KPMG

Report on economic impacts of potential changes to insurance regulatory framework in response to HM Treasury Review of Solvency II: Call for evidence

Association of British Insurers

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In preparing this report we have considered the requirements of the Technical Actuarial Standards (TAS) issued by the Financial Reporting Council. The Technical Actuarial Standards which apply to the work performed in preparing this report are "TAS 100: Principles for Technical Actuarial Work" and "TAS 200: Insurance". We have taken account of the requirements in Practice Standard 'APS X2: Review of Actuarial Work' introduced by the Institute and Faculty of Actuaries on 1 July 2015 and the work has been peer reviewed.

We accept no responsibility or liability for the findings or reports of legal and other professional advisers even though we have referred to their findings and/or reports in our report.

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1 Introduction and purpose

On 23 June 2020, the Government announced that it would review certain features of the prudential regulatory regime for insurance firms, known as Solvency II[1]. As set out in that announcement, the financial services sector plays a crucial role in supporting the wider economy, creating jobs across the UK, supporting SMEs, contributing taxes, driving regional growth and investment, tackling climate change and embracing technology and innovation.

The stated purpose of the review is to ensure that Solvency II properly reflects the unique structural features of the UK insurance sector. By design, the current regime is tailored to the EU insurance sector as a whole, but in several important ways, the UK insurance sector is different. This review is intended to emphasise potential areas for reform of Solvency II that could not only improve the efficiency and effectiveness of the application of the UK prudential regulatory regime, but also allow it to better recognise the unique features of the UK insurance sector. As a result, households and businesses should benefit from a wider choice of competitively priced products and services and the Prudential Regulation Authority should have the tools that it needs to supervise the safety and soundness of the UK insurance sector.

HM Treasury (HMT) launched Review of Solvency II: Call for Evidence[2] in October 2020. This call for evidence is the first stage of the review of Solvency II and is underpinned by three objectives:

— to spur a vibrant, innovative, and internationally competitive insurance sector;

— to protect policyholders and ensure the safety and soundness of firms; and

— to support insurance firms to provide long-term capital to underpin growth, including investment in infrastructure, venture capital and growth equity, and other long-term productive assets, as well as investment consistent with the Government's climate change objectives.

There is wide-ranging consensus on the benefit of a strong and capital-efficient UK insurance market to customers, policymakers and UK economy and insurers are uniquely placed to provide long-term capital for productive investment in UK economy.[3]

The Association of British Insurers (ABI), in their role of representing the UK insurance industry, intend to co-ordinate a response to the Call for Evidence. The impact and suitability of the implementation of Solvency II for UK insurance has been reported on previously by Treasury Committee[4]. This report does not revisit the debate on appropriateness of Solvency II or recommend specific changes to the regulatory framework. The purpose of this report is to analyse the impact on pricing, investment strategy and capital requirement of potential regulatory changes on typical UK product groups. The analysis will then be used to forecast the marginal macro-economic benefit of productivity gains in the insurance sector to the UK economy.

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[1] HMT, 2020, Statement made by the Chancellor of the Exchequer
[2] HMT, 2020, Review of Solvency II: Call for Evidence
[3] Bank of England, 2020, Speech delivered by Anna Sweeney
[4] Treasury Committee, Solvency II

2   Executive summary

The UK insurance sector currently has c.£1.9 trillion[5] of assets under management and is a significant contributor to the total GDP of the UK. The 'total output' from the insurance sector stands at £90.2bn based on ONS statistics[6]. Our analysis shows that, via a number of evolutionary changes to the existing Solvency II regulatory framework, the insurance sector can deliver significant additional benefits to the UK economy. Economic gains are achieved through:

— Enhanced insurance sector productivity. Initially, this has impacts within the sector via increased profitability, higher returns on investment, lower premiums and more attractive products. This in turn incentivises the insurance sector to increase in size. In a competitive market, these "within sector" effects then result in gains in other sectors and the rest of the economy. Lower premiums lead to greater household expenditure and lower input costs for buyers of insurance, and increased output leads to increased demand for labour and inputs in other sectors of the economy. Overall, this results in higher UK economic output, increased real wages, and improved tax receipts; and

— Redeploying invested capital to reduce financing costs and increase access to capital in other sectors. This means other parts of the economy benefit from both lower insurance costs (via the within sector gains above) and through lower costs of capital as the capital redeployment makes UK capital markets more efficient.

The economic benefits are illustrated by developing two regulatory scenarios underpinned by combinations of potential regulatory outcomes. The regulatory changes are aligned to the Solvency II aspects that are considered most impactful: risk margin calibration and matching adjustment requirements. In addition, the impact of a change in the supervisory approach to setting capital requirements was considered. We have undergone several iterations to develop and refine these scenarios through consultations with the ABI and industry participants. The outcome is the following two scenarios:

— 'Optimised for the UK market scenario – Scenario materially replicates the key elements of the Solvency II regime but considers a reduction in the requirement for key elements of risk margin and matching adjustment.

— 'Enhanced release of long-term capital' – A more far-reaching scenario which considers the option of complete removal of the risk margin, further refinements to the matching adjustment and a reduction in the target confidence level of the Solvency Capital Requirement.

The 'Enhanced release of long-term capital' scenario contains elements that go beyond the ABI's proposals for reform and represent a fundamental change to the nature of the regime. This scenario has been designed with the intention of answering the question of what is the additional capital that could be released, while retaining an adequate level of prudence in the regime – albeit not at the level currently applied under Solvency II. The analysis has been included at the request of the ABI to provide a reference point for a spectrum of potential outcomes. The wider supply side impacts of these scenarios described above have been addressed by feeding estimates of the initial gain into KPMG's Spatial Computable General Equilibrium model.

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[5] HMT, 2020, Review of Solvency II: Call for Evidence

[6] ONS, 2020, 2018 Supply and Use tables, escalated to 2020 prices by KPMG. This is the amount consumed by other sectors, households or exported overseas, and is further discussed in section 5.3.1.

The table below is a summary of the modelled scenarios, key regulatory levers, impact on insurance metrics and the associated indicative economic impacts. The indicative economic impact has been derived by representing the impact of the changes in premiums, investment income and capital costs in one year aligned to the definition used by ONS. A more detailed explanation is provided in section 5.3.1.

Figure 2.1.1 Summary of scenario and impacts

Scenario	Status quo	Optimised for the UK market ('UK optimised')		Enhanced release of long-term capital ('Enhanced capital')	
Reduction/removal of risk margin	No change from current regime	Reduce the overall level of the risk margin by 75% through combination of amendments, reducing appetite for ceding longevity risk to jurisdictions outside the UK		Complete removal of risk margin, reducing appetite for ceding longevity risk to jurisdictions outside the UK	
Matching adjustment (MA) refinements		Increase in MA holdings of both long-term productive assets and alternative corporate holdings by 20%	Changes to structuring requirements for illiquid assets	Lighten structuring requirements of illiquid assets in MA portfolios, increase in long-term productive assets and alternative corporate holdings by 30%	Changes to structuring requirements for illiquid assets.
		Reduce Fundamental Spreads by 25%	Review of credit Solvency Capital Requirement (SCR) calibration	Reduce Fundamental Spreads by 40%	Review of credit Solvency Capital Requirement (SCR) calibration
Supervisory approach		Firms are supervised with initial intervention at SCR level, represented as a reduction in Capital management policy buffer by 10%		Firms are supervised with initial intervention at SCR level, represented as a reduction in Capital management policy buffer by 10%	Reduce target calibration for SCR to 1-in-100 Value at Risk (VaR) event
Total risk margin (net of TMTP[1])	**£19.9bn**	**£5.0bn**		**nil**	
Total SCR	£106bn +40%	£106bn +30% buffer		£96bn + 30% buffer	
Indicative MA yield uplift[2]	N/A	27bps		42bps	
MA assets redeployed to long-term productive assets over 3-5 years	N/A	£60bn		£90bn	
Pricing benefit to policyholders[3]	N/A	Up to 6.0% reduction on Annuity premiums Up to 0.4% reduction on Other products premiums		Up to 8.5% reduction on Annuity premiums Up to 0.8% reduction on Other products premiums	
Indicative first round economic impact (pre-CGE)	**N/A**	**£4.4bn**		**£6.9bn**	

Source: KPMG 2021

Note   1:   Transitional measures on technical provisions

2:   Yield uplift is presented net of cost of capital and additional expected defaults

3:   An industry-wide aggregated impact on annuity premiums has been estimated for modelling purposes. In practice, the actual impacts will vary significantly between insurer and new business liabilities. In addition, the benefits of the impacts could be realised either as premium reductions to policyholders, profitability increase to insurers or as a cost of capital benefit to borrowers in other sectors. The latter impact is illustrated through Tests B and C presented in the Computable General Equilibrium (CGE) analysis in section 5.

As expected, annuity products provide the largest benefit to the Indicative economic impact. However, there could also be significant contributions from with-profit funds and the Property & Casualty segment of the market. Under the 'UK optimised' scenario, these changes could have a significant impact on the pricing of annuity contracts. This gain is, in part, supported by a more flexible investment approach on new premiums, but a significant volume of assets backing existing MA liabilities could re-balanced over time to long-term productive assets. In addition, £35bn[7] of capital currently backing risk margin, SCR and Capital management policy ('CMP') buffers could be redeployed, either to increase investment in the sector, support the writing of future capital-intensive annuity contracts or be returned to shareholders for the benefit elsewhere in the economy. We note that UK insurers would continue to hold in excess of £138bn[8] of solvency risk capital plus CMP, in excess of technical provisions.

As noted above, wider impacts are addressed by using these indicative first-round economic impact estimates as inputs ("shocks") into our Spatial Computable General Equilibrium (S-CGE) model.[9] Computable General Equilibrium (CGE) models are a sophisticated form of economic modelling which capture the complex interactions between different economic agents – including households, businesses, government and the rest of the world – operating in competitive markets with explicit resource constraints and budget constraints. The robust nature of CGE models mean they are widely used by Governments and international organisations to understand the economy wide impacts of regulatory and policy changes and investments. In the UK, this includes HM Revenue and Customs (HMRC) and HMT, which use Spatial CGE models to assess the impact of tax and trade policies on the UK economy.[10]

Under our 'UK optimised' scenario, we find that the £4.4 billion initial impact in the insurance sector could result in an additional £16.6 billion in annual Gross Domestic Product (GDP), in real terms in the UK by 2051 relative to a baseline scenario. This amounts to a supply-side multiplier of 3.8 between the initial impact in 2021 and the expected Gross Value Product (GVP) gain in 2051. It is also equivalent to a present value economic benefit of £190 billion in additional GDP aggregated over the 30-year appraised period.

The net impact of the scenario on UK capital stock is the principal mechanism through which these wider, long term gains in GDP - i.e. our 3.8 supply side multiplier - occur. This is consistent with empirical studies that have shown, that 50-60% of the GDP impact of a cost change can be missed if effects in capital markets are not modelled.[11]

Figure 2.1.2 Summary of CGE on UK economic impact results of UK Optimised scenario

UK economy impact	Incremental estimate above baseline
Size of the initial impact 2021 (£bn)	4.4
Additional real GDP 2051 (£bn)	16.6
Shock 2021 to real GDP 2051 supply-side "multiplier"	3.8
Additional real GDP (£bn PV, 30-year appraisal 2021-2051, HMT 3.5% discount rate)	190.2

Source: KPMG 2021
Note: Values are rounded to closest £billion at constant prices

[7] Based on FY 2019 aggregate figures for total UK insurance industry

[8] £138bn = £106bn + 30% as indicated in the 'UK optimised' scenario

[9] KPMG's SCGE model uses GEMPACK software; Horridge, Jerie, Mustakinov & Schiffmann 2018, GEMPACK manual, GEMPACK Software, ISBN 978-1-921654-34-3

[10] HMRC, 2013, HMRC's CGE model documentation and; HMG, 2018, EU Exit: Long-Term Economic Analysis Technical Reference Paper

[11] HMG, 2018, EU Exit: Long-Term Economic Analysis Technical Reference Paper, p32

Beyond the UK wide impact, our modelling also reveals important implications for HM Government (HMG) policy objectives. Specifically, how improved productivity in the insurance industry and beyond supports the wider economy and improves individual wellbeing, how it begins to bridge the 'capital gap', contributes positively to taxation, and helps to enable the tackling of climate change.

Under our 'UK optimised' scenario, we find that by 2051, household consumption is expected to increase by £13bn relative to a baseline, driven by higher wages and employment, via higher labour market participation. Firms spend an additional £6.6bn on labour by 2051 and importantly, almost 85% of that expenditure is experienced outside the insurance sector, reflecting its linkages with the rest of the economy. This means productivity gains in the sector translate into higher returns and thus investment elsewhere. At a UK level there is also expected to be slightly higher employment with an additional 20 thousand Full Time Equivalence (FTE)[12] of labour inputs by 2051. UK Gross Value Added (GVA) per person is expected to be £192 higher, with growth across all NUTS 1[13] regions in the UK and above average per capita gains in Scotland and Wales.

As noted above, capital accumulation plays a critical part in delivering these wider gains, and by 2051, UK capital stock is projected to be £35bn larger than what it would be in a baseline scenario. This is a capital stock multiplier of 8.0 times the size of the initial productivity impact. This modelled growth in capital will help plug the potential 'capital gap' identified in the Patient Capital Review 2017. Further, with the need for new forms of capital across sectors to achieve HMG's Net Zero Carbon targets, this also demonstrates how productivity improvements in the insurance industry will help enable sectors across the economy to better contribute towards these goals.

Finally, the impact of increasing economic growth directly in the insurance sector, but also other sectors through productivity improvements, is likely to increase taxation receipts. We model improvements in Exchequer receipts to be around £1.4bn by 2031[14], and £2.7bn by 2051.

When these additional tax receipts are considered relative to the additional GDP created (£16.6bn), the increase initially appears smaller than what might be expected given the UK average tax to GDP ratio tends to be approximately 34%[15]. This lower share of additional revenue reflects the balanced budget assumptions in the SCGE modelling, which mean that in addition to all markets clearing, the Government is assumed to stabilise government debt in the longer term. This is modelled by adjusting income tax rates to offset large increases in receipts due to greater GDP, a modelling assumption that is consistent with HMG's own CGE modelling[16][17]

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[12] FTE is the hours worked by one employee on a full-time basis. The concept is used to convert the hours worked by several part-time employees into the hours worked by full-time employees. Additional Labour FTE employment could reflect more workers in employment, or workers in employment working more hours, or a mix. See Footnote 60 for more information on treatment of additional employment in the modelling.

[13] NUTS is the geocode standard by Eurostat for referencing the subdivisions of the United Kingdom of Great Britain and Northern Ireland for statistical purposes

[14] It should be noted that the modelled outputs are more reliable when observing the longer-term impacts (e.g. 2051 and beyond), once all the dynamic effects have stabilised and the economy is back in a 'steady state equilibrium'.

[15] OECD, 2020, Revenue Statistics 2020 - the United Kingdom

[16] As GDP increases, so do tax receipts. However, a key modelling assumption is that in the long-term government debt is stabilised. That is that government injections (spending) and leakages (tax) are balanced. To achieve this, the modelling must either increase government expenditure to offset improved tax receipts or reduce tax rates to keep tax receipts relatively stable. The former requires assumptions on what additional government expenditure would be spent on, and so the latter is a more conservative approach, and one that is used in HMG CGE modelling. In practice this means that a small proportion of the additional GDP gain (relative to the baseline) from improved productivity in modelling reflects wider gains in the economy from lower income tax rates.

[17] HMG, 2014, Analysis of the dynamic effects of fuel duty, p25

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3   Methodology and approach

Our aim is to develop scenarios to represent varying impacts on insurance balance sheets and underwriting capacity of a range of potential regulatory outcomes. We sought to model these scenarios and estimate representative balance sheet changes, pricing impacts and capital redeployment. From a macro-economic perspective, these beneficial impacts on insurers will in turn deliver long term wider economic gains through the supply side of the economy.

In order to quantify the potential economic impact, we started out by gathering industry data across various sources. Through research and interviews with market participants and industry experts, we were able to establish industry trends and identify product groups that are most likely to deliver material impacts to the economy following regulatory changes.

The initial analysis divides the insurance market into several product groups. We consider the current state of the market and the regulatory drivers key to each product class. We then set out targeted updates to the insurance regulatory regime which would impact the productivity of insurance companies. The impact of these changes is considered in respect of each product class separately. The detailed product group analysis is combined into two high-level regulatory change scenarios, which would impact insurance balance sheets and underwriting capacity. We have provided additional qualitative commentary, where appropriate on the broader implications that are not directly modelled.

We considered regulatory levers that can have a beneficial impact on the economy, either through productivity gains or capital redeployment. Productivity gains are measured as the marginal cost savings to manufacture an insurance product, either through lower cost of capital or improved investment returns. We assume that these savings are passed back to both corporates and individuals which will in turn benefit the wider economy. Capital deployment represents the segment of assets currently under management to be reinvested in long-term growth sectors, thereby improving accessibility of capital to those sectors.

The key regulatory levers identified are amendments to the risk margin, matching adjustment rules and the supervisory approach to setting capital requirements. Throughout our interaction with the ABI, we have established and refined three scenarios, 'Status quo', 'Optimised for the UK market', and 'Enhanced release of long-term capital' scenario.

Section 4 captures a snapshot of industry data and current industry trends, before moving on to discuss regulatory levers and potential impacts for each individual product groups. A number of assumptions and methodology choices are required to obtain these economic impacts, where we also applied judgement on potential management actions as a result of regulatory changes, and how market conditions may evolve in terms of new business volumes and asset availability. These are further discussed in section 4.3.

Section 5 outlines the approach used to convert the regulatory impacts into initial economic impacts or 'shocks' in the economy, the approach to Computable General Equilibrium (CGE) modelling undertaken to estimate the wider impacts to other sectors and agents within the economy in the future, and results of this analysis. CGE models are a sophisticated form of economic modelling which capture the complex interactions between different economic agents – including households, businesses, government and the rest of the world – operating in competitive markets with explicit resource constraints and budget constraints. The robust nature of CGE models mean they are widely used by Governments and international organisations. In the UK, this includes HMRC and HMT, which use S-CGE models to assess the impact of tax and trade policies on the UK economy.[18]

Finally, this section illustrates how the economic outcomes achieved as a result of the regulatory changes align with HMG policy objectives. Specifically, we discuss how improved productivity in the insurance industry and beyond, supports the wider economy, contributes positively to taxation and helps to enable the tackling of climate change.

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[18] HMRC, 2013, HMRC's CGE model documentation and; HMG, 2018, EU Exit: Long-Term Economic Analysis Technical Reference Paper

4 UK Insurance industry overview

4.1 Aggregate statistics for UK Insurance industry

As referenced in the HM Treasury's Call for Evidence[19], UK Insurers held around £1.9 trillion in invested assets as at Q1 2020. For this analysis we replicated the quoted invested assets figure from UK Insurer's YE 2019 Solvency II balance sheets QRTs and also the total assets figure from the same source.

Figure 4.1.1 Assets held by UK insurers

£bn	YE 2019 QRT
Invested assets[1]	2,071
Total assets	2,550

Source: PRA – HMT Review of Solvency II: Call for Evidence, QRT – YE 2019 QRT S.02.01.02 (Balance Sheet)
Note 1:   Invested assets is calculated as the sum of "Assets held for index-linked and unit-linked contracts" and "Investments (other than assets held for index-linked and unit-linked contracts)".

We were able to broadly replicate the invested assets figure and have not investigated the difference further to the quoted £1.9bn figure but it will partly be driven by the timing difference and also potentially a slightly different definition of invested assets. The YE 2019 Solvency II QRT data enables us to obtain more granular Solvency II data for UK Insurers which forms the basis for some of our impact assessments. The analysis in the rest of this report is based on aggregated UK insurer Solvency II QRT data.

4.1.1.1 Technical Provisions split by product group

The Technical Provisions for UK insurers are able to be split into broad product groups to understand the relative size of the different product markets in the UK. We can estimate the total amount of assets backing each product class by considering the liabilities split by product group.

Figure 4.1.2 Technical provisions split by product group

YE 2019 (£bn)	Annuities, protection & other life insurance	With-profits funds	Unit-linked funds	Non-life	Other	Total
Technical Provisions	373.4	255.3	1178.6	125.7	203.6	2136.6

Sources: YE 2019 QRT S.12.01.02 (Life & Health SLT Technical Provisions), QRT S.17.01.02 (Non-Life Technical Provisions)

We have also used the Technical Provisions split above to estimate the amount of assets backing each product group. The regulatory levers developed in this report make use of this asset split.

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[19] HMT, 2020, Review of Solvency II: Call for Evidence

4.1.1.2 Risk margin

For various product classes we can determine the total amount of risk margin relating to each class and the total risk margin held by all UK insurers on a pre and post Transitional measures on Technical Provisions (TMTP) basis.

Figure 4.1.3 Risk margin (RM) pre and post TMTP split by product group

YE 2019 (£bn)	Annuities, protection & other life insurance	With-profits funds	Unit-linked funds	Non-life annuities	Accepted reinsurance	Health	Non-life	Total
Risk margin	19.6	4.9	5.3	0.4	3.1	0.7	7.5	41.5
TMTP on RM	16.0	1.0	2.5	0.1	2.0	0.1	0.0	21.6
RM net of TMTP	3.6	4.0	2.8	0.3	1.0	0.6	7.5	19.9

Source: YE 2019 QRT S.12.01.02 (Life & Health SLT Technical Provisions), QRT S.17.01.02 (Non-Life Technical Provisions)

The £19.9bn total in Figure 4.1.3 forms the basis of our economic impact estimates further discussed in section 4.3.1, as any relief of the risk margin on a pre TMTP basis relating to business sold prior to 2016 will be materially met by a corresponding release in TMTP. Note that the 'risk margin net of TMTP' refers to the proportion of TMTP attached to the risk margin, whilst the remainder of the total TMTP stems from other differences between the legacy Solvency I / Individual Capital A regime and Solvency II regime.

4.1.1.3 Solvency capital requirement (SCR)

We can obtain the total SCR held by UK insurers by summing the SCR for all Full Internal Model (IM), Partial IM and Standard Formula (SF) firms. In practice, firms hold a further capital buffer in excess of the SCR, the median level for solo UK life insurers is 130% to 140% of SCR[20].

Figure 4.1.4 Total SCR held by UK insurers

YE 2019 (£bn)	Full IM	Partial IM	Standard Formula	Total
SCR	51.7	38.5	16.1	106.3

Source: YE 2019 QRT S.25.03.21 (Full Internal Model), S.25.02.21 (Partial Internal Model), S.25.02.21 (Standard Formula)

The £106bn in Figure 4.1.4 is used to estimate impacts from potential changes to capital management policies and SCR calibration, this is discussed in section 4.4.

4.1.2 Insurer asset allocation

Any future changes to the insurers strategic asset allocations will need to remain consistent with Asset-liability matching (ALM) practices and sound risk management principles. The sections below provide an overview of the current insurer asset allocation.

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[20] KPMG, 2020, Technical Practices Survey, Figure 11.6

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4.1.2.1 Matching adjustment portfolios

Given the focus of the review is on the annuity agenda, it is necessary to assess the size of the existing business portfolio. To isolate the technical provision associated with matching adjustment portfolios, we have taken the assumption that they consist only of fixed interest and loans & mortgages assets, which make up £320.3bn[21] of the £373.4bn of assets backing "Other life insurance". A proportion of these £320.3bn are in respect of life products other than annuities. We have also ascertained that £268bn[22] of assets reside within matching adjustment portfolios for life insurers backing annuities across the industry as at 2018. As such we are assuming c.£300bn assets are currently held within matching adjustment portfolios. This assumption is based on recent market growth and lower interest rates.

4.1.2.2 Asset allocation for annuities

Firstly, we identify the UK insurers with large annuity books which we use as a representative sample of the UK annuity market. Next, we take the total Technical Provisions: Other Life for these insurers from YE19 QRT and make the simplifying assumption that this is entirely annuity business, to determine each company's market share. We use information disclosed on each company's website of their most recent asset allocation split for their annuity business.

Figure 4.1.5 Asset allocation split for annuities and other life business

| Entity | TP: Other life insurance (£bn) | Market share | % of assets invested in each asset class | | | |
			Equity + property	Fixed interest	Loans & Mortgages	Other
L&G	69.1	18.5%	4.0%	72.3%	2.7%	21.0%
Aviva Life & Pensions UK	62.7	16.8%	0.9%	57.5%	38.9%	2.7%
Prudential Assurance	41.1	11.0%	6.9%	83.5%	7.1%	2.5%
Pensions Insurance Corporation	35.8	9.6%	0.0%	89.6%	2.0%	8.5%
Rothesay Life	33.5	9.0%	10.2%	72.7%	16.7%	0.4%
Scottish Widows	18.6	5.0%	0.0%	36.4%	21.2%	42.4%
Canada Life	18.0	4.8%	7.4%	75.4%	13.7%	3.5%
Phoenix Life	14.9	4.0%	1.0%	70.9%	12.7%	15.4%
Just Retirement	14.2	3.8%	7.0%	48.1%	43.3%	1.6%
Standard Life Assurance	12.4	3.3%	1.0%	70.9%	12.7%	15.4%
Sample Total	**320.3**	**86%**	**4%**	**70%**	**16%**	**10%**

Source: Information disclosed in YE19 results reports on the websites of the insurance companies listed.

The "Sample Total" row gives the weighted average of asset allocation %, weighted by market share. This weighted average is applied to the UK total 'Technical Provisions: Other Life' value of £373.4bn.

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[21] See Figure 4.1.8
[22] EIOPA, 2019, Report on insurers' asset and liability management

Figure 4.1.6 Asset allocation totals for annuities and other life business

YE 2019 (£bn)	TP: Other life insurance	Market share	Amount invested in each asset class			
			Equity + property	Fixed interest	Loans & Mortgages	Other
All UK Total	373.4	100%	14.2	260.3	60.0	38.9

4.1.2.3 Asset allocation for with-profits funds

Similarly, for with-profits funds we firstly identify the UK insurers with the largest with-profits funds. We take the total Technical Provisions: With-profits from YE19 QRT to determine each company's market share. We use information disclosed on each company's website of their most recent asset allocation split for their with-profits business.

Figure 4.1.7 Asset allocation split for with-profits business

Entity	TP: With-profits (£bn)	Market share	% of assets invested in each asset class			
			Equity	Property	Fixed interest	Other
Prudential Assurance	103.7	40.6%	48.2%	14.7%	22.6%	14.5%
Aviva Life & Pensions UK	37.4	14.7%	53.2%	12.6%	26.9%	7.3%
Royal London	28.7	11.2%	49.0%	12.0%	36.0%	3.0%
Standard Life Assurance	15.5	6.1%	22.5%	3.2%	74.3%	0.0%
Scottish Widows	11.3	4.4%	52.0%	12.0%	17.0%	19.0%
Phoenix Life	11.1	4.4%	27.0%	19.0%	51.0%	3.0%
Phoenix Life Assurance	9.0	3.5%	0.0%	0.0%	99.0%	1.0%
L&G	8.6	3.4%	38.0%	10.0%	48.0%	4.0%
LV=	5.9	2.3%	52.0%	7.0%	40.0%	1.0%
NFU Mutual	4.3	1.7%	57.5%	17.5%	21.5%	3.5%
Sample Total	**235.6**	**92.3%**	**44.6%**	**12.5%**	**33.7%**	**9.2%**

The "Sample Total" row gives the weighted average of asset allocation %, weighted by market share. This weighted average is applied to the UK total 'Technical Provisions: With-profits' value of £255.3bn.

Figure 4.1.8 Asset allocation totals for with-profits business

| YE 2019 (£bn)	TP: With-profits	Market share	Amount invested in each asset class			
			Equity	Property	Fixed interest	Other
All UK Total	255.3	100%	113.9	31.8	86.0	23.6

We estimate that £113.9bn of equities are held within with-profits funds. Changes to the capital requirement for non-listed or private equities could open investment opportunities for with-profits funds.

4.1.3 Industry market trends

4.1.3.1 Annuity market

Following the pension reforms in 2014, the individual annuity market has experienced gradual recovery after the initial fall in demand. However, it is the bulk annuity market where there is expected to be potential further growth in the medium-term horizon, providing that certain market conditions and regulatory environment present itself. We have approached two industry participants, a monoline specialist provider and a new entrant to the bulk annuity market. We also discussed how likely longer-term industry forecasts will materialise with these participants.

Figure 4.1.9 Volumes of bulk annuities by year
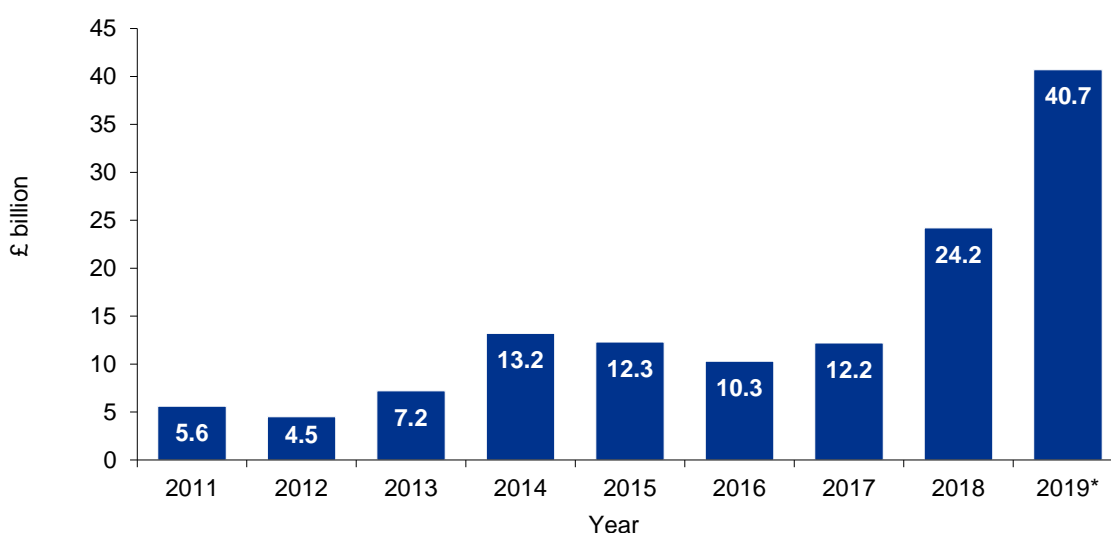
Note: (a)   2019 volume gives all deals publicly announced at the time of reporting
Source: WTW De-risking report 2020[23]

Through research and conversations with market expert the assumption that we have adopted is that the bulk annuity market is likely to be around £30bn[23,24] a year over a medium-term horizon. We assume that 2019 was an outlier due to the Prudential/Rothesay transaction. We have adopted a slightly modest view relative to market forecasts from two pension consultancies, one of the key challenges identified for further growth is the widening of the funding gap in prevailing market conditions, compounded by the feasibility of sourcing assets that could potentially narrow the funding gap. There tends to be much more scrutiny on the larger schemes (>£1bn) when it comes to asset sourcing and in-specie transfers, where market conditions weigh more heavily on the appetite for transaction.

Nevertheless, as the bulk annuity market continue to grow over the medium term, it will likely create capital strain for insurers under the current regulatory regime.

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[23] WTW, 2020, De-risking report
[24] Hymans Robertson, 2016, Risk Transfer Report

4.1.3.2 Capital redeployment and related challenges

The quantum of capital redeployment very much depends on the depth of supply on alternative assets over the immediate to medium term, even if permitted by relaxing regulations around matching adjustment and associated capital charges.

The large-scale quantitative easing taking place following recent developments have had significant ramifications on the cost of borrowing. In contrast to 2008, where liquidity had been a major concern, central banks are now buying up corporate bonds and not only gilts. This has re-anchored expected returns that can be earned on investment grade debt and beyond, and the structural shift is thought to persist over at least the medium-term horizon.

Insurers will likely remain low cost providers of long-term capital, where limited servicing is required beyond origination. In the higher-yield markets however, insurers may not necessarily have the expertise to select stocks with the right risk profile, these markets are typically shorter-term and may not be a good match to insurance liabilities.

There are nonetheless pockets of the market that presents more optimistic returns, where participants are yet to be educated on the risk profile. A recent example being the house building segment of the market, where it took some time for the initially sceptical investors to develop an appetite.

Due to the above operating environment, we have focussed on insurers providing more long-term capital via existing routes, by moving into adjacent ratings and sectors, and review the implications of the strict fixity of asset cashflow requirements implied by the existing matching adjustment rules. We consider that this is consistent with the perspectives expressed by Bank of England on the role of insurers in supplying investment to UK economy[25].

4.1.3.3 London company and Lloyd's markets

The London company and Lloyd's markets underwrite predominantly specialist general insurance and reinsurance, particularly marine and aviation business, with an increasing emphasis on high-exposure risks. The business written by these markets makes up over half[26] of the annual gross written premiums of the general insurance sector.

One of our observations on the Lloyd's market is that the cost ratio is currently very high (35%-40%[27]) relative to other operating geographies. This is partly driven by multiple layers of regulatory disclosures and an onerous internal model approval process. A modest reduction in the cost ratio can result in lower premiums, although prices generally tend to be driven more by underwriting cycle as opposed to margins.

Given the generally shorter-term nature of the liabilities, balance sheet levers such as risk margin are thought to play a less significant role than in the life insurance segment of the market. Capital requirements are also somewhat less significant but, for example, the allocation of premium and reserves by the European Insurance and Occupational Pensions Authority (EIOPA) lines of business can drive management actions (e.g. relating to diversification or buying reinsurance) that may be suboptimal relative to the underlying risk.

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[25] Bank of England, 2020, Speech delivered by Anna Sweeney
[26] ABI, 2020, Industry data and subscriptions, 2019-total-market-statistics-20201221.xlsx
[27] Lloyd's, 2019, Lloyd's Annual Report, Market Results

4.1.3.4 Granularity of analysis by product group

On the basis of the above, we have chosen to capture the impacts of potential regulatory changes at a more granular level. We have broken down the insurance industry into seven broad product groups that are most representative of the insurance sector as a whole;

— Individual annuities & bulk purchase annuities;

— Protection & other life insurance;

— With-profits funds;

— Unit-linked funds;

— Lloyd's of London;

— The London company market;

— Domestic property and casualty;

The majority of the impact is from individual and bulk annuities, as expected by the focus of review, but other product groups and markets do contribute. In order to aggregate impacts at a product level back up to a total UK insurance industry level for some product groups, we need to know the proportion of the market made up by each product group. We use the proportion of gross written premiums from new business sourced from the latest ABI income and outgo data.

Figure 4.1.10 Proportion of new business premiums split by product group

Product group	Annuities	Protection & other life insurance	With-profits & unit-linked funds	Lloyd's of London	Domestic P&C	The London market	Total
2019 GWP (£bn)	39.2	6.9	74.6	37.1	48.1	14.7	220.6
Proportion of total	18%	3%	34%	17%	22%	7%	100%

Source: ABI Income Outgo tables[28]

To estimate the split of non-Lloyd's general insurance premiums, we have assumed that all UK risks belong to domestic P&C, and all other risks belong to the London market.

4.2 Regulatory levers and scenario definition

4.2.1 Context of perceived challenges of Solvency II for UK insurance

As noted in the introduction to this report, the impact and suitability of the implementation of Solvency II for UK insurance has been reported on previously by Treasury Committee[29]. This report does not revisit the debate on appropriateness of Solvency II or recommend specific changes to the regulatory framework. However, for context the key areas of debate are summarised below:

— Role of the risk margin – both the absolute magnitude of the risk margin and the volatility of the risk margin to interest rate changes;

— Role of the matching adjustment qualification criteria – both in limiting the access to a wider range of long-term assets due to limits on the nature and features of asset cash-flows and potential incentives for divestment on downgrade which could contribute to pro-cyclical decision-making. This dynamic is referred to in the industry as the "BBB cliff";

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[28] ABI, 2020, Industry data and subscriptions, 2019-total-market-statistics-20201221.xlsx; 2019-income--outgo---20201026.xlsx
[29] Treasury Committee, Solvency II

— Simplifying and streamlining reporting and approvals, increasing proportionality and transparency, to reduce the cost of regulatory compliance;

— Other technical matters, for example the application of the Volatility Adjustment.

The Treasury Select Committee reported that there was no appetite to start again, but that there were areas that represented "significant weaknesses" for the UK industry. Since the initial review, the regulatory environment has evolved, but a number of the key areas of debate remain open. The regulatory levers considered in this report could be considered as potential responses to the challenges set out in the previous industry consultations.

4.2.2 Regulatory levers considered

We have considered the seven broad product groups (see section 4.1.3.4) that are most representative of the insurance sector as a whole, and assessed the likely impact from regulatory outcomes on each of these groups, the rationale in the selection process is further discussed in section 4.3.

The economic benefits are illustrated by developing two regulatory scenarios underpinned by combinations of potential regulatory outcomes. The regulatory changes are aligned to the Solvency II aspects that are most impactful for UK annuity writers: risk margin calibration and matching adjustment requirements. In addition, the impact of a change in the supervisory approach to setting capital requirements was considered. We have undergone several iterations to develop and refine these scenarios through consultations with the ABI and industry participants. The outcome is the following two scenarios:

— 'Optimised for the UK market scenario – Scenario materially replicates the key elements of the Solvency II regime but considers a reduction in the requirement for key elements of risk margin and matching Adjustment, whilst maintaining high regulatory standards.

— 'Enhanced release of long-term capital' – A more far-reaching scenario which considers the option of complete removal of the risk margin, further refinements to the matching adjustment and a reduction in the target confidence level of the Solvency Capital Requirement.

The 'Enhanced release of long-term capital' scenario contains elements that go beyond the ABI's proposals for reform and represent a fundamental change to the nature of the regime. This scenario has been designed with the intention of answering the question of what is the additional level of capital that could be released, while retaining an adequate level of prudence in the regime – albeit not at the level currently applied under Solvency II. The analysis has been included at request of ABI to provide a reference point for a spectrum of potential outcomes.

The table below is a summary of modelled scenarios, key regulatory levers, impact on insurance metrics and the associated indicative economic impacts. The indicative economic impact has been derived by representing the impact of the changes in premiums, investment income and capital costs in one year aligned to the definition used by ONS. A more detailed explanation is provided in section 5.3.1.

Figure 4.2.1 Summary of scenario and impacts

Scenario	Status quo	Optimised for the UK market ('UK optimised')		Enhanced release of long-term capital ('Enhanced capital')	
Reduction/removal of risk margin	No change from current regime	Reduce the overall level of the risk margin by 75% through combination of amendments, reducing appetite for ceding longevity risk to jurisdictions outside the UK		Complete removal of risk margin, reducing appetite for ceding longevity risk to jurisdictions outside the UK	
MA refinements		Increase in MA holdings of both long-term productive assets and alternative corporate holdings by 20%	Changes to structuring requirements for illiquid assets	Lighten structuring requirements of illiquid assets in MA portfolios, increase in long-term productive assets and alternative corporate holdings by 30%	Changes to structuring requirements for illiquid assets.
		Reduce Fundamental Spreads by 25%	Review of credit SCR calibration	Reduce Fundamental Spreads by 40%	Review of credit SCR calibration
Supervisory approach		Firms are supervised with initial intervention at SCR level, represented as a reduction in Capital management policy buffer by 10%		Firms are supervised with initial intervention at SCR level, represented as a reduction in Capital management policy buffer by 10%	Reduce target calibration for SCR to 1-in-100 VaR event
Total risk margin (net of TMTP)	£19.9bn	£5.0bn		nil	
Total SCR	£106bn +40%	£106bn +30% buffer		£96bn + 30% buffer	
Indicative MA yield uplift[1]	N/A	27bps		42bps	
MA assets redeployed to long-term productive assets over 3-5 years	N/A	£60bn		£90bn	
Pricing benefit to policyholders[2]	N/A	Up to 6.0% reduction on Annuity premiums Up to 0.4% reduction on Other products premiums		Up to 8.5% reduction on Annuity premiums Up to 0.8% reduction on Other products premiums	
Indicative first round economic impact[3] (pre-CGE)	**N/A**	**£4.4bn**		**£6.9bn**	

Source: KPMG 2021

Note 1: Yield uplift is presented net of cost of capital and additional expected defaults

Note 2: An industry-wide aggregated impact on annuity premiums has been estimated for modelling purposes. In practice, the actual impacts will vary significantly between insurer and new business liabilities. In addition, the benefits of the impacts could be realised either as premium reductions to policyholders, profitability increase to insurers or as a cost of capital benefit to borrowers in other sectors. The latter impact is illustrated through Tests B and C presented in the CGE analysis in section 5.

Note 3: Indicative economic impact is further discussed in section 4.3

4.2.2.1 Reduction of risk margin

The 'UK optimised' scenario has modelled a 75% total cut in RM, which will be offset to some extent by release of TMTP. The assumption is that the reduction is achieved through a combination of amendments, including a reduction in the absolute level of the cost of capital, tapering of the duration of the calculation and recognising diversification between Life and P&C contracts. The 'Enhanced capital' scenario assumes a complete removal of the risk margin.

The reduction in risk margin will release capital to the extent that the TMTP in respect of business sold prior to 2016 will also decrease. The impact on annuity new business is the focus of our analysis, as firms will likely reflect the lower cost of capital in their pricing and longevity risk appetite.

4.2.2.2 MA refinements

Of the £1.9 trillion assets held by UK insurers, currently c.£300bn (£268bn[30] as at YE18, see section 4.1) of assets reside within matching adjustment (MA) portfolios for life insurers backing annuities across the industry. A shift in regulations governing the MA portfolio may pave the way for reinvestment of a proportion of current assets. The key aspects of the assumed scenarios are that:

— Strict fixity of cash-flows qualification criteria is replaced with a broader principle of matching tolerance. This would allow insurers to access a broader range of issuances and sectors, remove re-structuring costs and increase balance sheet efficiency;

— Re-calibration of the Fundamental Spreads to remove prudence from base methodology and introduce additional granularity in the allowance for expected recovery rates on collateralised investments. This would improve balance sheet efficiency and remove some areas of relative disadvantage between asset types;

— Review of credit SCR calibration to smooth BBB cliff through re-assessment of Fundamental spreads and allowances for matching adjustment under stress for sub-investment grade assets would allow insurers to invest in opportunities for which achieving investment grade is a challenge, but the asset represents an attractive risk-adjusted return. Insurers could adopt a more buy-and-hold strategy for downgraded assets, thereby easing some of the cyclicality issues potentially encouraged by the current framework. There would also be a reduction in the capital requirement held in respect of credit downgrade via replacement costs.

Additional actions that have been identified which could facilitate the transition are:

— Streamline MA application process;

— Standardise an approach for applying Internal Rating frameworks;

— Allow firms flexibility to manage defaults within the MA fund through additional time to resolve or liability management, and;

— A reduced equity capital charge where the insurer holds a significant loan with the counterparty.

These changes, in combination, would be expected to be more impactful than applying them on an individual basis. The extent of these shifts is determined by the severity of the changes to existing regulation.

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[30] EIOPA, 2019, Report on insurers' asset and liability management

4.2.2.3 Supervisory approach

Currently it is expected of insurers to hold buffers materially over and above 100% of the Solvency capital requirement. At insurance entity level, we are observing target solvency buffers of 130% to 140% across both the life and non-life sectors. A change to the expectation of the buffer above SCR for insurers would reduce the amount of capital insurers need to hold. If the first point of supervisory intervention is set as 100% of SCR, then we are assuming that the additional margin held would trend down over time, subject to the view of external stakeholders, e.g. rating agencies.

4.2.3 Regulatory levers considered, but not modelled

Through the course of our work, we considered a number of regulatory outcomes. Although those listed below were identified, they are not explicitly modelled. While many of these issues may be material for individual insurers, our thinking is that they would not be at an aggregate industry level.

— A general cost reduction through reduced Pillar 2 compliance and Pillar 3 reporting requirements has not been included – while we acknowledge these could be substantial, especially for smaller insurers, the benefits at an aggregate industry level would not be as significant as for the Pillar 1 outcomes that have been modelled;

— The cost of compliance in the Lloyd's and London markets, in relation to reporting and internal model approvals. These are ad-hoc costs and likely to vary from firm to firm, as such we did not think it was appropriate to model these as annual productivity output gains;

— Periodic payment orders (PPOs) - Although investment risk is less material within the Lloyd's, London Market and domestic general insurance sectors as a whole, one area in the domestic sector where it is relevant is with periodic payment orders (PPOs). These being effectively annuities, the capital requirement involved is considerable, due to:

  - No matching adjustment being possible;

  - The extremely long tail of some PPO claims (exposures can be for more than a century), which also further increases mismatching of assets to liabilities; and

  - The impact of these in increasing the risk margin, with instances from major industry participants where the PPO risk margin makes up 25% of the overall risk margin despite being a much smaller part of the reserves.

  - The long tail from PPOs increases the overall risk margin as well as the volatility of it. This high volatility increases firms' need to set solvency coverage targets higher than they would otherwise be.

— Other previously identified technical areas, which for which a material impact was not assessed in our analysis:

  - Principles based approach to setting discount rate, through volatility adjuster changes or otherwise;

  - Operation of Transitional Measures for Technical Provisions – this would reduce materially following significant amendment of risk margin.

— There is currently c.£114bn invested in equities within with-profits funds[31]. Investment in start-up equity or environmental, social and corporate governance (ESG) equity investments can be encouraged through the removal of additional capital requirement incurred compared to conventional Type 1 equity investments. This provides incentives for with-profits funds to reallocate policyholders' assets without significant departure from PPFM investment guidelines. Some annuity providers will hold a small proportion of equity investments outside of the MA fund.

— This potential switch in equity holdings in with-profits funds or other shareholder assets from conventional equity investments to those aligning to growth sectors could be incentivised, if the latter asset class attracted no additional capital charge relative to standard equities. There would be reservations over the incentive of re-investing a large proportion of policyholders' assets, given most with-profits funds are either closed to new business or contracting. This is further discussed in section 4.3.2.

4.3 Impact analysis by product group

In this section, we analyse the impact of the potential regulatory levers set out above to each of the identified product groups. Regulatory levers impacting the industry as a whole are considered in section 4.4. For each regulatory lever, we have considered the impact from each of these components:

1 Productivity gains from prospective new business;

2 Cost of capital savings resulting from changes to the current balance sheet.

The new business component is driven by new business over a one-year horizon, written on more competitive terms. Whereas the existing business component is driven by one-year's cost of capital on the quantum of surplus released, resulting from the proposed regulatory change.

We have represented the impact over a one-year time horizon in order to best align with the SCGE model, where the insurance sector output is expressed as a per annum quantum.

The cost of capital throughout the calculation is assumed to be 5.57%. This represents the compounding of 3.5% real discount rate used by HMT for project appraisals, and 2% CPI which underpins a representative proportion of inflation-linked insurance contracts. Note that this is different to the fixed 6% cost of capital rate used in the calculation of the risk margin.

4.3.1 Individual and Bulk annuities

4.3.1.1 Regulatory drivers

This product group is where the most material benefit can be derived from regulatory changes. We have identified changes to the existing risk margin and matching adjustment framework as the key regulatory levers to facilitate.

4.3.1.2 Potential impact

Risk margin

Reducing or removing the risk margin would likely alleviate new business strain for annuity providers, which can be passed onto consumers through lower premiums. We assume where savings are not passed onto the consumers, the benefit will be retained by the insurer or flow through to shareholders, which would ultimately be beneficial to the general economy.

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[31] See section 4.1.2.3 for details of this estimation

The risk margin can be reduced through the adoption of a cost of capital lower than the currently prescribed 6% applied to the non-hedgeable SCR, or treating longevity risk as a hedgeable risk and thus excluding it from the risk margin calculation and replacing with the market-consistent cost of hedging longevity risk. This may in turn reduce the incentive for ceding longevity risk to jurisdictions outside the UK and retain the profit margin currently passed elsewhere. However, there will be offsetting impact from higher capital requirement in respect of longevity risk previously mitigated through reinsurance.

An industry-wide aggregated impact on annuity premiums has been estimated for modelling purposes. In practice, the actual impacts will vary significantly between insurer and new business liabilities. We acknowledge that the impact on pricing is likely to be more pronounced on deferred annuity, relative to pensioners. In addition, the benefits of the impacts could be realised either as premium reductions to policyholders, profitability increase to insurers or as a cost of capital benefit to borrowers in other sectors. The latter impact is illustrated through Tests B and C presented in the CGE analysis in section 5. In the current market the costs of de-risking deferred schemes are often prohibitive without reinsurance, which is expensive for the insurer. Therefore, removing or reducing the risk margin will open up the buy-out market.

MA uplift through increase in long-term productive assets

Refinements to the existing matching adjustment framework could help optimise the matching adjustment extracted from current MA portfolio assets, which could lead to further benefits as annuity providers increase their holdings of long-term productive assets.

Long-term productive assets may be deemed more attractive relative to corporate bonds and gilts, which will drive capital redeployment. Changes to the guidance governing matching adjustment under stress would lessen the burden on capital requirement borne by insurers holding non-investment grade and other illiquid assets. This would introduce diversification benefits, whilst easing some of the pro-cyclicality issues identified with current practice.

Figure 4.3.1 shows the allocation of assets held in MA portfolios based on the asset category classification from QRT S.06.02, as at 31 December 2018.

Figure 4.3.1 Allocation of assets held in MA portfolios

	Corporate bonds	Government bonds	Mortgages and loans	Collateralised securities	Other
Proportion of MA portfolios	58%	21%	15%	3%	3%

Source: EIOPA report on insurers' ALM in relation to the illiquidity of their liabilities[32]

For the UK market, corporate bonds were over half of the total assets held and the largest three categories (corporate bonds, government bonds, and mortgages and loans) made up over 94% of the total assets.

Fundamental spread relief

Reducing the fundamental spreads will lift the MA. As a proportion of MA asset proceeds currently earmarked for cost of default or downgrade would be made available to match MA liability cashflows, this would in turn boost the proportion of liquidity premium recognised in the asset spreads and hence benefit the valuation discount rate.

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[32] EIOPA, 2019, Report on insurers' asset and liability management

The resulting reduction in technical provisions will lead to more competitive new business for both individual and bulk annuities, whilst accelerating economic returns from assets backing existing business.

Structuring requirements

Removing the structuring requirements under the current regime for assets with non-fixed cashflows would release asset proceeds currently deemed ineligible for matching adjustment which are currently held back in the restructuring vehicle for liquidity.

The resulting reduction in technical provisions will lead to more competitive new business for both individual and bulk annuities, whilst generating additional returns from assets backing existing business.

Smoothing of the 'BBB cliff'

Mitigating the effects of the BBB 'cliff edge' effect prevalent amongst credit risk modelling frameworks would also reduce the capital requirement held in respect of credit downgrade via replacement costs.

As observed in Figure 4.3.2, a material proportion of annuity backing assets is currently invested in BBB corporate bonds, which carries a substantial capital charge as future downgrades to 'non-investment' credit ratings would incur substantial costs to annuity providers.

Debt securities held in respect of annuities and other long-term business are analysed below according to external credit ratings issued. The information below has been sourced from the market disclosures from 5 major annuity market participants, as at 30 June 2020.

Figure 4.3.2 Credit rating of debt securities backing annuities and other long term business

	AAA	AA	A	BBB	Below BBB	Not rated
Proportion held	8%	26%	32%	29%	2%	3%

Source: Publicly available information published by 5 major market participants as at HY 2020

4.3.1.3   Impact quantification – Summary

We are expecting productivity gains from annuity business, through reduced premiums from lower risk margin and optimisation of matching adjustment portfolios. The table below sets a summary of the impacts from annuities.

Figure 4.3.3 Impact on individual and bulk annuities

(£bn)	Risk margin	Increase in long term productive assets	Fundamental spread relief	Structuring requirement	Smoothing BBB cliff	Total
'UK optimised' scenario	1.6	0.8	0.4	0.4	0.2	3.4
'Enhanced capital' scenario	2.0	1.1	0.7	0.6	0.2	4.7

Source: KPMG 2021

4.3.1.4 Impact quantification – Risk margin

New business

Direct impact of risk margin reducing

To assess the direct impact of removing the risk margin we have considered the impact on annuities as these are a larger driver of the overall industry new business risk margin. We have modelled the 'Enhanced capital' scenario by removing the risk margin on an illustrative annuity policy using market annuity rates and inferred the amount of required capital from the QRT of a monoline annuity provider. Under our modelling using a 5.57% cost of capital this gives a benefit on one year's new annuity business of £0.9bn.

We have validated the modelled £0.9bn impact by considering the volume of annuity business written each year in the UK of c.£40bn[33]. The risk margin on annuities is typically around 5%[34]. Using this, the 5.57% cost of capital and assumed annuity duration of around 10 years (based on an example policy projection discounted using the cost of capital) gives a crude estimate of the impact of £1.1bn (£40bn * 5% * 5.57% * 10 = £1.1bn).

The impact of £0.9bn will understate the overall impact on new business as there will also be gains on other new business from removing the risk margin but the gains on other business are likely to be far less than for annuities.

Secondary impact of insurers making less use of reinsurance

As well as the direct impact of removing the risk margin on new business there will also be a secondary benefit from Insurers being less incentivised to cede longevity risk to jurisdictions outside the UK.

The current cost of Reinsurance is around 5%[35]. Under both 'UK optimised' and 'Enhanced capital' scenarios we have assumed a 50% reduction in the proportion of new business to be reinsured on annuities. We expect that, if the risk margin is removed, annuity providers would be broadly neutral towards ceding longevity risk overseas and would thus scale back significantly from doing so for new business.

The current cost of longevity reinsurance varies but is estimated to be in the region of 5% of fixed leg liabilities[36], whereas the longevity risk capital as a proportion of annuity liabilities is thought to be 6% to 10% for monoline annuity providers, where the capital is released over the lifetime of an annuity policy with a typical duration of 12 years (based on an example policy projection discounted using a typical liability evaluation discount rate of 2.5%). The quantum of the net benefit depends on a number of factors, chief amongst which is the cost of capital, which varies between provider. Our central estimate for the net benefit is £0.2bn based on the 5.57% cost of capital used throughout this report.

The combined changes to risk margin, reinsurance fees and longevity risk capital is captured in our modelling to produce an estimated benefit of 2.3% to 2.9% of premium for annuity policy. This is then applied to an industry aggregate annual annuity premium of £39.2bn[37], resulting in £1.4bn productivity gains (£1.8bn for the 'Enhanced capital' scenario).

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[33] See Figure 4.1.10

[34] Sourced from QRT disclosures of four major monoline annuity providers

[35] IFoA, 2019, Report from the Risk Margin Working Party

[36] IFoA, 2019, Report from the Risk Margin Working Party

[37] See Figure 4.1.10

Existing business

The size of the risk margin post TMTP for UK Insurers was £19.9bn at YE 19 based on their Solvency II balance sheets. This figure does not capture the risk margin implicitly captured within Technical Provisions calculated a whole and hence is likely to underestimate the overall impact of removing the risk margin.

Figure 4.3.4

YE 19 QRT Item	Risk margin (£bn)
Non-life (excluding health)	7.3
Health (similar to non-life)	0.2
Health (similar to life)	0.6
Life (excluding health and index-linked and unit-linked)	8.9
Index-linked and unit-linked	2.8
Total	**19.9**

Source: UK Insurers solo QRT S.02.01 R0550, R0590, R0650, R0680, R0720

To estimate the gain from the release of the full risk margin on the existing basis under the 'Enhanced capital' scenario we have considered the release of the total risk margin post TMTP, excluding Non-life, (£12.6bn) and multiplied it by the assumed cost of capital of 5.57% to give an assumed benefit of £0.7bn.

Under the 'UK optimised' scenario only 75% of the risk margin (£9.5bn) is released so the benefit is 75% of the benefit under the 'Enhanced capital' scenario which is £0.5bn. The reason for excluding non-life risk margin impact on existing business is that in our view there is no clear evidence of net capital strain in the non-life sector, where we assume capital required for new business is funded by the release of capital from business running off, and as such we are not expecting repeated annual cost of capital savings from risk margin attached to the non-life sector.

We have quantified the potential change on firms' reinsurance strategies on their existing business if the risk margin was removed as there would be a cost with unwinding existing reinsurance but there is likely to be a potential gain there as well.

Total impact

The table below sets out the total impact of the changes to the risk margin under the scenarios.

Figure 4.3.5

(£bn)	'UK optimised' scenario	'Enhanced capital' scenario
New business impact	1.1	1.3
Existing business impact	0.5	0.7
Total	**1.6**	**2.0**

Source: KPMG 2021

4.3.1.5 Impact quantification – Matching adjustment portfolio

The impact from potential matching adjustment framework is divided into three components. The increase in investment in long-term productive assets, the removal of structuring

requirements, and the relief on capital requirement in respect of non-investment grade assets under stress. The estimated combined impact is believed to be in the range of £1.5bn to £2.4bn

We arrived at these estimates by quantifying the relief in the cost of capital on an illustrative policy, validated using market annuity prices and typical capital requirements for an annuity provider.

The capital redeployment is estimated to be £60bn to £90bn. These funds are currently held in assets residing within matching adjustment portfolios, primarily invested in investment grade corporates and gilts.

Through consultation with industry experts we expect an additional 20% to 30% of these assets to be redirected to long term economic assets such as infrastructure, commercial and residential properties. We have estimated this based on business plans of large annuity providers.

We have allowed for the supply expansion and funding appetite of these markets through a haircut of yield pickup implied by current market conditions, and that insurers will also need time to develop the expertise required to manage and build relationships to source these assets that are previously unfamiliar to them.

Given that the quantum to be redeployed is material, we have considered the impact this may have on the potentially diminishing returns offered by these assets over time.

Whilst we do recognise the enhancement on productivity within the insurance sector may be dampened over time, the consequent lower cost of capital and the greater availability of funding to key sectors identified to contribute to growth would ultimately benefit the economy as a whole. This is further discussed in the SCGE modelling section in 5.5.

As the impacts identified above are not instantaneous and depend upon industry response and management action, we have taken a high-level approach to quantify potential impacts.

Increase in long-term productive assets in matching adjustment portfolios

New business

For this regulatory lever, we are assuming that firms are able to increase their holdings of long-term productive assets (equity release mortgages (ERM), commercial mortgages, residential and commercial properties, infrastructure debts and other direct investments) within matching adjustment portfolios from around 30% to around 50% (60% in the 'Enhanced capital' scenario). We calculate the additional uplift in yields on these assets to be 20bps to 100bps[38] higher relative to the average corporate bond in a matching adjustment portfolio. We have determined these assumptions based on discussions with a large annuity and lifetime mortgage provider.

Assuming the matching adjustment portfolio has a weighted average duration of around 10 years[39] then for every 10bps uplift in the matching adjustment there would be a c.1% reduction in the related insurance liabilities. As such, an increased holding of 40% in long-

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[38] Bank of England, 2018, Speech delivered by David Rule
[39] EIOPA, 2019, Report on insurers' asset and liability management

term productive assets would generate £0.5bn productivity gains. (£0.6bn for the 'Enhanced capital' scenario).

Figure 4.3.6 Impact of reinvestment of MA assets on new business

	Increase holdings of long-term productive assets and BBB	Diluted impact across MA portfolio[1]	Frictional cost of higher capital requirement[2]	Yield uplift on reinvested assets[3]	Impact on productivity as a % of NB premium[4]	Impact (£bn)
'UK optimised' scenario	20%	0.17%	0.05%	0.12%	1.18%	0.5
' Enhanced capital' scenario	30%	0.23%	0.07%	0.17%	1.65%	0.6

Source: KPMG 2021

Note 1: This is the estimate uplift in the overall portfolio matching adjustment allowing for the new asset mix.
Note 2: This is to allow for the higher capital charges attracted by the long-term productive assets, acting to offset the benefit from a higher matching adjustment.
Note 3: MA uplift net of cost of capital impact from above two steps.
Note 4: This is the resultant savings expressed as a percentage of new business premium, passed on as productivity gains for the insurance sector or the customer

To estimate the uplift in matching adjustment, we have obtained the proportion of asset classes invested in matching adjustment portfolios along with their average matching adjustment from public source as at 2016[35]. These are then updated to reflect December 2019 market conditions, which we believe are more reflective of our longer-term view in comparison to December 2020.

We then assume 20% of assets currently invested in 'traditional annuity assets' to be redirected to infrastructure, real estate and equity release mortgages. We then considered moving 20% of the remaining 'traditional annuity assets' from AA/A to BBB rated corporate bonds, implicitly making the broad assumption that 'traditional annuity assets' are corporate bonds as we do not have the proportion for gilts and cash.

Through the calculations we have allowed for the changes in EIOPA fundamental spreads, and the expected increase in credit risk SCR as we move down the credit ratings in the corporate bond holdings.

Note that the asset allocation below is different to the one shown in Figure 4.3.1, in order to be consistent with other information used in estimating the MA uplift impacts. The matching adjustment asset allocation provided by the Bank of England source provides the necessary granularity to perform calculations on yield uplift.
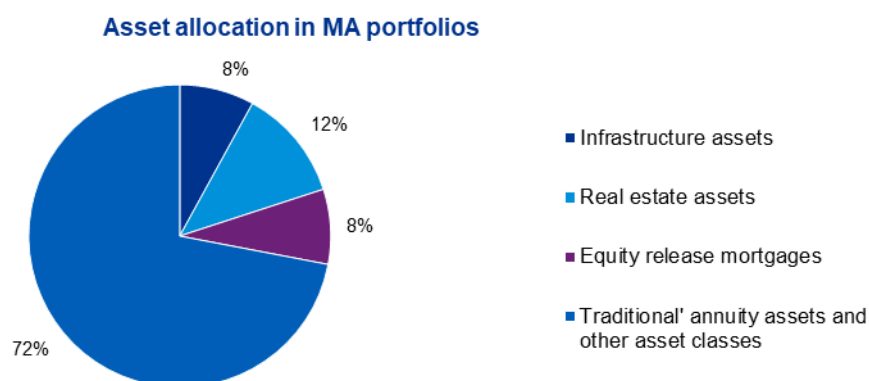
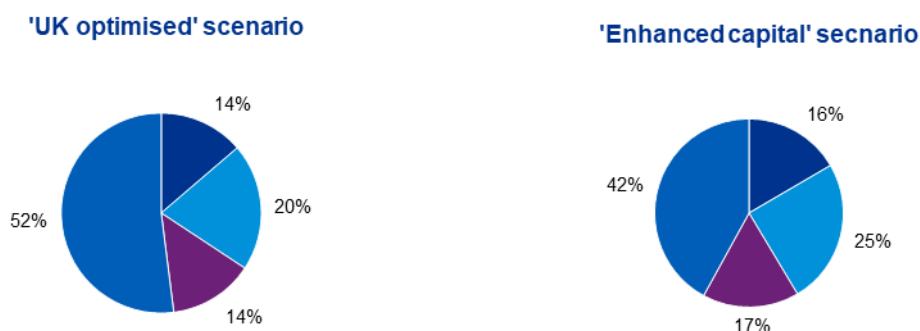## Figure 4.3.7 Current asset allocation in MA portfolios

Asset allocation in MA portfolios

- Infrastructure assets
- Real estate assets
- Equity release mortgages
- 'Traditional' annuity assets and other asset classes

8%
12%
8%
72%

Figure 4.3.8 Asset allocation in MA portfolios under proposed scenarios

'UK optimised' scenario

14%
20%
14%
52%

'Enhanced capital' secnario

16%
25%
17%
42%

Source: Bank of England

Existing business

For the existing business we have adopted a similar approach where we considered the uplift attained from reinvestment into illiquid assets and corporate bonds further down the credit quality ladder. This results in £0.3bn additional investment return over one year. (£0.5bn for the 'Enhanced capital' scenario).

Figure 4.3.9 Impact of reinvestment of MA assets on existing business

	Reinvestment from corps to illiquids (£bn)	Assumed illiquid MA pickup[1]	Frictional cost of higher capital requirement[2]	Volume switching from AA/A to BBB (£bn)	Assumed corporate MA pickup[3]	Frictional cost of higher capital requirement[4]	Impact (£bn)
'UK optimised' scenario	60	0.52%	0.03%	31.2	0.13%	0.03%	0.3
' Enhanced capital' scenario	90	0.52%	0.03%	37.8	0.13%	0.03%	0.5

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Similar to the way we estimated matching adjustment uplift for new business, we have also made allowances for higher cost of capital from an increased holding of BBB-rated corporate bonds.

Fundamental Spread relief

Under the current regime, a proportion of the asset spread is attributed to the cost of default and downgrade, where the remainder 'liquidity premium' is termed 'matching adjustment' which contributes to the valuation discount rate on MA liabilities. The fundamental spread is currently released by EIOPA on a monthly basis, split by sector and maturity.

Following discussions with several annuity providers, there is consensus that the fundamental spread methodology captures undue prudence, especially in relation to covered bonds and real estate where recovery rates in the event of default are materially higher than levels assumed by EIOPA.

We have therefore evaluated the potential impact if 25% of the fundamental spread (40% for the 'Enhanced capital' scenario) were to be released, thereby boosting the MA by the same amount and thus reducing the level of technical provision.

Using specimen MA portfolios discussed in the reinvestment section, we determined the uplift in MA to be 0.15% (0.25% for Maximised capital scenario), this translates to c.1.5% reduction in technical provisions and resulting in £0.3bn impact from annual new business. Note that we have captured the cost of capital impact as the investment return achieved over time is assumed to remain unchanged. There is an additional £0.1bn contribution from existing business.

Figure 4.3.10 Impact of removal of structuring requirement on new and existing business

	Increase in matching adjustment	Reduction in Technical Provisions	Assumed Annuities NB premium	Duration of new business	Impact on NB (£bn)	Impact on EB (£bn)
'UK optimised' scenario	0.15%	1.5%	39.2	10	0.3	0.1
' Enhanced capital' scenario	0.25%	2.5%	39.2	10	0.5	0.2

Source: KPMG 2021

Removal of structuring requirement

Under the current regime, in order for assets with non-fixed cashflows to be rendered matching adjustment eligible, a special purpose vehicle (SPV) is utilised to hold these assets and transform the proceeds to fixed, bond-like cashflows, providing liquidity where necessary.

Through restructuring, some of the asset cashflow proceeds are deemed ineligible for matching adjustment and are held back in the restructuring vehicle for liquidity. We expect there to be c.100bps[40][38] drag on the rate of return over an average duration of 20 years,

[40] Bank of England, 2018, Speech delivered by David Rule

where it would be released over time. This is the return component that is locked up through the structuring of the ERM loss absorbing feature (i.e. junior and equity tranches which are not MA eligible), a change to the current MA regime may enable the MA to benefit from the eligibility of these tranches. The cost of capital is estimated to be £0.4bn over new and existing business combined (£0.6bn for the 'Enhanced capital' scenario).

Figure 4.3.11 Impact of removal of structuring requirement on new and existing business

	Increase in illiquid asset IRR from removing SPV	Assumed additional proportion invested in ERM	Assumed ERM average duration	Reduction in Technical Provision	Assumed Annuities NB premium	Duration of equity tranche of structured notes	Impact on NB (£bn)	Impact on EB (£bn)
'UK optimised' scenario	1%	6%	12	0.69%	39.2	20	0.3	0.1
' Enhanced capital' scenario	1%	9%	12	1.03%	39.2	20	0.4	0.2

Source: KPMG 2021

Smoothing of 'BBB cliff'

For technical provisions, there is not expected to be an immediate benefit on matching adjustment if the BBB-cap is removed or smoothed, as there is currently a small proportion (2%[41]) of non-investment grade assets invested in matching adjustment portfolios.

However, the credit risk capital in the SCR will be reduced as the cost of downgrade will be lower. The productivity impact from lower credit risk capital is estimated based on the assumption that the total SCR is typically c.8%[42] of single premium on annuities and that the downgrade component of the SCR is c.20%[38] of the total SCR

We have used the fundamental spreads and matching adjustment portfolio credit rating released by EIOPA to estimate the impact of smoothing and removing the BBB-cliff. We have used the increase in fundamental spread for each drop in credit quality step as a proxy for cost of downgrade, and have made the assumption that the cost of downgrade is half of the credit risk SCR. For both the 'UK optimised' and 'Enhanced capital' scenarios we have assumed that the proxied downgrade cost from BBB to BB is halved to reflect potential impact from regulatory outcome.

We estimate a reduction of c.40% of the credit downgrade SCR as in the event that existing investment grade corporate bonds held by an insurer downgraded to non-investment grade they would no longer be required to immediately replace them, which equates to 8% reduction of total SCR translating as £0.2bn productivity gains. This should not be an incentive for insurers to substantially increase their holdings of sub-investment grade assets, rather.

4.3.2   With-Profits Funds

4.3.2.1   Regulatory drivers

We estimate that there is currently c.£114bn invested in equities in with-profits funds across the UK[43]. Equity risk is typically a material contributor to the SCR for with-profits funds, and in

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[41] See Figure 4.3.2

[42] Sourced from QRT disclosures of four major monoline annuity providers

[43] See section 4.1.2.3 for details of this estimation

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particular investments in non-standard equities attract additional capital requirement under the current regulatory regime. Therefore, setting capital requirement to be no higher than Type 1 equity for equities aligning to the economic growth and carbon-neutral agenda could open up investment opportunities for with-profits funds.

However, there is reservations over the incentive of reinvesting a large proportion of policyholders' assets, given most with-profits funds are either contracting or in run-off which will likely give rise to ALM constraints, as well as communications regarding policyholders' expectation and risk appetite.

4.3.2.2 Potential Impact

The removal of additional capital requirement provides incentives for with-profit funds to reallocate their equity assets to ESG investments, without significant departure from PPFM investment guidelines. This could also help firms demonstrate their corporate social responsibilities.

4.3.2.3 Impact quantification

We estimate that potentially up to 10% of these equity assets can be reinvested in ESG or start-up equity, which would generate up to £11bn capital deployment without incurring additional burden on capital requirement should the capital charge be capped at type 1 equity. There is no specific economic benefit allowed for within the modelling, but this could complement the policy objectives to support long-term productive investment opportunities earlier in the development cycle.

4.3.3   Unit-Linked

4.3.3.1 Potential Impact

Unit fund assets and unit reserves are well-matched and future profits arising are taken credit for via negative non-unit reserves. This allows insurers to reduce capital strain. The insurance, credit and market risk components of the SCR predominantly represent a stress of the negative non-unit reserve and hence are proportionate to the magnitude of this reserve.

4.3.3.2 Regulatory drivers

Reductions in the risk margin and SCR, either in aggregate or through reduced market risk charges, could reduce the capital required. We assess that there would not be a material impact on pricing or cost of manufacture of unit-linked products. In addition, the insurers have a more secondary role in directing the investment choices. The role of the wealth management industry in directing more unit-linked fund investments towards long-term productive assets is beyond the scope of this report.

4.3.3.3 Impact quantification

There is no allowance for any economic benefit on unit-linked products.

4.3.4   Protection & other life products

A reduction in capital requirements and risk margins is a potential lever to enhance productivity through more competitive premiums, which in turn increases household spending in other sectors. However, protection products are generally of shorter duration with assets backing reserves typically invested in gilts and cash-like instruments in order to

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provide the necessary liquidity. We therefore have not further considered the potential impact from this product group.

4.3.5 Lloyd's and London Company Market

4.3.5.1 Potential impact

Many general insurance groups have multiple "platforms" (entities in different locations which provide alternative places to underwrite the same risks). Likewise, and more generally, the London Market – both in the company and Lloyd's markets – have to compete against other jurisdictions (such as Bermuda, the US and Switzerland) for business. Regulatory regimes are one aspect of that competitiveness. Bermuda in particular is often viewed as a 'lighter touch' regime, despite its equivalence to Solvency II.

Before the start of Solvency II (over the time period approximately 2004-2015), the prevailing capital regime in the UK was ICAS. This struck a compromise between:

— the varied types of insurance and reinsurance, and indeed varied business models, which exist across the London market (both Lloyd's and companies), and;

— the cost and management time involved in having a bespoke model for each insurer and reinsurer.

Under Solvency II, the requirements to get a bespoke internal model approved by regulators hugely increased, to the point where many smaller insurers in particular used the Standard Formula even though management had misgivings about its appropriateness. It should be noted that every firm, in its ORSA, must assess whether its capital model was appropriate. In practice, some firms were faced with confirming appropriateness of the Standard Formula despite management misgivings, simply because no affordable alternative existed.

One proposal would be an easing of the very high requirements to go through the current Internal Model Approval Process (IMAP), in favour of a more pragmatic "fit for purpose" review, which would be informed by lessons learnt from IMAP. This would reduce costs, especially for firms which would like to use internal models – including insurers which would be new entrants to the UK market - but which are put off by the costs involved. There could also be cost savings for existing insurers with internal models, as their ongoing update and validation processes could be shortened and simplified by focussing on the most material items.

4.3.5.2 Regulatory drivers

From a cost perspective, the Lloyds market expense ratio is high (c.35-40%[44] of premiums), which serves to gradually reduce its role in the global market as the cost burden is considerable. One part of this arises from the double burden in compliance (from quasi-regulation by the Society of Lloyd's and actual regulation by the PRA). A small amount of cost savings does deliver material improvement in profits.

4.3.5.3 Impact quantification

There is scope to potentially adopt a lighter touch approach such as the Bermudan regime, where the double burden in compliance can be relieved, or the Swiss regime where it is less onerous to obtain internal model approval. This would result in reduced expenses.

A smaller company market participant indicated that the prohibitive estimate cost of c.£2m to get through the internal model approval process is a significant deterrent of adopting the

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[44] Lloyd's, 2019, Lloyd's Annual Report, Market Results

internal model in favour of standard formula under Solvency II. Due to the relatively immaterial level of cost savings, this impact has not been included.

4.3.6   Domestic P&C

4.3.6.1   Potential impact

A reduction in capital requirements and risk margins is a potential lever to enhance productivity through more competitive premiums, which in turn increases household spending in other sectors. Whilst we recognise that premiums are highly dependent on underwriting cycles and are not necessarily driven by costs, the benefit from lower costs to the insurer would ultimately benefit the economy.

4.3.6.2   Regulatory drivers

In terms of capital requirements in the Standard Formula, the biggest single driver is currently the premium and reserve risk charge. In this calculation, premiums and reserves are multiplied by various parameters (which vary by line of business) so higher parameters are applied to more "risky" lines of business. The parameters used were developed by EIOPA to be applicable across the EU (this is also applicable to the London market, but is perhaps more relevant to the domestic sector). Following Brexit, it becomes feasible to develop UK specific parameters. These would be more applicable to the UK insurance industry, making for a more appropriate framework for risk capital in the UK. This would need research: it is, however, quite feasible that the parameters developed would be less than those under Solvency II, causing lower capital requirements.

4.3.6.3   Impact quantification

For example, if the risk margin were to reduce by 75%, we estimate a 0.3% per annum contribution to productivity. This is based on £100bn annual premiums[45] across the general insurance sector, where 5.57% cost of capital[46] is applied on c.£7.5bn of risk margin[47] over an average duration of 1 year.

4.4   Capital levers & impact analysis

This section addresses potential impacts from capital management related regulatory levers, which applies at aggregate industry level.

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[45] See Figure 4.1.10

[46] Cost of capital used in the SCGE model, which combines HMT project appraisal real rate of 3.5% and CPI of 2%

[47] See Figure 4.1.3

4.4.1 Supervisory approach

4.4.1.1 Regulatory drivers

Currently it is expected of insurers to hold buffers materially over and above 100% of the Solvency capital requirement. At insurance entity level, we are observing solvency buffers of 130% to 140% across both the life and non-life sectors. A change to expectation of the buffer above SCR for insurers would reduce the amount of capital insurers need to hold. If first point of supervisory intervention is set as 100% of SCR, we are assuming that for both the 'UK optimised' and 'Enhanced capital' scenarios firms will lower their buffer by 10% (e.g. to 120% of SCR) in line with appetite from various other stakeholders.

4.4.1.2 Potential Impact

Overall, we expect that a 10% reduction from current buffer levels would contribute c.£1bn to productivity by scaling the cost of capital impact for new business across all product classes, and one year's cost of capital savings for existing business.

New business

For this regulatory lever, we have estimated the impact by capturing the lower cost of capital incurred on new business, across different product groups. We have used annual new business premiums by product groups[48] and made assumptions about the average duration of which the required capital is released (10 years for annuities, 5 years for other life products, and 2 years for general insurance). The productivity impact is determined to be £0.6bn for new business.

Existing business

We have quantified the existing business impact by capturing one year's cost of capital savings on 10% of £106bn aggregate industry SCR[49].This impact is estimated to be £0.3bn.

4.4.1.3 SCR calibration

4.4.1.4 Regulatory drivers

Given the high level of prudence that exists in the current SCR calculation, insurers could reduce the calibration of the SCR from 1-in-200 to 1-in-100 whilst still being resilient to a significantly adverse scenario. This is not something currently being called for by the industry and as such the impact is relevant to the 'Maximising capital' scenario only.

4.4.1.5 Potential Impact

To quantify the impact of moving the SCR calibration from 1-in-200 to 1-in-100, we need to make an assumption on the distribution of change in Own Funds over a one-year period. Whilst we acknowledge that in practice, the distribution is likely to exhibit some skewness and a long tail for the onerous scenarios. To provide an indicative impact and for simplicity, we have assumed a Gaussian distribution.

If we were to assume the change in Own Funds over a year to conform to a normal distribution, moving from the 99.5th percentile to 99th percentile would reduce the current SCR by a factor of c.10%. The critical 'z' values for 99.5% and 99% are 2.58 and 2.33 respectively. Inferring from the ratio of the 'z' values ($z_{99}/z_{99.5}$) results in an indicative SCR reduction of 9.7%.

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[48] See Figure 4.1.10
[49] See Figure 4.1.4

Given that the SCR impact from calibration change is broadly similar to lowering the solvency buffer discussed above (capital release of c.10% of SCR), we determined the combined impact on new and existing business to be £1.2bn. This change would contribute to improved productivity in the form of reduced premiums on new business and a reduced cost of capital contribution from legacy business. This is captured only in the 'Enhanced capital' scenario.

Assuming that the MCR cap and floor calibration remains at 45% and 25% of the SCR, then changing the SCR calibration would impact firms for whom the cap or the floor is currently biting, this could result in the MCR being c.10% lower.

The table below shows the total estimated impact for capital management levers.

Figure 4.4.1 Total impact for capital management levers

£bn Impact	Capital buffer	SCR calibration	Total
'UK optimised' Scenario	1.0	-	1.0
'Enhanced capital' Scenario	1.0	1.2	2.2

Source: KPMG 2021

4.5 Overall impact breakdown by key regulatory lever

This table below provides an overview of total estimated impact for each scenario, split by the key regulatory levers as identified in Figure 4.3.1.

Figure 4.5.1 Overall impact breakdown

£bn Impact	Risk margin	Matching adjustment	Supervisory approach	Total
'UK optimised' Scenario	1.6	1.8	1.0	4.4
'Enhanced capital' Scenario	2.0	2.7	2.2	6.9

Source: KPMG 2021

4.5.1 Key Assumptions

A number of assumptions are required to in order to estimate economic impacts from regulatory outcomes, we have included some of the pivotal assumptions below:

— Assumes all benefits from the productivity-related regulatory outcomes are passed onto new policyholders, both individual and corporate, through lower premiums, not allowing for any associated costs for implementation;

— Assumes a proportion of corporate bonds in matching adjustment portfolios will be reinvested in productive long-term assets. We recognise the potential impact on the market from the disinvestment of material proportion of existing assets in the matching adjustment portfolio, however the quantification is highly subjective and as such it has not been captured;

— Productivity enhancement and capital redeployment are estimated via cashflow projection modelled on a healthy 65-year-old male annuitant, using market annuity prices and capital requirement from major annuity providers;

— The balance sheet relief and capital released are quantified as savings in cost of capital over a 1-year horizon, this is to align with how the CGE model is parameterised;

— The cost of capital is determined at 5.57% throughout the calculations. This comprises the HMT project appraisal real rate of 3.5%[50], and the indicative inflation rate, CPI at 2%[51]. Note that this is different to the fixed 6% cost of capital rate used in the calculation of the risk margin.

We recognise that the cost of capital is an important assumption and have therefore provided alternative scenarios to understand the sensitivities around the assumption.

Figure 4.5.2 Sensitivity of cost of capital on overall impact

£bn Impact	Low estimate -2%	Central Estimate 5.57%	Higher estimate +2%
'UK optimised' Scenario	3.5	4.4	5.3
'Enhanced capital' Scenario	5.4	6.9	8.4

Source: KPMG 2021

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[50] HMT, 2020, The Green Book
[51] ONS, 2020, Inflation and price indicies

5 Modelling the macro-economic impacts

5.1 Introduction

After defining the regulatory scenarios and estimating the insurance balance sheet impacts of each regulatory scenario, it is necessary to estimate the changes these will have on the UK economy. These changes are both as a result of impacts within the insurance sector and as a result of wider effects that come about because of: the important role insurance plays in the supply chains other sectors; the impact on households as consumers of insurance; effects as a result of the role the insurance sector plays in UK capital markets; and impacts via Exchequer revenues.

This chapter outlines the approach used to convert the regulatory impacts into initial economic impacts or 'shocks' in the economy, the approach to Computable General Equilibrium (CGE) modelling undertaken to estimate the wider impacts to other sectors and agents within the economy in the future, and results of this analysis. Finally, it illustrates how the economic outcomes achieved as a result of the regulatory changes align with HMG policy objectives. Specifically, we discuss how improved productivity in the insurance industry and beyond, supports the wider economy, contributes positively to taxation, and helps to enable the tackling of climate change.

The rest of this chapter is structured as follows:

5.2 Modelling wider impacts

5.3 Understanding Economic output, inputs and linkages in the Insurance sector

5.4 Initial impacts

5.5 Headline CGE results

5.6 Assessing modelled economic impacts against policy objectives

5.2 Modelling wider impacts

To estimate the medium to long term economic impacts to the UK economy from the regulatory changes outlined in this paper, we use a Computable General Equilibrium (CGE) model.

5.2.1 What are CGE models and why do they allow us to estimate wider economic impacts in the economy?

CGE models are a sophisticated form of economic modelling which capture the complex interactions between different economic agents – including households, businesses, government and the rest of the world – operating in competitive markets with explicit resource constraints and budget constraints.

Economic theory is used to specify the behaviour and market interactions of these different economic agents. Through these linkages, CGE models capture how changes in one part of the economy can have knock-on effects in others; this includes effects on inter-sector trade (supply chains), capital markets (investment and saving), international trade (imports and exports), labour markets, household consumption and Government spending and taxes. Without capturing these impacts, economic modelling is limited to estimating impacts to a given sector or area only. Figure 5.2.1 below illustrates how the linkages between different agents and markets are reflected in a CGE.

Figure 5.2.1: Overview of agents and transactions flows in KPMG's SCGE Model
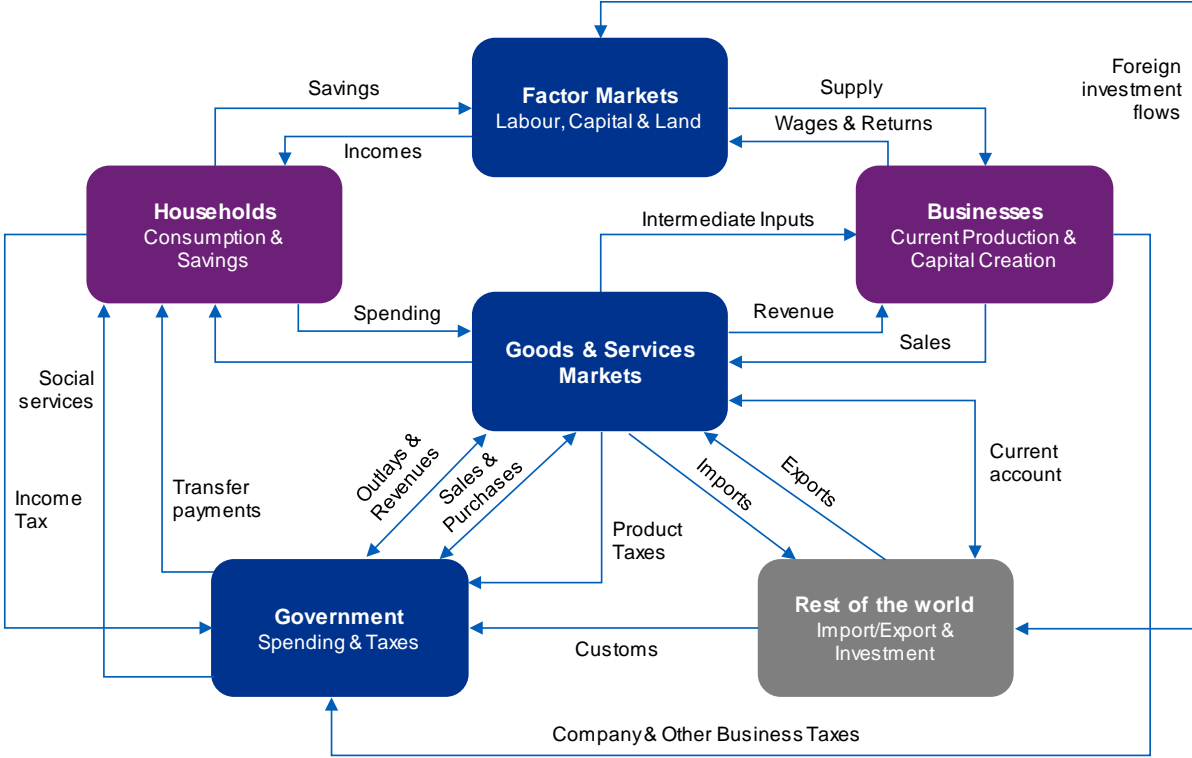
Source: KPMG 2021

A robust feature of CGE models is that when analysing a change or 'shock' in one part of the economy, growth in the whole economy is constrained by available resources, meaning over time the economy must converge to a new "general equilibrium" or "steady-state" (after adjusting for changes in prices and a new allocation of resources). This contrasts with static input-output analysis, which is a partial equilibrium approach to measuring wider economic impacts that does not capture budget and resource constraints and the interactions/ competition between different economic agents for those resources. Other limitations of input output analysis are outlined in the Figure 5.2.2 below, as well as the differences between national CGEs and CGEs that are disaggregated spatially (aka Spatial CGEs or S-CGE)

Figure 5.2.2 Features of different forms of wider economic impact modelling

	Input-output analysis	CGE (national)	CGE (spatial)
Supply side constraints	— None	— National level constraints	— Regional level constraints (allows displacement and competition)
Endogenous prices	— None (assumes prices are fixed)	— National level	— Regional level prices (allows displacement and competition)
Different ratios for intermediate inputs and production	— None (assume fixed ratio)	— Substitution across factors and products (domestic and international) — Diminishing marginal returns	— Substitution across factors and products (regional, domestic and international) — Diminishing marginal returns
Budget constraints	— None	— Households and government have budget constraints	— Households and government have budget constraints and differ at a regional level
Allowance for purchases marginal response to change	— None	— Households and firms budget shares can change	— Households and firms budget shares can change
Applicable for small regions	— Not applicable (interlinkages are shallower than regional level)	— Not applicable (interlinkages are shallower than regional level)	— Applicable (incorporates regional differences and allows for regional shocks)

Source: KPMG 2021, based on information from the ABS 2020

The robust properties of CGE models mean they are widely used by Governments and international organisations. In the UK, this includes HMRC and HM Treasury, which use S-CGE models to assess the impact of tax and trade policies on the UK economy.[52] Examples include:

HMT, 2018: HMT used CGE modelling to estimate the impact of changes in trade costs on the UK economy due to EU Exit[53]. The CGE modelling results provided an estimate of the changes in the total value of exports and domestic demand by sector. Regional analysis then apportioned these changes to regions to estimate their exposure to a particular scenario.

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[52] HMRC, 2013, HMRC's CGE model documentation and; HMG, 2018, EU Exit: Long-Term Economic Analysis Technical Reference Paper

[53]HMG, 2018, EU Exit: Long-Term Economic Analysis Technical Reference Paper

HMRC, 2013: HMRC developed a CGE model, capable of modelling the dynamic macroeconomic effects, and subsequent Exchequer revenue effects of a major policy change. The modelling suggested that certain tax reductions increased investment by between 2.5% and 4.5% in the long term (equivalent to £3.6 billion – £6.2 billion in today's prices) and GDP by between 0.6 per cent and 0.8 per cent (equivalent to £9.6 billion - £12.2 billion). Lower Corporation Tax was argued to increase the demand for labour which would in turn raise wages and increase consumption. Given the share going to labour this equated to between £405 and £515 per household[54].

5.2.2   Introduction to KPMG's Spatial General Equilibrium (SCGE) Model

KPMG has developed a spatial CGE (S-CGE) Model[55] of the UK economy using CGE theory and detailed economic data from the ONS and other HMG public available information, as well as academic empirical studies. The S-CGE Model disaggregates the UK economy into up to 105 sectors, including the insurance sector and its supply chain, and up to 109 sub-regions of the UK which operate as separate economies linked by inter-regional trade flows.

The key economic disciplines underpinning KPMG's S-CGE Model are:

— Optimising behaviour by households and firms in the context of competitive markets with explicit resource constraints and budget constraints.

— The price mechanism which operates to clear markets for goods and factors such as labour and capital (i.e. prices adjust so that supply equals demand); and

— At the margin, costs are equal to revenues in all economic activities.

For the purposes of this analysis, S-CGE model has been aggregated to 36 key sectors of interest (see appendix Appendix 6.1) and the 12 NUTS 1 geographic regions. This aggregation allows the model to run efficiently, whilst maintaining a sufficient level of detail to estimate robust impacts. Model aggregation is typical in calibration modelling (e.g. transport modelling)[56].

### 5.2.3   Understanding the 'Incremental impact' in the economy

To understand the change in the economy as a result of a policy impact or intervention, the CGE estimates the difference or 'incremental' between two modelled scenarios, the with Policy ("Do Something") and the Baseline ("business as usual") scenario (see Figure 5.2.3) This is a standard approach in economic modelling and aligns with the principles of the UK Greenbook. Results are then presented as a percent or pound deviation from the baseline.

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[54]HMRC, 2013, Analysis of the dynamic effects of Corporation Tax reductions

[55] KPMG's SCGE model uses GEMPACK software; Horridge, Jerie, Mustakinov & Schiffmann 2018, GEMPACK manual, GEMPACK Software, ISBN 978-1-921654-34-3

[56] Department of Transport, 2014, TAG Unit M1.1 Principles of Modelling and Forecasting

Figure 5.2.3 Illustration of Incremental impact
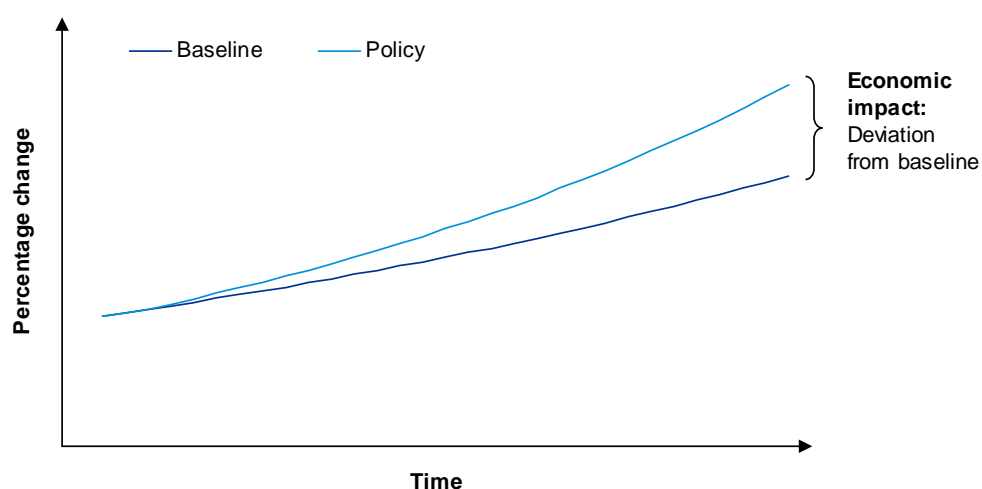
Source: KPMG 2021

The results for the "baseline" and "with policy" is *not* an attempt to predict everything that might occur in the future, but instead a projection or representation of the future growth path of the economy based on today's available information.

While this long-term growth path may differ in both the baseline and policy scenarios to what occurs in reality, what is most important is the incremental or difference between these two scenarios themselves.

5.3 Understanding Economic output, inputs and linkages in the Insurance sector

Before analysing impacts to the wider economy, it is worth understanding how the Insurance sector and its linkages are defined in the ONS National Accounts, and in the S-CGE model.

The Insurance sector, as defined in the ONS Supply and Use tables, has four key subcategories. These include Non-life Insurance, Life Insurance, Reinsurance and Pension funding (excluding compulsory insurance.)

The UK National Accounts reflects the output of the insurance sector in two ways. The first is through the cost of all the resources needed to create the output. This can be broadly broken down into the payments to Factors of production (rents to Land, wages to Labour and profits/rents to real Capital), and cost of Intermediate Inputs, which is the price of the goods and services used in the production of insurance (see Figure 5.3.1).

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Figure 5.3.1 Inputs in production

Factors of production	Intermediate inputs

Factors of production: Land, Labour, Capital
Intermediate inputs: Goods & Services

What is 'Capital', and how is it represented?

It is worth noting the distinction in capital as represented in the UK National Accounts, also referred to as 'real capital', and other terms such as intermediate inputs and financial capital.

Real capital, (aka Capital assets or Capital goods), are already produced durable (non-financial assets) used as 'tools' in production of goods or services, e.g. Buildings, Computers, etc. Capital is produced by distinct sectors of the economy (e.g. Construction sector) and accumulated by businesses overtime. It also depreciates with age and must be replaced if output levels are to be sustained

This is distinct from intermediate inputs, which are the goods and services (including energy, raw materials, semi-finished goods, and services that are purchased from all sources) that are used in the production process to produce other goods or services rather than for final consumption.

Real capital on the above definition is also distinct from financial capital, the debt and equity measured in monetary terms, used by organisations to finance operations and investment through capital markets. This financial capital is a critical enabler of production (including by facilitating real capital, labour, land and intermediate inputs), but is not itself an additional factor of production

In the S-CGE model, real capital is ultimately owned by households, reflecting their role as 'shareholders' or lenders in the economy through their savings. Therefore, the operating surplus (profit) of firms flows back to households in the form of rents on real capital. This is akin to owning equity/debt in a business, as the real capital assets is the claim that a shareholder might have on that organisation's assets (should it be liquidated).

Assumptions are required about the efficiency or otherwise of financial capital markets impact on CGE modelling via the implications for the costs of real capital and production more generally. Improvements in the efficiency of financial capital markets can be an important driver of the overall productivity of a given set of real inputs (i.e. of total factor productivity), but CGE modelling requires external estimates of the scale and distribution of these changes in order to generate forecasts of the impact on real output, real capital stock, labour supply etc.

Source: KPMG 2021

The second way the national accounts reflects output is through the demand for insurance. Unlike other sectors in the economy, where the value of the output is as simple as the goods or services purchased by its users, Insurance produces intangible products used to control risk, where the product incorporates a significant redistribution of funds.

Therefore, the principle adopted by the European System of Accounts (and the ONS), is that the value of the output produced by the sector is the price the policy holders 'actually' pay for the risk pooling, risk bearing, and other insurance services received.[57] This reflects the premiums earned by insurers net of the claims/benefits due to policy holders, plus income earned from the investment of the insurance technical reserves of the insurers, or (P-C+I).[58]

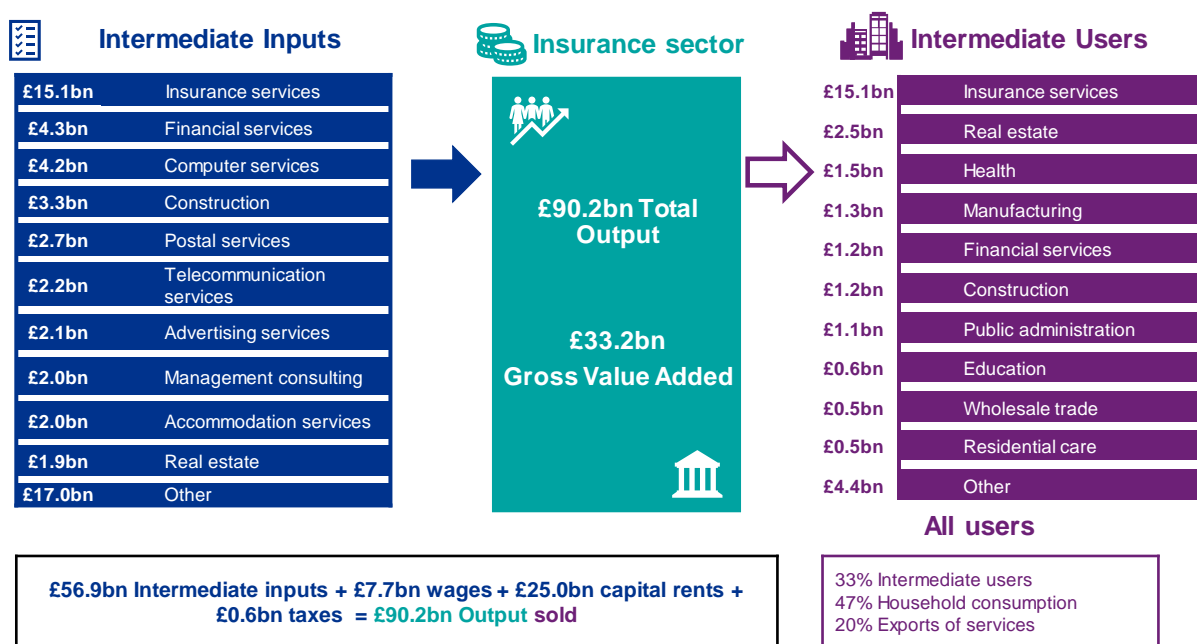[57] Eurostat, 2013, European system of accounts ESA 2010, ch16

[58] Strict calculations differ across types of insurance (non-life, Life and Reinsurance), but the overarching principle remains the same

This could also be viewed as the 'revenue' of the sector from the product itself. There are no doubt issues with this approach. For instance, claims can be volatile over time, and could exceed premiums in a given year resulting in a negative output estimate. The ONS therefore must adjust to account for this volatility.

5.3.1   Insurance sector in ONS

The ONS statistics on the Insurance sector, the interrelationships between the cost of its inputs, and outputs, and gross value added are reflected in Figure 5.3.2 below.

Figure 5.3.2 Insurance Sector Economic Linkages

Intermediate Inputs		Insurance sector	Intermediate Users	
£15.1bn	Insurance services		£15.1bn	Insurance services
£4.3bn	Financial services		£2.5bn	Real estate
£4.2bn	Computer services	£90.2bn Total Output	£1.5bn	Health
£3.3bn	Construction		£1.3bn	Manufacturing
£2.7bn	Postal services		£1.2bn	Financial services
£2.2bn	Telecommunication services		£1.2bn	Construction
£2.1bn	Advertising services	£33.2bn Gross Value Added	£1.1bn	Public administration
£2.0bn	Management consulting		£0.6bn	Education
£2.0bn	Accommodation services		£0.5bn	Wholesale trade
£1.9bn	Real estate		£0.5bn	Residential care
£17.0bn	Other		£4.4bn	Other

All users

£56.9bn Intermediate inputs + £7.7bn wages + £25.0bn capital rents + £0.6bn taxes = £90.2bn Output sold

33% Intermediate users
47% Household consumption
20% Exports of services

Source: ONS, 2020, 2018 Supply and Use tables, escalated to 2020 prices by KPMG

Figure 5.3.2 shows that the Insurance sector draws on goods and services from a number of other sectors (represented in blue on the left) in its 'production' process. In addition, it uses the factors of production including labour (to which it pays wages), and land and real capital (which it pays rents/profits) and taxes. The addition of the intermediate costs as well as returns to the factors of production (known as Gross Value Added) equals the total output of the sector (£90.2bn) sold in the economy (box on the bottom left).

Adding the output in all sectors of the economy would overestimate the value of total domestic output (GDP). This is because the intermediate inputs used in a given sector, reflect the added value of land, labour and capital of another sector (which is double counting). It is therefore the sum of all sectors gross value added (GVA) which (after some tax adjustments) equals the total economic output in the economy. the Insurance sectors GVA which reflects its contribution (i.e. value added) towards that GDP figure.

The output of the insurance sector, is consumed by other sectors in the economy (as an intermediate input), presented in the purple column on the right of the diagram, which includes other insurance firms within the sector itself. In addition, a large proportion of insurance is consumed directly by households or exported overseas.

The interlinkages above reflect the importance of the insurance sector to the wider UK economy. Impacts to the insurance sector directly will have flow on impacts to sectors that provide its intermediate inputs and capital, as well as the sectors and households and international users that purchased its outputs, and the households that supply its labour.

5.4 Initial impacts

The input/output linkages presented in Figure 5.2.1 and reflected in the data presented in Figure 5.3.2 show how changes to the insurance sector impact the rest of the economy, and which areas of the economy would experience additional demand as a result of an expansion of the sector. These linkages in the modelling allow us to translate any Solvency II regime change into wider impacts whilst adhering to economic disciplines, ensuring prices are endogenous and all markets clear.

5.4.1 Initial impact routes

The regulatory scenarios outlined in Section 4 ('UK Optimised' and 'Enhanced Capital'), lead to initial impacts in the economy through two routes.

5.4.1.1 Route 1: Initial improvement in productivity in the Insurance sector

If the regulation under Solvency II changed, this would initially improve the returns in the insurance sector. This amounts to a total factor productivity improvement, as it reflects lower costs incurred for the same amount of inputs[59] (labour, real capital, intermediate goods) to deliver a given level of output.

While the initial effects of a productivity improvement are felt within the insurance sector, in a competitive market economy, impacts would quickly flow through the rest of the economy. Improvements would be passed on to consumers in the form of lower premiums (prices), allowing them to save and consumer more insurance, or consume more of other goods and services (reflecting downward sloping demand curves). It would also flow to downstream sectors that purchase insurance for use as an intermediate input, lowering their input costs and allowing them to expand production. The savings also represent an increase in real wages raising the returns to labour at the margin.

The improvements in return also allow the insurance sector to expand, demanding more inputs from sectors upstream, improving upstream sector returns and allowing them to expand production. With the expansion of insurance and other sectors, this also drives demand in factor markets including demand for Labour and Capital, further increasing real wages and returns to capital, as well as increasing employment[60] and leading to an accumulation of capital through greater investment, which in turns helps drive further growth in the economy.

Importantly, impacts will not necessarily be positive for all sectors. For instance, while the Finance and Insurance sector are interlinked, they also compete with each other for similar inputs. The CGE models these competing demands across sectors and regions.

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[59] It is more prudent to only shock productivity for just the factors of production. This is because intermediate inputs reflect the factors of production of other sectors, and so an all input shock may result in overestimation of improvements in the economy.

[60] Under both the baseline and the policy scenario, we assume 'Full employment' from a structural and cyclical point of view. Therefore, the vast majority of employment changes in certain sectors/regions reflect displacement in others. However, while labour supply at an aggregate level is inelastic, it is not assumed to be perfectly inelastic. This is because even in an economy at Full Employment in equilibrium, a work/leisure trade off exists and needs to be accounted for. As real wages improve in the economy, households will substitute towards work, and this leads to small increases in hours worked (employment) in the economy.

Overall, as output expands in many sectors, and in aggregate, prices fall until profit (returns on capital) also fall back to their 'normal' levels. This reflects a world of increasing marginal costs (i.e. upward sloping supply curves). The economy finally settles at a new steady state equilibrium, with greater output, higher wages, higher employment and more accumulated capital then it had before.

5.4.1.2 Route 2: Initial improvement in productivity in other sectors

As the Solvency II changes allow a redeployment of financial capital, they also affect other sectors in the economy directly. That is, some of the improvement is not initially gained through the insurance sector itself as described in Route 1 (flowing through the economy via lower products prices or greater demands for inputs), but instead the initial gain is felt in other sectors via financial markets where the redeployment lowers the cost of financial capital compared with what those sectors experienced before. This means these other sectors experience their own direct total factor productivity gain, reflecting a lower cost incurred for the same amount of inputs[61] (labour, real capital, intermediate goods).

These improvements allow sectors across the economy to expand, as well as up and downstream sectors. Under this route our modelling reflects two alternative sub-scenarios: one where the initial improvement is diversified across all sectors, and a second where the impact is concentrated in key growth sectors of the economy.

Figure 5.4.1 below is a stylised/simplified version of Figure 5.2.1, and focuses on the two key routes and interlinkages between different agents in the economy, specifically those impacted by the initial impact.

Figure 5.4.1 Key impacts and interlinkages
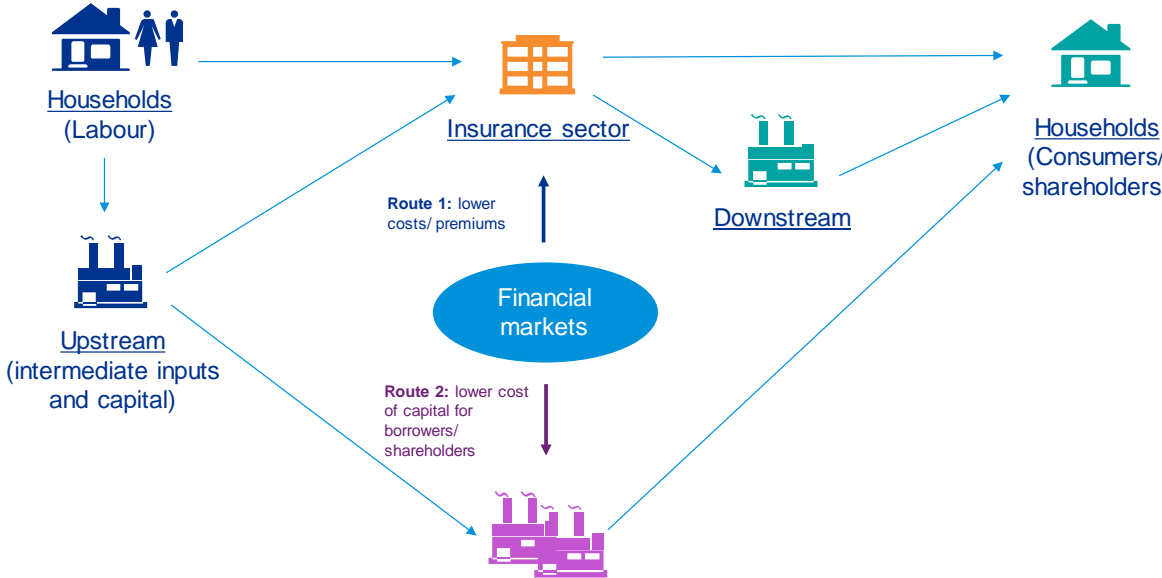
Source: KPMG 2021

5.4.2 Derivation of the initial shocks

In the Section 4, we calculated the initial financial impacts from various regulatory levers, under both the 'UK optimised' and 'Enhanced capital' scenario.

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[61] While financial capital is used to fund all inputs, it is more prudent to only shock productivity for just the factors of production. This is because intermediate inputs reflect the factors of production of other sectors, and so an all input, all sectors shock may result in overestimation of improvements in the economy.

These impacts capture both productivity gains within the insurance sectors, through lower cost of capital and lower insurance costs, and capital redeployed to other sectors through reinvestment of existing assets held by insurers in a way that improves the overall efficiency of financial capital markets by removing barriers to financial capital flowing to its most productive use.

To simplify the analysis, it was assumed that these initial effects occur in a single year. This is considered a proportionate approach, as the strength of CGE modelling lies in its long-term forecasting of policy impacts relative to a baseline. Whether the initial impact is modelled in a single year or ramped up over many, should not materially impact the long-term economic outcomes once the dynamic effects in the modelling have stabilised, and the economy is back in a 'steady state equilibrium'. Any short-term outcomes, therefore, should be read with caution and not heavily relied upon, as they will be a product of this assumption, as well as the limitations of CGE modelling in short-term forecasting, covered in more detail in Section 5.5.4.

The CGE definition of insurance sector output, as prescribed by the ONS (see Section 5.3.1), is broadly defined as premiums less claims plus interest earned[62], which is akin to IFRS profit and loss accounts. We have therefore estimated initial economic gains in a way that is designed to align with the way the CGE model interprets its inputs. For instance, we have assumed that the new business volumes will continue to grow in the bulk annuities market, thereby benefitting from the lower cost of capital afforded by the regulatory levers as there is likely to be a net capital strain.

We implicitly assume that the productivity gains and capital savings achieved over one year are maintained for the foreseeable future, relative to the base case, which is the way CGE model interprets the 'day one' shock to the economy and projecting the GDP gain 30 years into the future relative to the baseline. The baseline is itself a 30-year forecast, but one that does not include the shock.

Drawing on from analysis in Section 4, the initial shocks that reflect the productivity gains and capital savings achieved under both scenarios are presented Figure 5.4.2 below. The table reflects two key scenarios, and four tests in total.

Under the 'UK optimised' scenario Test A, the estimated £4.4bn initial economic impact is felt entirely in the insurance sector, and its impact on the wider economy flows through this sector (Route 1 as described in Section 5.4.1).

In Test B, it is recognised that not all of the cost impact will be felt initially in the insurance sector, as redeployment of financial capital is expected to lower the cost of financial capital in other sectors relative to what was experienced before (Route 2 as describe in Section 5.4.1). This has been estimated to be £0.8bn, as it captures impact from reinvesting matching adjustment portfolio assets into long-term productive assets, and as such the benefit can be realised in the form of reduced cost of capital for other sectors in the wider economy, instead of through more competitive insurance pricing. It is assumed that this benefit is spread proportionally across the sectors in the economy, reflecting the expectation that the insurance sector would seek to diversify its investments across different sectors.

In Test C, we look at a hypothetical situation where the potential for gain is felt in key targeted sectors, recognising the growth of key sectors in the economy (e.g. areas aligned

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[62] Eurostat, 2013, European system of accounts ESA 2010, ch16

with Transition to Net Zero) and their importance to increasing the long-term capital and growth. These specific sectors are outlined in further detail in section 5.4.3.

Test D, we look at the 'Enhanced capital' scenario, where the economic gains of the are larger. Conservatively, we only analyse the impact through Route 1 for this Scenario.

Figure 5.4.2 Tests modelled in KPMG S-CGE

Scenario	Test	Route 1 shock to Insurance sector	Route 2 shock in other sectors
UK optimised	A	£4.4b	-
	B	£3.6b	£0.8b diversified
	C	£3.6b	£0.8b targeted
Enhanced capital	D	£6.9b	-

Source: KPMG 2021

5.4.3   Defining target sectors for Test B and C

We note that HMG is proposing to make extensive long term investments in infrastructure across many areas of the economy as we seek to 'build back better' from the economic downturn caused by COVID-19, as well 'Level up' the UK economy, transition towards net zero, drive overall productivity in the medium to longer term[63]. For example, between £29bn and £37bn of social and economic infrastructure will be brought to market over the next year[64]. Further, there is already evidence increasing investment across key growth markets aligned with UK governments long term objectives and these trends are expected to continue. For instance, a 2020 ONS investment analysis showed that low carbon and renewable energy economy sectors (LCREE) acquired £8.1 billion of capital assets in 2018, an increase of £2.6 billion compared with 2015 and CAGR of 14%[65]. At the same time, UK public sector net debt increased to over 100% of GDP in October 2020[66]. One obvious source of investment in infrastructure and long term capital is the insurance sector.

Proportion invested in each sector

The general expectation reflected and validated amongst insurers is that

— that investment portfolio would remain reasonably well-diversified by sector

— for life insurers, investing in longer-term and illiquid assets in preference to shorter-term and liquid assets, for the reason that the longer-term duration provides a better ALM match to the long duration of annuities liabilities and illiquid assets will tend to offer a small premium in the return available to investors such as insurance who do not require liquidity.

— For the purposes of Test B, we diversify the additional gain proportionally across all sectors in the economy. In Test C, we have proposed a scenario that is targeted towards sectors that drive long term infrastructure assets, as well as those low carbon growth sectors expected to attract investment. For simplicity, the gain is assumed to be divided proportionally across these sectors targeted sectors.

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[63] HMT 2020, National Infrastructure Strategy, ch1-4
[64] IPA, Analysis of the National Infrastructure and Construction Procurement Pipeline 2020/21, p5
[65] ONS, 2018, Low carbon and renewable energy economy, UK: 2018
[66] ONS, 2020, Public sector finances, UK: October 2020

Figure 5.4.3 Key target sectors used for Test C

Sector name	Full definition	Identified as long-term productive asset by the insurance sector globally	Identified as key sector climate change[67]
Agric[68]	AGRICULTURE, FORESTRY AND FISHING		✓
Manufacturing	MANUFACTURING		✓
Elec	Electricity, transmission and distribution		✓
Gas	Gas; distribution of gaseous fuels through mains; steam and air conditioning supply		✓
Construction	CONSTRUCTION General construction is the construction of entire dwellings, office buildings, stores and other public and utility buildings, farm buildings etc., or the construction of civil engineering works such as motorways, streets, bridges, tunnels, railways, airfields, harbours and other water projects, irrigation systems, sewerage systems, industrial facilities, pipelines and electric lines, sports facilities etc.[69]	✓	
RailTrn LandTrn WatTrn WarTrnSrv PostCourSrv	TRANSPORTATION AND STORAGE: Rail transport services Land transport services and transport services via pipelines, excluding rail transport.	✓	✓
RealEst OwnOccHou	Real estate services, excluding on a fee or contract basis and imputed rent Owner-Occupiers' Housing Services	✓	
Education	EDUCATION	✓	
Health	Human health services	✓	
Tourism	ACCOMADATION AND FOOD		✓
TOTAL			

Source: KPMG developed scenario based on a range government sources including HMT, IPCC, ONS

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[67] IPCC, 2014, AR5 Climate Change 2014: Impacts, Adaptation, and Vulnerability Chapter 10: Intergovernmental Panel for Climate Change (IPCC) has identified the following as key sectors vulnerable to climate change: Energy, Water, Transport, Tourism, Insurance, Health
[68] The Parliamentary Office of Science and Technology, 2019, Climate Change and Agriculture
[69] ONS, 2007, UK Standard Industrial Classification of Economic Activities 2007

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Agricultural

Agriculture is responsible for a substantial proportion of UK (10%) and global (10-12%) greenhouse gas (GHG) emissions that cause climate change. This sector can be invested in the form of customised financing for agricultural use. Insurers in the US have contributed to the equivalent of 530 farms and 6,100 pieces of farm equipment.

Manufacturing

The largest proportion of total UK Low carbon and renewable energy economy (LCREE) turnover and employment in 2018 as defined by the ONS, was from businesses classified within the manufacturing industry, which account for around one-third of LCREE turnover (32%) and employment (37%).[70]

Electricity

Construction of power plants falls under Construction, whereas this sector includes the operation of the electricity generating facilities (includes renewables)[71].

Wind energy was the largest investment opportunity in the power sector in Europe. Europe raised a total of €51.8bn for the construction of new wind farms, refinancing operations, project and company acquisitions as well as public market fundraising.

Oil and Gas

A number of major providers are targeting carbon neutrality in the medium/long term horizon prior to the 2050 carbon-neutral target set by the UK government. The expectation is the 'massive investment' would be required to meet Net Zero targets[72], with the IEA in its sustainability scenario estimating $68 trillion globally. Funding in this sector could constitute ESG investments.

Construction

The intention is that this would be used for Construction of new infrastructure for a variety of different purposes. Residential / Commercial buildings, general civil engineering works (tunnels, bridges, railways, etc.).

Transportation

This covers a wide array of transport services, such as rail, water and air transport services, as well as Warehousing and support services for transportation, Postal and courier services.

London's Gross Value Added per hour worked has risen to 32% above the national average, while city regions in the North and the Midlands have fallen 10-17% below. The UK government is committed to transport investment playing its part in building the Northern Powerhouse and Midlands Engine, and supporting every part of Britain to reach its potential.

Real estate and Owner-occupiers housing

The UK is currently behind its housing delivery targets (e.g. 300,000 new homes per year from 2025 in England), where outturn for the sector was at 217,000 homes being built in 2018, which was noted as the largest increase in almost a decade.

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[70] ONS, 2018, https://www.ons.gov.uk/economy/environmentalaccounts/bulletins/finalestimates/2018
[71] ONS, 2018, Low carbon and renewable energy economy, UK: 2018
[72] OGUK, 2020, Economic Report 2020

Ten-year funding cycles for social housing could boost productivity in the UK construction industry by up to 70%. Construction productivity is dampened because building firms' dependence on the volatile private housing market inhibits them from investing in new technologies and hiring or training up staff. Productivity in the construction industry is around 20% lower than in the wider economy.

Education

In the run-up to the financial crisis, the up skilling of the UK's workforce accounted for around 20% of total labour productivity growth. Various research indicates that a 1% rise in the share of the workforce with a university education raises the level of productivity by 0.2%-0.5% in the long-run.

Health

According to the Office for National Statistics, there is on average 1.1% per year growth in productivity in public service healthcare in England. Note that the target productivity gain does not include the cost saving targets of around 4% given to providers of hospital and other frontline services in recent years.

SME

Whilst this cannot be represented by a particular sector, our findings indicate that European insurers have dedicated programmes for funding SME, start-ups and entrepreneurs. As for the UK, SME plays a key role in boosting productivity, contributing 47% of revenue to the UK economy.

Innovation and expansion to international markets are fundamental drivers in boosting productivity among UK SMEs, yet this avenue has been relatively underexplored. Estimates suggest that an improvement in exporting alone would add £1.15 billion to annual gross value-added.

5.4.4   Key CGE appraisal assumptions

There are a number of key assumptions which underpin the economic modelling and appraisal. These reflect:

— Discount/price year: 2020
— Shock year: 2021
— End Year: 2051
— Appraisal length: 30 years
— Discount rate: 3.5%
— Baseline GDP annual growth rate: 2.2% based on ONS assumptions

5.5   Headline CGE results

This section presents the key results of the CGE modelling, including the UK Optimised Scenario Test A, as well as the economic impacts of the other three tests. It also outlines key limitations of the modelling. Section 5.6 presents implications for key priority objectives and provides further results specific to these objectives.

5.5.1 UK Optimised Scenario Test A

Figure 5.5.1 presents the UK wider results from the 'UK optimised' scenario test A. Under the assumptions made for this scenario we find that the £4 billion initial impact in the insurance sector could result in an additional £16.6 billion in real annual GDP in the UK by 2051 relative to a baseline scenario. This amounts to a supply-side multiplier of 3.7 between the initial impact in 2021 and the expected GVA gain in 2051. It is also equivalent to a present value economic benefit of £190 billion in additional GDP aggregated over the 30-year appraised period.

Figure 5.5.1 Summary of CGE on UK economic impact results of UK Optimised scenario Test A

UK economy impact	Real Terms Incremental estimate above baseline
Size of the initial impact 2021 (£bn)	4.4
Additional real GDP 2051 (£bn)	16.6
Shock 2021 to real GDP 2051 multiplier	3.8
Additional real GDP (£bn PV, 30-year appraisal 2021-2051, HMT 3.5% discount rate)	190.2

Source: KPMG 2021

Figure 5.5.2 below presents the Key Macro factors in Test A (% deviation from the baseline scenario) that is driving this gain, and how these factors change over the appraised period. Importantly it demonstrates that the improved productivity drives additional investment and subsequent capital accumulation, which in turn drives growth in GDP, consumption, real wages, exports and imports across the UK economy. It also shows that much of gain is felt by households (reflected in their additional consumption).

Figure 5.5.2: Key Macro factors under test A, % deviation from baseline
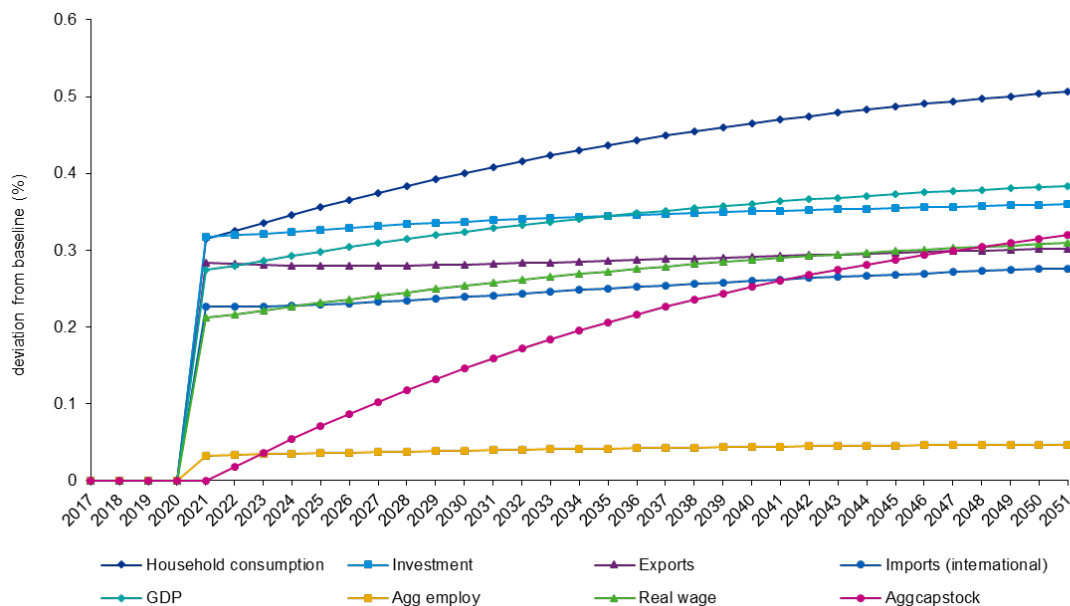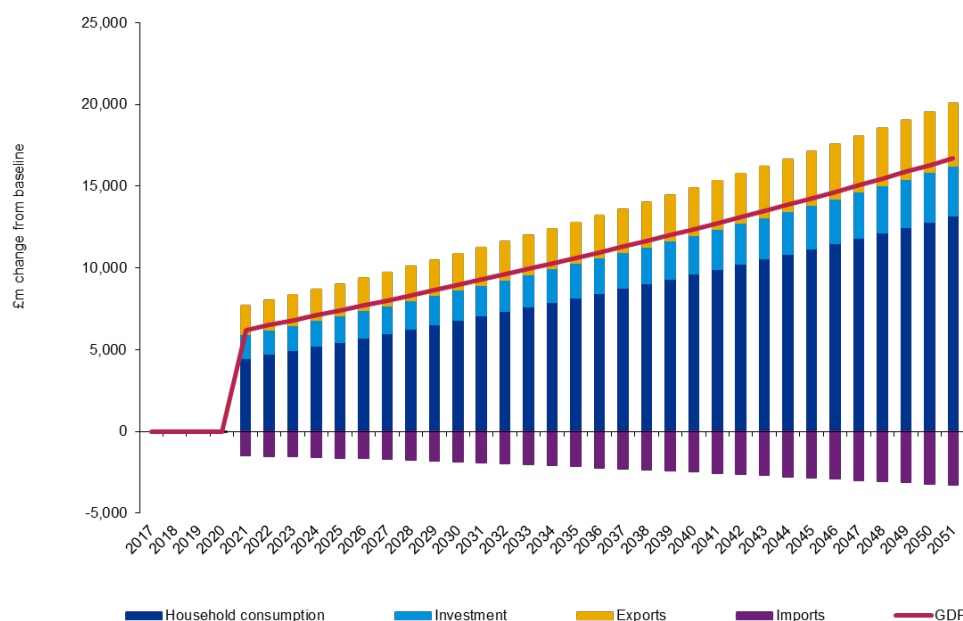

Source: KPMG 2021

Note: To simplify the analysis, it was assumed that any initial impacts occur in a single year. This is considered a proportionate approach, as the strength of CGE modelling lies in its long-term forecasting of policy impacts relative to a baseline. Whether the initial impact is modelled in a single year or ramped up over many, should not materially impact the long-term economic outcomes once the dynamic effects in the modelling have stabilised, and the economy is back in a 'steady state equilibrium'. Any short-term outcomes, therefore, should be read with caution and not heavily relied upon, as they will be a product of this assumption, as well as the limitations of CGE modelling in short-term forecasting, covered in more detail in Section 5.5.4.

Figure 5.5.3 below present the decomposition of GDP by expenditure in £m over time, relative to the baseline. Net GDP is a function of positives (exports, investment, household consumption), less negatives (additional imports). Importantly it shows significantly more trade and investment (greater imports representing a negative), but most importantly greater household consumption, reflecting how much of the gain is felt directly by consumers through lower insurance premiums, lower prices from upstream firms, greater labour income, and capital rents retained domestically.

Figure 5.5.3: GDP expenditure decomposition, (£m deviation from baseline)

Source: KPMG 2021

Note: (a)   the size of the gains between the baseline and the policy is increasing overtime. This is because the additional investment adds to capital stock and thus output and consumption over time, but also because of underlying growth in the economy means the productivity gain itself increases in value. Figure 5.5.2 (shown in percentages) shows the policy scenario converges on a new steady state equilibrium.

(b)   To simplify the analysis, it was assumed that any initial impacts occur in a single year. This is considered a proportionate approach, as the strength of CGE modelling lies in its long-term forecasting of policy impacts relative to a baseline. Whether the initial impact is modelled in a single year or ramped up over many, should not materially impact the long-term economic outcomes once the dynamic effects in the modelling have stabilised, and the economy is back in a 'steady state equilibrium'. Any short-term outcomes, therefore, should be read with caution and not heavily relied upon, as they will be a product of this assumption, as well as the limitations of CGE modelling in short-term forecasting, covered in more detail in Section 5.5.4.

5.5.2   UK Optimised Scenario Test B and C

As outlined in Section 5.4.2, test B and C recognise that not all of the cost impact will be felt initially in the insurance sector, as redeployment of financial capital is expected to lower the cost of financial capital in other sectors relative to what was experienced before (Route 2 as described in Section 5.4.1). Under test B it is assumed this redeployment benefit is spread proportionally across all sectors in the economy (reflecting diversified investment strategy). In Test C we look at a we look at a hypothetical situation where the potential for gain is felt in key targeted sectors (See Section 5.4.3 for details).

Figure 5.5.4 presents the UK wider results from the 'UK optimised' scenario tests A and B. Under this situation we find that the impact is only slightly lower to Test A. This reflects the fact that the majority of the gain still remains within the Insurance sector, and that total factor productivity gains in this sector, £ for £ deliver more than on average as a result of this sector's role in supply chains and exports.

A limitation of the modelling is that the results draw on 2016 ONS data as a basis (reflecting the latest version of the ONS input output symmetrical analytical tables available). This means that the key targeted sectors under Test C reflect a slightly smaller share of GDP than might be the case today.

It is also worth noting that in common with other forms of CGE modelling, the analysis presented here does not take into account the positive externalities associated with investing in these sectors. For example, investments in education leading to furthermore productive human capital, transport leading to agglomeration economies, or new forms of energy improving UKs environment. In spite of this, directing this investment towards these sectors generates a broadly similar overall impact on the economy. This highlights the importance of the scale of the impact on capital stock to results that exclude sector specific externalities.

Figure 5.5.4 Summary of CGE on UK economic impact results of UK Optimised scenario Test B and C

UK economy impact – real GDP impacts	Test B: Incremental estimate above baseline	Test C: Incremental estimate above baseline
Size of the initial impact 2021 (£bn)	4.4	4.4
Additional real GDP 2051 (£bn)	15.7	15.5
Shock 2021 to real GDP 2051 multiplier	3.6	3.5
Additional real GDP (£bn PV, 30-year appraisal 2021-2051, HMT 3.5% discount rate)	181.5	180.0

Source: KPMG 2021

5.5.3   UK Enhanced Capital

As outlined in Section 5.4.2, test D presents 'Enhanced capital' scenario, where the economic gains are larger.

The headline results show that a £6.9 billion initial impact in the insurance sector could result in an additional £28.0 billion in real annual GDP in the UK by 2051 relative to a baseline scenario. This reflects a multiplier of 4.1 between the initial impact in 2021 and the expected GVA gain in 2051. It is also equivalent to a present value economic benefit of £317.6 billion in additional GDP aggregated over the 30-year appraised period.

Figure 5.5.5: Summary of CGE on UK economic impact results of UK Optimised scenario Test D

UK economy impact	Incremental estimate above baseline
Size of the initial impact 2021 (£bn)	6.9
Additional real GDP 2051 (£bn)	28.0
Shock 2021 to real GDP 2051 multiplier	4.1
Additional real GDP (£bn PV, 30-year appraisal 2021-2051, HMT 3.5% discount rate)	317.6

Source: KPMG 2021

5.5.4   Limitations of the modelling

The report aims to cover the key areas of impact typically reported as part of an economic impact study, which were agreed with the ABI, however, a limitation of the report is that does not cover all possible areas of economic and social contribution, both positive and negative.

All models, including CGE models are subject to some uncertainty. These uncertainties relate both to the assumptions made about the way markets operate in the model (e.g. the steepness of the relevant supply and demand curves), and (perhaps more fundamentally) about the scenario specific inputs to the model; if the regulatory scenario being tested generates a different scale or distribution of shock than that that assumed this would be reflected in a different CGE forecast.

It should also be noted that CGE models are not designed for short-term forecasting. Their strength lies in their internally consistent and disciplined approach to modelling the long-term economic effects of policies when compared to a baseline, rather than short-term economic fluctuations relative to GDP today. Cyclical and other short term uncertainties are not captured by the model, and while these effects would principally affect both the baseline and the policy scenario, and therefore net out, we cannot discount the possibility of short term effects that disproportionately affect either the policy or the baseline and thereby affect the differences reported by the modelling.

To simplify this analysis, it was assumed that any initial impacts occur in a single year. This is considered a proportionate approach, as the strength of CGE modelling lies in its long-term forecasting of policy impacts relative to a baseline. Whether the initial impact is modelled in a single year or ramped up over many, should not materially impact the long-term economic outcomes once the dynamic effects in the modelling have stabilised, and the economy is back in a 'steady state equilibrium'. Any short-term outcomes, therefore, should be read with caution and not heavily relied upon, as they will be a product of this assumption, as well as the limitations of CGE modelling in short-term forecasting outlined above.

As mentioned previously, the ONS data is the basis of the modelling, specially 2016 ONS (latest version) of the ONS input output **symmetrical analytical** tables. This means that while the modelling assumes growth across the economy overtime in the baseline, it does not take into account any realised trends (e.g. increased investment in green sectors) beyond 2016 or any projected/potential future trends not already reflected in this data. For instance, it will not incorporate long term impacts of COVID-19 on the makeup of the economy.

It also does not consider the positive or negative externalities, instead it only values marketable transactions. For example, if the model estimated an increase in car production, it would not include the effects on pollution, modelled changes in education leading to more productive human capital would not change skills or labour productivity endogenously in the model, and any expected investments in transport would not lead to agglomeration economies and further increases in GVA beyond what would occur from changes in market costs.

5.6 Assessing modelled economic impacts against policy objectives

5.6.1 Introduction

A robust and proportionate prudential regulatory regime is necessary for the UK to remain a world leader as an open 'hub' in the provision of insurance products and home to an insurance sector which is internationally competitive. This regime should enable the insurance sector to play a significant role in supporting the Government's objectives in terms of levelling-up and delivering long-term capital to support growth, including adding investment capacity to support additional investment in infrastructure and other long-term

productive assets. As Bank of England Governor Andrew Bailey notes[73], we live in a time where there appears to be no shortage of aggregate saving, but investment is weak. As such, the Solvency II Review presents an opportunity to address part of the disconnect between savings and investment both via what insurance sector productivity can do for investment returns in the wider economy and by improving the effectiveness of UK capital markets.

The economic modelling undertaken as part of this report, clearly underpins the policy objectives of the Solvency II regime changes, showing how improved productivity in the insurance industry and via its role in capital markets change:

— Supports the wider economy
— Contributes positively to taxation
— Helps to enable the tackling of climate change

5.6.2   Supporting the wider economy

The financial services sector plays a crucial role in supporting the wider economy, creating jobs across the UK, supporting SMEs, contributing taxes, driving regional growth and investment, tackling climate change and embracing technology and innovation. The insurance industry is an important part of this and manages investment of £1.9 trillion[74], which is equivalent to around 25% of the UK's total net worth[75]. It also helps Britain thrive in its global role, adding £29.1 billion a year to the UK economy.

The Government is committed to 'levelling up' the UK by raising productivity and growth in all nations and regions, creating opportunity for all, and addressing disparities in economic and social outcomes. Levelling up according to the Centre for Cities[76] is aimed at improving all areas of the economy not just London and the South East, and aims to concentrate some types of public spending (like transport) away from these already productive areas. The UK is one of the most geographically unequal countries in the developed world; compared with 26 other developed countries, it ranks near the top of the league table on most measures of regional economic inequality[77]. The North-South divide sees transport spending[78], average earnings[79], house prices[80] and political influence differ geographically. By improving productivity in the insurance sector, we are able to estimate how different areas are affected by the changes and underpin the aim of building back better.

Under the 'UK optimised' scenario, our modelling shows that by 2051, household consumption is expected to increase by £13bn relative to a baseline, driven by higher wages, and higher employment via higher labour market participation. Firms spend an additional £6.6bn on labour by 2051 and importantly, almost 85% of that expenditure is experienced outside the insurance sector. This reflects its linkages with the rest of the economy, which mean productivity gains in the sector translate into higher returns and thus investment elsewhere. At a UK level there is also expected to be slightly higher employment with an

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[73] Bank of England, 2020, The future for business investment in the age of COVID and the role of financial services
[74] HMT, 2020, Review of Solvency II: Call for Evidence
[75] ABI, 2021
[76] Centre for Cities, 2020, Why big cities are crucial to 'levelling up'
[77] IFS, 2020, Levelling up: where and how?
[78] IPPR, 2018, Press Release
[79] ONS, 2020, Earnings and working hours,
[80] Land Registry, 2020, UK House Price Index

additional 20 thousand Full Time Equivalence (FTE) of labour inputs by 2051[81]. UK GDP per person is expected to be £192 higher, with growth across all NUTS 1[82] regions in the UK and above average per capita gains in Scotland and Wales.

A significant portion of this growth is driven by investment and capital accumulation in the economy. It has been well acknowledged for centuries that capital accumulation drives growth[83], and this consistent with empirical studies that have shown that 50-60% of the GDP impact of a cost change can be missed if effects in capital markets are not modelled.[84] This is especially important for the UK, since despite the opportunities for world-leading innovation, the 2017 Patient Capital Review exposed a long term, or 'patient capital', gap[85]. The difficult transformation of start-ups into large scale businesses indicate that many UK-based businesses are unable to reach their full potential and either remain "stuck" in a mode of incremental growth, or accept a trade sale as the most convenient exit, both of which are ultimately to the detriment of the UK economy, tax receipts and job creation.

The review notes there is c.£3bn of equity investment deployed to scale-up businesses annually within the UK, and there is an opportunity to improve the UK ecosystem and increase this supply with more patient capital, collectively of the order of billions of pounds annually.

The Business Growth Fund also warns of a serious rising shortfall in equity funding and calls for the pensions industry, insurance companies, quoted investment trusts, private clients and the UK government to back an investment-led renewal plan[86]. It highlights the persistent shortfall in equity funding for the growth economy, owing to a shortage of appropriate funding options, artificial barriers to access, and a poor level of awareness of the benefits of long-term, patient, equity capital.

This combined with the COVID-19 Pandemic (TheCityUK estimates that, by the end of March 2021, there could be c.£100bn of debt held by UK businesses that they will struggle to repay under existing terms[87]), and Brexit shows the importance of using the Solvency II regime changes for insurance to help build back better to close this capital gap.

In addressing the capital gap, our analysis shows that the capital multiplier in the 'UK optimised' scenario is likely to be 8.0 the size of the initial productivity impact, reflecting £35bn more capital in the UK economy by 2051. This reflects a significant improvement in capital stock which can begin to close the capital gap and drive future and growth and prosperity across the UK. The analysis also suggests that even ignoring the positive externalities likely to be associated with these kinds of investment, little is lost by assuming the additional investment capacity is steered towards infrastructure or zero carbon sectors, highlighting the critical importance of the scale of the underlying impact on capital stock.

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[81] FTE is the hours worked by one employee on a full-time basis. The concept is used to convert the hours worked by several part-time employees into the hours worked by full-time employees. Additional Labour FTE employment could reflect more workers in employment, or workers in employment working more hours, or a mix. See Footnote 60 for more information on treatment of additional employment in the modelling.

[82] NUTS is the geocode standard by Eurostat for referencing the subdivisions of the United Kingdom of Great Britain and Northern Ireland for statistical purposes

[83] Smith. A, 1776, The Wealth of Nations Book II, Ch 1

[84] HMG, 2019, EU Exit: Long-term Economic Analysis Technical Reference paper, p32

[85] HMT 2017, Patent Capital Review

[86] Seldon. A, and Welton. S, 2020, From survive to thrive: Funding the growth economy to kickstart an investment-led recovery, p3

[87] TheCityUK, 2020, Supporting the UK Economic Recovery: Recapitalising Business Post COVID-19, p24

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5.6.3 Contributing to taxation

Alongside the contribution of the insurance industry to the UK economy, it also £12bn in taxes to the Government and supports communities across the UK by enabling trade, risk-taking, investment and innovation[88].

The OBR's initial analysis of the impact of coronavirus on the economy and public finances suggests that government receipts may decrease by over 10% in 2020/21, compared with 2019/20[89]. The impact of increasing economic growth directly in the insurance sector, but also in other sectors through productivity improvements is likely to increase taxation receipts – this has been the general trend in the UK over the last 20 years. This is reflected by improvements in exchequer receipts which are estimated to be around £1.4bn by 2031[90], £2.7bn in 2051 according to our modelling.

When these additional tax receipts are considered relative to the additional GDP created (£16.6bn), the increase initially appears smaller than what might be expected given the UK average tax to GDP ratio tends to be approximately 34%[91]. This lower share reflects the balanced budget assumptions in the S-CGE modelling, which mean that in addition to all markets clearing, the Government is assumed to stabilise government debt in the longer term. This is modelled by adjusting income tax rates to offset large increases in receipts due to greater GDP, a modelling assumption that is consistent with HMG's own CGE modelling[92][93]

5.6.4 Tackling climate change

In response to the challenge of climate change, last year the UK became the first major economy to legislate to reach net zero emissions by 2050. This agenda is critical for long term prosperity[94].

According to the ONS[95], total investment in the low carbon and renewable energy economy increased by 48% between 2015 and 2018, to stand at £8.1 billion in 2018; this was mainly the result of a rise in acquisitions by the offshore wind sector (up £3.5 billion between 2015 and 2018).

We must acknowledge that there are limitations in isolating the impact of insurance on low carbon sectors in terms of statistical modelling due to the broad nature of sector classification. Both defining and examining the green sector presents a number of problems, because the sector is diverse in its nature and does not fit easily within any existing Standard Industrial Classification (SIC) structure.[96] For example, 'environmental consultants' would

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[88] ABI, 2021

[89] Keep.M, 2020, House of Commons Briefing Paper - Tax Statistics: an Overview, p3

[90] Should be noted that the modelled outputs are more reliable when observing the longer-term impact, once all the dynamic effects have stabilised and the economy is back in a 'steady state equilibrium'.

[91] OECD, 2020, Revenue Statistics 2020 - the United Kingdom

[92] As GDP increases, so do tax receipts. However, a key modelling assumption is that in the long-term government debt is stabilised. That is that government injections (spending) and leakages (tax) are balanced. To achieve this, the modelling must either increase government expenditure to offset improved tax receipts or reduce tax rates to keep tax receipts relatively stable. The former requires assumptions on what additional government expenditure would be spent on, and so the latter is a more conservative approach, and one that is used in HMG CGE modelling. In practice this means that a small proportion of the additional GDP gain (relative to the baseline) from improved productivity in modelling reflects wider gains in the economy from lower income tax rates.

[93] HMG, 2014, Analysis of the dynamic effects of fuel duty, p25

[94] HMT 2020, Net Zero Review: Interim Report, p6

[95] ONS, 2018, Low carbon and renewable energy economy, UK: 2018

[96] GLA 2010, Current Issues Note 25: How big is London's green sector?

match most closely with 'consultants' using SIC codes – this would overestimate the size of the sector.

These limitations notwithstanding, the economy will need more/new capital to achieve Net Zero objectives; and to do this we need to achieve new investment in Net Zero sectors. The modelled capital accumulation multiplier of 8.0 the size of the initial productivity impact reflects £35bn more capital in the UK economy by 2051. Again, it would be reasonable to assume that a significant proportion of this additional investment capacity is steered towards net zero carbon sectors given the significant growth and demand investment now and in the future.

6 Appendices

6.1 Appendix 1: Sectors in KPMG S-CGE model

For the purposes of this analysis, the S-CGE model has been aggregated to 36 key sectors of interest, allowing the model to run efficiently, whilst maintaining a sufficient level of detail and robust impact.

Figure 6.1.1 Aggregation of sectors in KPMG S-CGE model

Sector	Full name
Primary	AGRICULTURE, FORESTRY AND FISHING, AND MINING AND QUARRYING
Manuf	MANUFACTURING: General
ChemManuf	MANUFACTURING: Chemicals
PharmManuf	MANUFACTURING: Basic pharmaceutical products and pharmaceutical preparations
Elec	Electricity, transmission and distribution
Gas	Gas; distribution of gaseous fuels through mains; steam and air conditioning supply
WaterWaste	WATER SUPPLY; SEWERAGE, WASTE MANAGEMENT AND REMEDIATION ACTIVITIES
Construction	CONSTRUCTION
WholeRetail	WHOLESALE AND RETAIL TRADE; REPAIR OF MOTOR VEHICLES AND MOTORCYCLES
RailTrn	TRANSPORTATION AND STORAGE: Rail transport services
LandTrn	TRANSPORTATION AND STORAGE: Land transport services and transport services via pipelines, excluding rail transport
AirWatTrn	TRANSPORTATION AND STORAGE: Air and Water transport services
WarTrnSrv	TRANSPORTATION AND STORAGE: Warehousing and support services for transportation
PostCourSrv	TRANSPORTATION AND STORAGE: Postal and courier services
AccomFoodSrv	ACCOMMODATION AND FOOD SERVICE ACTIVITIES
InfoComm	INFORMATION AND COMMUNICATION
Finance	Financial services, except insurance and pension funding
Insurance	Insurance and reinsurance, except compulsory social security & Pension funding
AuxFinInsSrv	Services auxiliary to financial services and insurance services
RealEst	Real estate services, excluding on a fee or contract basis and imputed rent
OwnOccHou	Owner-Occupiers' Housing Services
RealEstOth	Real estate services on a fee or contract basis
Legal	Legal services
Accounting	Accounting, bookkeeping and auditing services; tax consulting services
MngConSrv	Services of head offices; management consulting services
ArchEngSrv	Architectural and engineering services; technical testing and analysis services
SciResSrv	Scientific research and development services

Sector	Full name
AdvMktRes	Advertising and market research services
OthProfSrv	Other professional, scientific and technical services
VetSrv	Veterinary services
AdminSuppSrv	ADMINISTRATIVE AND SUPPORT SERVICE ACTIVITIES
PubAdmin	PUBLIC ADMINISTRATION AND DEFENCE; COMPULSORY SOCIAL SECURITY
Education	EDUCATION
Health	Human health services
ResCarSoc	Residential Care & Social Work Activities
OthSrv	OTHER SERVICE ACTIVITIES

6.2 Glossary

Figure 6.2.1

Abbr./term	Description
ALM	Asset liability management
ESG	Environmental, Social and Governance
GDP	Monetary measure of the market value of all the final goods and services produced in the economy
GVA	Gross Value Added: value of output minus the value of intermediate consumption; it is a measure of the contribution to GDP made by an individual producer, industry or sector; (e.g. Insurance sector uses intermediate inputs from other sectors, and combines them with Labour and Capital (the value added) to produce output.
Intermediate inputs	The goods and services (including energy, raw materials, semi-finished goods, and services that are purchased from all sources) that are used in the production process to produce other goods or services rather than for final consumption
MA	Matching adjustment
P&C	Property and Casualty
PPFM	Principles and Practices of Financial Management
Productivity	Reflects Outputs/Inputs (or at a firm level Revenue/Costs
QRT	Quantitative Reporting Templates
Real capital	Aka Capital assets or Capital goods, are already produced durable (non-financial assets) used in production of goods or services.
RM	Risk margin
S-CGE	Spatial Computable General Equilibrium Model: A model capable of simulating a wide range of policies across trade, transport, productivity, and labour and capital markets.
SCR	Solvency Capital Requirement
TMTP	Transitional measure technical provision
WPF	With-profits Funds

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