net benefit of incentive-based regulation: A case study of environmental standard setting. American Economic Review 79, pp 1233-42.

    - For books:
      Olson, M. (1965). The Logic of Collective Action, Cambridge. MA, Harvard University Press.

    - For works published in collections:
      Romer, C. D., and D. H. Romer (1989). Does monetary policy matter? A new test in the spirit of Friedman and Schwartz. In O.J. Blanchard and S. Fischer, eds. NBER Macroeconomics Annual: 1989. Cambridge, MA. MIT Press.

    - For working papers:
      Caselli, F. and M. Morelli (2001). Bad politicians. Working Paper 8532. Cambridge, MA. NBER.

      Further references in: www.apa.org/journals, www.apastyle.org.elecref.html

11. For documents written in the latex text composition system, both the PDF document and the Tex file must be attached in order to edit the document in the format of the LAJED journal. As well as documents in Word format, you must also get an Excel file with graphics and data used.

For the International Editorial board

The articles of the LAJED journal should be submitted for evaluation to professionals specialized in the subject matter of each article. All the evaluators will be handed a form that includes all the aspects that according to the Editorial Committee must be complied in general by the articles to be published in the journal. The evaluators will describe the degree of compliance with these aspects and will finally issue an opinion on the quality of the article in a written note. Some aspects that the evaluator should take into account are:

1. Originality and innovation of the article.
2. Relevance of the article in relation to the current situation.
3. Clarity of the text, even for non-experts in the subject matter (shall include spelling and writing in the evaluation, in order to improve the quality of the article).
4. Scientific rigor and well-founded conclusions of the work.
5. Any objection, comment or criticism must be formulated clearly and in written form.
6. The final decision of the arbitrator, accepting or rejecting the item must be supported by the respective arguments in written form.
7. The evaluator must bear in mind that other evaluators of the same article may have different viewpoints, and that the Editor will make the decision to publish it on the basis of reports with different recommendations. Therefore, it is very useful for the editor that the reasons behind the decision of the Examiner are clearly established.

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