Society of Actuaries in Ireland

Finance & Investment Forum

20th November 2017

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Society of Actuaries in Ireland

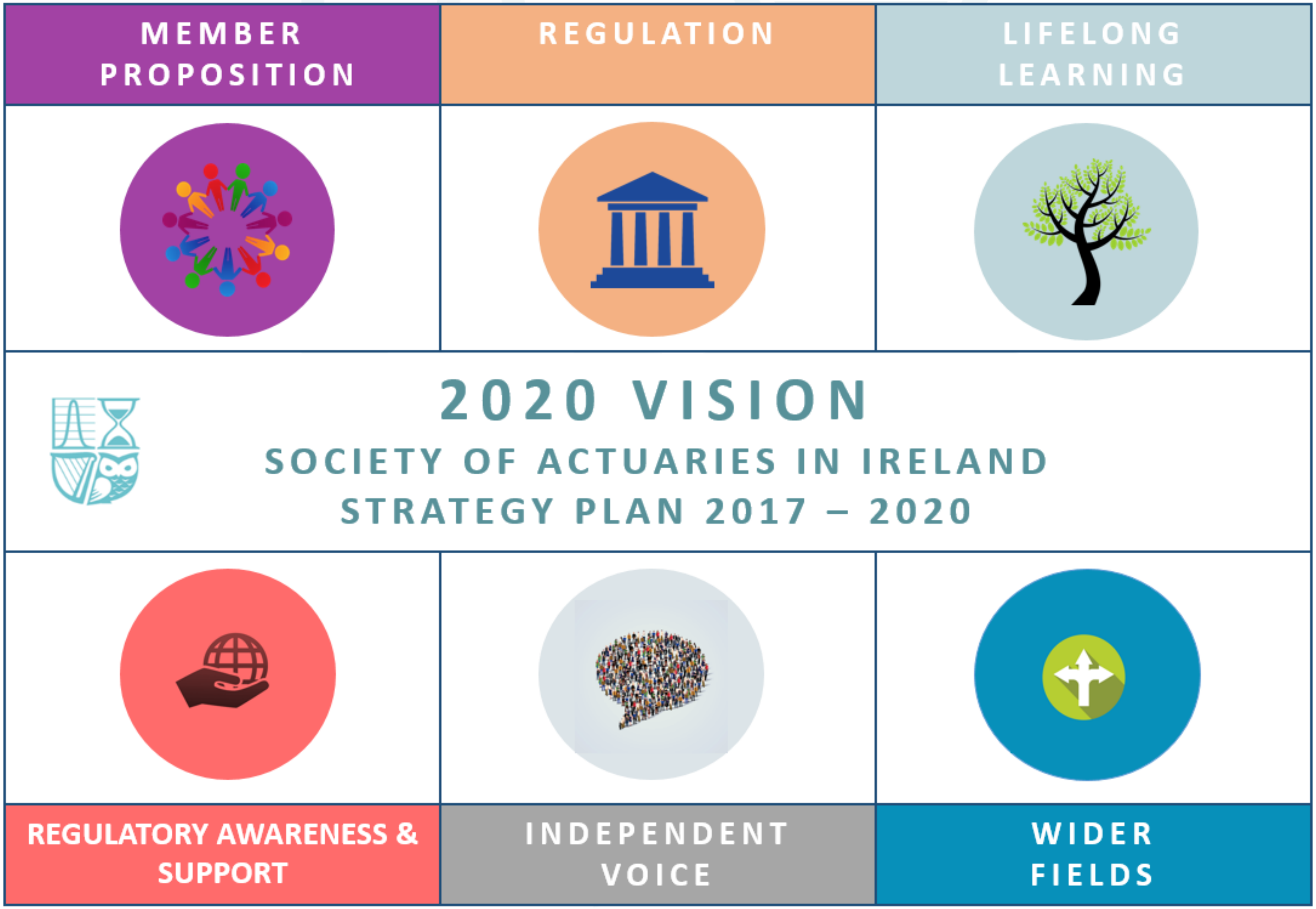
2017-2020 Strategy Plan

Maurice Whyms, SAI President

Society's Mission

1. To develop the role and standing of the actuarial profession in Ireland and enhance its reputation;
2. To support actuaries throughout their career so that they have the skills, attributes and knowledge appropriate to both current and future needs of actuarial practice;
3. To develop, maintain and enforce actuarial standards that require actuaries to advise their clients with integrity, professionalism and objectivity.

Society’s Strategy Plan 2017-2020



Regulation

Our Goal: We will regulate members' professional activities in such a way as to sustain public confidence in the quality of actuarial work.

Background	Actions for Next 3 Years Include…
<u>Background and key issues:</u> • Changing regulatory requirements and expectations • Self regulation vs independent regulation • Increased internationalisation of standards • Nature of work changing with more actuaries in wider/adjacent fields <u>So what's the main focus for next 3 years?</u> General thrust of ensuring regulatory framework "fit for purpose" unchanged. **Need to re-evaluate overall architecture and how we maintain it.**	• Articulate our regulatory strategy. Describe our role as a regulatory body and how this fits in with the roles of others such as regulators and international actuarial bodies; • Review architecture of ASPs and other materials. Includes clarifying roles of elements such as ASPs, IANs and reference resources; • Review mechanism for creating, implementing and maintaining standards/guidance; • Play an active role internationally; • Review scope and operation of the disciplinary scheme.

Lifelong Learning

Our Goal: We will promote the importance of lifelong learning and will provide learning opportunities and content that address the evolving needs of members.

Background

Background and key issues:

- Allied to technical skills, focus on development of broader based professionals increasingly important:
    - because our key stakeholders are telling us they expect it and
    - It is essential if we are to expand our sphere of influence
- Differing needs of membership
- Heavy reliance on volunteerism

So what's the main focus for next 3 years?

Many of the building blocks already in place. **Emphasis will be on developing competency framework, promoting importance of developing skills and ensuring CPD programme fit for purpose.**

Actions for Next 3 Years Include…

- Identify technical and non-technical skills /competencies for various roles. Compile output in a competency framework;
- Broaden and add depth to the program of CPD events to support competency framework;
- Create/brand series of events to promote the different areas of focus of the Lifelong Learning programme;
- Collaborate with others to facilitate access to non-technical training and development;
- Keep resource requirements under review and supplement volunteer resources, as required.

Regulatory Awareness and Support

Our Goal: We will support members in fulfilling their professional responsibilities within the commercial workplace.

Background	Actions for Next 3 Years Include…

<u>Background and key issues:</u>
 	
• From an individual member's perspective, risks and challenges in fulfilling professional responsibilities are increasing:
  • Broadening expectations of stakeholders including regulators
  • Growth in volume of requirements
• Reality of operating in a commercial environment.
 	
<u>So what's the main focus for next 3 years?</u>
 	
Regulatory Awareness and Support is a new theme which recognises its importance. **Focus will be on identifying what more we can do to maintain awareness and support members in a practical way.**
	• Map out in user friendly summary form, the professional regulation framework;
	
	• Arrange regular events to focus on professional standards and ensure consistency of interpretation;
	
	• Identify specific regulatory areas such as whistleblowing where targeted CPD training sessions should be developed;
	
	• Run forums to allow actuaries share and discuss experience in regulated roles;
	
	• Bring greater visibility among employers and other stakeholders to actuaries' professional responsibilities;
	
	• Provide CPD events on ASP PA-2.

Independent Voice

Our Goal: We will make a contribution to public debate as an independent voice, and will build our role and influence in contributing to the public policy agenda.

Background

<u>Background and key issues:</u>

- Over the years we have developed relationships with other organisations, Gov't departments and regulators.
- Generally, approach has been to engage directly with such regulators and policy makers to offer constructive input.
- Several recent examples of good engagement.
- Publishing research can also be effective in contributing to public debate

<u>So what's the main focus for next 3 years?</u>

Aim will be to continue effective engagement with stakeholders and increase independent research to support this activity.

Actions for Next 3 Years Include…

- Develop a more structured approach to stakeholder management, with focus on key public policy decision-makers;
- Identify a small number of worthwhile research initiatives to improve quality of debate on relevant public policy matters;
- Allocate resources and/or partner with others to deliver on those projects;
- Enhance the role of the PR group into PR and Research to get more 'bang for our buck' from our thought leadership;
- Consider how we can better utilise digital/ social media. Continue to invest in website and assess if refreshed design is required to bolster our visual identity.

Wider Fields

Our Goal: We will promote and encourage the involvement of the profession in wider fields and the involvement in the Society of actuarial professionals operating outside traditional areas

Background

<u>Background and key issues:</u>

- Likelihood numbers in some traditional roles will reduce while strong level of entrants to the profession will continue
- Actuaries have skills and attributes which can add value in organisations beyond our traditional areas
- Often little association with or appreciation of potential to secure those skills by employing actuaries.

<u>So what's the main focus for next 3 years?</u>

Building on work done over the last 3 years, **main emphasis will be on increasing awareness of actuaries and in particular promoting the advantages of the actuarial skill set.**

Actions for Next 3 Years Include…

- Promote the profession to a wider audience, with particular emphasis on articulating the actuarial skill set;
- Examine and learn from how other professions have grown their visibility and spheres of activity and influence;
- Collaborate with other professions to showcase the actuarial skill set and raise the profile of the profession;
- Use technological advances to build awareness of possible applications of the actuarial skill set;
- Engage with members working in wider fields to ensure that membership of the Society continues to add value to the.

Member Proposition

Our Goal: We will seek to create, and be recognised for creating, sustained value for our members, recognising the diverse needs and expectations of a growing membership.

Background

<u>Background and key issues:</u>

- Both tangible and intangible elements of the services we provide
- Services must continuously evolve, be delivered effectively and represent a positive experience
- Different natural segments of members in terms of needs and expectations
- Technology changing how members consume services
- Awareness of services also important

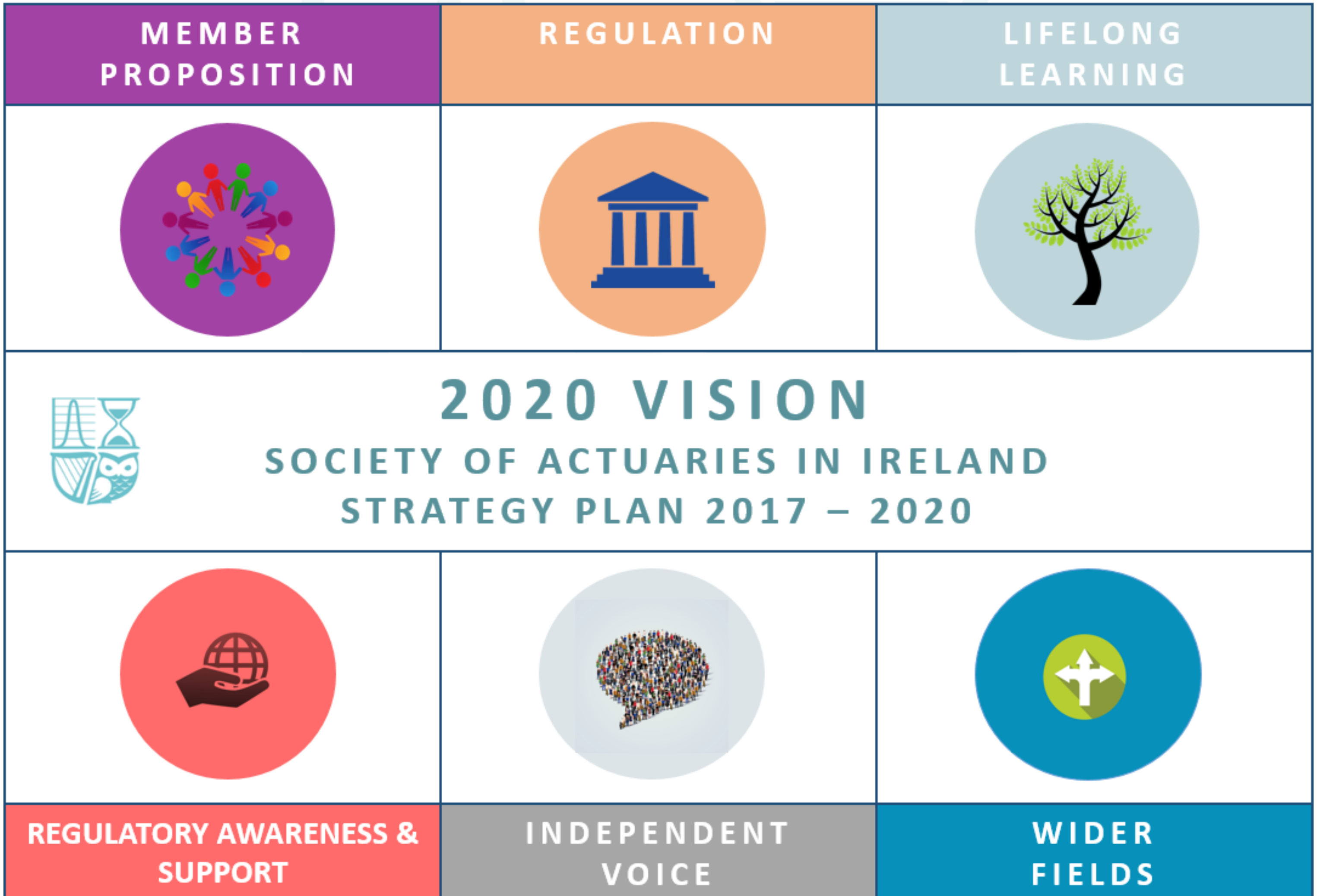
<u>So what's the main focus for next 3 years?</u>

Emphasis will be on **actively engaging with members to understand needs and expectations of different cohorts, and increasing awareness of services available.**

Actions for Next 3 Years Include…

- Review how we let members know about the services and how they can access and benefit from them;
- Identify and address any substantive gaps in the services we provide,
- Promote the benefits of membership across different membership types;
- Develop and implement a plan for embedding a culture of diversity and inclusion in the profession
- Research options for delivering CPD activities through diverse methods;
- Review our volunteering structure promote it as development opportunity

Society's Strategy Plan 2017-2020



Society of Actuaries in Ireland

Update on New 2017-2020 Strategy Plan

Maurice Whyms

Society of Actuaries in Ireland

Algorithmic Trading

Colm Fitzgerald (University College Dublin)

Overview

- Introduction & Background
- Definitions
- Aims
- Methods
- Development of Algorithms
- Uses
- Advantages & Disadvantages
- Challenges
- Regulatory Issues

Introduction & Background

A move from open outcry to electronic trading to algorithmic trading.

Factors influencing:

- To gain an advantage over other market participants.
- Increased market fragmentation
- Development of rules based trading
- Development of execution management systems (EMS) and increased amounts of high frequency databases available

Algorithmic trading is now used by most of the main market participants as well as by brokers.

- Brokers have mostly embraced such approaches as a means of survival, and they increasingly compete on the quality of their algorithms.

The Efficient Markets Hypothesis

Source: Andy Marlette in the Pensacola News-Journal.

Definitions

The term "algorithmic trading" is often used broadly to refer to automated computerised electronic trading based on quantitative rules in the form of algorithms.

Two distinct uses of it exist:

- Firstly when it is used for dealing and execution only – the algorithms are usually referred to as execution algorithms, although the general term is also used for this narrow use.
- And secondly, when it is used for trading with the aim of making trading profits, it is usually referred to as high frequency algorithmic trading or as quantitative trading.

Aims

The aims of execution algorithms are to reduce the costs and risks associated with the dealing and execution of trades. They aim to minimize market impact and to help achieve an execution price as close to the market price as possible.

They also aim to disguise their deals to stop other market participants using any power gained by from knowing one participant's desired trades to their advantage.

There are a number of methodologies for assessing how well the algorithms work, e.g. assessing the size of the implementation shortfall, which is roughly the difference in the value of a notional portfolio including sales or purchases made notionally at the market price at the time of the deal and the value of the actual portfolio after the execution of the trades. The algorithms with the lowest implementation shortfall are considered to be superior.

The aim of high frequency trading algorithms is to make profits.

Methods

Various methods exist. Simple examples would be placing trades so as to match the expected volume pattern during a trading day or to place trades evenly over time. More elaborate variations also exist.

They can be set up as black boxes, grey boxes or white boxes. Black boxes have hidden workings, grey boxes facilitate some external interaction and white boxes are models whose logic and workings are clearly visible and so have greatest external interaction.

The aim of high frequency trading algorithms is to track high-frequency data and to use an algorithm to make decisions based on how to trade, when to trade and / or what to trade.

A very simple example would be an algorithm designed to buy the German 2-yr bond future when the 10 day moving average crosses above the 20 day moving average and sell when the 10 day moving average crosses below the 20 day moving average.

Development of Algorithms (1)

Although algorithmic trading sounds like its is mainly a computerised activity there is a large and significant human element, namely creating the algorithm in the first place.

The algorithms need to created by astute market participants who have spotted a market behavior that they believe can be taken advantages of by a profitable trading strategy (or equivalently a cost minimization strategy). This is far from an easy thing to do.

Once the strategy has been devised it needs to be back-tested, signed-off, put into production, fine-tuned, and a feedback risk management and monitoring system put in place to manage it.

Development of Algorithms (2)

Many similar algorithms can be produced at the same time meaning that there will be a first mover advantage for those with the fastest market access. A significant and ongoing investment in technology and research may be needed to remain competitive.

There is also the danger of market participants reverse-engineering another participant's algorithm and taking advantage of any knowledge gained. This is common.

Just as traders "battled" in the markets in the past, arguably computers are battling other computers in today’s markets. This has changed the role of traders into strategists and tacticians.

Uses

Trading algorithms are important for assessing and spotting liquidity in markets. This is important for dealing but also for pricing large deals as the market impact of the deal is a big factor in determining the prices.

The aim with high frequency algorithmic trading is to create money making machines – though this is much easier said than done in practice. It’s mostly about the thought [*nous*] put into it in the first place.

Advantages & Disadvantages (1)

The introduction of algorithmic trading has brought some advantages: reducing bid-offer spreads, lowering transaction costs, increasingly liquidity and arguably improving market efficiency. Some market now offer payments for providing liquidity.

However, they are mostly only available to the more powerful market participants - and this gives these participants a greater advantage over smaller less powerful participants. From a competitive markets perspective, this makes the markets less fair and more prone to manipulation and abuse, especially at the expense of small (individual) investors. Market regulators would regard this as undesirable.

Advantages & Disadvantages (2)

Poorly constructed or supervised algorithms have the potential to make market moves bigger (by continuing to execute when a change in circumstances means they have become ineffective) and there is a risk of the algorithms ‘going wrong’, e.g. as happened with Knight Capital, a broking firm, which incurred a multi-million dollar loss in 2012 due to a programming error in its equity trading algorithm.

The issue of the greater ability to take risk in markets by some market participants is also very important.

The patterns created by algorithmic trading, i.e. by the computers/robots, have led to a marked rise in the use of fractal analysis by traders as part of their toolkits.

Challenges & Regulatory Issues

A significant challenge for algorithm trading is what is referred to as latency, which is the time difference between stimulus and response, between order generation and execution.

Low latency is essential to prevent other market participants gaining a first mover advantage and placing orders ahead of one's own

Regulatory issues – mostly from lack of understanding and cultural inertia in the organizations

Thank you for your attention

Any questions?

Contact: colm.fitzgerald@ucd.ie

Society of Actuaries in Ireland

How Trustees can Invest for Impact

Jennifer Richards (Aberdeen Standard Investments)

ESG and the investment process

Traditional factors

- Sales growth
- Margins
- Cash flow
- Capital adequacy
- Market share
- Valuation

ESG factors

- **Environmental**
- Energy, water, pollution, cleantech
- **Social**
- Human rights, health and wellbeing, innovation
- **Governance**
- Succession, remuneration, diversity, transparency

Source: Standard Life Investments

Traditional + ESG = Stronger returns

ESG Investment – values based funds and approaches

Ability to build and tailor investment solutions

Ethica l

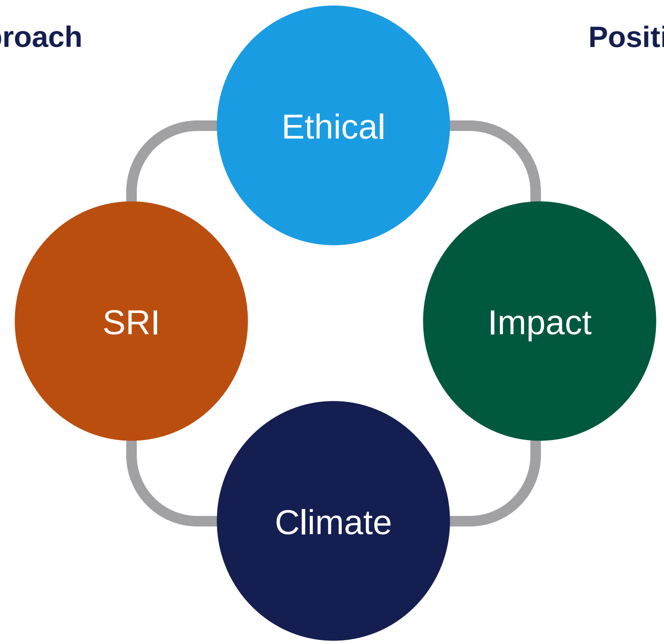
Traditional sin-stock approach

Exclude companies involved in industries deemed unethical, such as tobacco, gambling, armaments, animal testing, or companies with poor business practices. Positive bias towards stocks that score well on RI issues. The ethical policy is overseen by an external advisory group

SRI

Sustainability focused

Screen companies on their management of sustainability matters. Exclude worst performing companies, with strong active engagement approach focused on “watch list” stocks



Positively screened selection

Impact

Positive selection of companies that are delivering products and solutions to address societal challenges, such as climate change, rising inequalities and unsustainable production & consumption. UN Sustainable Development Goals based

Carbon based

Climate

Ability to capturing climate concerns through a range of activities, including engagement, exclusions, carbon tilted portfolios and carbon foot printing

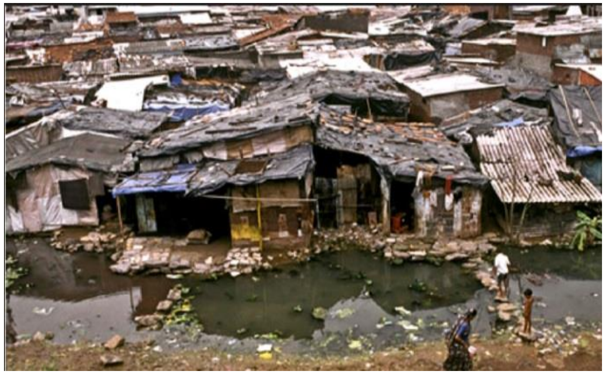
The problems

Poverty

Hunger & Malnutrition

Poor Health & Mortality

Access to Clean Water



Inequality

Climate Change

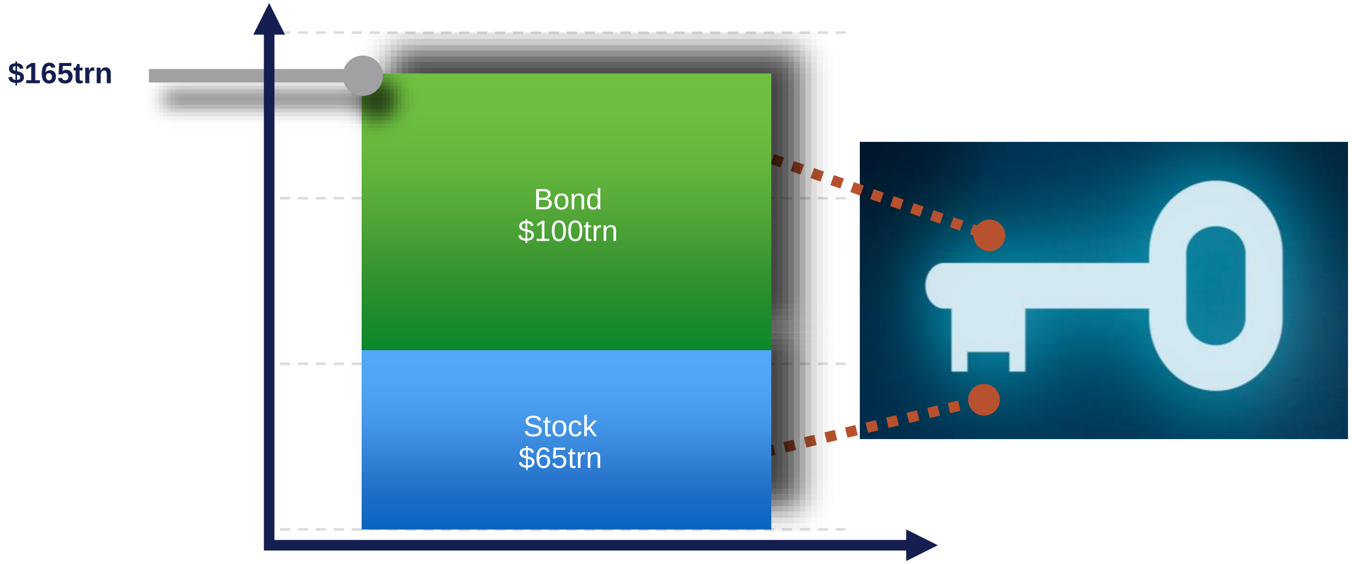
UN Sustainable Development Goals

Environmental & social challenges

- What are the UN's global goals?
- How can we possibly address them?
- How much will they cost to achieve?
  – $75 – 105trn
- Where will that money come from
  - Governments?
  - Private Sector?

Investment, not philanthropy

Environmental and social challenges



Source: Standard Life Investments

Impact Investing framework

UN 2030 Agenda for Sustainable Development

Key Performance Indicators

Annual Impact Report

UN 17 SDGs

8 impact pillars

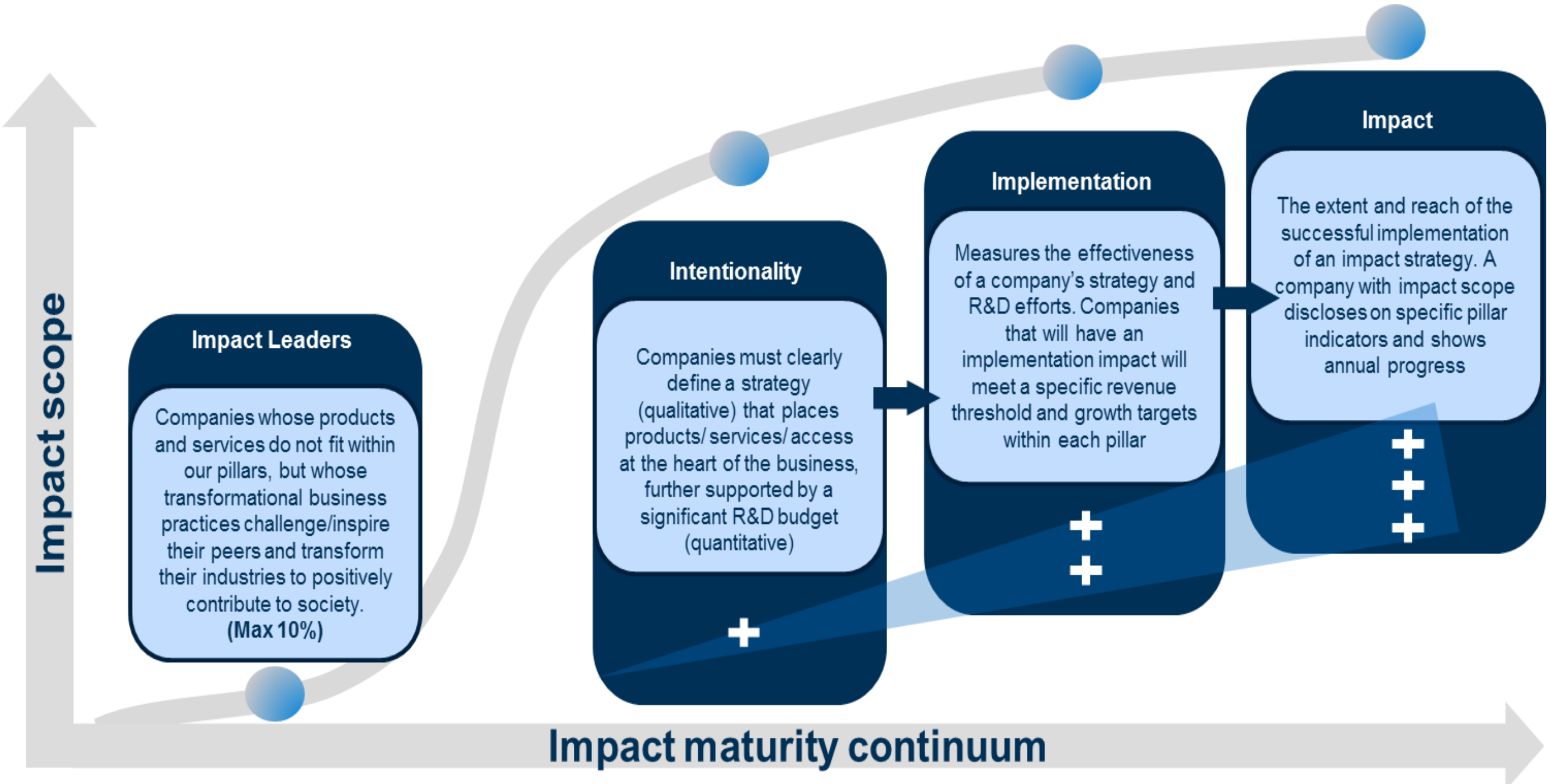
Circular Economy	Health & Social Care
Sustainable Energy	Financial Inclusion
Food & Agriculture	Sustainable Real Estate
Water & Sanitation	Education & Employment

3 challenges to address

- Climate change
- Reduce inequalities
- Unsustainable production and consumption

Impact maturity stages

Three measures of impact are considered:



Pillar level reporting: Financial Inclusion

Holdings: Axis Bank, Bradesco, Garanti, Mastercard, Safaricom, Unifin

Underserved customers

31.9 million underserved customers open a bank account: **more people than the entire population of Peru**

New finance

$10.9 billion made available to underserved customers, including rural, retail agriculture and SMEs.

Financial Inclusion

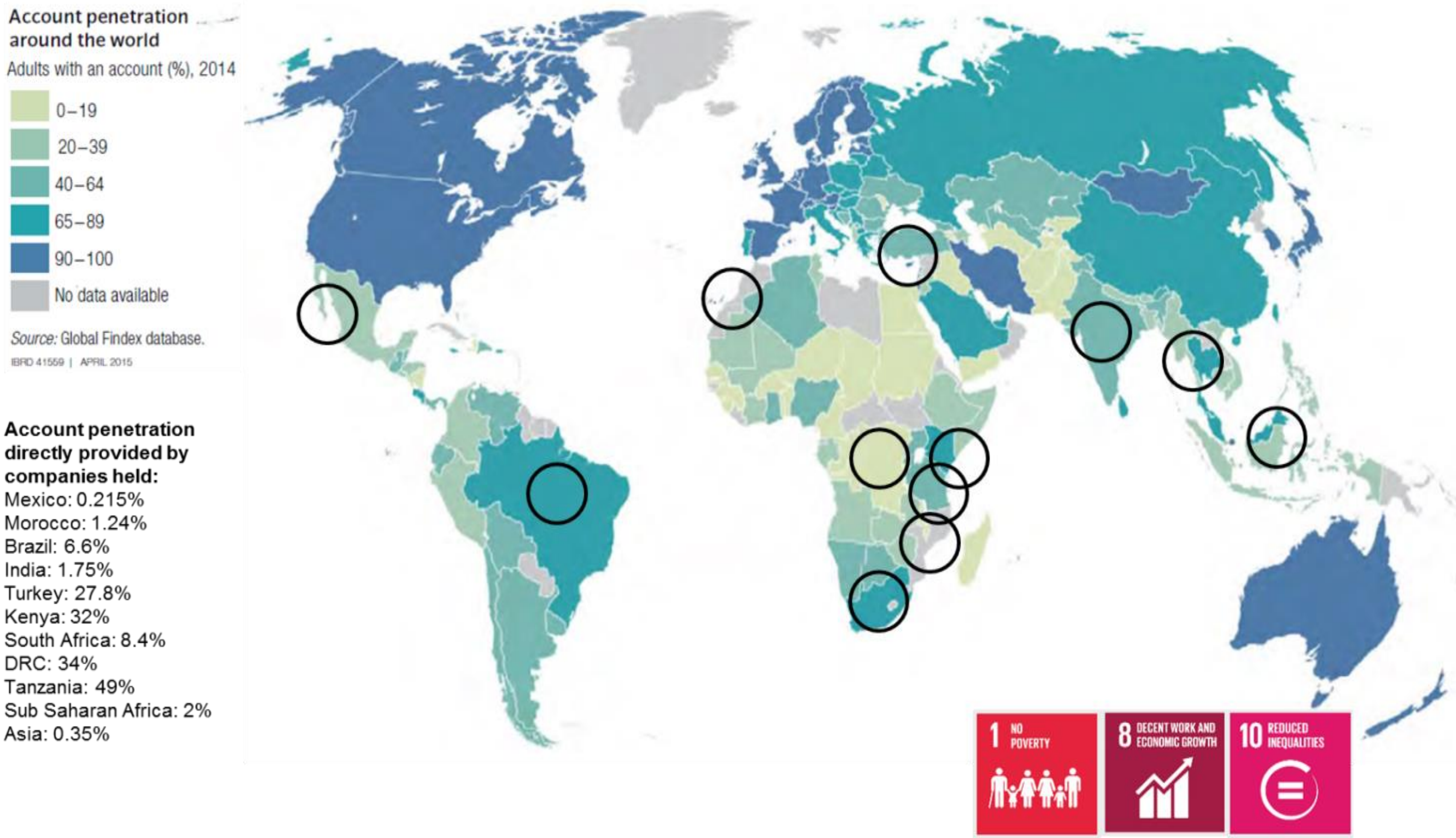
Access points

3,016 new branches in rural and underserved areas including **India, Turkey and Mexico**

Mobile money

66 million mobile wallet users: the equivalent **population of France**

Impact foot printing: Account penetration



Account penetration directly provided by companies held:
Mexico: 0.215%
Morocco: 1.24%
Brazil: 6.6%
India: 1.75%
Turkey: 27.8%
Kenya: 32%
South Africa: 8.4%
DRC: 34%
Tanzania: 49%
Sub Saharan Africa: 2%
Asia: 0.35%

Source: Standard Life Investments, December 2016

Have your cake…

- No compromise on returns
- No compromise on sustainability
- Long term
- Sustainable
- Impact investing

The information shown relates to the past. Past performance is not a guide to the future. The value of an investment can go down as well as up.

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Society of Actuaries in Ireland

Ireland’s Debt Insurance

T Anthony Linehan (NTMA)

MANDATE

Funding and Debt Management is responsible for borrowing on behalf of the State and managing the National Debt in order to ensure liquidity for the Exchequer and to minimise the interest burden over the medium-term

MANDATE

The main concerns of the NTMA as debt manager are to

(1) ensure that the government's financing needs and financial obligations over the medium- to long-term are met at the lowest cost consistent with a prudent level of risk;

(2) establish a sustainable debt service profile consistent with the government's medium-term debt payment capacity;

(3) promote the efficiency and development of primary and secondary markets for government securities; and

(4) broaden the investor base and diversify funding sources.

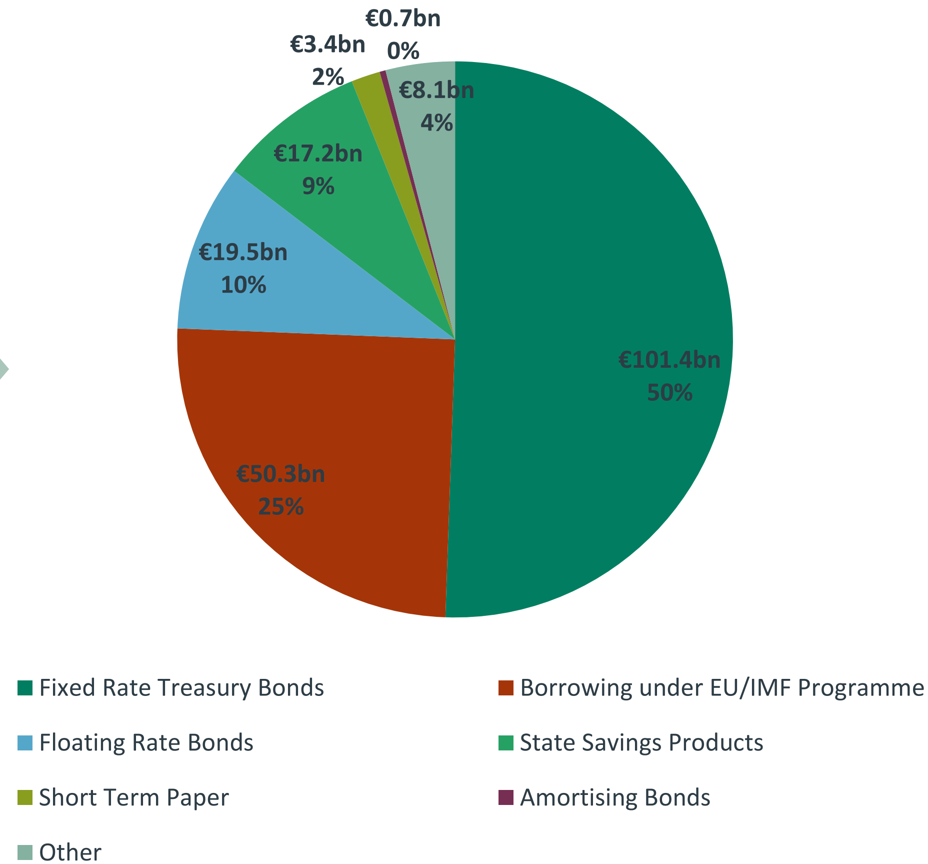
Debt issuance since the crisis

Gníomhaireacht Bainistíochta an Chisteáin Náisiúnta
National Treasury Management Agency

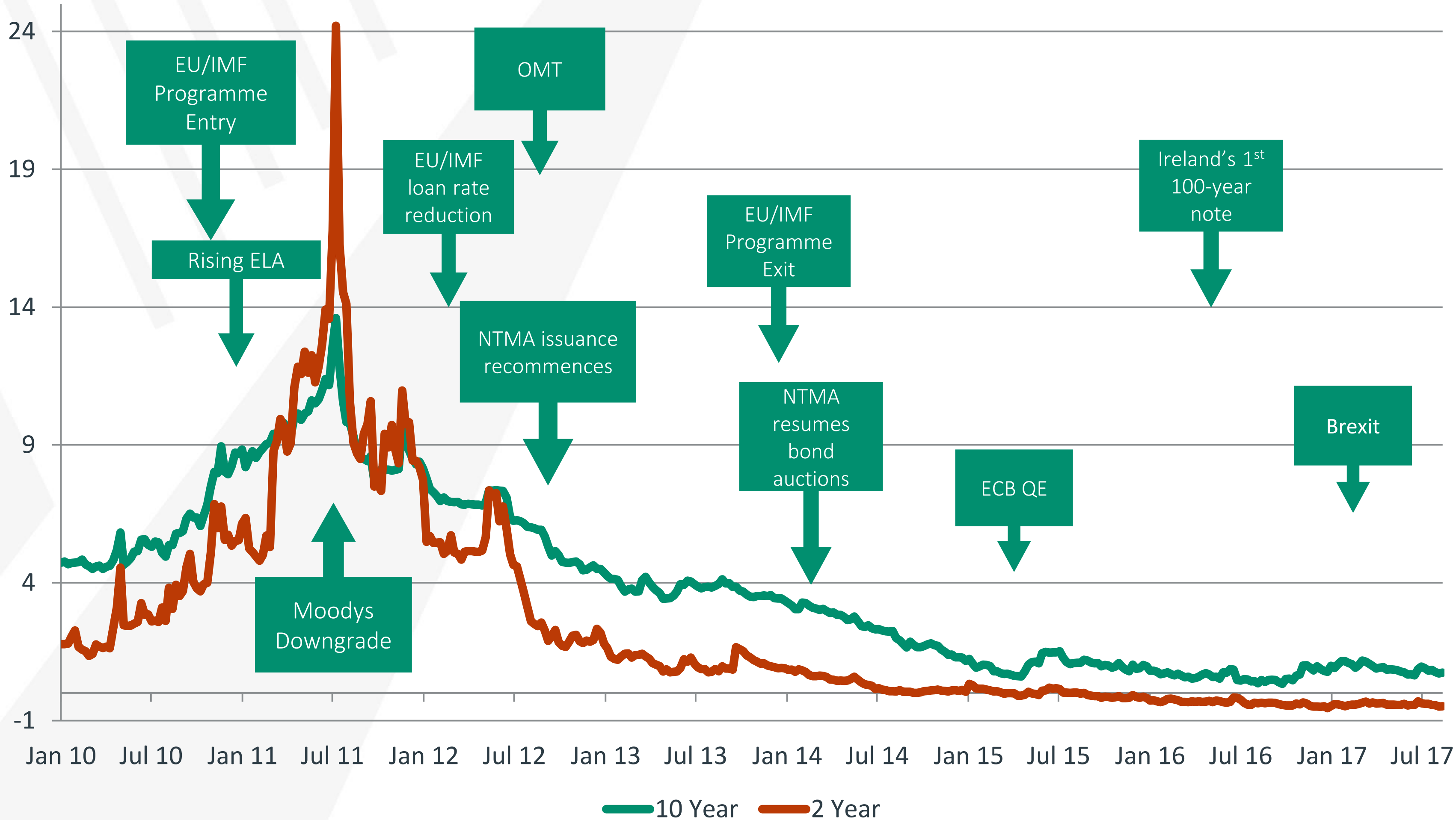
General Government Debt

General Government Debt
€47 billion end 2007

General Government Debt
€200 billion end 2016



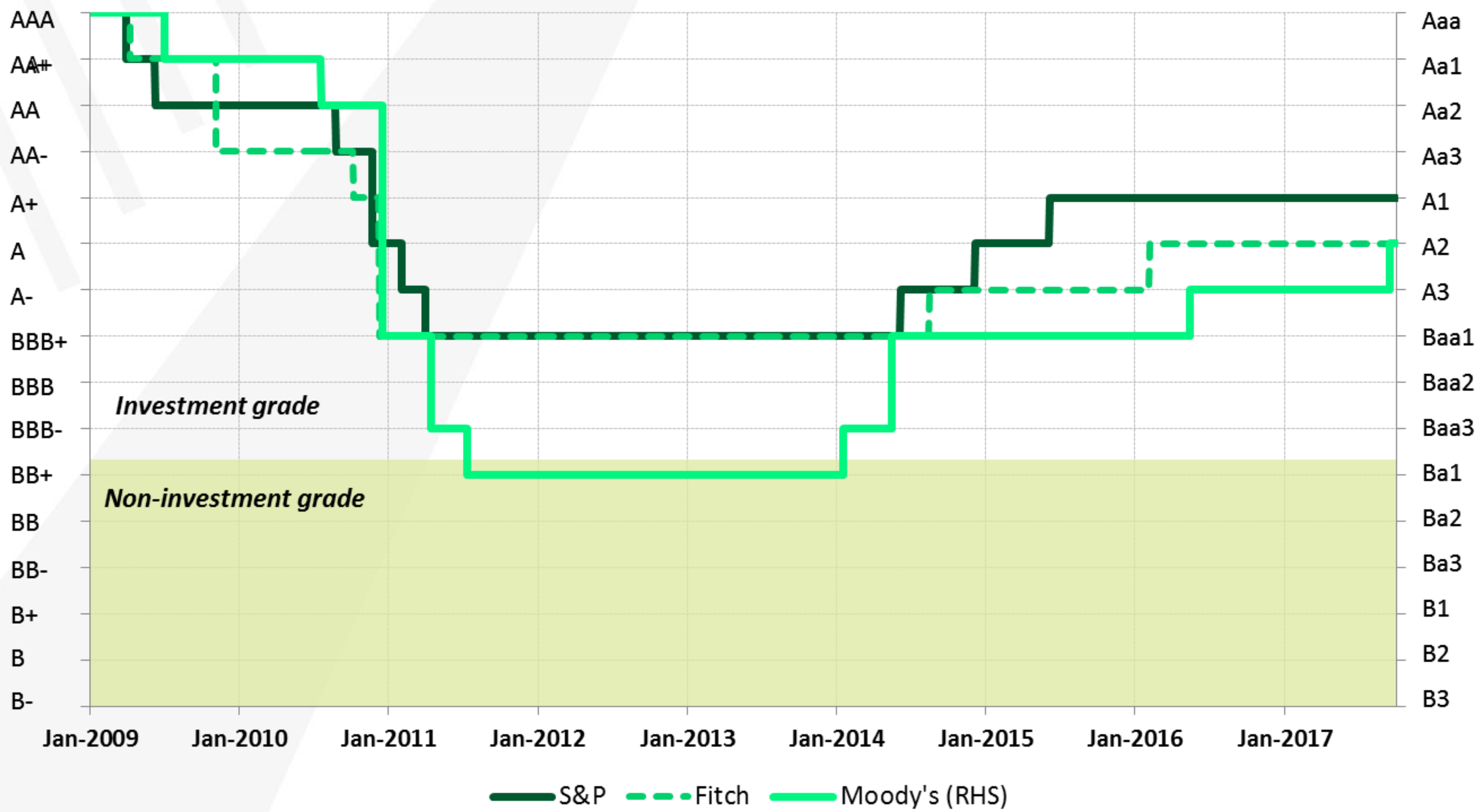
Ireland's happy bond market story has lots of milestones



Source: Bloomberg (weekly data)

Ireland's Credit Ratings

Ireland went from a AAA issuaer to sub investment and is now back in the A class



What helped Ireland ?

- Fiscal discipline and political consensus
- Facing up to problems early
- The EU/IMF
- The Structure of the Irish Economy
- QE – Monetary Policy

Regaining Market Access

- Despite being locked out from private debt markets the NTMA took a leading role in communicating with investors and rating agencies

- In January 2012, Switched 2014 bond into 2015 bond (linked to introduction of 3yr LTRO).

- In July 2012, Treasury Bill auctions 3 month €500 million

Regaining Market Access

- 2012 Switch and Outright sale of 2013/2014 bonds into new 2017 and existing 2020 bonds; key here for us - first time back below 6%!

- Issue of Irish Amortising Bonds - new product

- In 2013 we recommenced syndications and Anglo / IBRC Promissory Note converted to long term 25-40yr floating rate bonds

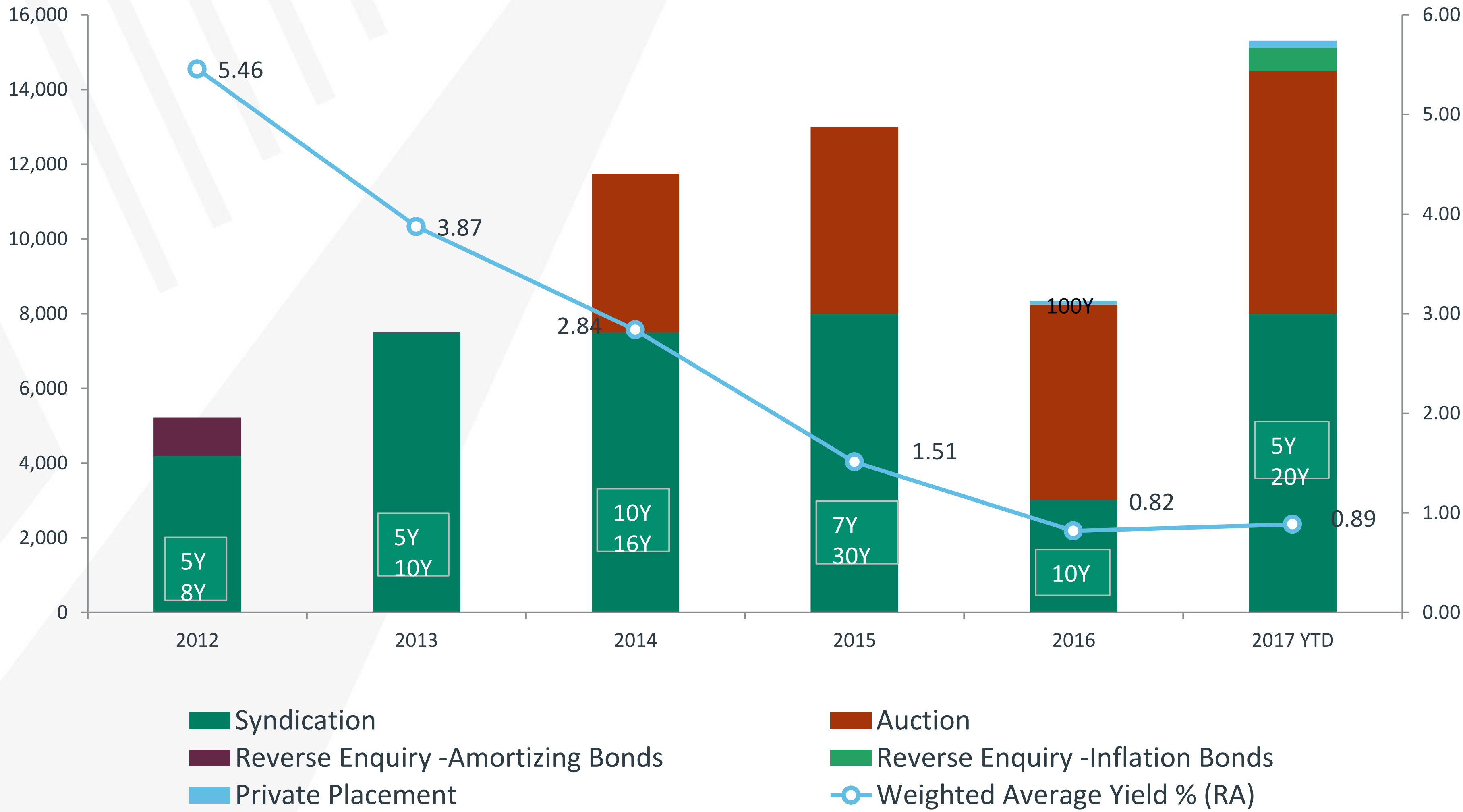
Regaining Market Access

- January 2014 – existed the Troika Programme

- In 2014 regular auctions resumed.

- March 2015 - €18 billion to the IMF replaced with lower cost, longer dated, market funding. 4 year loans replaced with 15 year debt while still hitting target savings of over €1.5 billion.

Irish Bond Issuance 2011 – 2017



Gníomhaireacht Bainistíochta an Chisteáin Náisiúnta
National Treasury Management Agency

Other significant points in return to markets

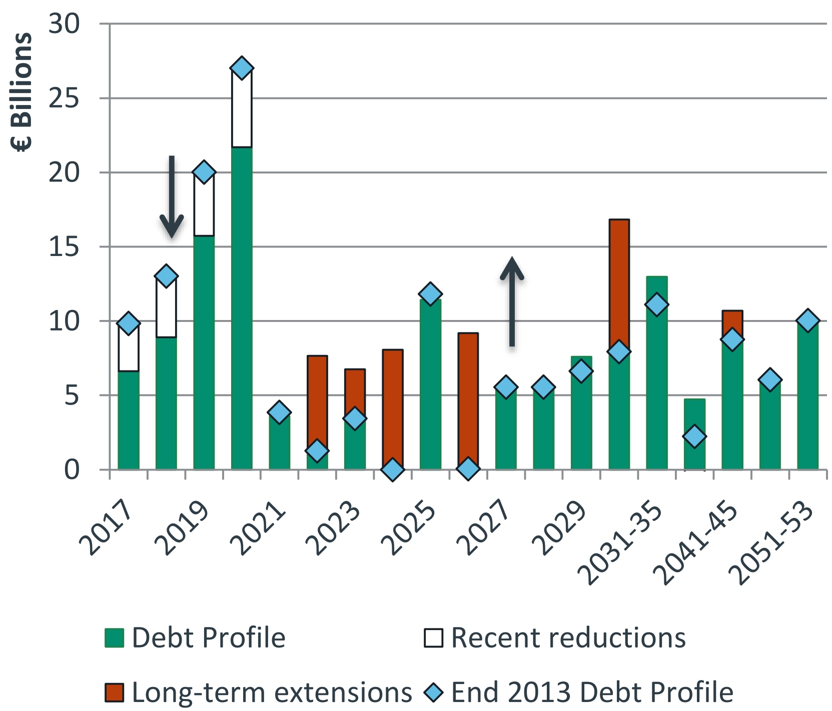
- Rotation of investors from Hedge Funds to traditional investors as Ratings improve.

- Prudential cash balances to reassure markets.

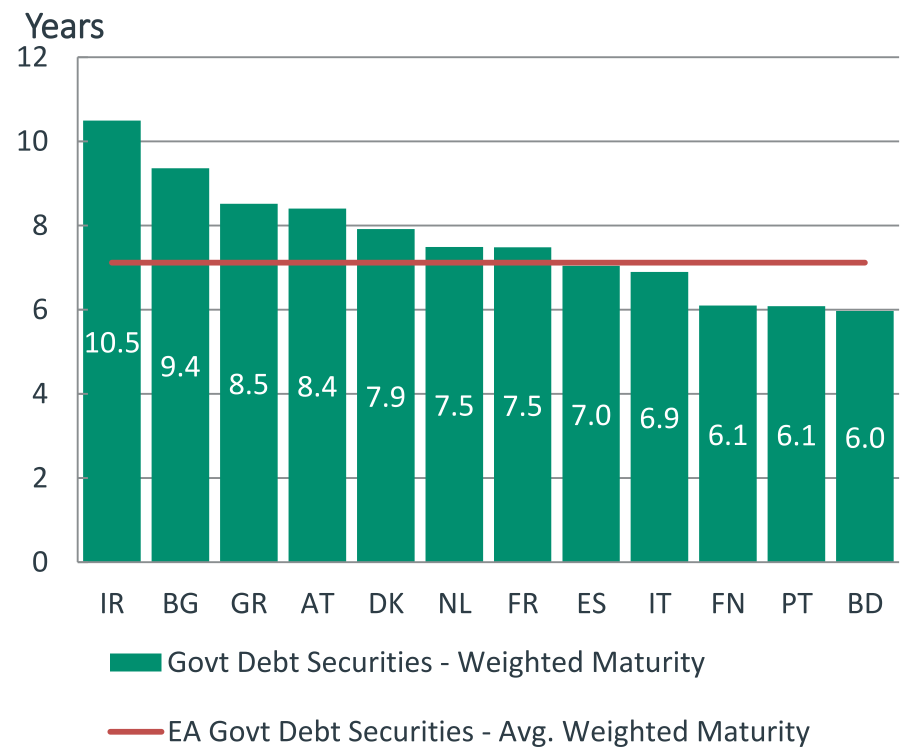
- Managing the Maturity Profile of the debt

We improved our 2017-2020 maturity profile significantly in recent years

Various operations since 2013 have led to an extension of maturity…



…Ireland compares favourably to other European countries



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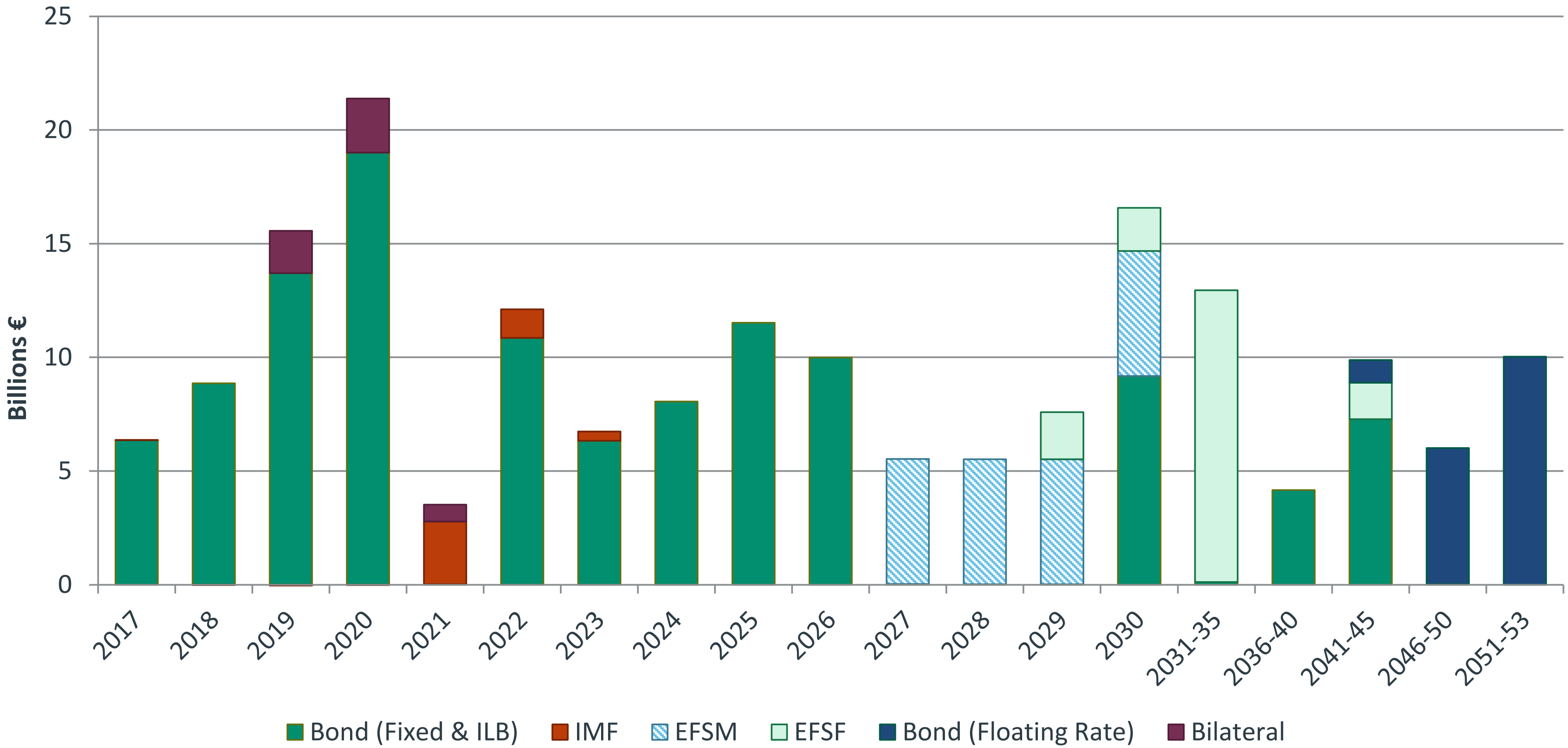
National Treasury Management Agency

Source: NTMA; ECB

**excludes programme loans. Ireland's maturity including these loans is still similar.*

Maturity profile – modest refinancing in 2017 and 2018

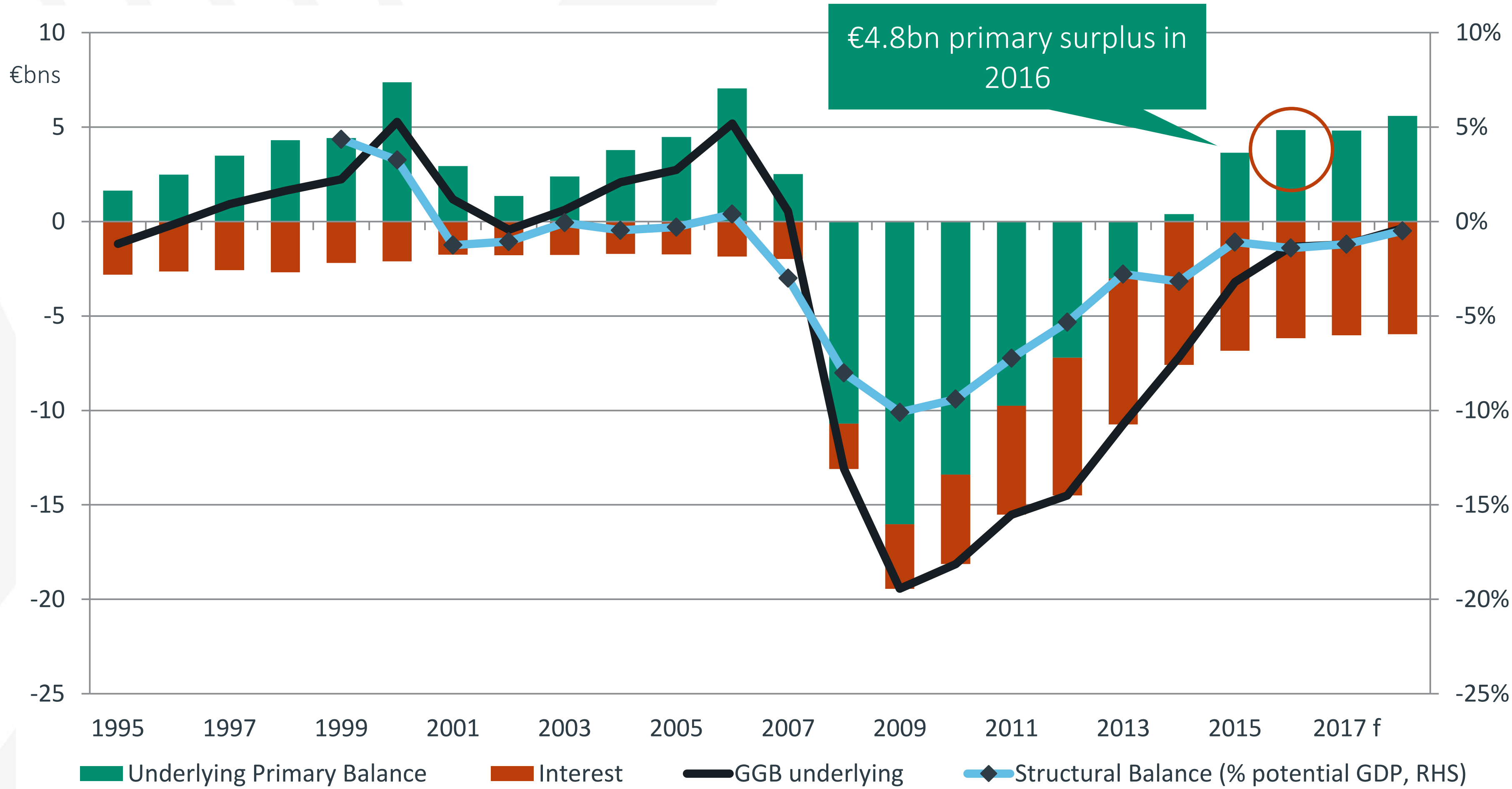


Source: NTMA

Gníomhaireacht Bainistíochta an Chisteáin Náisiúnta
National Treasury Management Agency

Note: EFSM loans are subject to a 7-year extension that will bring their weighted-average maturity from 12.5 years to 19.5 years. It is not expected that Ireland will refinance any of its EFSM loans before 2027. As such we have placed the EFSM loan maturity dates in the 2027-31 range although these may be subject to change.

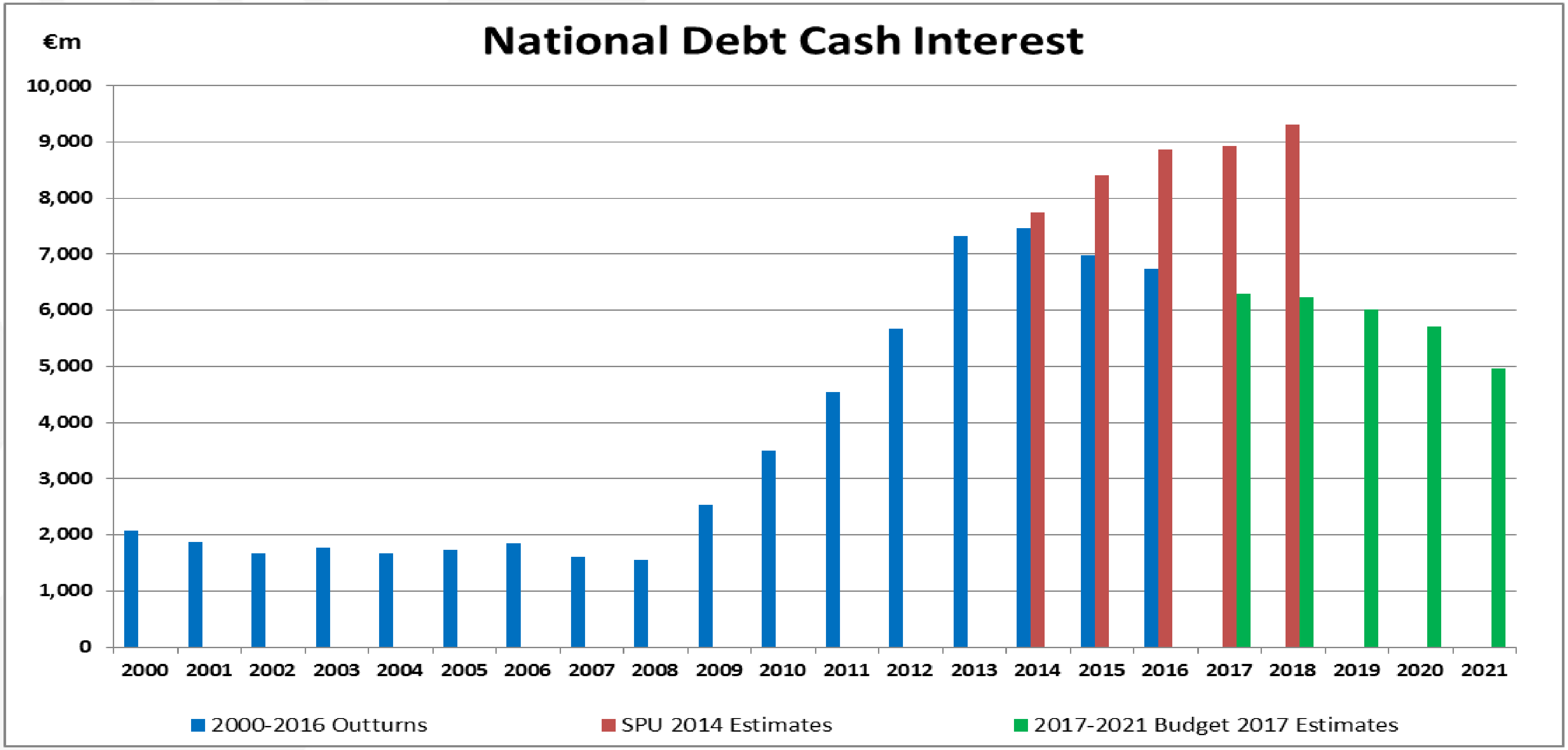
Ireland has confirmed debt sustainability: debt is falling naturally through "snowball" effect



Source: CSO; Eurostat; IMF

Reduced National Debt Cash Interest

April 2014 SPU forecast interest bill for 2016/2017 c.€9bn. Actual 2016 outturn €6.7bn.



Gníomhaireacht Bainistíochta an Chisteáin Náisiúnta
National Treasury Management Agency

Funding sources

Long Term

- Benchmark bonds – auctions/ syndications via Primary Dealer System
- European Medium Term Note Programme – private placement/ Inflation linked bond
- EU (EFSF, EFSM)/ IMF/ Bilateral loans
- Other (EIB, CEB)

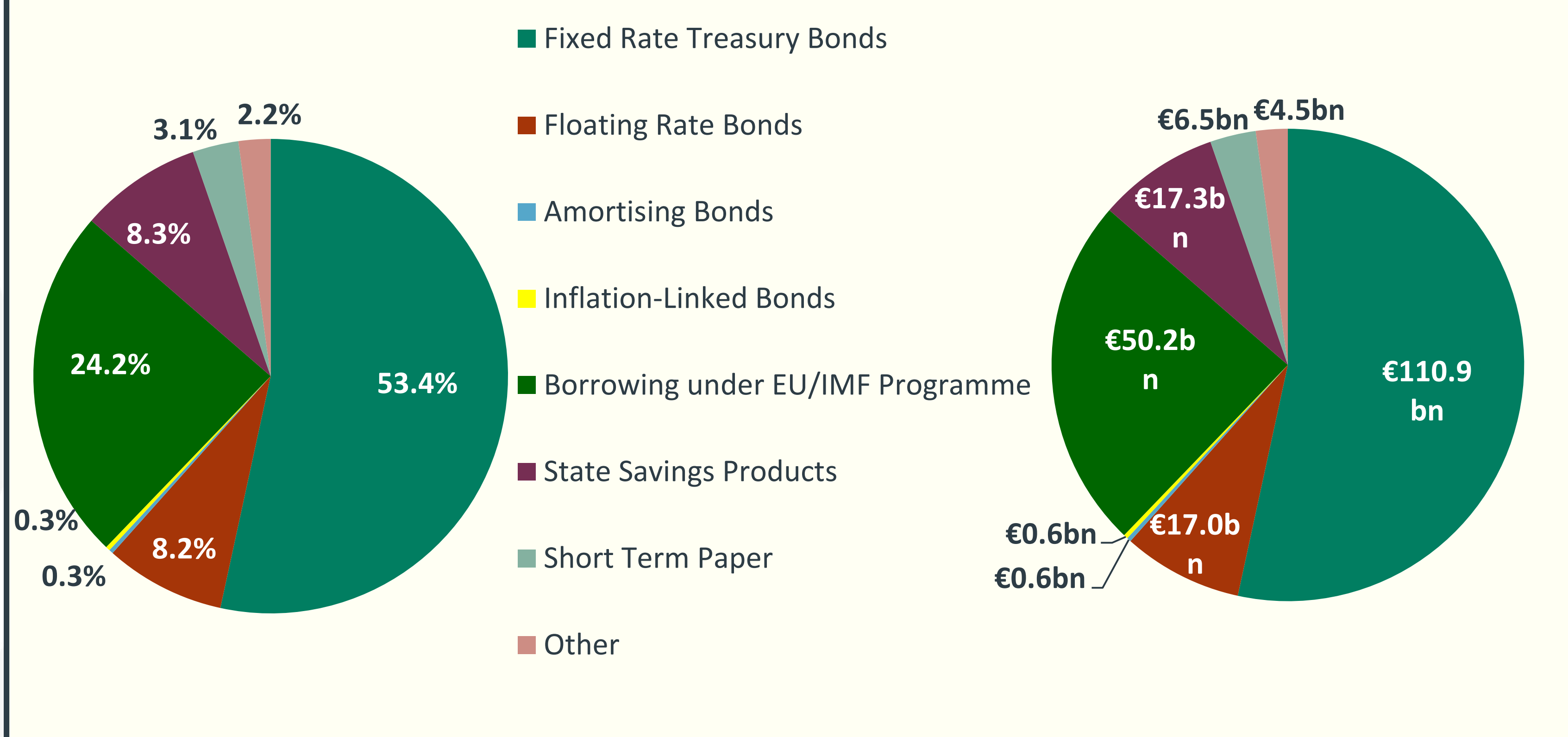
Short term

- T-Bills
- Commercial Paper (European and US)
- Exchequer Notes

Retail Debt

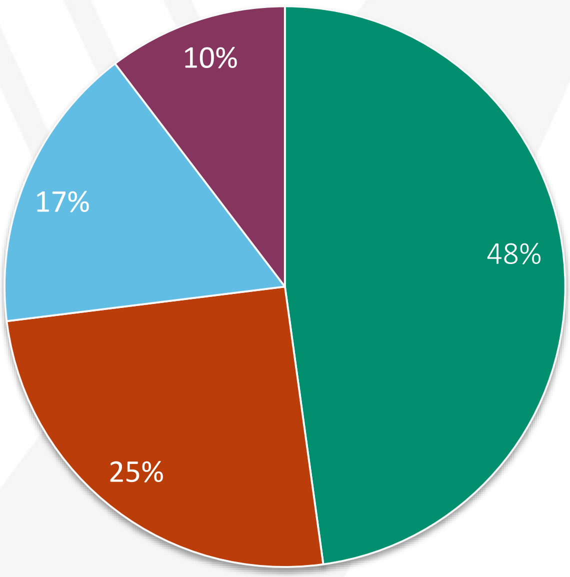
- Prize Bonds, Fixed Term Products, POSB

Gross National Debt Components
End Aug €207.6bn



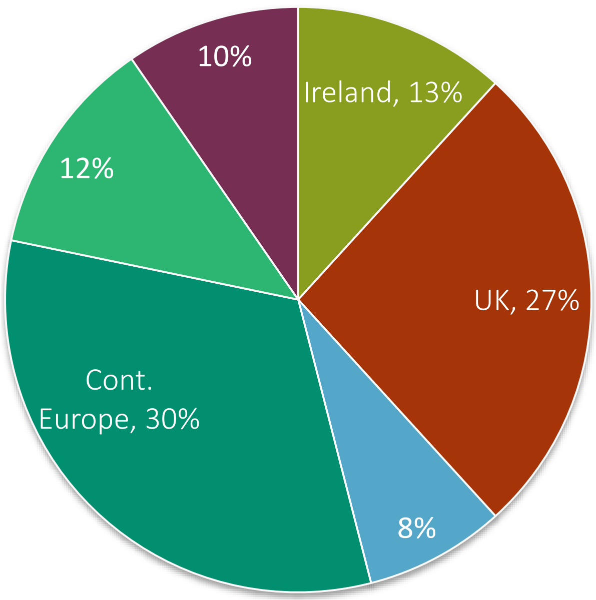
Investor base for Government bonds is wide and varied

Investor breakdown:
Average over last 8 syndications



■ Fund/Asset Manager ■ Banks/Central Banks
■ Pensions/Insurance ■ Other

Country breakdown:
Average over last 8 syndications

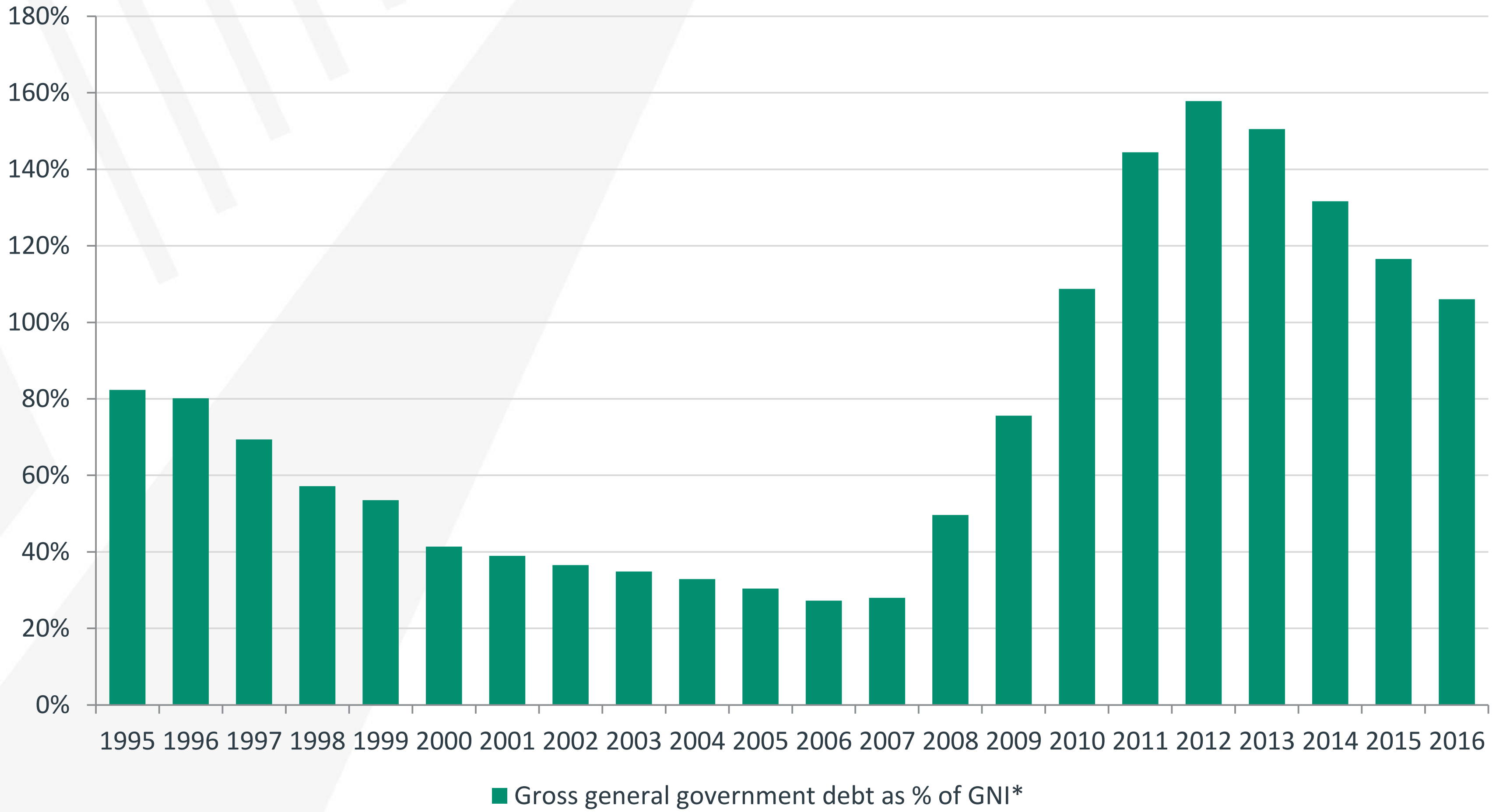


■ Ireland ■ UK
■ US and Canada ■ Continental Europe
■ Nordics ■ Other

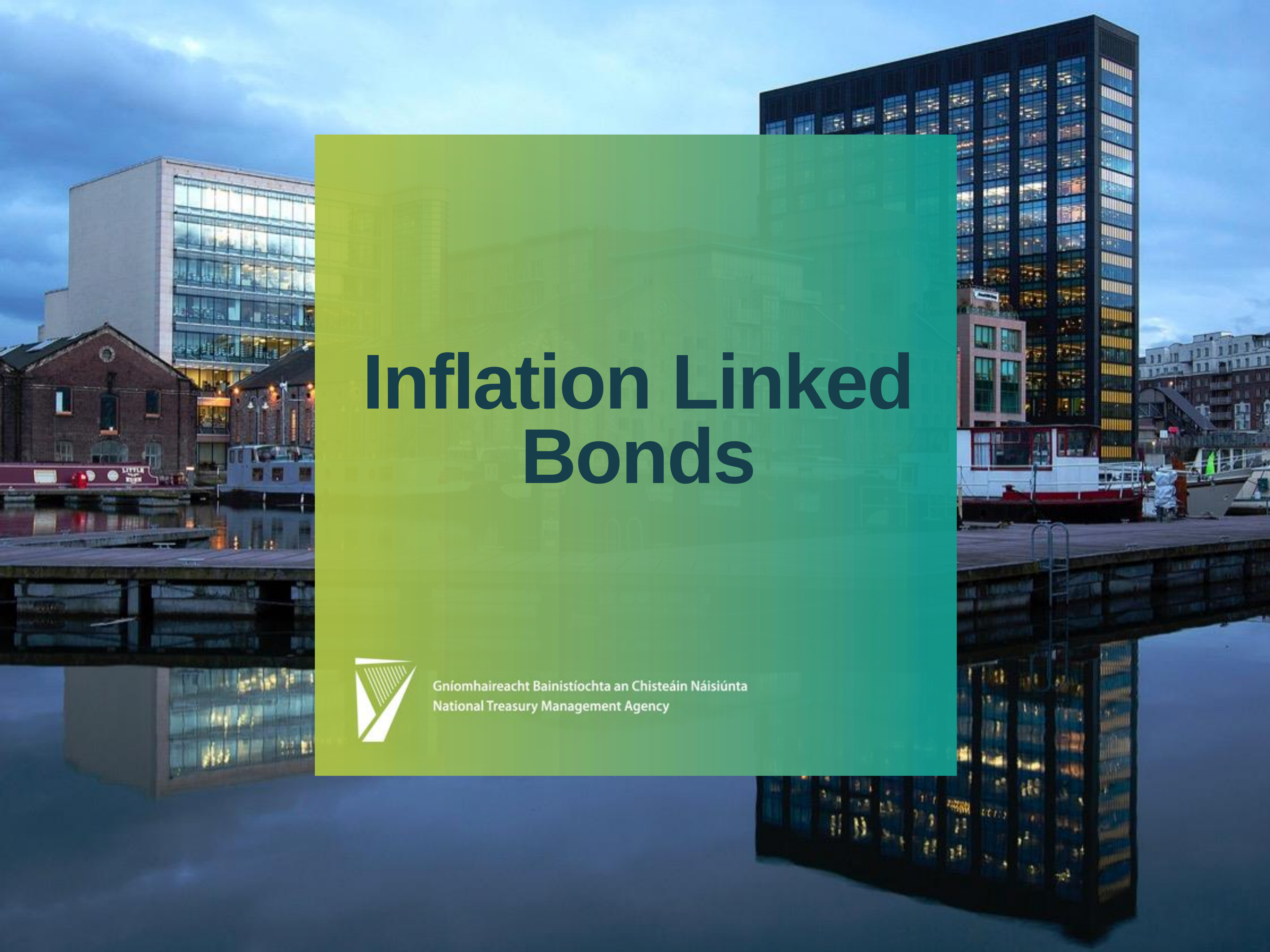
Gníomhaireacht Bainistíochta an Chisteáin Náisiúnta
National Treasury Management Agency

Source: NTMA

Government debt has dropped from 160% of national income to 100%



Source: CSO



Inflation Linked Bonds

Gníomhaireacht Bainistíochta an Chisteáin Náisiúnta
National Treasury Management Agency

WHAT IS AN INFLATION-LINKED BOND?

- **Standard Bond** gives you a payment every year – coupon (interest rate) and gives you back your €100 at maturity.
- The risk is that €100 in 10/ 20 years' time is not worth the same as €100 now.
- For the issuer clear cash flows

- **Inflation- linked Bond** indexes the coupon and the final payment to inflation thus protecting the "real" yield.
- Usually the coupon is a lot lower so if inflation low the cost to the issuer is less.
- Less certainty of cash flows for the issuer.

KEY FEATURES

Growth in coupon and principal if inflation index increases

Reduction in coupon if inflation index decreases, ***<u>however original principal is preserved</u>***

INFLATION LINKED

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KEY FEATURES

- Diversification

- Inflation Hedge – if inflation is high the bonds become more expensive however standard fixed-rate bonds cost less in real terms

- Breakeven rate – compares fixed rate bonds with inflation-linked bonds

KEY FIGURES

- Size : €609,500,000
- Price: €100.00
- Real Yield: 0.25%
- Maturity Date : 1 April 2040
- Coupon Date: 1 April
- Inflation Index : Ireland HICP excluding tobacco, 3 month time-lag
- Index base: 99.04
- Redemption Amount: Indexed Principal, at least par

BACKGROUND

- Approach from one investor via one Primary Dealer, Davy
- NTMA's Products and Processes Committee Review of Risks
- Negotiations led to standard inflation-linked HICP ex tobacco
- Demand broadened from other investors, domestic pension funds
- Pricing discussions
- Internal booking
- Final documentation preparation and signing

PRICING & EXECUTION

- Pricing taken from France Sovereign Inflation Curve, the benchmark for this product
- Pricing based on the French seasonally-adjusted inflation curve and the spread difference on the standard curve.
- Private placement approach, using Ireland's EMTN programme
- Deal launched 19 April at 09.00
- Orders placed within minutes and deal closed 09.15
- Settlement 28 April (T+7)
- Notes listed on the Irish Stock Exchange

POST TRADE

- Media and market attention
- Primary Dealers approach with other trade ideas
- Debt issuance strategy discussion, public vs private trades
- Monitor market developments
- Creates a new line of issuance with further potential

The Inflation – Linked Market

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MAIN ISSUERS

Issuer	Nominal O/S.*	% Issuance	Max. maturity
United States	USD 1,084 bn.	8	30
United Kingdom	GBP 297bn.	21	52
Germany	EUR 54 bn.	5	30
France	EUR 165 bn.	12	31
Italy	EUR 134 bn.	9	25
Spain	EUR 28 bn.	4	14

Source: HSBC, November 2016

*Nominal values and market values can differ significantly

EXAMPLE

Year	Index Level	Coupon payment	Principal repayment
Start 1	100	1.00	0
End 1	102	1.02	0
End 2	104	1.04	0
End 3	105	1.05	105

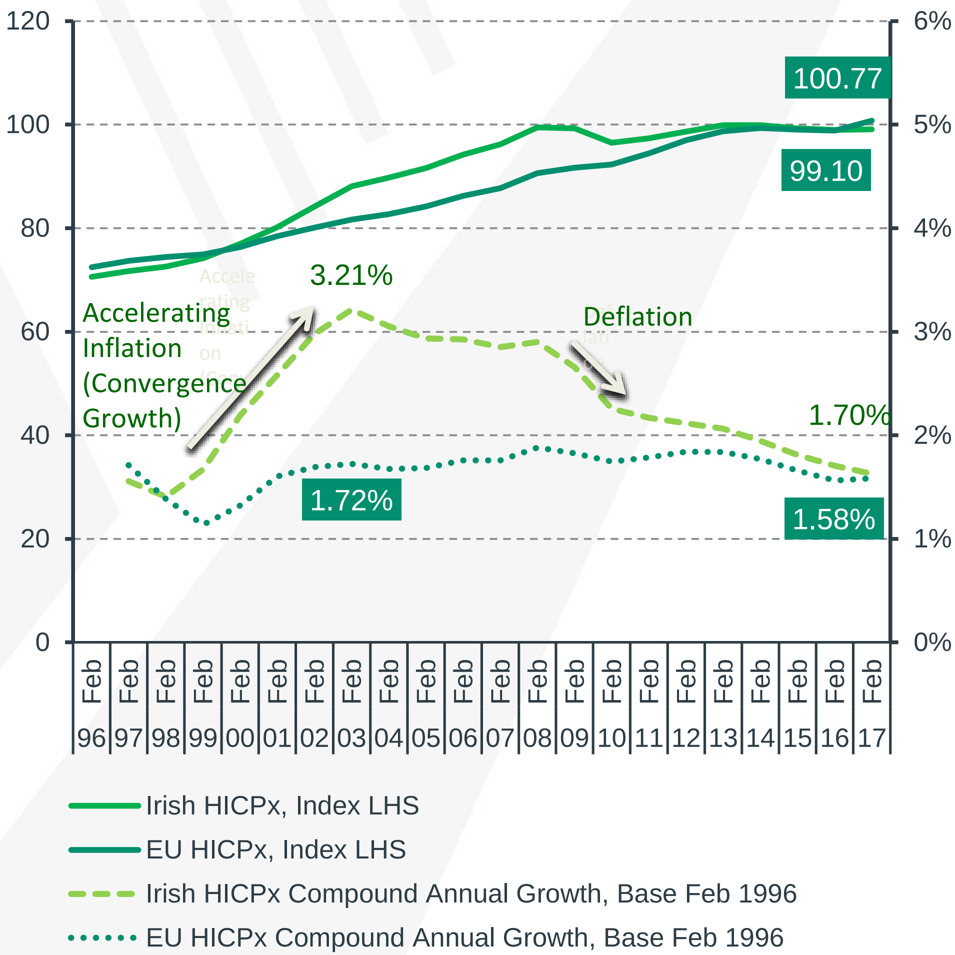
- Year 1 – Issue inflation-linked bond, €100 principal with coupon of 1% and 3 year maturity
- Inflation index level Year 1 is 100
- Inflation index level end Year 1 is 102
- Coupon payment end Year 1 is €1.02 i.e. (1% x 102/100)
- Inflation index level end Year 2 is 104
- Coupon payment end Year 2 is €1.04 i.e. (1% x 104/100)
- Inflation index level end Year 3 is 105
- Coupon payment end Year 3 is €1.05 i.e. (1% x 105/100)
- Principal repayment end Year 3 is €105 i.e. (€100 x 105/100)

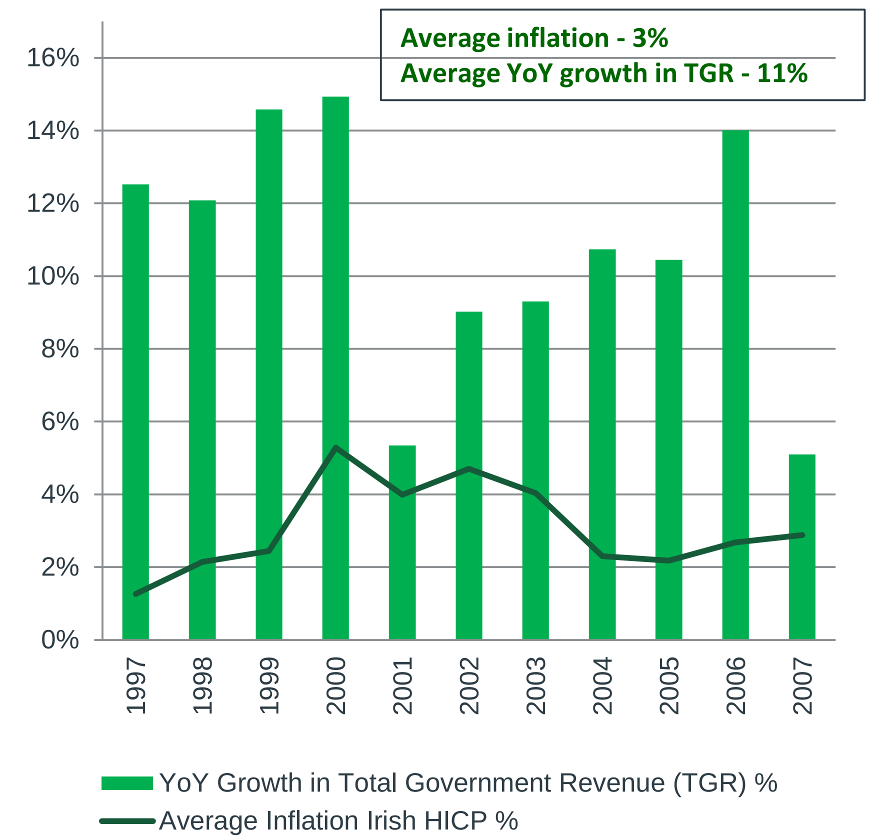
EXAMPLE

Year	Index Level	Coupon payment	Principal repayment
Start 1	100	1.00	0
End 1	98	0.98	0
End 2	96	0.96	0
End 3	95	0.95	100

- Year 1 – Issue inflation-linked bond, €100 principal with coupon of 1% and 3 year maturity
- Inflation index level Year 1 is 100
- Inflation index level end Year 1 is 98
- Coupon payment end Year 1 is €0.98 i.e. (1% x 98/100)
- Inflation index level end Year 2 is 96
- Coupon payment end Year 2 is €0.96 i.e. (1% x 96/100)
- Inflation index level end Year 3 is 95
- Coupon payment end Year 3 is €0.95 i.e. (1% x 95/100)
- Principal repayment end Year 3 is €100 i.e. (€100 x 100/100)

RISK OF INFLATION





Thank You

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