

Latin American Capital Markets Financing the Real Economy

A Glass Half Empty or Half Full?

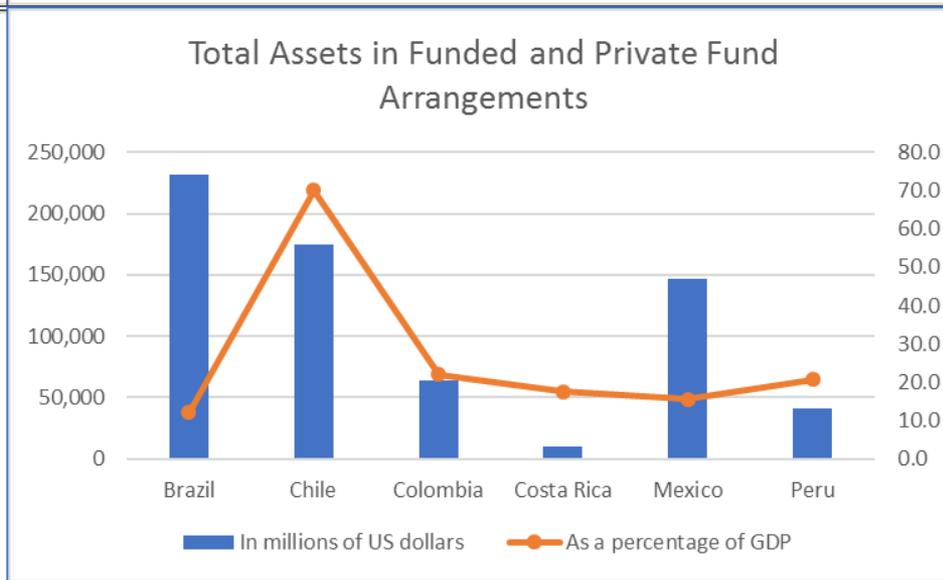
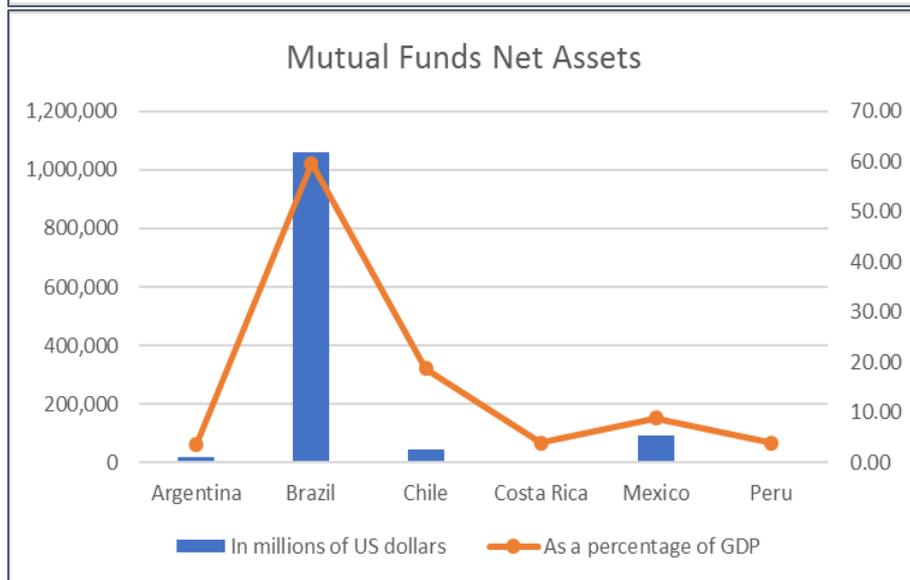
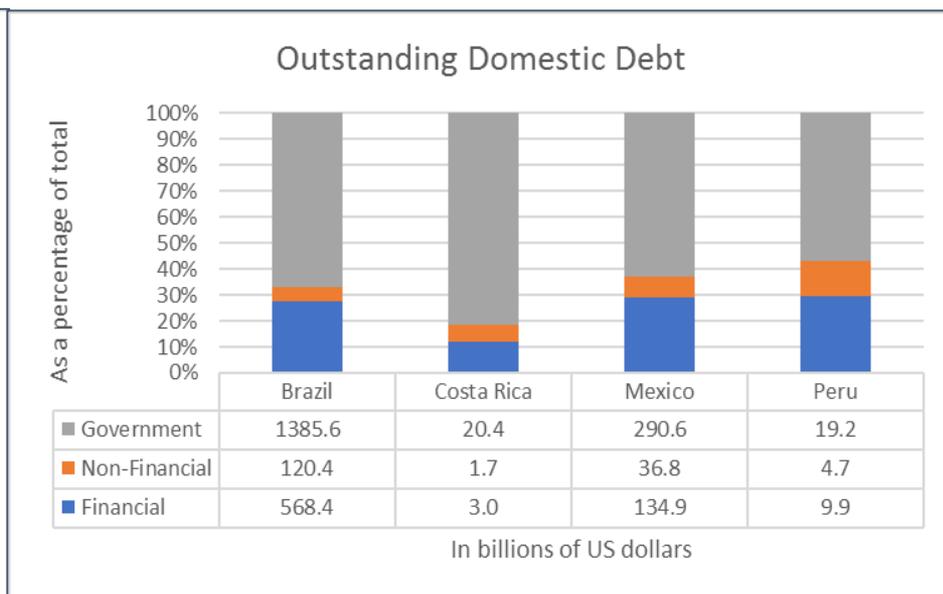
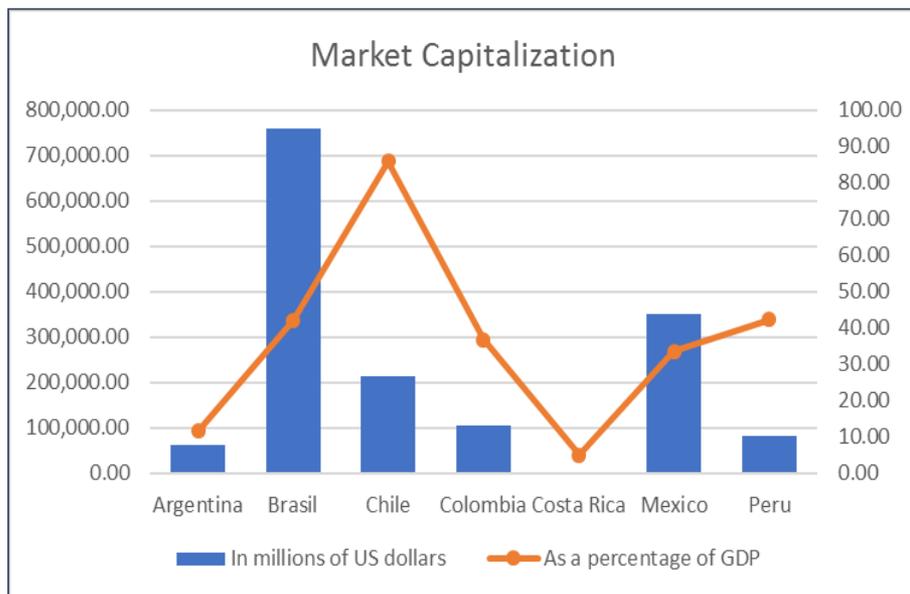
Ana Carvajal
Lead Financial Sector Specialist

Harvard Symposium: Building the Financial System for the 21st Century: An
Agenda for Latin America and the United States

December 2017



KEY INDICATORS (as of 2016)*



A GLASS HALF EMPTY?

Domestic CM have limited role in corporate financing

- Equity markets concentrated in a few large companies, with a limited number of new entrants
- More dynamism in debt markets, but still open mostly to financial and larger non-financial corporates

Limited investor base

- Only pension funds have sizable assets across many countries in the region
- Life insurance at nascent stage (except for Chile)
- Limited direct retail investor participation and very small CIS industry (except for Brazil)
- Substantial foreign inflows – but focusing on government bonds and larger corporates (and in many cases, financing takes place in the international markets)

OR HALF FULL?

Region pioneer in mobilization of pension funds to infrastructure financing

- Chile (1990s-2000s) and more recently Brazil, Colombia, Mexico, Peru and even smaller countries (Costa Rica, El Salvador)
- Many instruments being tested (CKDs and CERPIs in Mexico, infrastructure funds in Brazil, Colombia and Peru and project bonds in all these countries)

Efforts in expanding access to corporates, but impact uncertain

- Creation of differentiated market to attract foreign investors (Brazil)
- Creation of differentiated market for institutional investors (Colombia and Peru)
- SME markets in Brazil, Chile, Mexico and Peru (in some cases accompanied by rationalization of disclosure and CG requirements)
- Some innovation in products (SME guaranteed bonds in Argentina, SME receivable funds in Chile and Peru, SME bond fund in Peru, exchange platform for factoring in Chile)

WHAT HAS BEEN DIFFERENT WITH INFRASTRUCTURE FINANCING

High level alignment of “interests”

- Although complex, more ability for public authorities to influence the supply side (via PPPs)
- Size of funding gap provides space for CM solutions to complement banking lending
- Infrastructure investment aligned with profile of institutional investors – help to diversify portfolios and potentially also, increase profitability

Understanding of challenges and sustained commitment by many public authorities to address them

- Efforts to identify gaps via consultations with multiple stakeholders, sometimes with MDBs (like the WBG) supporting the process
- “Concerted” policy reforms in different areas from PPP side, to capital markets and pension funds regulations and revisions to tax treatment of instruments
- More than one iteration of reforms

Innovation in instruments with a view to aligning risk-return appetite of institutional investors (domestic and in some cases also foreign)

- Increasingly use of public funding to spur private sector participation (i.e. development of credit guarantees and more recently tools also to hedge FX risk with support from MBDs such as the WBG)
- In many cases, support from MDBs, such as the WBG, as comfort investors

WHAT HAVE WE LEARNED

Sustained commitment key to accelerating mobilization of CM to corporate financing

- Constitute a committee with representatives from public and private sector
- Benchmark yourselves (see example)
- Make benchmark public and provide periodic updates on progress

WHAT HAVE WE LEARNED

EXAMPLE OF CRITERIA TO BENCHMARK CORPORATE DEBT MARKETS (FOCUS ON DOMESTIC INVESTORS)*			
Access	Market efficiency	Aligning risk-return appetite of investors	Legal and regulatory environment
Availability of “agile” private offering regime	Availability of credible ratings	Availability of different types of instruments	Credible supervisor
Differentiated requirements for public offering depending on size of company	Availability of credible research	Availability of CIS structures to create volume/size and which are tax efficient	Efficient mechanisms for dispute resolution
Differentiated and efficient processes for registration of public offerings (issuance programs, seasoned issuers, etc)	Pre and post-trade transparency aligned with market structure	Availability of credit enhancements	Robust but flexible insolvency regime
Tax neutrality between different types of funding (tax treatment of loans versus debt)	Alignment of market “model” with market structure	Credible financial information from issuers	Availability of credit information
Availability of specialized market participants to support issuance and structuring	Depth of market		

* MSCI Emerging Markets Criteria useful as a benchmark to expand foreign investors’ participation

WHAT HAVE WE LEARNED

Innovation key to align appetite of institutional investors

- Use of funds to create volume to make smaller corporates more attractive to institutional investors (i.e. SME bond funds)
- Use of funds to link banking and real based lending into CM solutions (Funds specialized in factoring, leasing, loans, etc)
- Adapt current public guarantee schemes for loans to serve CM instruments (i.e. first loss in SME securitization, or SME bond funds, etc)
- Use innovation to expand credit information (i.e. development of credit scorings based on non traditional information)

Concerted policy changes critical for true catalytic effect

- Supply (review of regulatory requirements to access the market, tax neutrality of different funding options, etc)
- Demand (investment rules of pension funds, taxation of investors)
- Market infrastructure (availability of reliable information, ratings, research, improvements in clearing and settlement, etc)

WHAT HAVE WE LEARNED

BUT, only improvements in preconditions will lead to quantum leaps

- Macroeconomic conditions, size of the economy, and level of savings are key determinants of market potential, along with rule of law
- In general there is progress –but uneven across countries in the region and with “hiccups”
- The structure of pension systems is a big ticket in the agenda with significant impact on CM development

Regional integration often cited as the “quick solution” for smaller markets

- Conceptually appealing but politically complex –thus take time
- And it does not substitute the need to work on preconditions

Annex

HOW IS THE WBG HELPING LAC IN LONG TERM FINANCE? – STYLIZED TEMPLATE FOR INFRASTRUCTURE

A one stop solution across the value chain, involving multiple expertise

Supply side

- Project pipeline:
- Standardization, bidding procedures for capital markets solutions
- Project Feasibility Fund and Contingent Liability framework and training
- Instrument design: bonds, funds and credit enhancement instruments

Demand side

- Long term investors rules and minimum return benchmark rules
- Capacity building for LT investors and regulators
- Sector policy changes in some cases (e.g. annuities hedging in Colombia)
- Improved conditions for foreign investors (e.g. taxes, fx hedging)

Market architecture, infrastructure and regulations

- Pricing: government bond yield curve and credit rating
- Prudential regulations for credit enhancement instruments
- Market regulations: issuance, securitization, SPVs, etc.

Role of MDBs (depending on context)

- Outright investments/interventions on balance sheet
- Catalytic role to crowd-in private sector
- Pooled financing: Bond bank models

CASE STUDY: COLOMBIA

The Challenge

- A USD 26 bn pipeline of toll roads and other growing infrastructure needs
- Insufficient funding from domestic banks
- Shallow corporate bond market (5.6 % of GDP)
- Large but very concentrated pension fund industry:
 - USD 80 billion (20 % of GDP), 4 pension funds of which 2 hold 80 % of assets.
- High risk averse institutional demand below AA+

CASE STUDY: COLOMBIA

The Solution: A proactive set of coordinated policies

- **Standardization of public-private partnership (PPP) contracts**
- **Changes to infrastructure fiscal support to toll road program**
 - From 15 to 30 % availability payments in USD
 - More frequent payments to compensate for traffic shortfalls
- **Capital markets support**
 - Creation of a development bank, *Financiera de Desarrollo Nacional (FDN)*, to support market-based financing solutions with emphasis on capital markets: guarantees, take out facilities
 - New regulations for the offering of issuances to institutional investors to make the offering more efficient
 - Changes in fund regulations to allow for infrastructure debt funds and in parallel changes to institutional investors regulations
- **WBG support included:**
 - Supporting the infrastructure agency, *Agencia Nacional de Infraestructura (ANI)*, in contract standardization and quality control of project structuring
 - Investment in equity of FDN by IFC
 - Supporting FDN in design of guarantees, standard project bonds and capacity building,
 - Investing in infrastructure debt fund
 - Supporting the financial supervisory agency, *Superintendencia Financiera de Colombia (SFC)* and the Ministry of Finance on the development of a set of regulation including regulations for the offering regime, regulations for mutual funds and project finance regulations.

The Billion Prices Project

Big Data in Macroeconomics

Alberto Cavallo
MIT & NBER

Symposium Building the Financial System
Harvard Law - December 2017

Big Data in Macroeconomics

- Increasing demands for better data in macroeconomics ([Eichengreen \(2015\)](#) , [Summers \(2016\)](#))
- But macroeconomists rely mostly on data collected by governments → [Griliches \(1985\)](#) The Uneasy Alliance

“... we have shown little interest in improving it [the data], in getting involved in the grubby task of designing and collecting original data sets of our own. Most of our work is on “found” data, data that have been collected by somebody else, often for quite different purposes... “They” collect the data and are responsible for all their imperfections. “We” try to do the best with what we get, to find the grain of relevant information in all the chaff.”

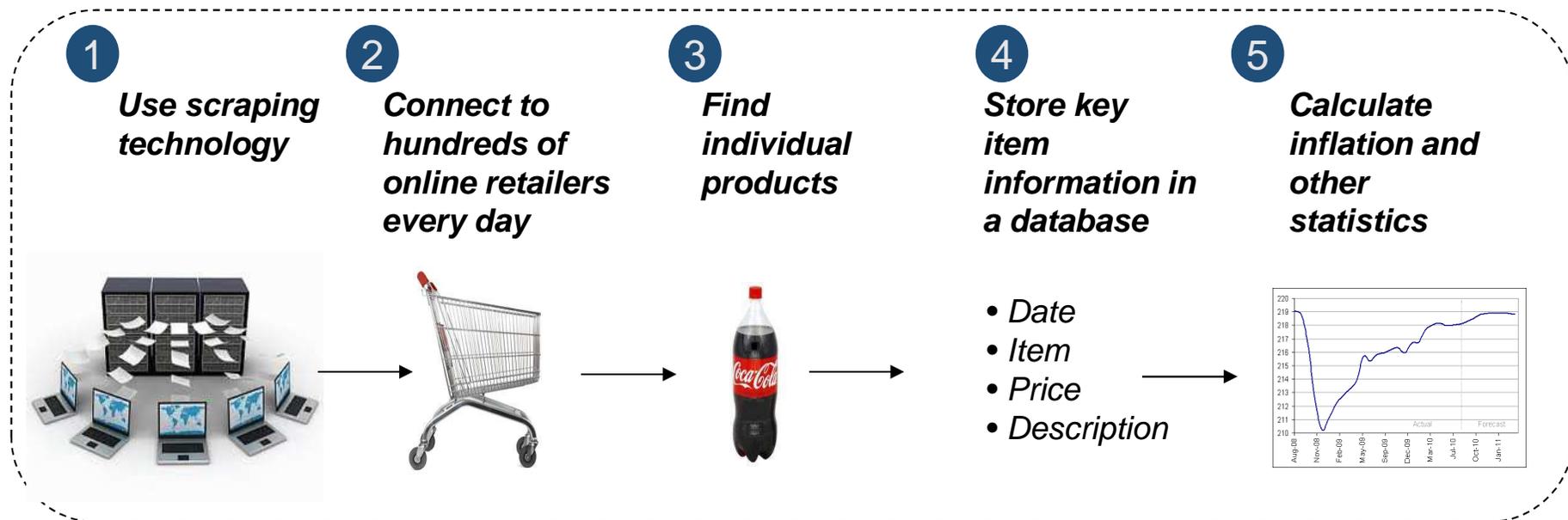
- Can Big Data help? ([Einav & Levin \(2014\)](#))

Big Data in Macroeconomics

- New technologies for data collection
 - New not necessarily big
 - Open access (governments cannot restrict)
- Traditional data sources
 - Survey methods (National Statistical Offices)
- New data sources
 - Administrative data (eg. tax, property records, banking records)
 - Scanner data (eg. Nielsen)
 - Search data (eg. Google, Indeed)
 - Satellite data (eg. lights, parking lots, tanker and crop heights)
 - Sensor data (smart phones, smart watches, IOT devices)
 - Online data (eg. Billion Prices Project)
 - Crowd-sourced data (eg. mobile phones)

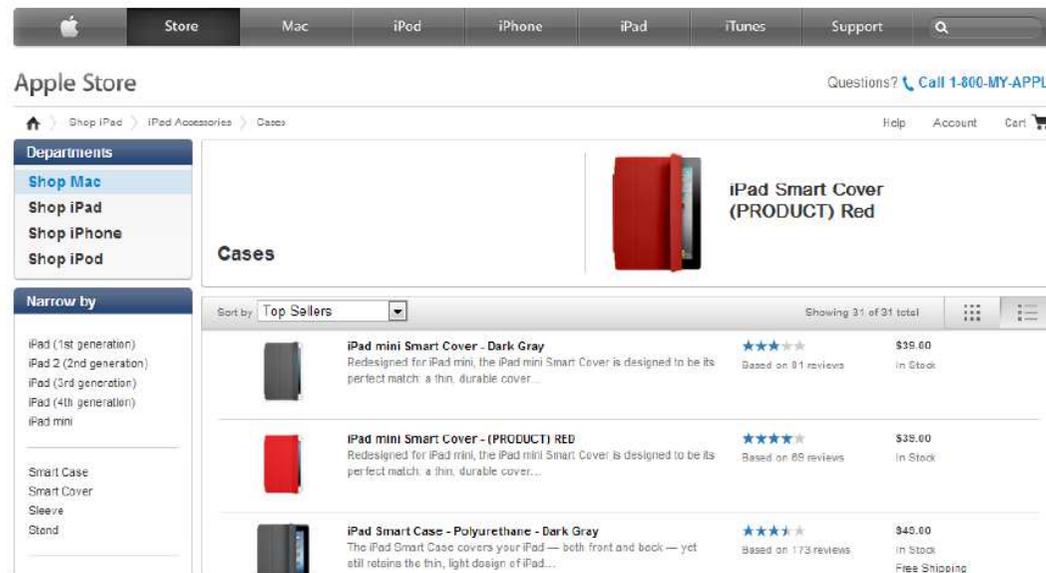
The Billion Prices Project

- Academic initiative to collect and use online price data for economic measurement and research
 - Daily prices since 2008
 - From hundreds of large multi-channel retailers
 - In over 60 countries



Web-Scraping Online Data

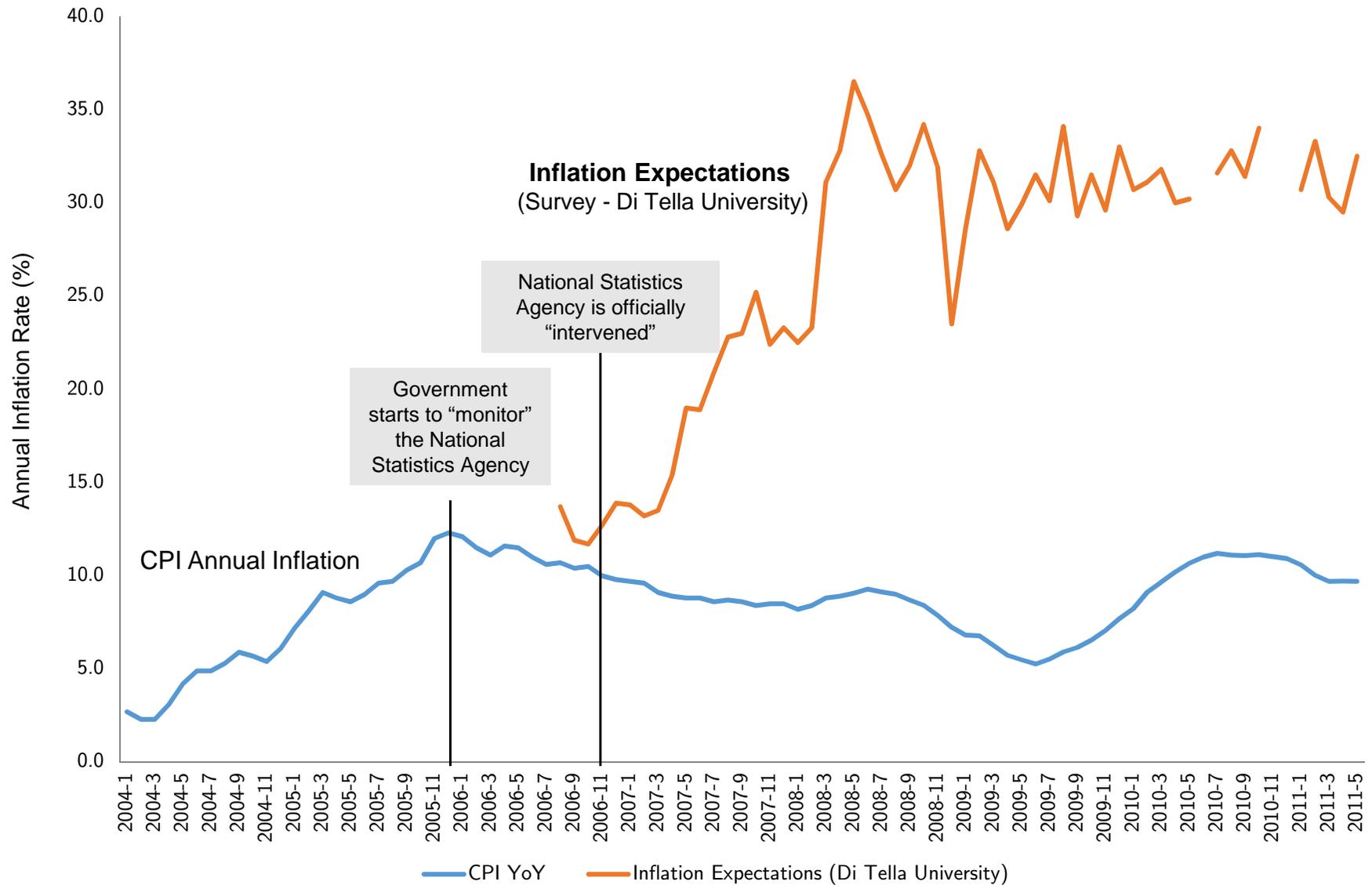
- Every day a software downloads a public webpage, analyses the HTML code, extract product data, and stores it in a database



```
<html>
<!-- START product -->
<a href="productId=MD963LL"></a>
<p class="productname">Ipad Mini Smart Cover – Dark Grey</p>
<td class="Price">$39.00</td>
<!-- END product -->
```

.....

The Case of Argentina's Missing Inflation



Could online prices help?

- Largest supermarkets posted all prices online (but few online sales at the time)
- Cavallo (2013) → scraped daily prices for all products sold by the largest supermarket in 5 Latin American countries (about 11K daily prices each).
- Applied standard CPI methods :
 1. Price changes at product level,
 2. Unweighted geometric means within categories,
 3. Aggregated using a weighted arithmetic mean and official weights for the sectors covered

Online indices matched CPIs in other countries

Supermarket Price Index

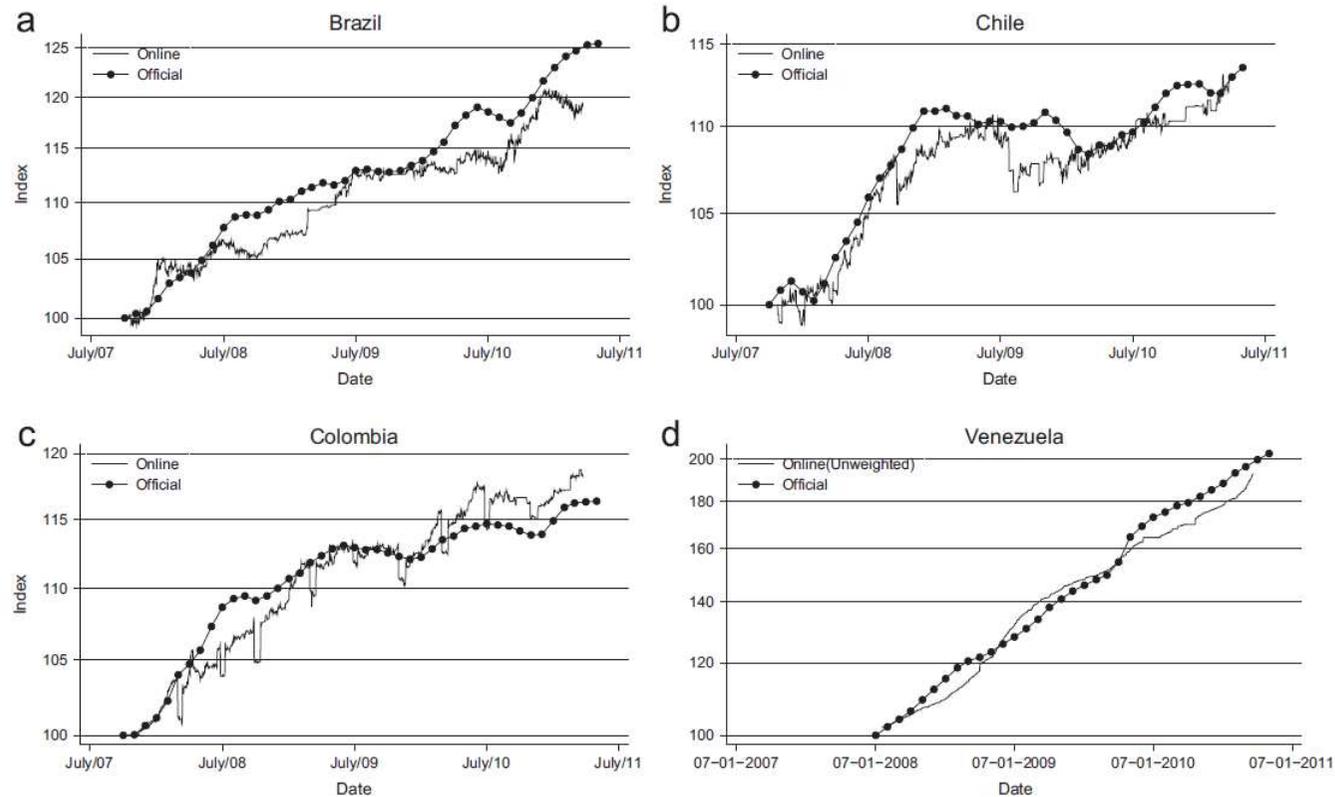


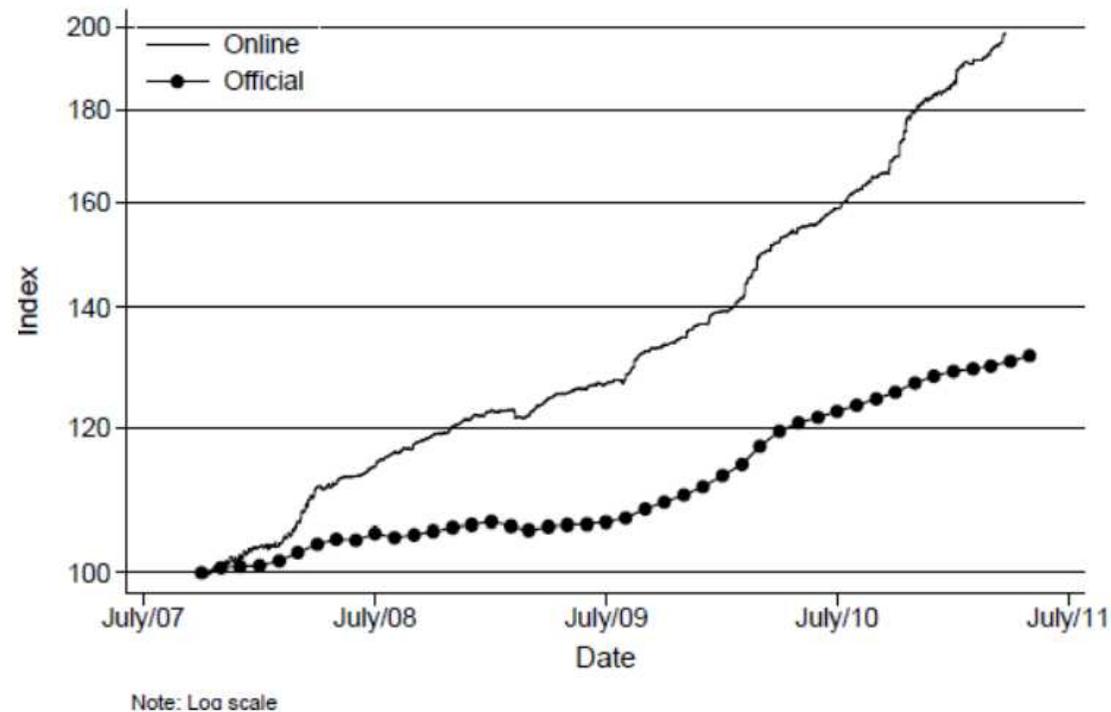
Fig. 1. Online and official indexes in four Latin American countries: (a) Brazil; (b) Chile; (c) Colombia; and (d) Venezuela. *Notes:* The daily online supermarket index is constructed with an online prices and official CPI category weights. In Venezuela, the online data has no category information and therefore the online index is built as a geometric average of all price changes observed each day. The official supermarket index is an equivalent indicator constructed as a weighted average of the “Food and Beverages” and “Household Products” official price indexes in each country.

Source: Cavallo (2013) Online vs Official Price Indexes: Measuring Argentina’s Inflation - Journal of Monetary Economics. Vol 60.

Something was wrong with Argentina...

Argentina

(a) Daily Index



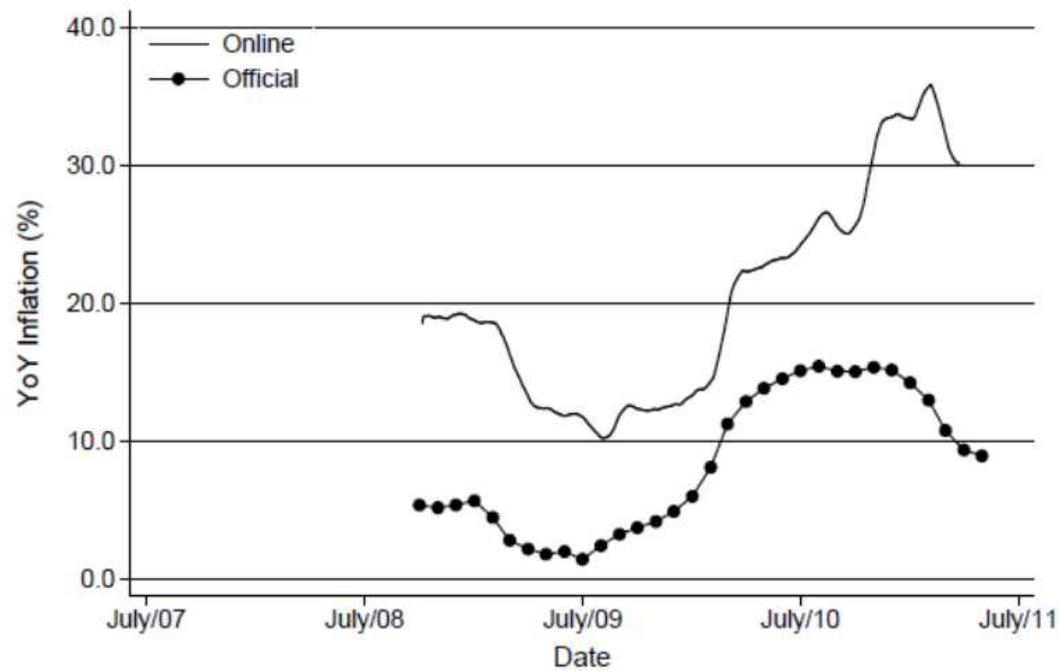
- In 4 years online prices had increased 100%, the CPI only 25%

Different level but similar dynamics

- The annual inflation rates behaved similarly over time

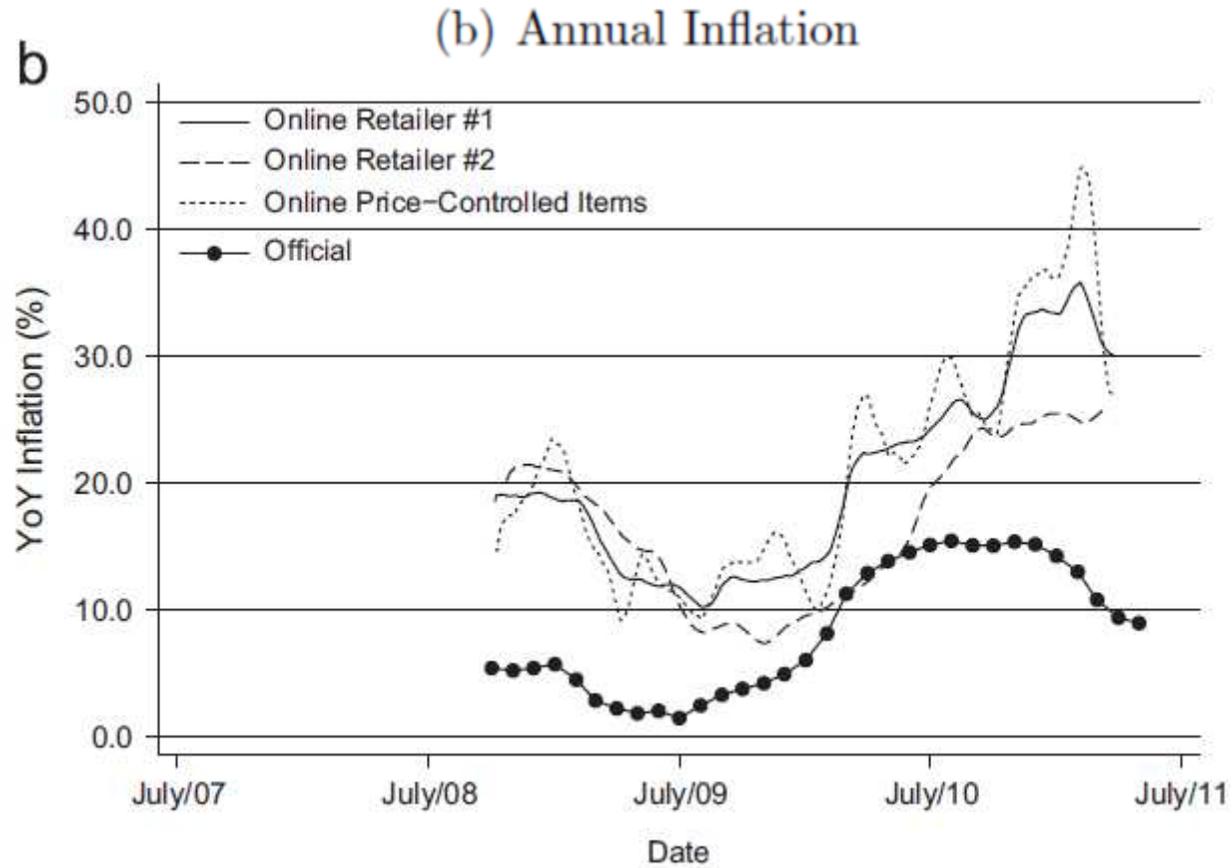
Argentina

(b) Annual Inflation



Not explained by retailer, method, or goods

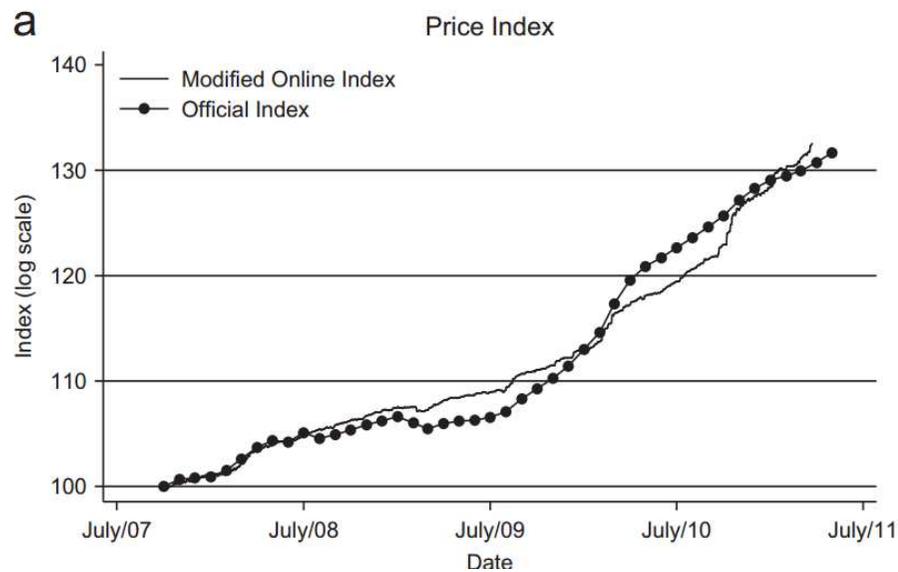
Argentina



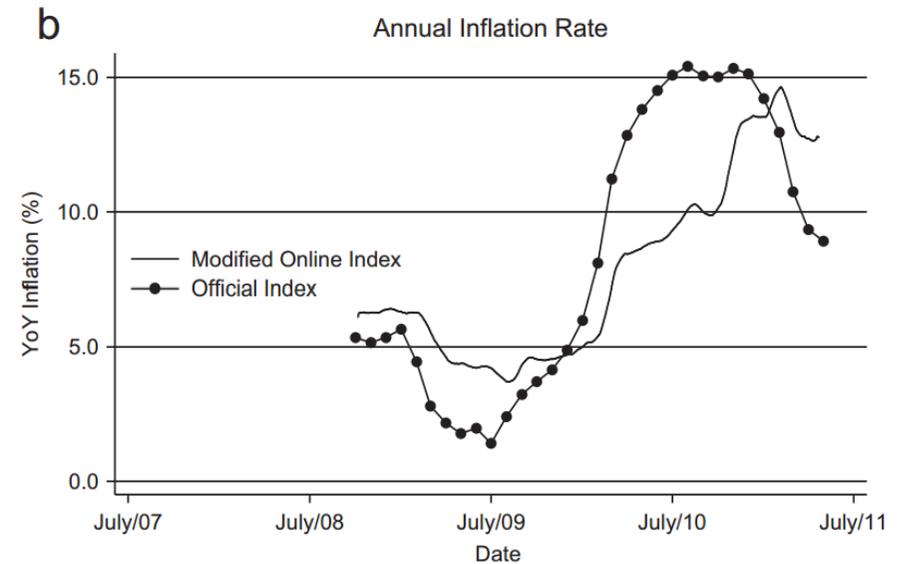
Best way to match the official data?

- Take the online inflation rate and divide by 3.

Argentina

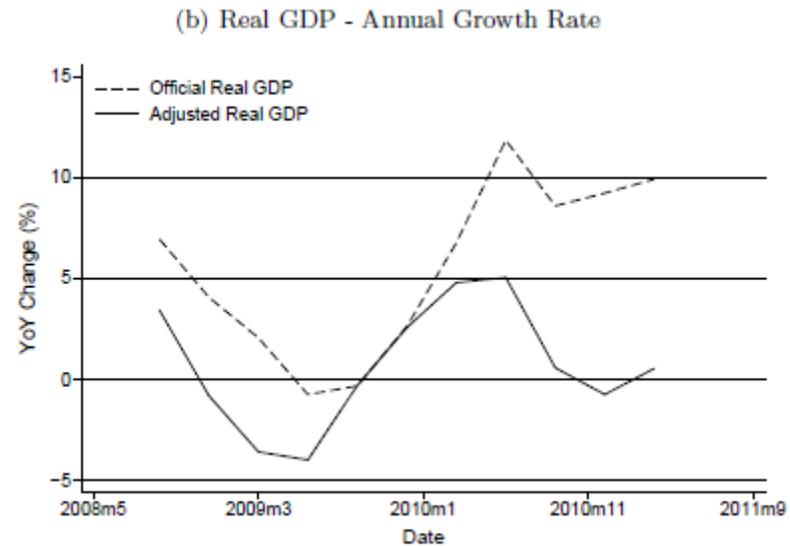
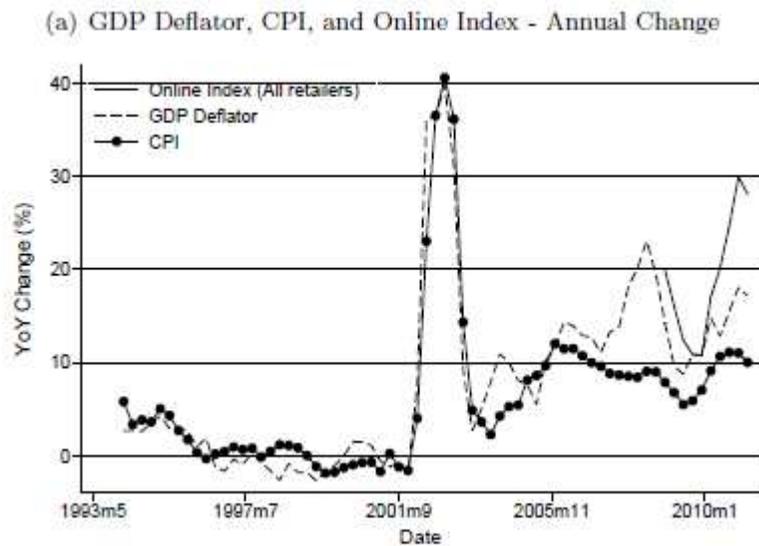


Argentina



Statistical Crisis

- By underestimating inflation they overestimated growth



Todos los días buscamos los precios de un listado de productos en supermercados y calculamos la verdadera inflación de alimentos en Buenos Aires.

Ultima Actualización: 1 Nov 2011 -  [Enviar por Email](#) - [Si no podés ver los gráficos instalá el [Flash Player](#)]

Compartir |    

Los Precios Hoy

Somos un [grupo de economistas](#) que todos los días registra los precios de un [listado](#) de productos en dos grandes supermercados de Buenos Aires y los publica en este sitio.

En esta sección mostramos un resumen de nuestras principales estadísticas, basadas en la evolución diaria de dos índices propios de inflación:

- Un *índice de Alimentos y Bebidas*, equivalente al 31% del IPC.
- Un *índice de la Canasta Básica Alimentaria*, como el que el INDEC usa (o usaba) para calcular el nivel de indigencia

En la sección [Novedades](#) hacemos un análisis periódico de los datos. En la secciones de [Precios](#), [Aumentos](#) y [Caídas](#) se pueden ver detalles de precios individuales. Finalmente, en [Metodología](#) y [Preguntas](#) explicamos cómo lo hacemos y cómo podés ayudarnos.



Novedades

Email:

Administrado por FeedBurner

 Suscribir con RSS

INFLACION ANUAL

23,7 %

Alimentos y Bebidas

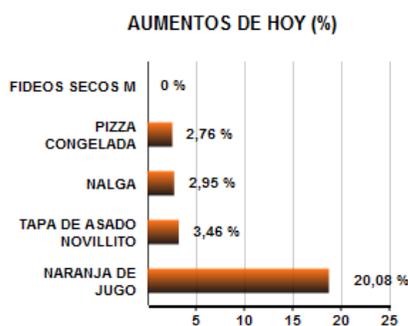
www.InflacionVerdadera.com

INFLACION ANUAL

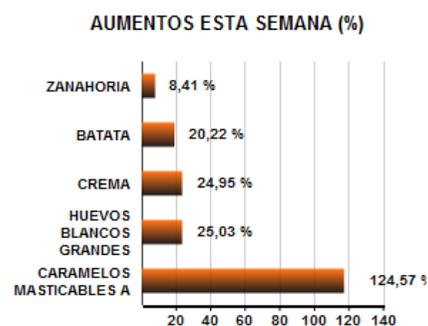
25,4 %

Canasta Basica

www.InflacionVerdadera.com



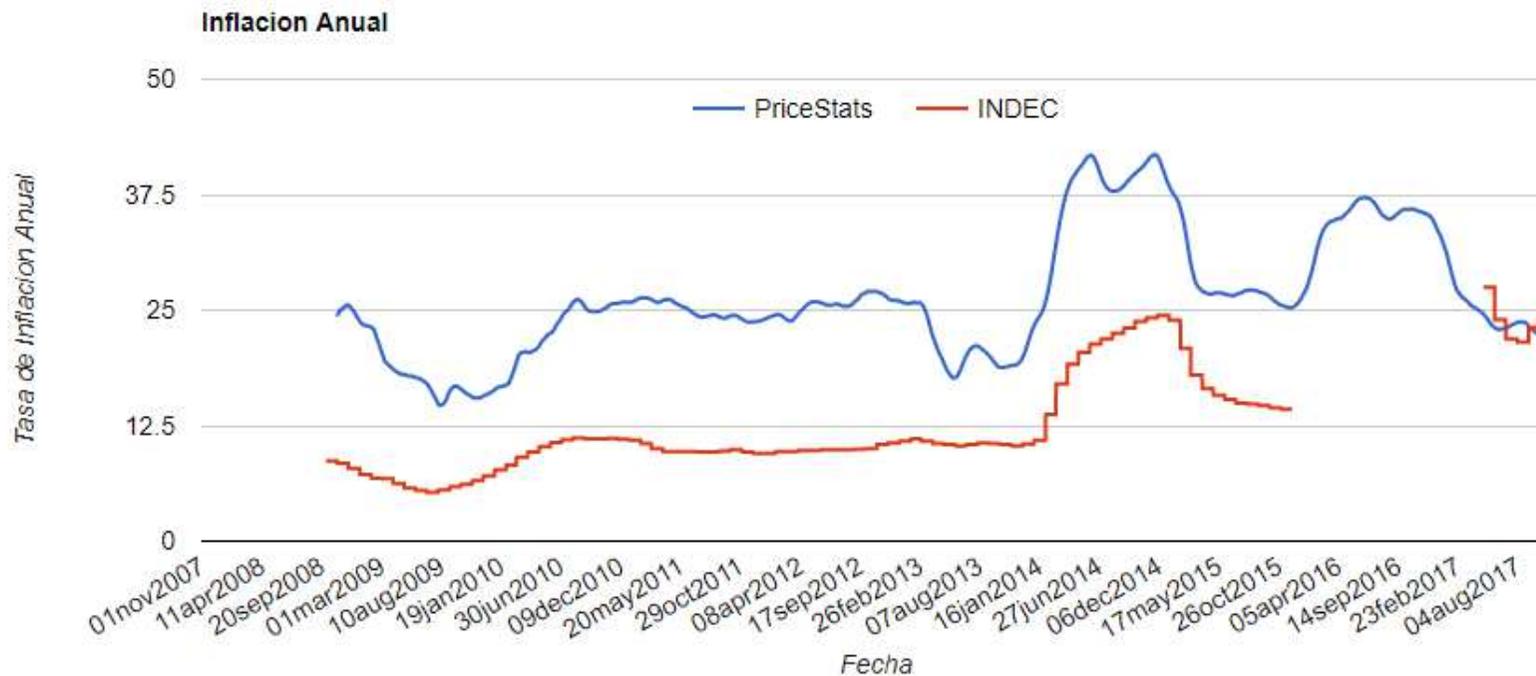
Fuente: www.InflacionVerdadera.com



Fuente: www.InflacionVerdadera.com

(incluye precios que entran y salen de oferta)

Since 2016, Argentina s CPI closely matches our index



Three related initiatives

INFLACION VERDADERA

Con el apoyo del Billion Prices Project @ MIT Sloan y Harvard Business School

www.inflacionverdadera.com

- Alternative inflation indices for Argentina (online) and Venezuela (crowdsourced)
- Started in 2007

THE BILLION PRICES PROJECT

MIT MANAGEMENT
SLOAN SCHOOL

www.thebillionpricesproject.com

- Academic initiative to use new data sources in macro and international research
- Started in 2008

PriceStats[™]

www.pricestats.com

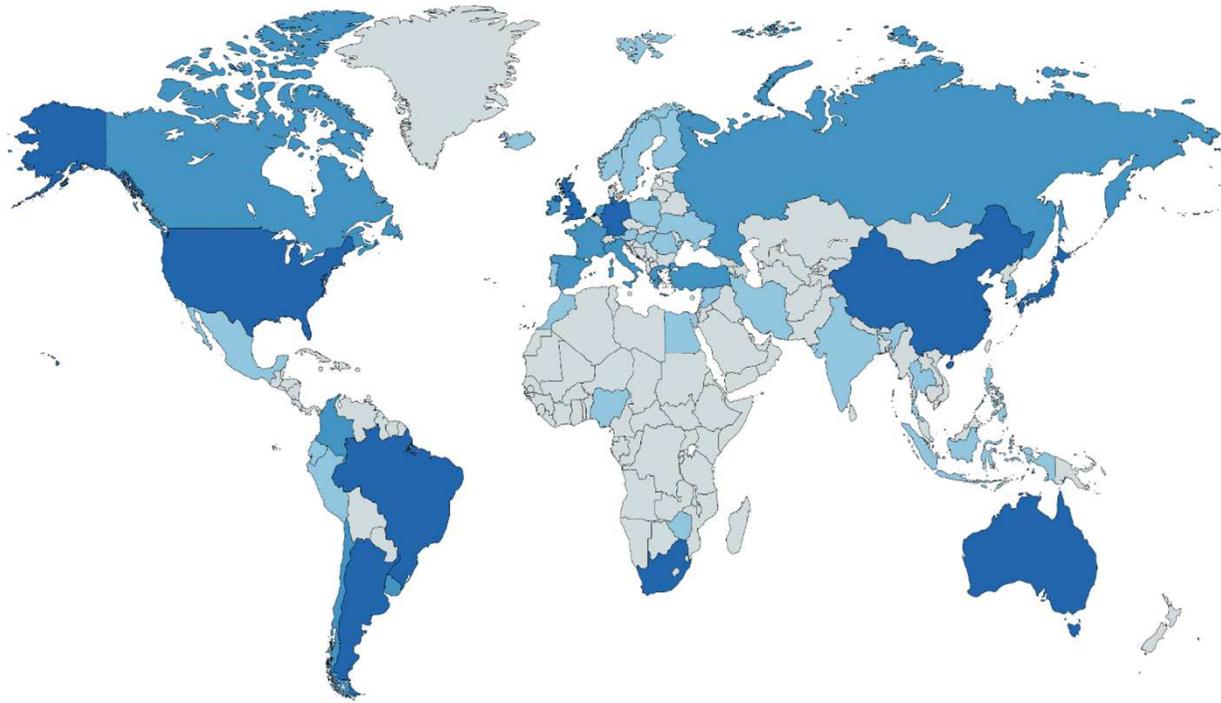
- Private company that collects daily price data from thousands of retailers that sell online, publishes daily inflation and PPP series (distributed by State Street)
- Started in 2011

PriceStats Daily Inflation and PPP Indicators

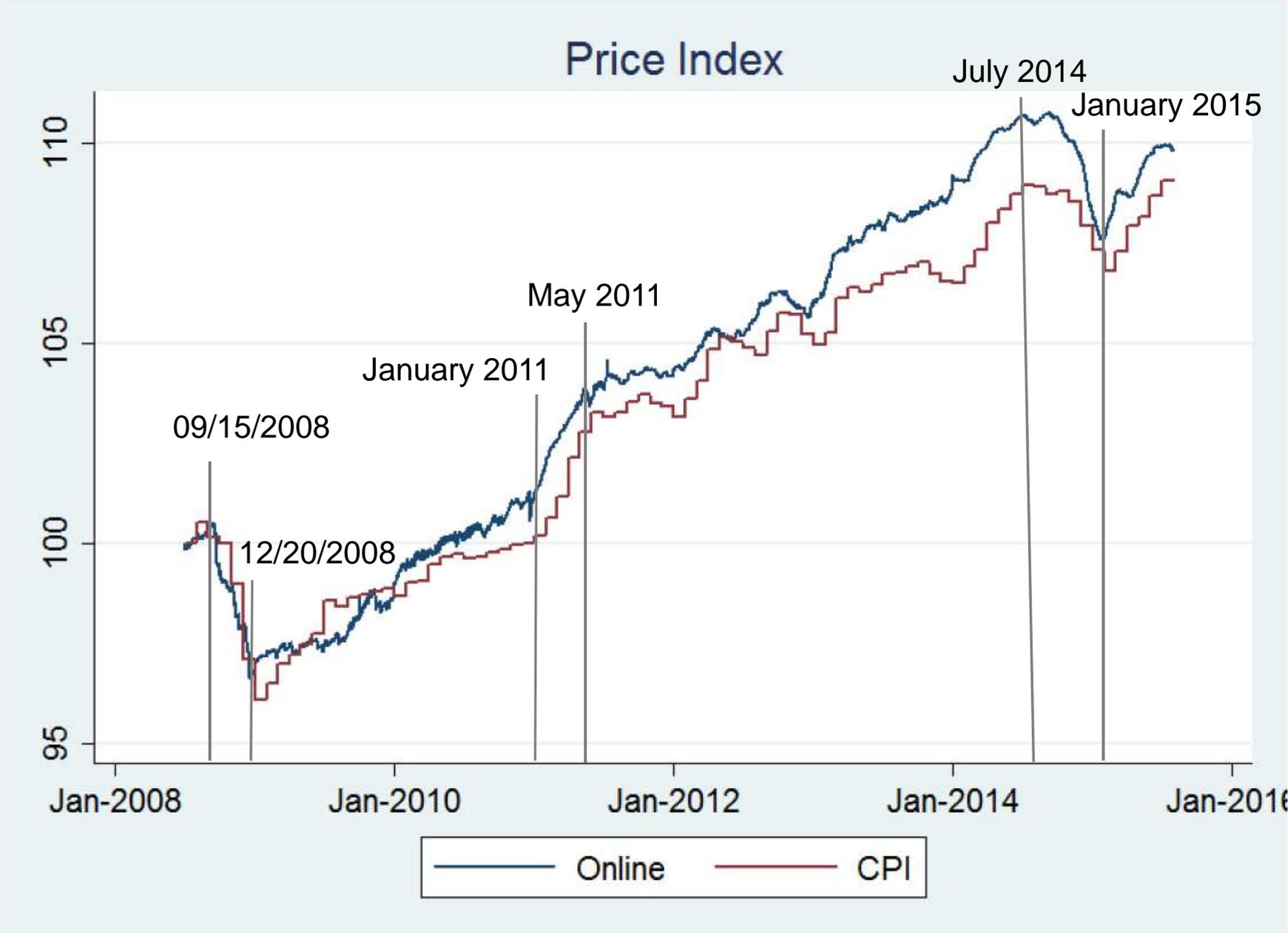
OUR GLOBAL REACH

PriceStats collects price information from over 1,000 retailers across nearly 70 countries. We publish daily inflation series for over 20 countries and PPP indices for 8 economies. Most of our series start in 2007-2008.

-  Inflation & PPP Series Available
-  Inflation Only Available
-  Active Data Scraping



US Daily Price Index



Source: Cavallo & Rigobon (2016) "The Billion Prices Project", Journal of Economic Perspectives, Spring 2016, Vol 30(2):151-78.

Anticipation: Lehman Brothers Bankruptcy

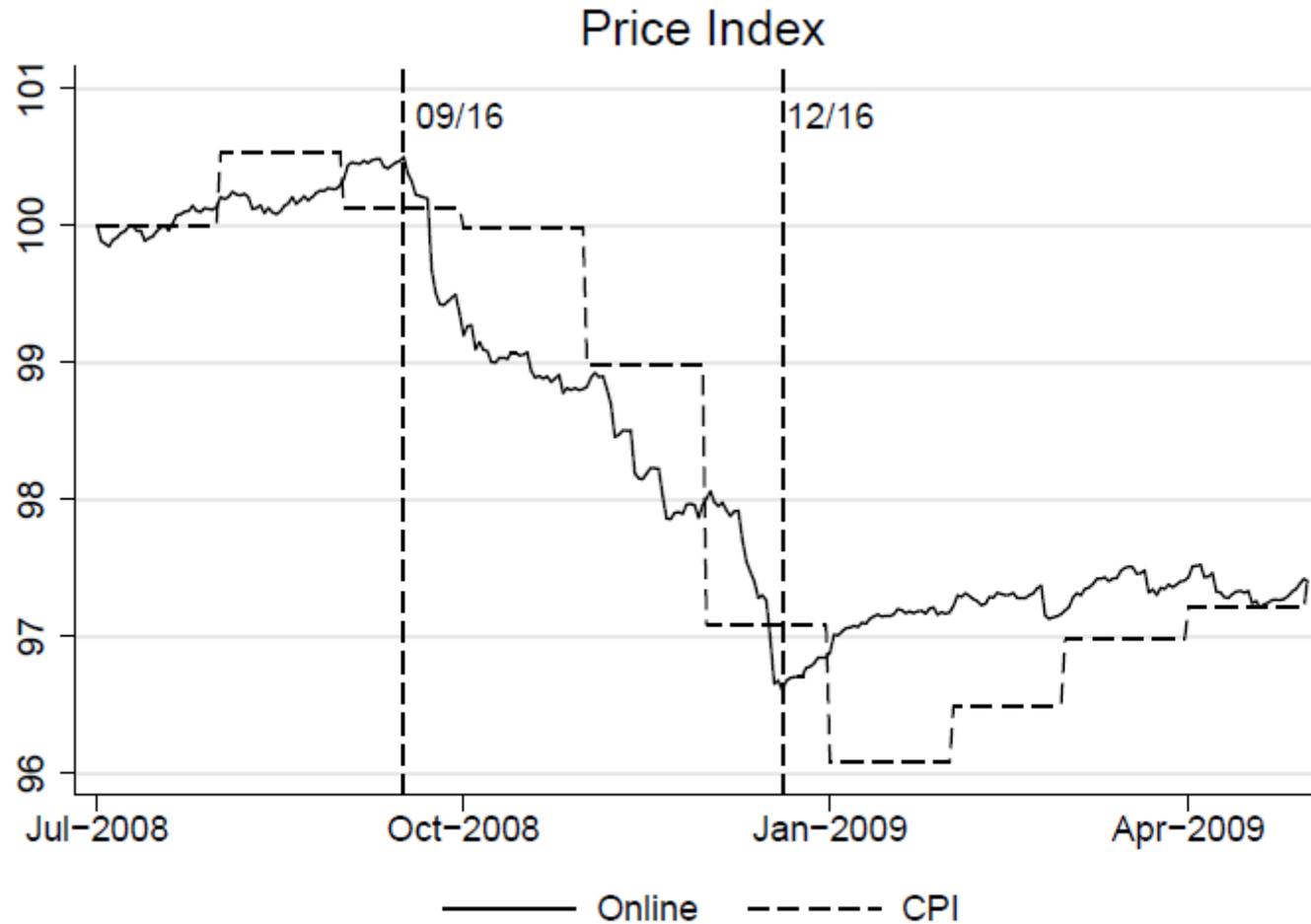
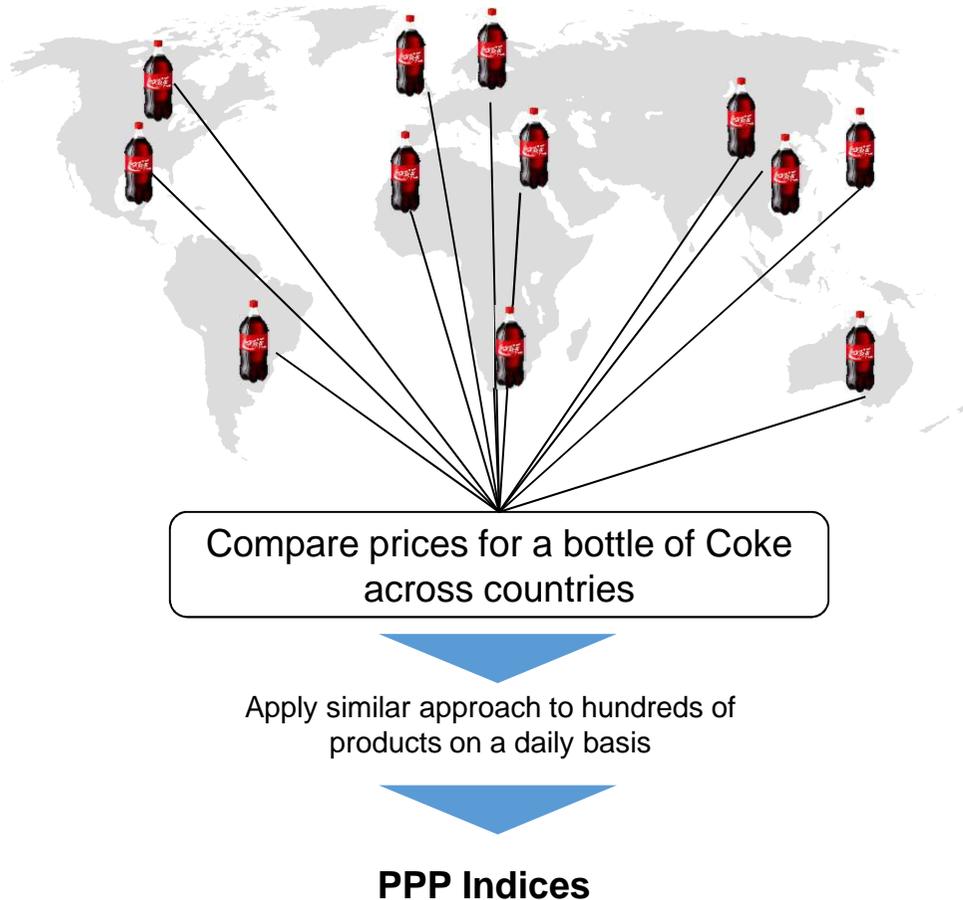


Figure 3: US Price Index around Lehman Brother's Bankruptcy

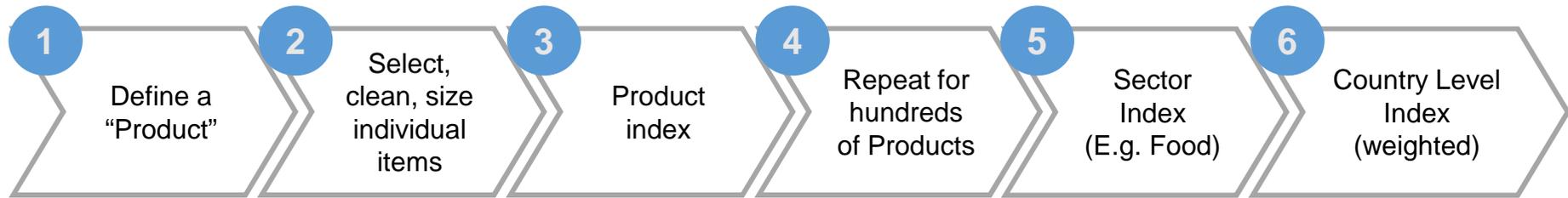
International Relative Prices with Online Data

Illustration: International Prices



- The objective of the PPP series is to help determine whether currencies are under or overvalued over time
- Online prices represent an effective tool to measure PPP fluctuations
 - Identical items sold around the world
 - Detailed descriptions to achieve a nearly perfect matching
 - Daily Prices
- PriceStats indices:
 - More than 300 narrow product categories
 - With > 50 thousand individually matched items
 - In food, fuel, and electronics
 - High frequency releases
 - Sector and Country-Level Indices

PPP Methodology



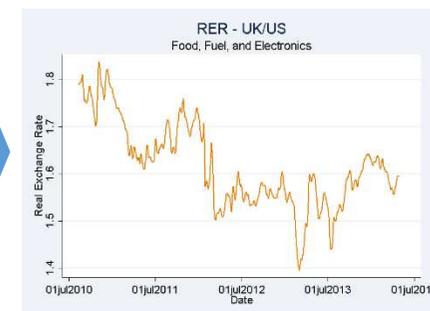
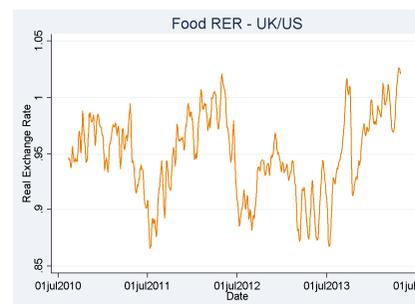
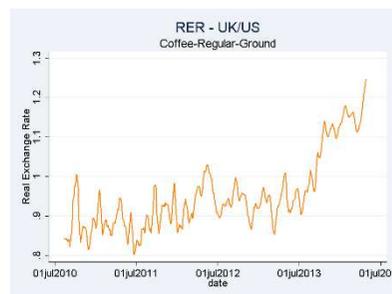
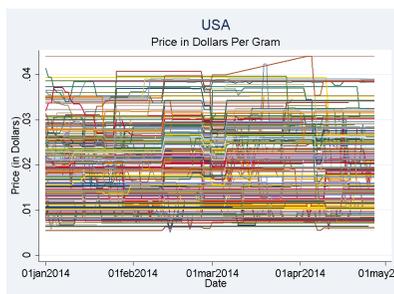
- Very narrow product definition
- Must be available in multiple countries
- Branded and Unbranded categories

- Dozens of items per "product" in each country
- Different retailers, brands, and sizes

- Product availability varies across countries and time
- If a good is not available in the US, it will not appear in our series

- Some sectors are cheaper, others more expensive

- Use to compare Eppp and E



Relative Prices and Exchange Rates

Real Exchange Rate

- The relative cost of a large basket of identical goods when expressed in the same currency

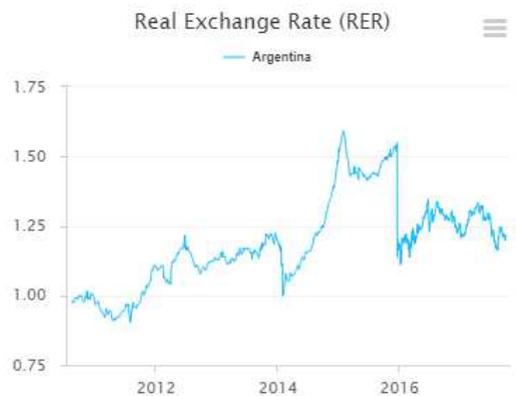
$$RER = \frac{P_{lc} \cdot E}{P_{us}}$$

Relative Price Level

- The relative price in local currencies
- The sub-component of the RER that we are measuring (the other is the market nominal exchange rate E)
- Useful to distinguish whether movements in the RER are coming from local prices or E.

PriceStats Purchasing Power Parity Series

Real Exchange Rate (RER) and Components

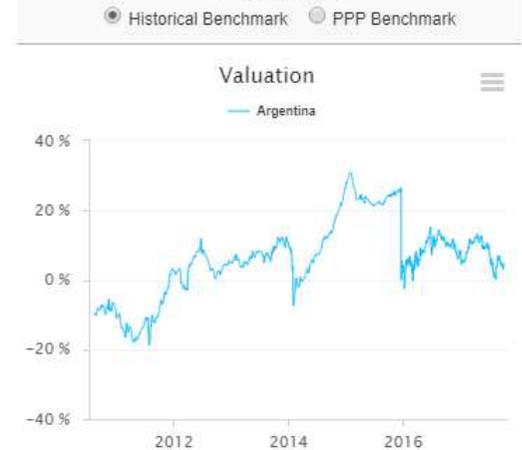


Components of RER

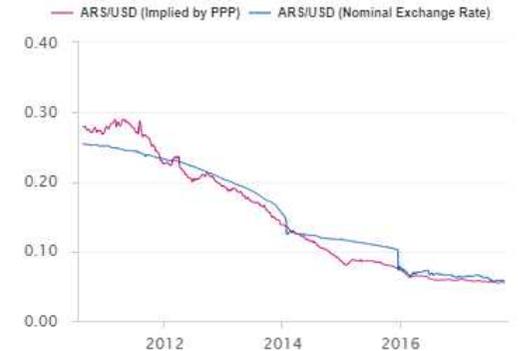


Argentina 6m 1y 2y

FX Implications



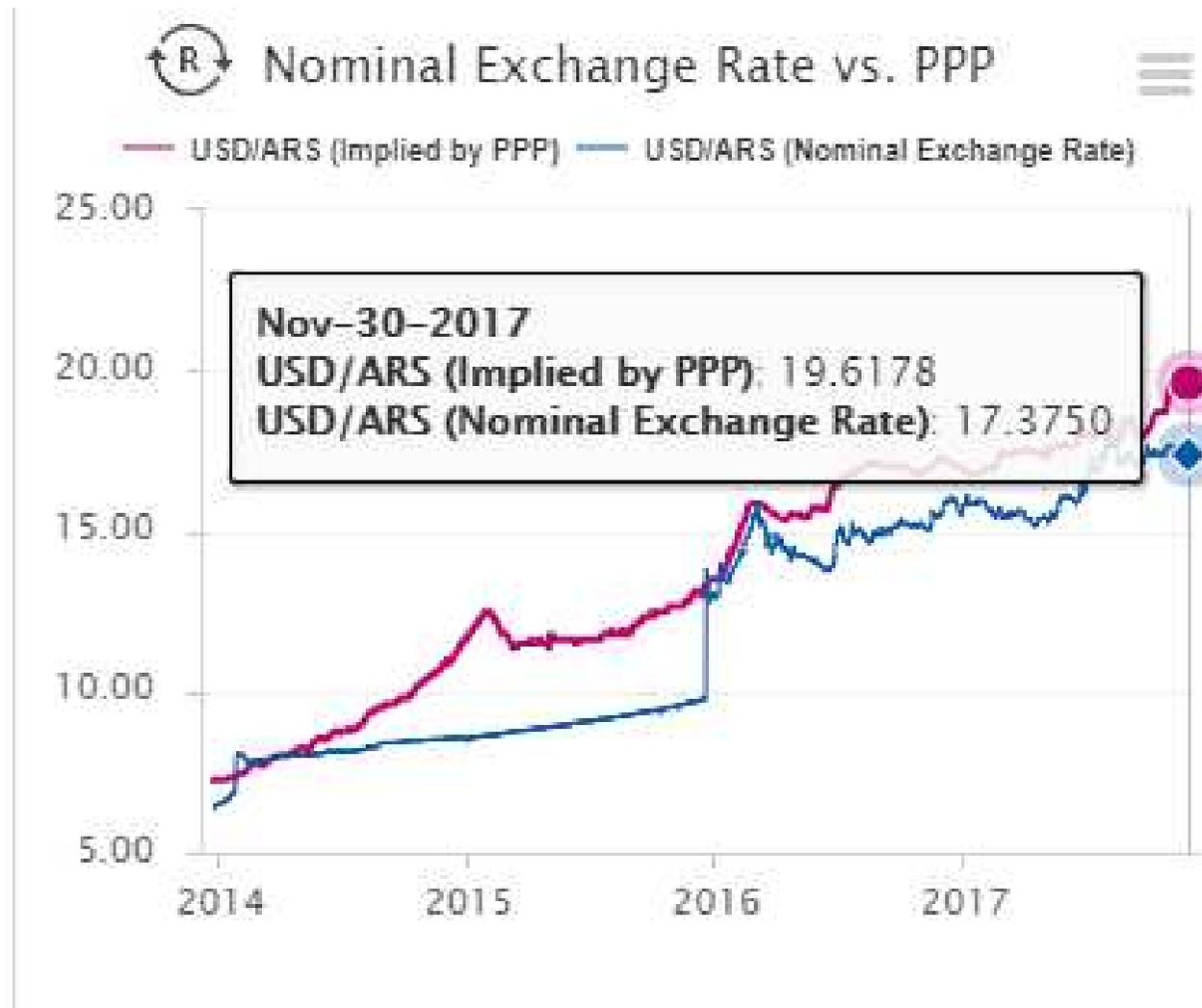
Nominal Exchange Rate vs. PPP



PPP Exchange Rates (Valuation Estimates)

- Use relative prices to estimate long-run expected exchange rate
- What is the E that takes us back to equilibrium ?
- Answer depends on equilibrium benchmark
- Historical Benchmark → average RER (since series started)
- Data can be downloaded to create custom benchmarks (eg. recent averages or account for regime change)

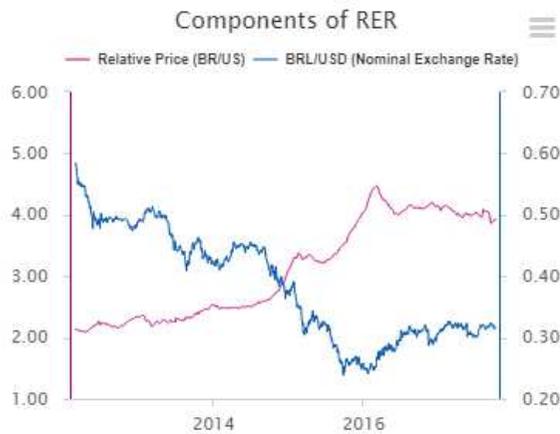
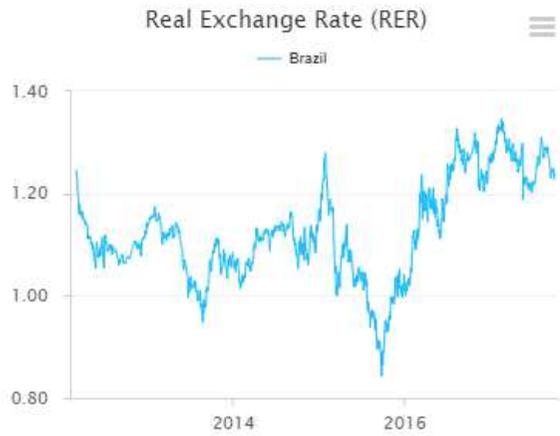
Example: Argentina's Overvaluation (Nov. 30th, 2017)



Brazil

PriceStats Purchasing Power Parity Series

Real Exchange Rate (RER) and Components



Brazil 6m 1y 2y

FX Implications

Historical Benchmark PPP Benchmark

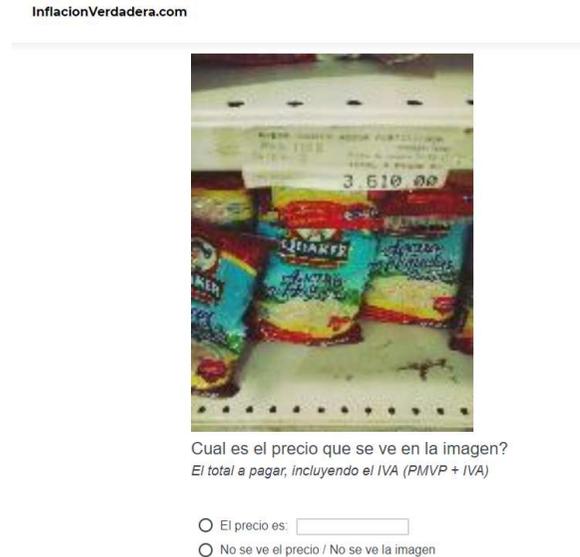


Source: State Street Global Markets, WM/Reuters

We also experiment with other data sources

- New data sources
 - Administrative data (eg. tax, property records, banking records)
 - Scanner data (eg. Nielsen)
 - Search data (eg. Google, Indeed)
 - Satellite data (eg. lights, parking lots, tanker and crop heights)
 - Sensor data (smart phones, smart watches, IOT devices)
 - Online data (eg. Billion Prices Project)
 - Crowd-sourced data (eg. mobile phones)

Measuring Venezuela's Inflation with Mobile Phones



- No official inflation data since December 2015
- Crowdsourcing → we hire freelancers in Venezuela to collect about 500 prices, every week, in 10 cities
- Mobile phones → they download an app, visit a retailer, scan product barcodes, enter prices, take photo of the price tag
- Other freelancers/volunteers validate the prices on our website

Inflation is close to 60% per month

INFLACION VERDADERA

Con el apoyo del Billion Prices Project @ MIT Sloan y Harvard Business School



INFLACIÓN ARGENTINA

En 2007 creamos InflationVerdadera.com para proveer índices de precios alternativos en Argentina, donde las estadísticas oficiales no fueron creíbles entre 2007 y 2015.



INFLACIÓN VENEZUELA

En 2017 comenzamos a estimar la inflación de Venezuela usando precios recolectados con teléfonos móviles y crowdsourcing.



- Data updated every day
- Lower than IMF and other estimates, but rising quickly

Inflation Details by Category

- All data and code publicly available on our website

Datos por Categorías

CATEGORIA	MENSUAL	INICIO	FIN	OBS	PRODUCTOS	CIUDADES	TIENDAS	PONDERACION
Alimentos y Bebidas	59.72	22apr2017	30nov2017	4,781	1,697	10	129	32.19
Bebidas Alcoholicas y Tabaco	75.35	21jun2017	30nov2017	588	145	4	21	2.96
Vestido y Calzado	51.83	07sep2017	30nov2017	109	68	4	11	7.16
Alquiler de Vivienda	25	05may2017	31oct2017	10	5	4	7	9.83
Servicios de la Vivienda Excepto Telefono	2.56	06may2017	30nov2017	154	58	7	43	2.33
Equipamiento del Hogar	205.42	22may2017	30nov2017	244	73	4	9	5.6
Salud	25.22	07may2017	30nov2017	304	40	4	50	4.31
Transporte	0	04may2017	30nov2017	121	40	7	41	10.84
Comunicaciones (Telefonos y Servicios Asociados)	0	06may2017	30nov2017	58	25	7	8	3.81
Electronicos y Entretenimientos	91.08	22may2017	30nov2017	117	34	3	4	3.61
Servicios de Educacion	244.72	06may2017	30nov2017	24	8	5	13	2.7
Restaurantes y Hoteles	68.19	21may2017	30nov2017	690	107	4	50	8.83
Bienes y Servicios Diversos	0	06may2017	30nov2017	28	14	5	14	5.82

Final Remarks

- Big/New data is a great *measurement* opportunity
- Governments no longer have the monopoly of macro data
- We saw examples of online and crowdsourced data, but many other new technologies available
- Every index/database has advantages and disadvantages → be aware of potential issues/biases
- Considering your own Big Data project?
 - Think carefully what you want to measure
 - Start small, experiment a lot, scale up
- As Griliches said, we need to *get involved in the task of designing and collecting datasets of our own* if we want to *find the grain of relevant information in all the chaff*