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CONSAR
Comisión Nacional del Sistema de Ahorro para el Retiro

Mexican pension funds
Long term financing

Costa Rica
February, 2015

En tu Afore
Siembra y Cosecha

Investors main advantages from financing real long term projects

Portfolio Diversification	Investments have a lower correlation with other asset classes (infrastructure, real estate)
Maturity and Scale	Projects allow long-term and large-scale investment objectives, consistent with pension funds'
Cash Flows	When the assets are stabilized, these investments provide a steady cash flow
Inflation Protection	Many real projects have a natural protection against unexpected inflationary events
Economic Growth	Returns of these investments are procyclical with economic growth, but they also help foster economic growth, competitiveness and productivity of the overall economy

Main factors influencing pension funds' long term financing policies

1) The investment rules
2) Creation of enlarged Family of funds
3) Application and reorientation of VaR
4) Incentives to compete via longer term performance (Net Return Indicator)
5) Liquidity management
6) Other regulatory policies
7) Supply of investment projects

G20/OECD HIGH LEVEL PRINCIPLES ON LONT TERM INVESTMENTS BY INSTITUTIONAL INVESTORS

Principle 6: Investment restrictions

6.1 Where applied, restrictions on long-term investment by institutional investors should be consistent with diversification and financial regulation objectives. They should be reviewed regularly and, where appropriate, they should be eased subject to necessary safeguards being in place, such as strong governance and risk management mechanisms, effective supervision, and appropriate diversification.

1. Investment rules: Main changes in regulation

1998
Inception of SAR: Portfolios invested in government securities.

2001
Derivatives were allowed.

2002
Value at Risk (VaR) was introduced.

2005
Investment in foreign securities and equity.

2007
Structured Instruments were allowed (ad hoc Private Equity Funds and Real Estate Trusts).

2008
Family of funds were expanded to 5 Basic SIEFORES.

Competition via Net Return Index (IRN)

2010
Participation in IPOs and subordinated debt were allowed.

2011
Expansion of eligible foreign exchanges and Countries.

Inclusion of Commodities and of Mandates (segregated accounts).

2012
Reorganization of the family of funds.

Introduction of marginal CVaR to control derivatives.

Eventual elimination of VaR with stronger corporate governance.

2013
Addition of new Eligible Countries.

Elimination of procyclicality in the marginal CVaR computation (fixed and stressed scenarios).

2014
Specification of requirements for the Benchmark Portfolio.

Specification of criteria to self-regulate the VaR.

Differentiation funds' IRN horizons.

1. Investment rules: Asset classes authorized

Currently there are six asset classes:

Asset classes allowed within the Investment Regime of SIEFORES																		
	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Debt	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Currencies	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Equity	×	×	×	×	×	×	×	×	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Alternatives*	×	×	×	×	×	×	×	×	×	×	✓	✓	✓	✓	✓	✓	✓	✓
Securitizations	×	×	×	×	×	×	×	×	×	×	✓	✓	✓	✓	✓	✓	✓	✓
Commodities	×	×	×	×	×	×	×	×	×	×	×	×	×	×	✓	✓	✓	✓

* Includes: PE, VC, Projects Finance, Infrastructure, Real Estate; all of the financing in Mexico

Within each asset class, restrictions have been relaxed, e.g.: stock picking, international debt with lower credit ratings, more FX and some can be used with more freedom, more variety of structuring of alternatives financing, among others.

1. Investment rules: General financial vehicles

The regulation states authorized investment vehicles and/or mechanisms

- **Direct purchase of assets**
- **Derivatives**
- **ETFs**
- **Investment mandates[1/]**
- **Security lending[2/]**
- **Repurchase agreements (Repo)[2/]**
- **Mutual Funds[3/]**
- **Structured securities**
- **Notes linked to real projects**

[1/] Foreign Securities, Structured Securities and Commodities are allowed.
[2/] Only with government and bank securities. AFOREs can only act as lenders.
[3/] The operative guidelines are not issue yet.

1. Investment rules: Long term financing vehicles

1	**CKDs**	For the development of different types of real projects and funding companies.
2	**FIBRAs** (Mexican REITs)	Specializing in the acquisition, construction and financing infrastructure and real estate.
3	**REITs**	Financing of Real Estate, listed in eligible countries.
4	**ABS**	Debt whose payment sources are real assets/projects.
5	**Stocks**	Equity of companies listed on stock exchanges.
6	**Debt**	Long term debt issued by firms in the infrastructure, energy, and real estate sectors

1. Investment rules: CKDs are trust that turn out top be very flexible investment vehicles

Type of CKD's

- Project Finance
- Infrastructure
- Real Estate
- Private Equity
- Financial Assets

CKDs can be used to finance:

- ✓ Different stages of the development of a real project
- ✓ Any economic sector or activity
- ✓ And financial structures can be adjusted

The projects must be developed in Mexico

1. Investment rules: How can infrastructure be financed by Mexican pension funds

Securities to Finance Infrastructure

1

Unsecured debt

- Debt: Focused on solving financial needs of medium and large size companies. Must meet a minimum credit rating.

2

Equity

- Equity: International and domestic. Listed companies in the infrastructure sector.

3

Infrastructure and real state investment trusts (FIBRAs) and REITs

- Publicly traded vehicles specialized in financing infrastructure and housing, have tax and dividend special features.

4

Capital Development Certificates (CKDs)

- Provides funding to small business in any economic sector and infrastructure projects IN MEXICO. Includes public-private-partnerships (PPP) through concessions management contracts and leases.

5

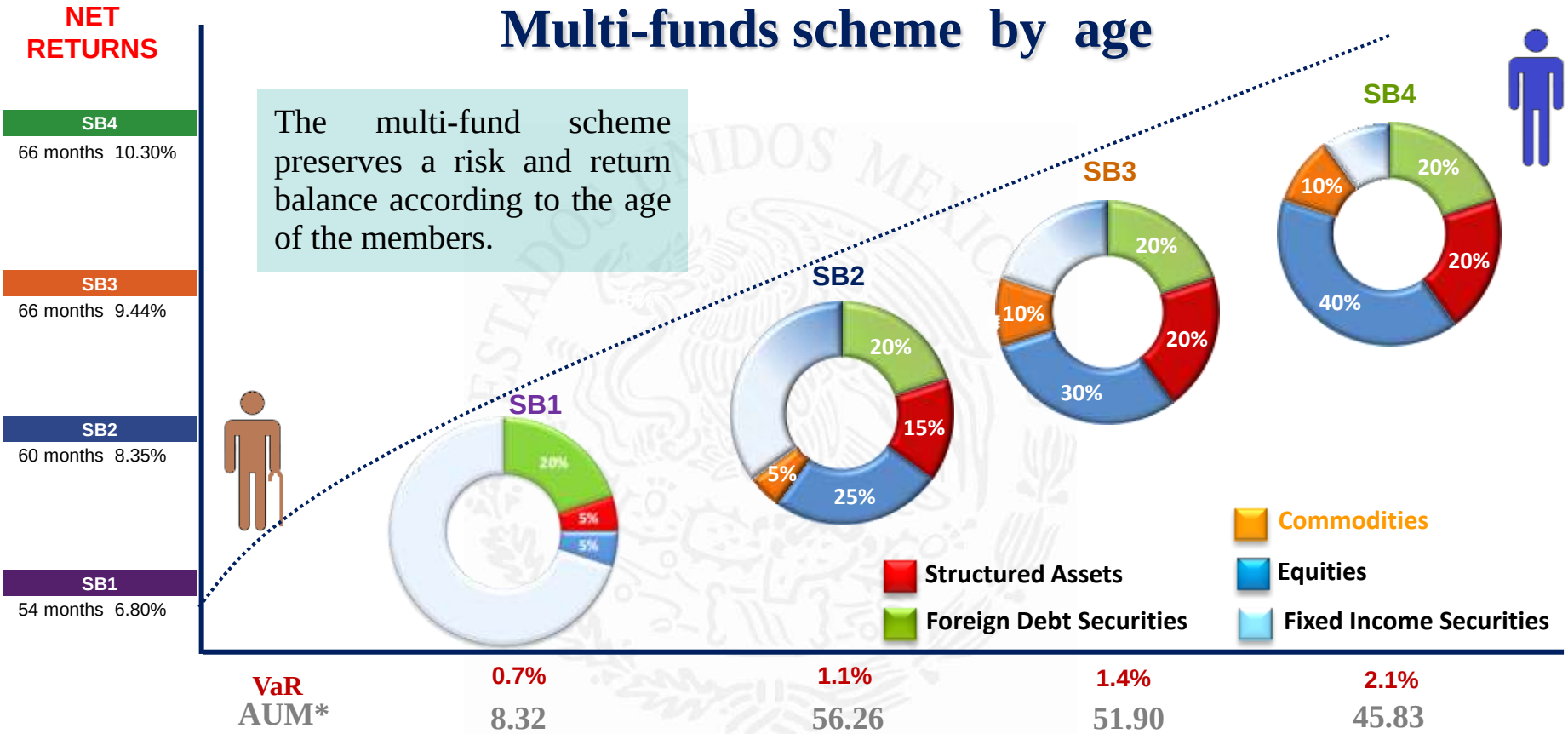
Asset-Backed Securities (ABS) linked to real projects

- Allow financing real projects, with debt structures, mainly for stabilized assets.

2. The Multi-Funds Family: The main tool used for investment specialization

Multi-funds scheme by age

The multi-fund scheme preserves a risk and return balance according to the age of the members.



	SB1	SB2	SB3	SB4
VaR	0.7%	1.1%	1.4%	2.1%
AUM*	8.32	56.26	51.90	45.83

From 2007 to 2012, the multi-funds family was made up by five SIEFORE. In 2012 resources of SIEFORE 5 were merged with SIEFORE 4. In the near future a SIEFORE "Zero" will be operating.
The aims have been to differentiate the investment possibilities according to age and type of exit rights and to consider the dynamics of the demographics of the system

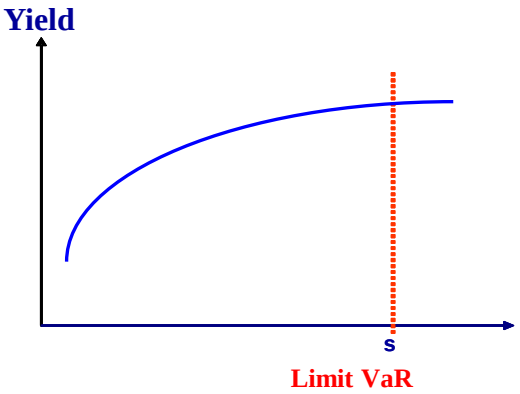
Figures in US$ Billions. Data as of January 2015.
Fuente: CONSAR- VICEPRESIDENCIA FINANCIERA.

3. VaR: long term investment?

Some advantages of the VaR:

- It is a measure that captures market risks and its effects on the entire portfolio.
- It has some important implementation advantages:
  - It is an objective parameter and is simple to manage.
  - Facilitates comparison between SIEFORE.
  - Simple to implement and replicate.
- It allowed to limit derivatives without restricting them for hedging purposes
- It was calibrated to allow long term investments

WAM	VaR (Different equity levels)*					
	0.00%	5.00%	10.00%	15.00%	20.00%	25.00%
500	0.08%	0.15%	0.24%	0.34%	0.45%	0.55%
1500	0.27%	0.33%	0.35%	0.42%	0.51%	0.60%
2000	0.37%	0.43%	0.45%	0.48%	0.56%	0.64%
2500	0.47%	0.47%	0.44%	0.51%	0.58%	0.65%
3000	0.44%	0.48%	0.46%	0.51%	0.59%	0.65%
4500	0.49%	0.51%	0.53%	0.57%	0.63%	0.70%
5000	0.55%	0.56%	0.57%	0.59%	0.66%	0.71%
5500	0.61%	0.58%	0.57%	0.63%	0.69%	0.74%
6000	0.65%	0.59%	0.58%	0.62%	0.72%	0.77%



3. VaR:
Adjustments to improve long term investment

A **A regulatory maximum limit for leverage through derivatives using CVaR differential was established. The following maximum parameters are set:**

Limit with respect to AUM	SB0	SB1	SB2	SB3	SB4
CVaR Differential	0.30%	0.30%	0.45%	0.70%	1.00%

Complete portfolio CVaR minus the same portafolio CVaR without Derivatives

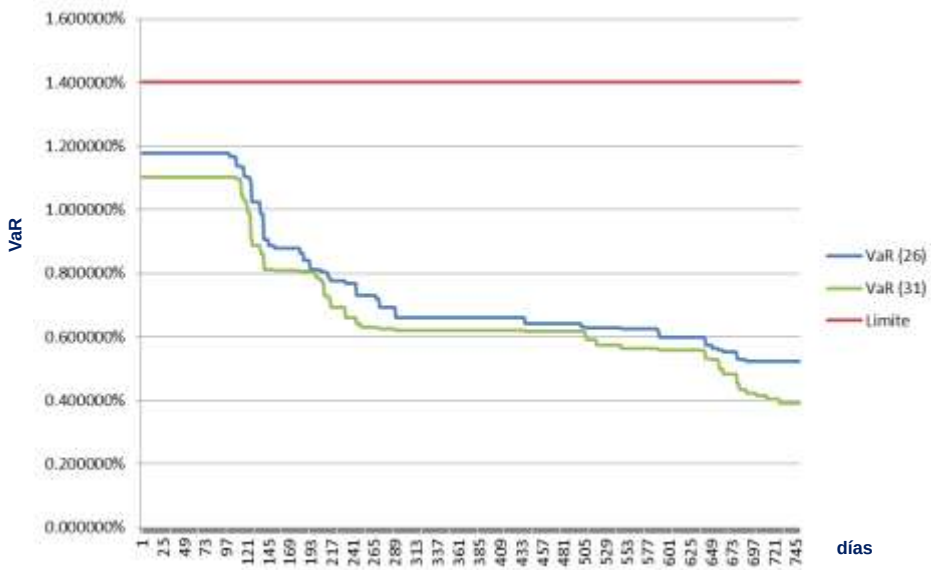
SB1	VaR		Diferencia	CVaR		Diferencia
	Con Derivados	Sin Derivados		Con Derivados	Sin Derivados	
Afirme	0.23%	0.23%	0.00%	0.35%	0.35%	0.00%
Azteca	0.58%	0.58%	0.00%	0.92%	0.92%	0.00%
Banamex	0.56%	0.40%	0.16%	0.91%	0.58%	0.33%
Bancomer	0.69%	0.57%	0.12%	1.02%	0.87%	0.15%
Coppel	0.40%	0.40%	0.00%	0.61%	0.61%	0.00%
Inbursa	0.05%	0.07%	-0.03%	0.11%	0.13%	-0.02%
Invercap	0.84%	0.82%	0.02%	1.28%	1.22%	0.06%
Metlife	0.69%	0.57%	0.12%	1.04%	0.86%	0.18%
PensionISSSTE	0.62%	0.62%	0.00%	0.93%	0.93%	0.00%
Principal	0.64%	0.49%	0.14%	0.98%	0.78%	0.20%
Profuturo	0.73%	0.58%	0.16%	1.08%	0.84%	0.24%
SURA	0.73%	0.68%	0.05%	1.13%	1.07%	0.06%
XXI-Banorte	0.67%	0.45%	0.22%	1.03%	0.72%	0.30%

The VaR measure for the entire portfolio will be self-regulated selectively depending on the pension fund headway in asset allocation, risk management and corporate governance

3. The VaR:
The CVaR Differential methodology was adjusted in order to avoid pro-cyclical dynamics: the calculation window scenarios were fixed

The procyclicality can have a two way effect: to force sells under stressed conditions and to allow to build up disproportionate risks exposures under stable market conditions.

Evolution of VaR under stable observed conditions



Evolution of VaR evaluated in a fixed stressed scenario

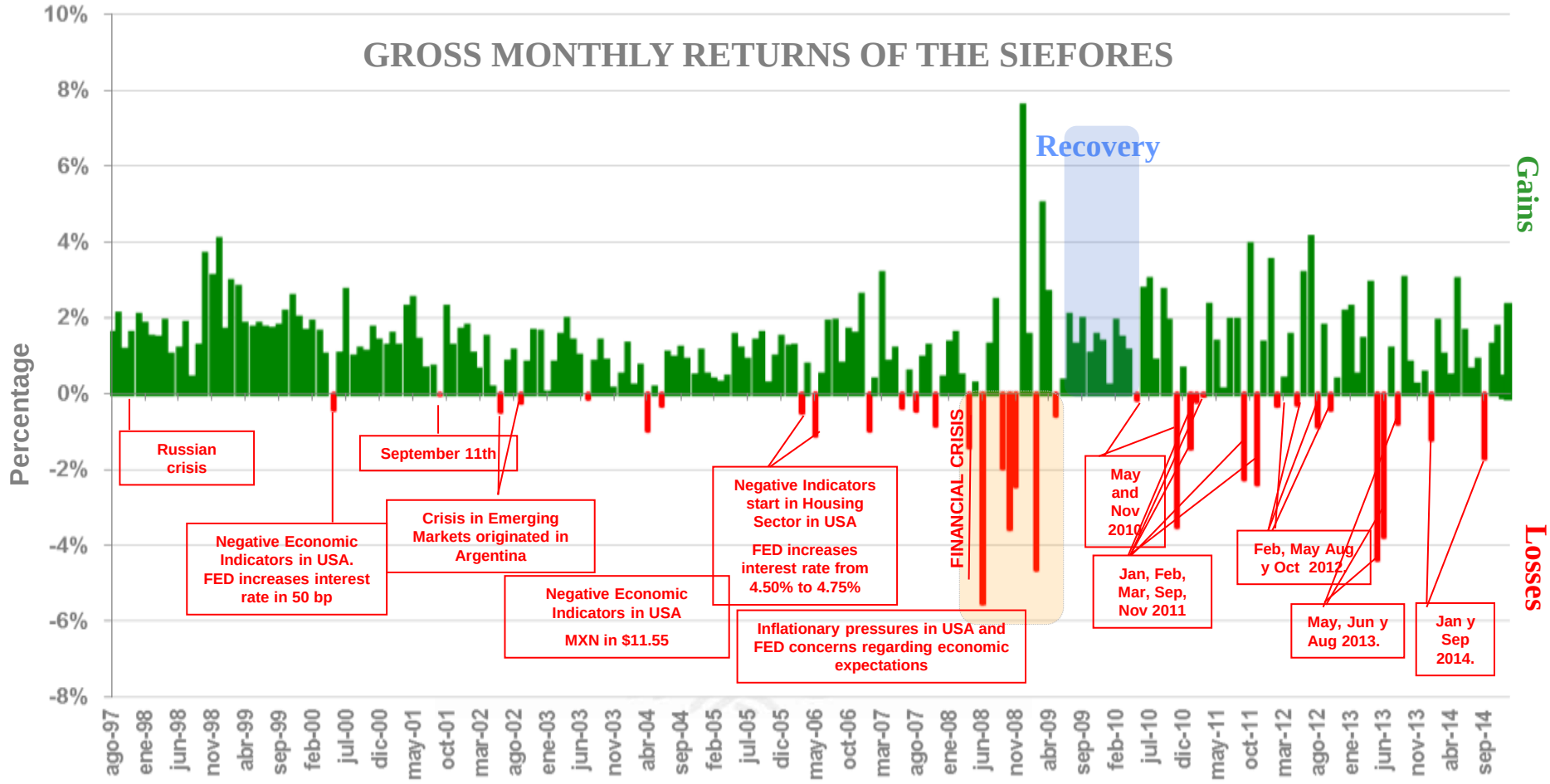
4. Net Return Index: Focusing competition on longer term performance

Net return index (IRN, *by their acronym in Spanish*) has been a mainstay in the Pension System in Mexico for the following reasons:

- **Allows workers to focus on the variable that has more impact on their pension.**
- **IRN has become the principal engine to foster market competition among pension funds by being an important variable for switching accounts.**

The pension's law requires daily mark to market valuation which along with sensitive portfolios and market volatility had inhibited long term allocation

4. Net return index: market volatility and mark to market valuation



Given that the long term is the natural horizon for Pension Funds' Investments, then the short term market volatility only has a temporal negative effect on employees' savings but introduces noise.

4. Net return Index: market volatility translated into IRN volatility

The market volatility was inherited to the IRN's ranking of SIEFORE

Ranking of Basic SIEFORE 2

	August 2008	October 2008
1	Invercap	Inbursa
2	Coppel	Coppel
3	Banamex	Argos
4	ING	Afirme Bajío
5	Profuturo GNP	XXI
6	XXI	HSBC
7	Principal	Profuturo GNP
8	Afirme Bajío	Principal
9	HSBC	Metlife
10	Scotia	Scotia
11	Metlife	ING
12	Banorte Generali	Azteca
13	Inbursa	Banorte Generali
14	Argos	Banamex
15	Azteca	Bancomer
16	Bancomer	Invercap

Elaborated with information available on CONSAR's web page

a) Introduced noise in affiliates decisions

b) A volatile IRN reinforced the pro-cyclical behavior of pension funds

c) Unexpected liquidity demand distorts asset allocation

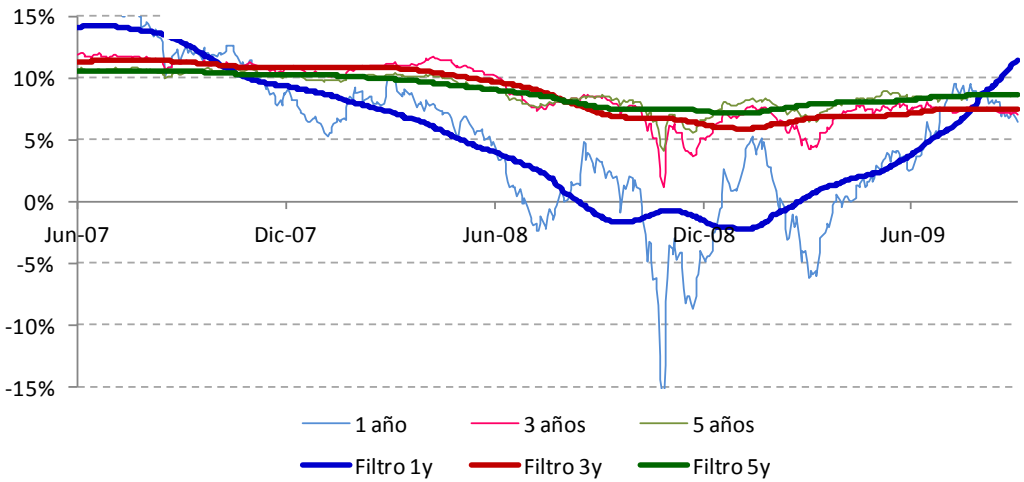
d) Reactive switching of workers can generate lower replacement rates

4. Net Return Index: Adjustments

Lengthening the indicator and filtering the inputs:

- The indicator sensitivity was reduced by computing the 6-month average of end-of-period indicators
- The horizons of the end-of-period indicators have been specialized by type of fund

IRN stabilization



1 year — Filter 1y

3 years — Filter 3y

5 years — Filter 5y

IRNs horizons

SIEFORE	Horizon in years
SB1	3
SB2	5
SB3	7
SB4	7

4. Net Return Index: regulatory switching policy depends on consistency of performance

The law of the pension system allows affiliates to switch pension fund once a year without restrictions or for a second time before 1yr if the IRN of the host fund and the receiver fund satisfy the following criteria:

1. The receiver fund's IRN exceeds the host fund's IRN by a threshold

2. However, the host will not yield accounts if:

✓ Host's IRN

- In the last **24** months stayed above the **median** at least **70%** of the 24 months
- In the last 24 months stayed below the **lower quartile** at most **20%** of the 24 months

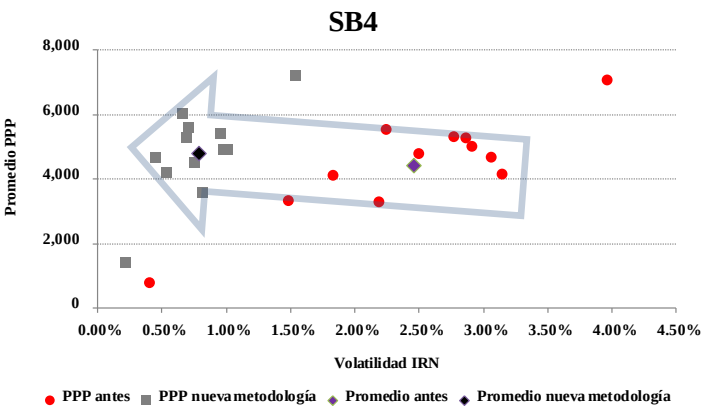
3. The receiver fund will not be eligible to receive accounts if:

✗ Receiver's IRN

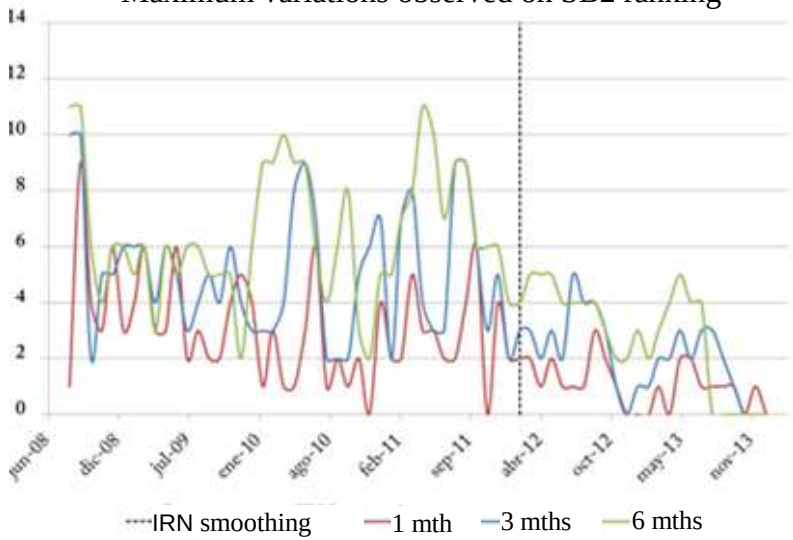
- In the last **24** months the receiver fund did not stay below the lower **tercile** more than 1/3 of the time

4. Net Return Index: some observable effects form the adjustments

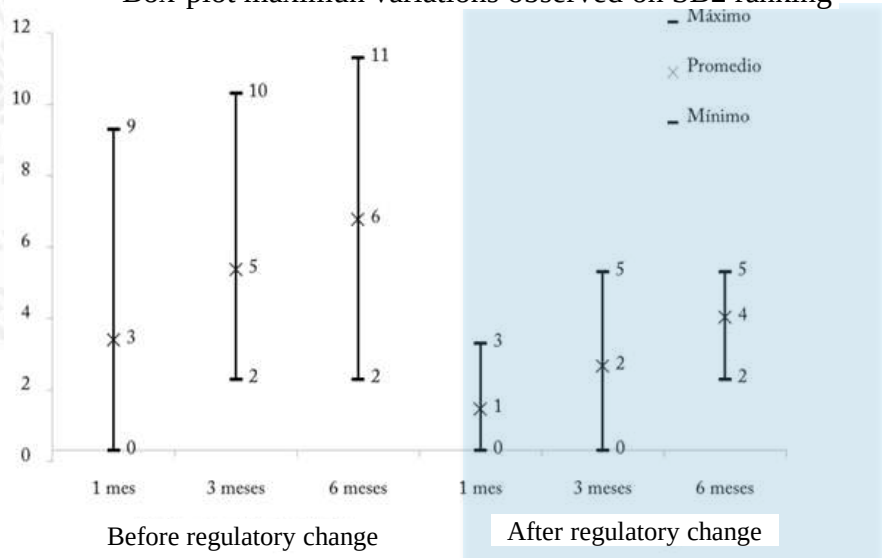
The regulatory change has been accompanied by a significant reduction on IRN volatility
And a slight increase in the WAM (PPP[1/]).



Maximum variations observed on SB2 ranking

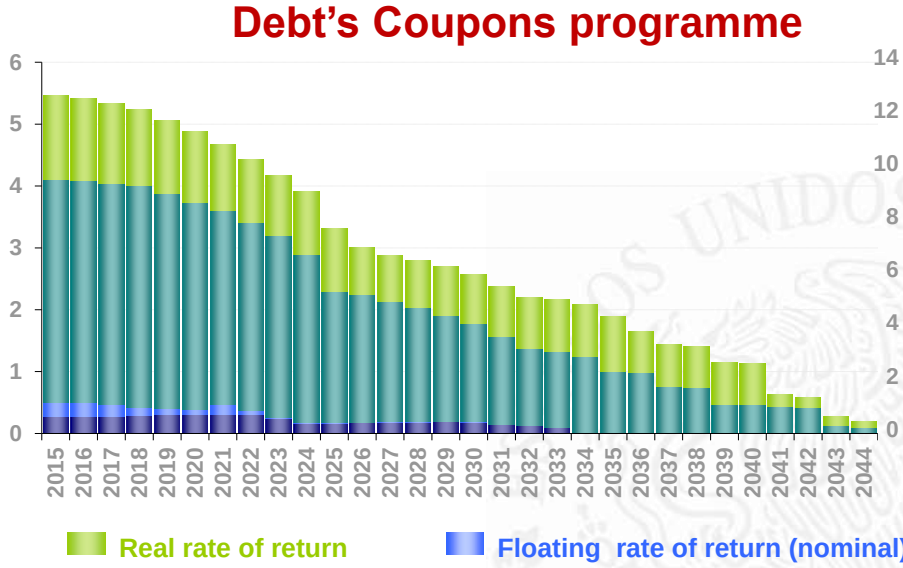


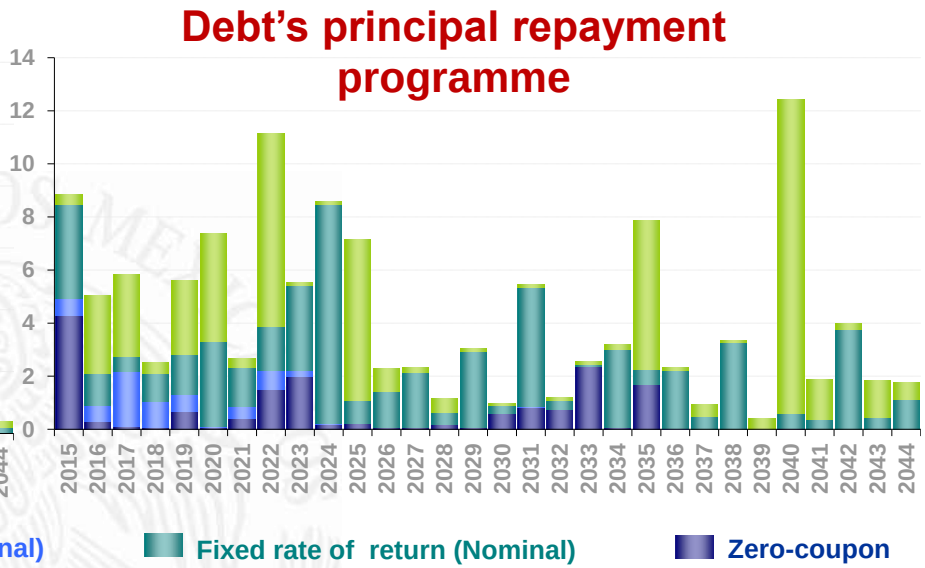
Box-plot maximun variations observed on SB2 ranking



1/ PPP: Weighted Average term to maturity (WAM)

5. Liquidity management: a balance between long term objectives and liquidity needs





Real rate of return | Floating rate of return (nominal) | Fixed rate of return (Nominal) | Zero-coupon

The liquidity analysis is complemented with studies on:

Demand side:

- Demographics of the funds (birthday transfers, total withdrawals)
- Operative processes (inflows and outflows of resources due to switching accounts, periodic collections, partial withdrawals)
- Credit lines in OTC derivative counterparties.

Supply side

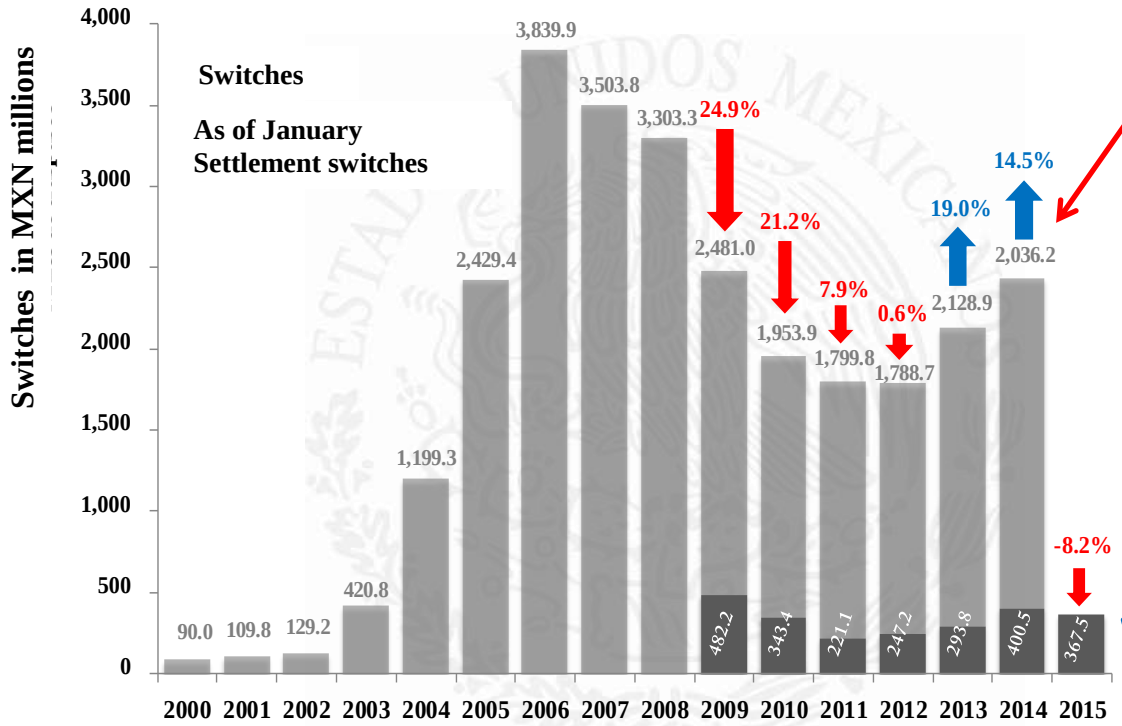
- Asset allocation objectives
- Liquidity of each asset class.
- Liquidity buffers: Repos, securities lending and cash deposits.

** Figures in US$ Billions. Data as of January 2015.*

Fuente: CONSAR- VICEPRESIDENCIA FINANCIERA.

5. Liquidity management: Evolution of switches per year (at 1st Settlement of 2015)

✓ In 2015, **367,526 switches** were made by MXN **$50,543.5** millions.



Annual growth over the previous year.

Growth compared to the first settlement of the previous year.

Near 15% of AUM

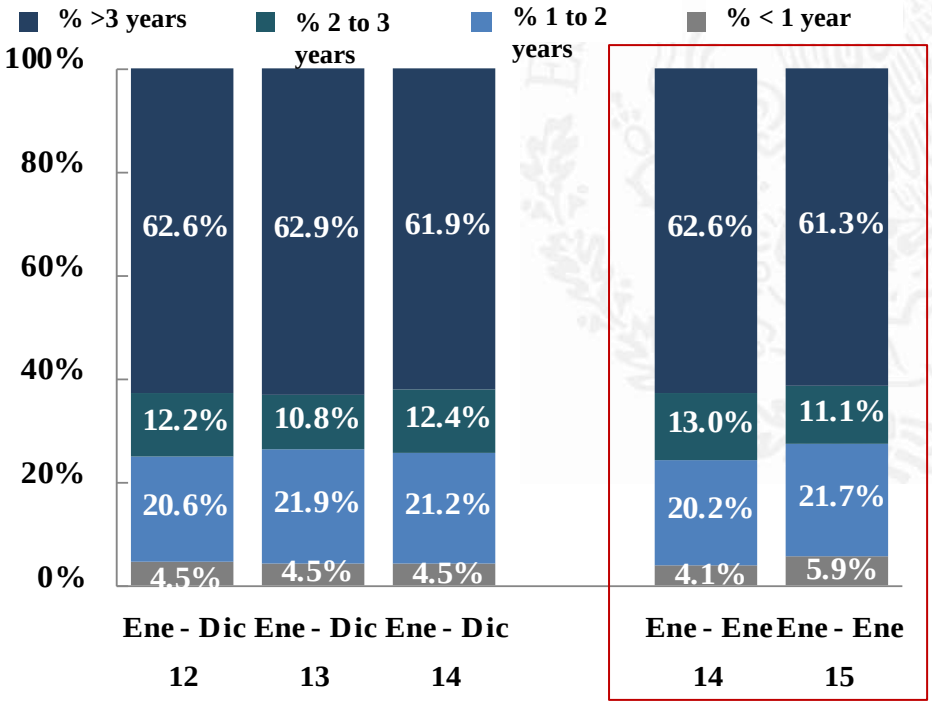
Switched balances (MXN million)

	2010	2011	2012	2013	2014	2015*
Annual	$164,441.3	$183,355.9	$215,485.6	$264,578.6	$313,501.5	$50,543.5
As of January	$24,199.2	$22,622.7	$24,268.6	$34,732.2	$51,281.1	$50,543.5

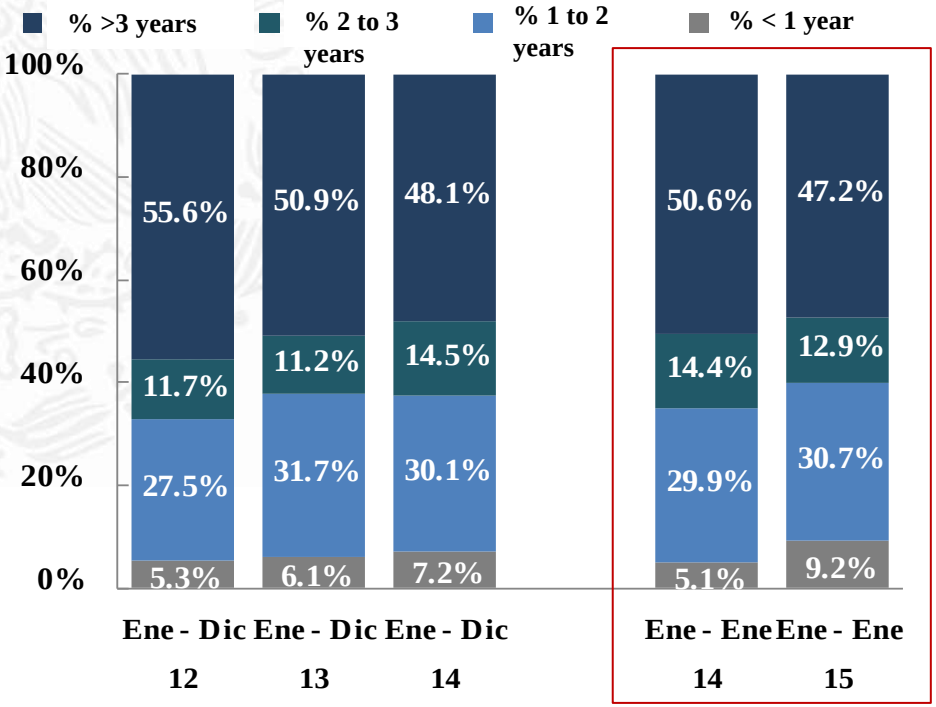
5. Liquidity management: Free switches vs IRN driven switches

- ✓ In 2014, the proportion of individual accounts switched before 1yr. barely reached a 7.2% of the total AUM switched and 4.5% of the total accounts switched
- ✓ Liquidity buffers have to be built by all pension funds (independently of performance) due to commercial forces of pension funds

Switches Settled for Permanence: Proportion of Accounts



Switches Settled for Permanence: Proportion of AUM.



1/ RCV: Retirement, Severance (over 60 years old) and Seniors over 65 years old.

6. Other regulatory policies that may have affected long term investments

Other regulatory policies

i. Strengthening rules for asset management, risk management and prudential criteria

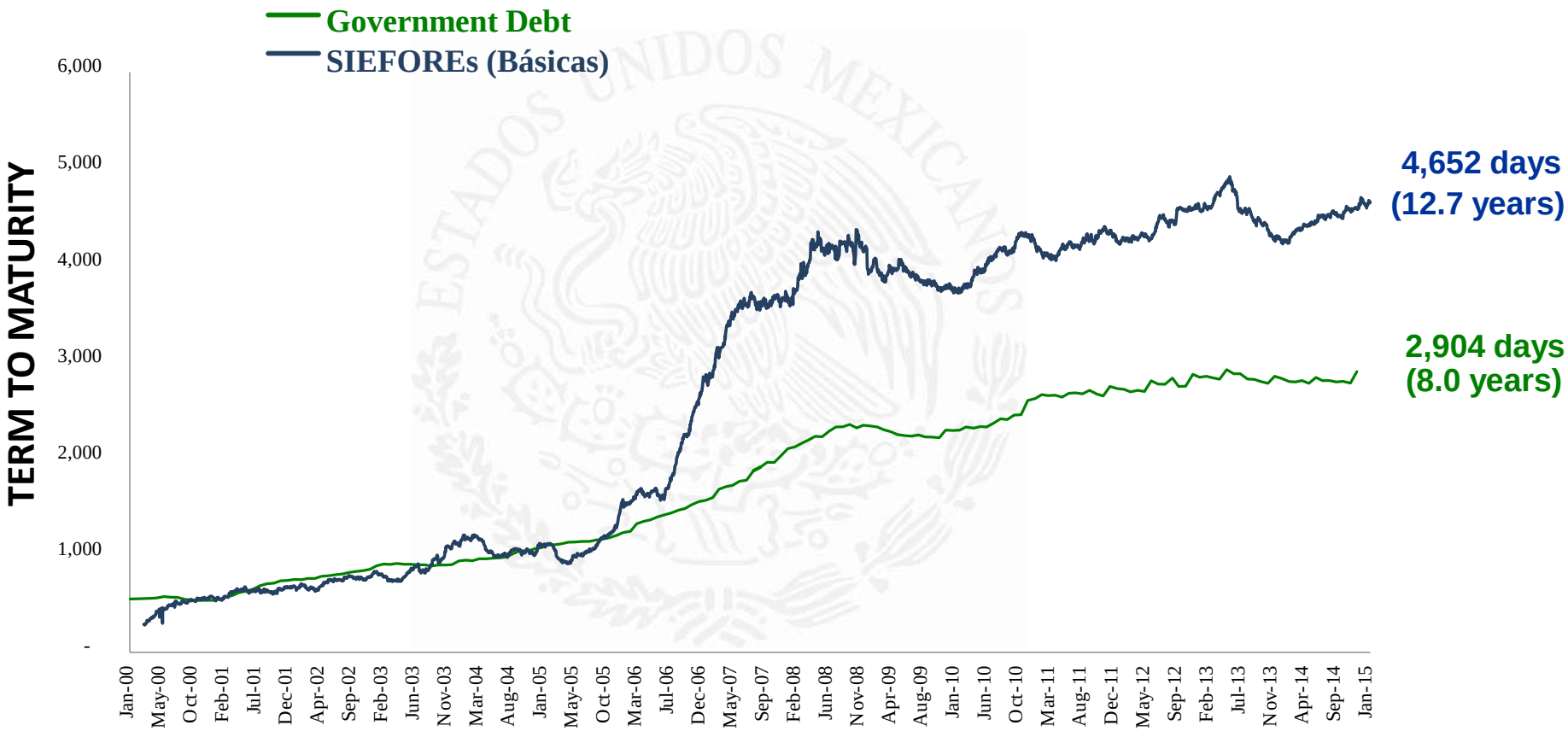
ii. Introduction of *Benchmark* per Fund

iii. Sanctions were made proportional to investment rules violations

7. Where long term financing lays currently: evolution of WAM

Evolution of Weighted Average term to maturity (WAM)

Siefores Básicas - days



Figures as of January 2015.

Government debt data as of December 2014 (source: www.banxico.org.mx).

Fuente: CONSAR- VICEPRESIDENCIA FINANCIERA y Banxico.

7. Where long term financing lays currently: Measuring the impact of regulatory changes on long term investments

A linear regression model was implemented in order to investigate the manner in which various regulatory changes have influenced the behavior of PPP[1] (weighted average term to maturity) across the time[2], these regulatory changes include:

- Weighted average limit investment in equities
- Weighted average limit of Value at Risk (VaR)
- Increase the family of funds (Three funds were created**)**
- Changes in IRN calculation (horizons for calculating this indicator were adjusted accordingly the retirement period)

All variables resulted statistically significant (at 97.5% confidence level) with the expected signs

1/ PPP was long time ago the only measure used to manage the SIEFORE´s risk
2/ This analysis include the period: december-2005 to january-2015

7. Where long term financing lays currently: Investment in different kind of project through CKDs

Types of CKD	Holding (USD million)	Holdings (%)
Highways (Maintenance, management and build of highways)	972	98.14
Investments in financial assets (Well-diversified portfolios, credit instruments, among others)	1,146	90.65
Real Estate (For industrial, housing, office buildings and commercial)	1,508	84.40
Energy projects (Wind and alternative energy)	264	98.49
Forestry Project (Campeche)	237	99.89
Infrastructure	230	83.23
Social Infrastructure (Schools, hospitals, sewage plants, bridges, roads, among others)	384	82.73
Enterprise finance (Private Equity)	667	90.10
Total	**5,406**	**Average: 90.1**

Figures in US$ Billions. Data as of January 2015.
Fuente: CONSAR- VICEPRESIDENCIA FINANCIERA.

7. Where long term financing lays currently: infrastructure sector has received USD 18.2 billion from pension funds

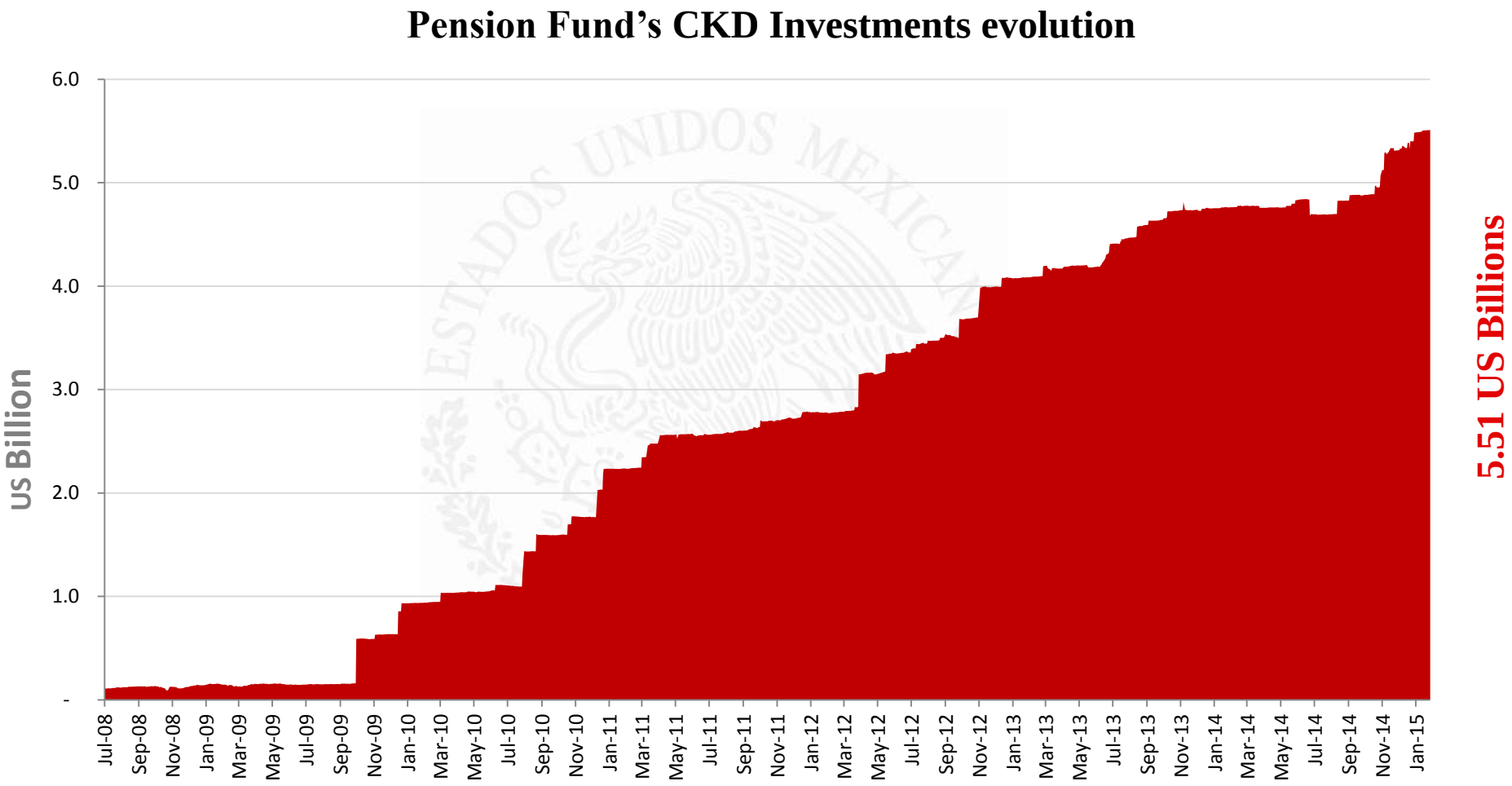
…which represents 20.81% of the total outstanding.
Through corporate bonds and structured securities

Infrastructure sector financing

Sectors	Siefores Holdings (a)	Total outstanding (b)	% (a/b)
SOFOL HIPOTECARIA	0.06	0.60	10.20%
INFONAVIT	1.85	4.78	38.68%
FOVISSSTE	1.58	5.03	31.34%
BORHIS	0.29	1.64	17.38%
CFE *	2.97	9.47	31.41%
PEMEX *	5.61	52.47	10.70%
Roads & Local Government **	4.26	11.21	37.98%
STRUCTURED SECURITIES ***	1.55	2.07	74.70%
TOTAL	18.16	87.27	20.81%

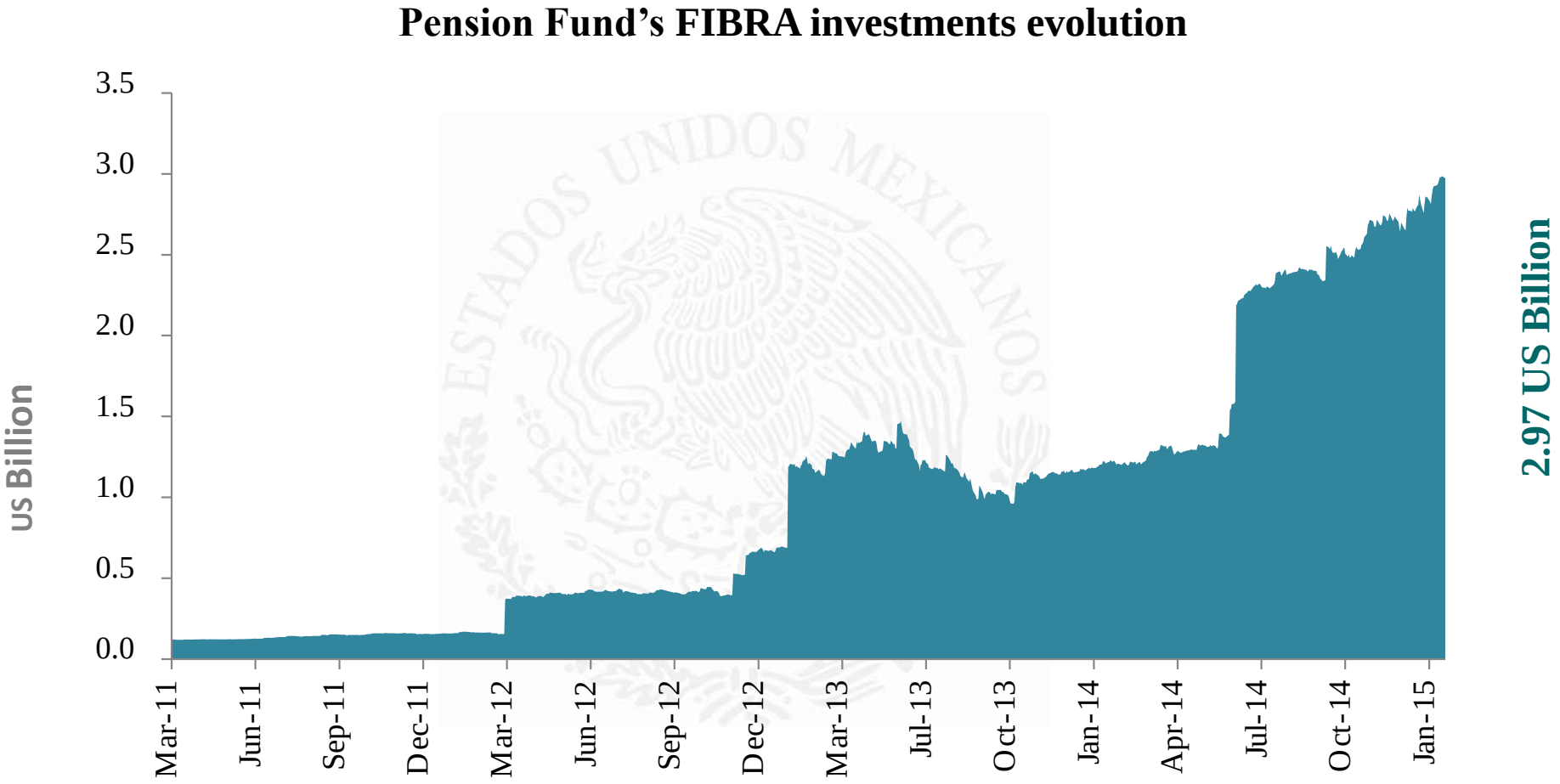
* Includes PEMEX and CFE international issuance (EUROPESOS).
** Includes investments classified as Local Governments and Infrastructure
*** Includes only Infrastructure Funding Structured Securities.
Figures in US$ Billions. Data as of January 2015.

7. Where long term financing lays currently: CKDs.



Figures in US$ Billions. Data as of January 2015.

7. Where long term financing lays currently: Fibras.



Figures in US$ Billions. Data as of January 2015.

7. Where long term financing lays currently: Challenges by participating in real projects (infrastructure projects)

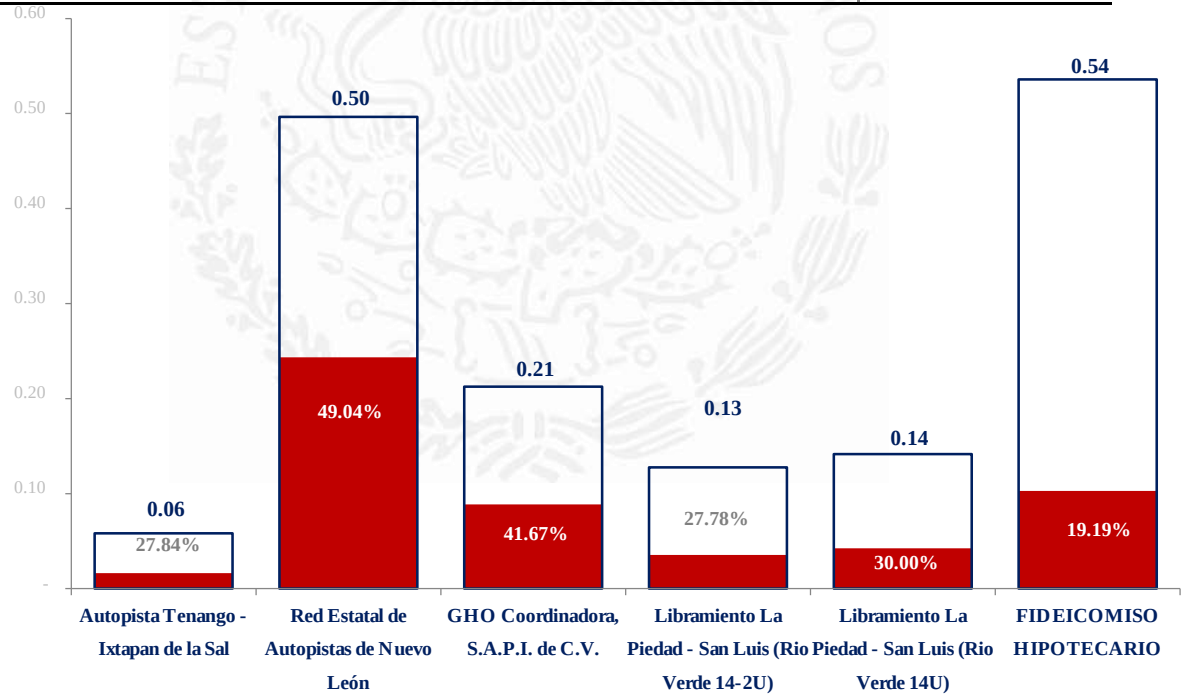
By participating in infrastructure projects, pension funds face diverse challenges/risks, among which are included:

- Valuation
- Project Development and operation
- Natural disasters and catastrophes
- Maintenance Costs
- Political and Social Risks
- Legal uncertainty over rights.
- Price Regulation
- Haircuts and Income streams volatility
- Obsolescence

The risks vary depending on whether the project finances a public good, a private good, or publicly provided private good, among many other factors

7. Where long term financing lays currently: Asset Backed Securities linked to real projects

Asset class		Structured Securities	Issue Date	SIEFORES Holdings (a)	Total outstanding (b)	% (a/b)
Asset Backed Securities	91_TENIXCB_14U	Autopista Tenango - Ixtapan de la Sal	17-Feb-14	0.02	0.06	27.84%
	90_PAMMCB_14U	Red Estatal de Autopistas de Nuevo León	16-Jun-14	0.24	0.50	49.04%
	91_GHOCB_14 1/	GHO Coordinadora, S.A.P.I. de C.V.	1-Aug-14	0.09	0.21	41.67%
	91_LPSLCB_14-2U	Libramiento La Piedad - San Luis (Rio Verde 14-2	24-Jul-14	0.04	0.13	27.78%
	91_LPSLCB_14U	Libramiento La Piedad - San Luis (Rio Verde 14U)	24-Jul-14	0.04	0.14	30.00%
Fideicomisos Hipotecarios	FH_FHIPO_14	FIDEICOMISO HIPOTECARIO	5-Nov-14	0.10	0.54	19.19%
		TOTAL		0.53	1.57	33.6%



Figures in US$ Billions. Data as of January 2015.

7. Where long term financing lays currently: Room for further investments in long term projects via Structured Assets

Structured Securities

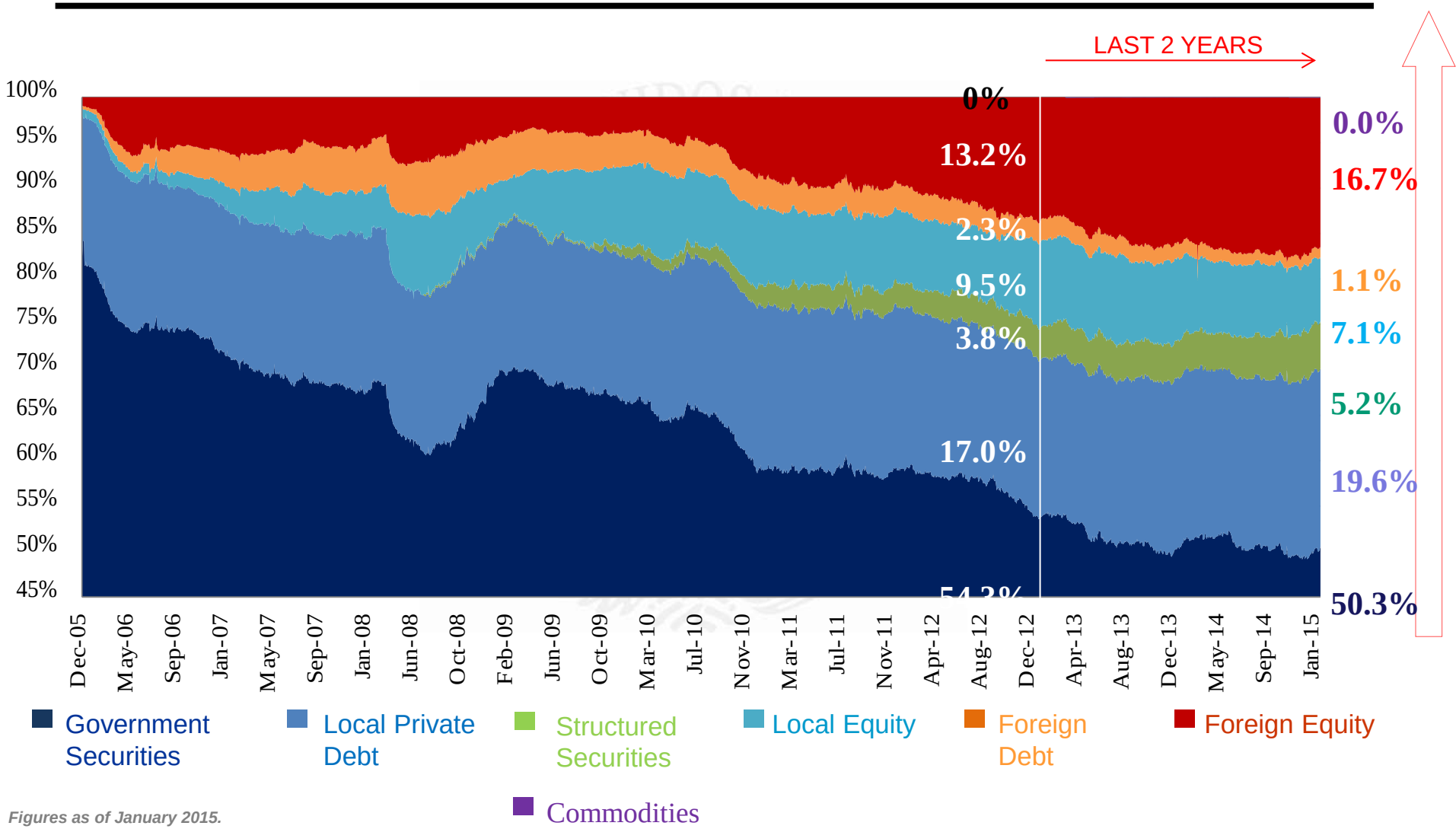
(Capacity in Limits)

	SB1	SB2	SB3	SB4	Additional	Total
AUM	8.32	56.26	51.90	45.83	2.72	165.04
Total capacity	0.42	8.44	10.38	9.17	0.54	28.95
Available	0.36	5.68	7.08	6.42	0.50	20.04
Consumption	0.05	2.76	3.30	2.74	0.04	8.91
Limit (%)	5%	15%	20%	20%	20%	
Consumption (%)	0.65%	4.91%	6.37%	5.99%	1.59%	

Figures in US$ Billions. Data as of January 2015.

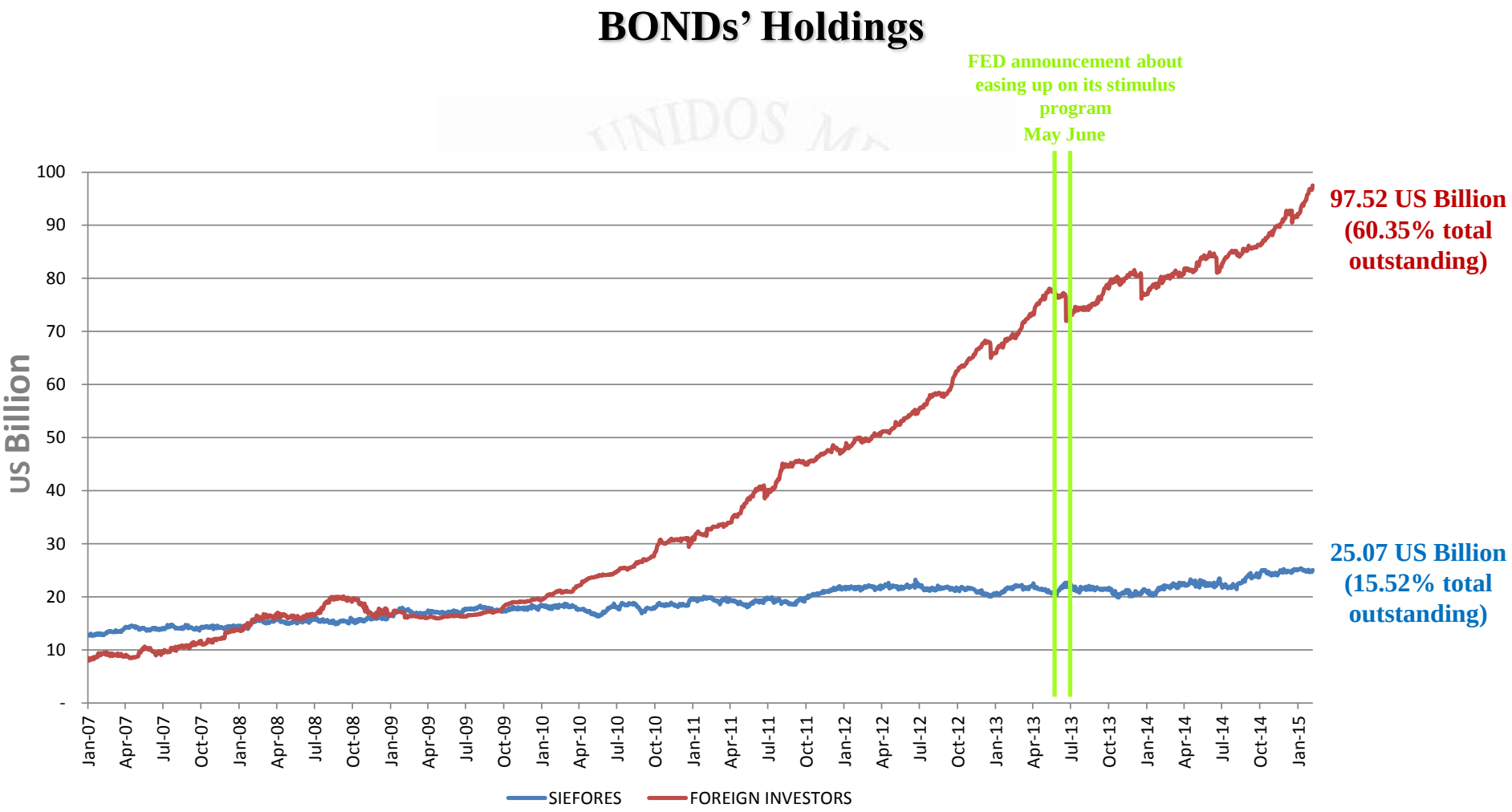
7. Where long term financing lays currently: Pension funds have taken advantage of the investment regime liberalization.

Pension Funds portfolio's evolution



Figures as of January 2015.

7. Where long term financing lays currently: Mexican government Bonds' Holdings.



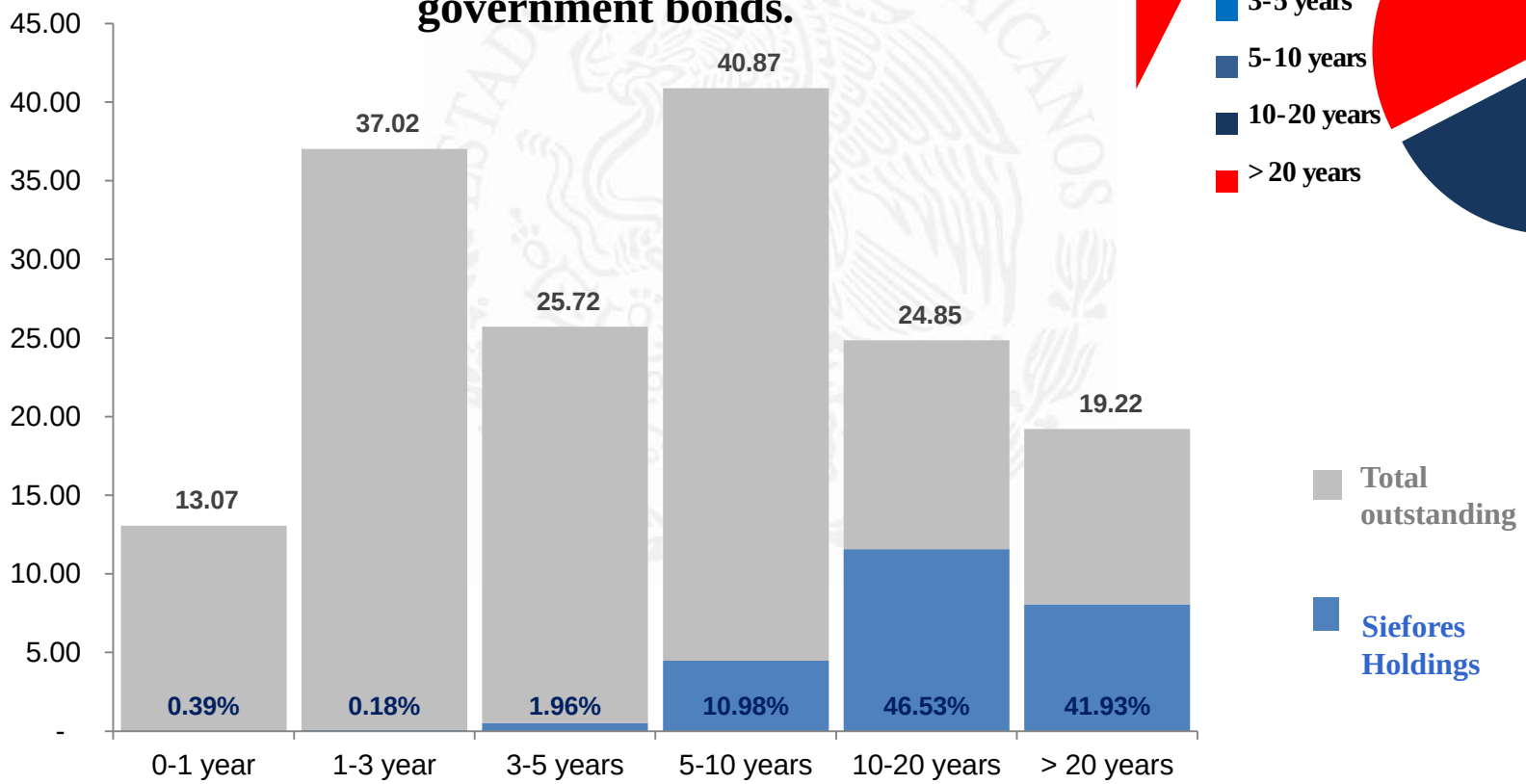
** Figures in US$ Billions, face value.*

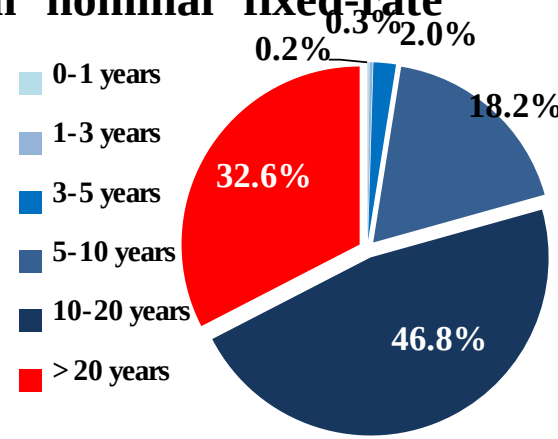
Fuente: CONSAR- VICEPRESIDENCIA FINANCIERA y Banxico.

7. Where long term financing lays currently: SIEFORES Holdings in nominal fixed-rate government bonds.

The Pension Funds (SIEFORES) stand out as the main holder of long term fixed-rate government bonds. AFOREs hold 44.5% long term nominal fixed-rate government debt with respect to the total outstanding.

SIEFORE Holdings in long term nominal fixed-rate government bonds.

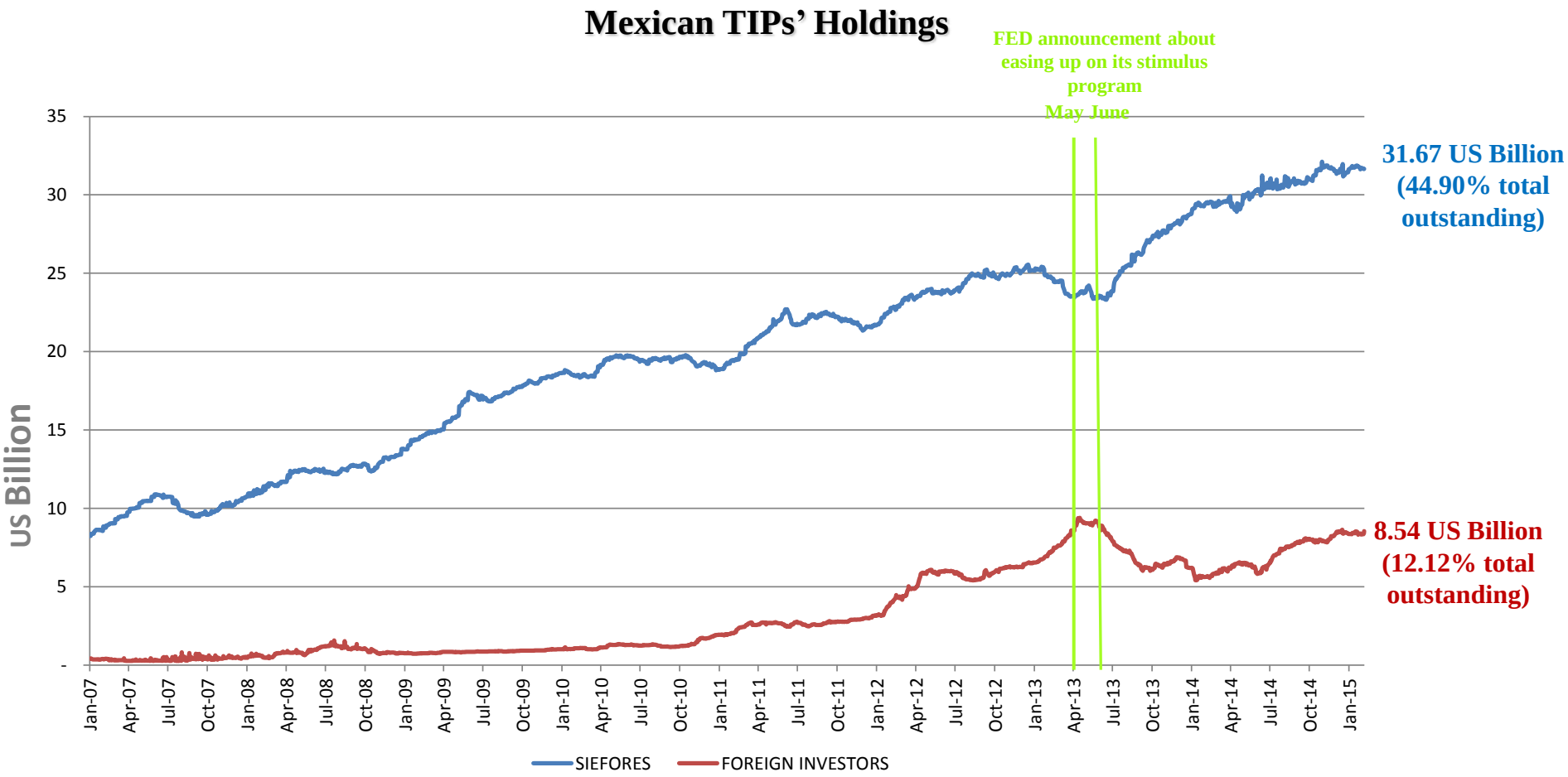




** Figures in US$ Billions, face value. Data as of January 2015.*

Fuente: CONSAR- VICEPRESIDENCIA FINANCIERA y Banxico.

7. Where long term financing lays currently: Mexican government TIPs' Holdings



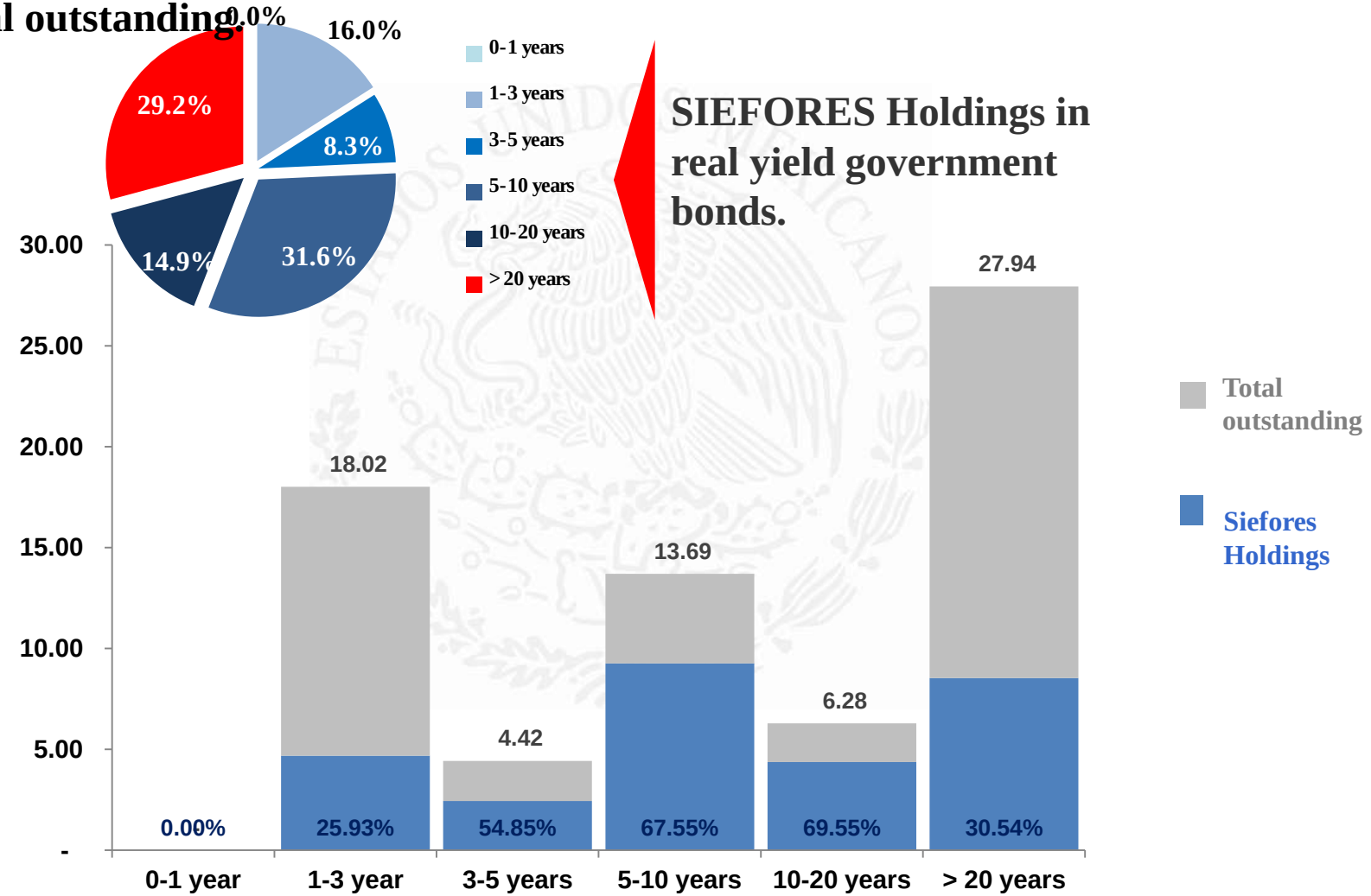
Pension funds are the main holder in Mexican TIPs

** Figures in US$ Billions, face value.*

Fuente: CONSAR- VICEPRESIDENCIA FINANCIERA y Banxico.

7. Where long term financing lays currently: SIEFORES Holdings in real yield government bonds.

AFOREs hold 41.6% long term real yield government debt with respect to the total outstanding.



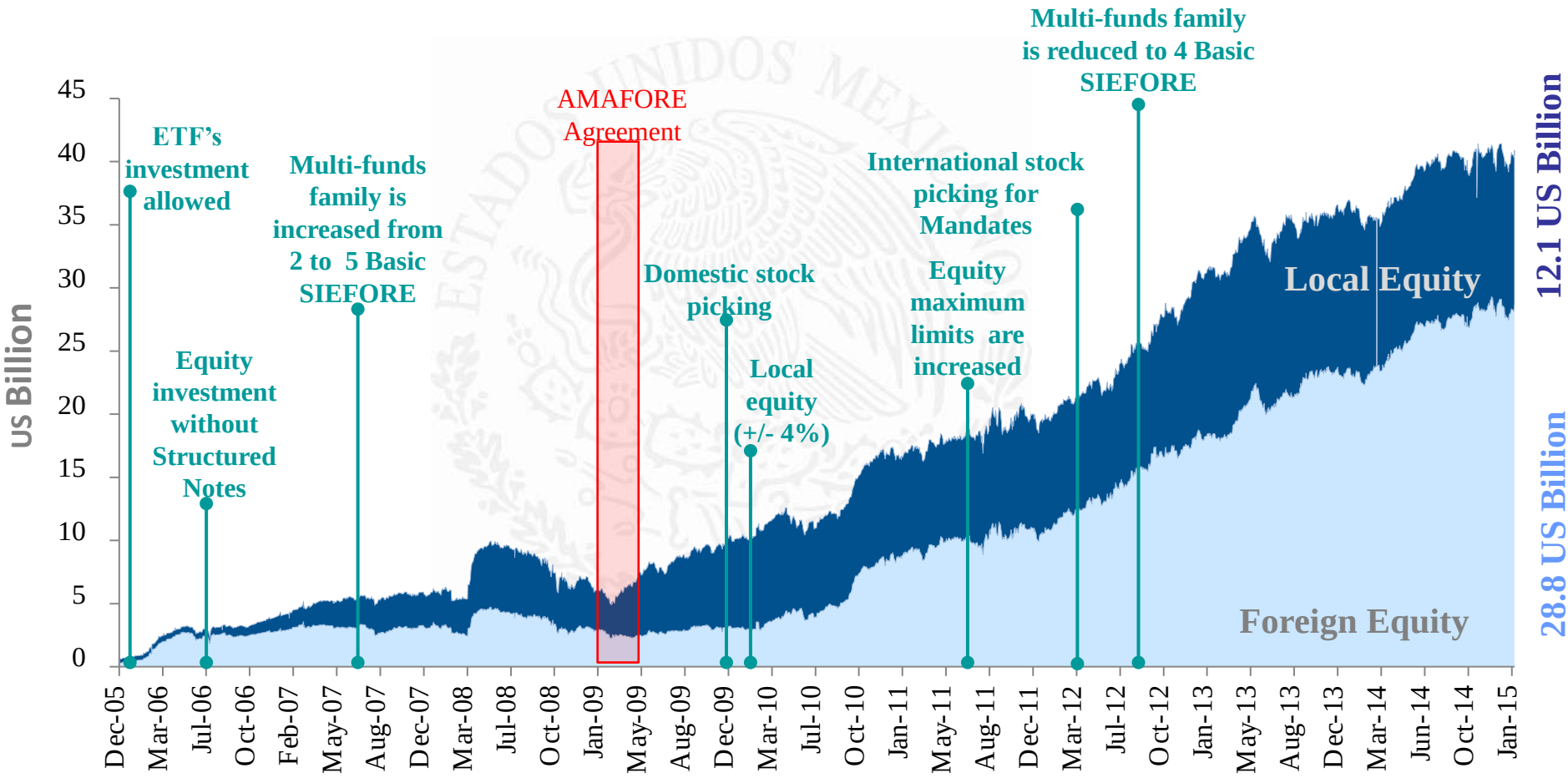
** Figures in US$ Billions, face value. Data as of January 2015.*

Fuente: CONSAR- VICEPRESIDENCIA FINANCIERA y Banxico.

7. Where long term financing lays currently: investments in Equity

Pension Fund's Equity Investments evolution

(Mark to Market value, delta value in derivatives)



* Figures in US$ Billions. Data as of January 2015.

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CONSAR
Comisión Nacional del Sistema de Ahorro para el Retiro

Mexican Pension Funds
Long term financing

Costa Rica
February, 2015

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