

**An Economic Assessment of the Fourth Protocol to the Convention on International Interests on Mobile Equipment on Matters Specific to Agricultural, Construction and Mining Equipment (the “MAC Protocol”)**

**A Preliminary Report to UNIDROIT by Warwick Economics and Associates**

**Second Session of UNIDROIT Committee of Governmental Experts, Rome 2 October 2017**

## About us



**Ken Warwick** - independent consultant at Warwick Economics

- Member of UK Regulatory Policy Committee, reviewing Regulatory Impact Assessments
- Former Chief Economist at the Department of Business, Innovation and Skills
- Former Senior Economic Adviser in Foreign & Commonwealth Office
- Author of two recent policy papers for the OECD on the evaluation of industrial policy.
- Extensive experience of working with international organisations, including the OECD, IMF and World Bank.



**Peter Dodd** - independent consultant at Vital Economics

- Experience in central government, international organisations and the private sector, specialist in international trade and energy.
- Former Director of International Economics at the Department of Business, Innovation and Skills
- Former head of communications and stakeholder relations at the Energy Technologies Institute



**Brian Titley** - independent consultant at Brian Titley Consulting Ltd.

- Member of Expert Peer Review Groups on appraisal and evaluation for the UK Departments of Business and International Trade
- Former Chief Economist for Turks and Caicos Islands and for the Lord Heseltine review of UK Competitiveness
- Former Director of Performance, Evaluation and Business Economics in the UK Department for Business
- Author of international textbooks in economic and business

## The brief

- UNIDROIT requires an assessment of the likely scale and main channels of global economic impact of the MAC protocol to inform and assist ongoing negotiations
- The requirement is to review and critique existing analysis, specifically CEAL (2013), and suggest alternative measures of impact
- Three phases were agreed with UNIDROIT




## Project objectives

- **Development and demonstration of a robust and evidence based assessment framework that reflects best practice and is capable of being widely applied.**
- **Review and build on the work already undertaken by CEAL (Center for the Economic Analysis of Law).**
- **Identify the various channels of impact of the MAC protocol and help UNIDROIT and its members consider how its impacts might vary.**
- **Help UNIDROIT build its evidence base to demonstrate to members and non-members the effect of potential reforms.**
- **Assist the Committee of Governmental Experts by providing an overview of the key issues and initial findings.**

## Impact assessment methodology

- Developed over last 30 years in UK government from standard project appraisal methodology used extensively for 60+ years.
- Very strong commonality between approach in UK, OECD, World Bank, etc.
- Challenge and subtlety come from determining precisely what drives an outcome and seeking to assess things that are hard to count/estimate or proxy.


### Sources of Guidance



**The Greenbook**

Guidance on:

- Rationale for intervention
- Identifying options
- Cost benefit analysis (appraising options)
- Valuing non-market impacts




[https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/220541/green\\_book\\_complete.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/220541/green_book_complete.pdf)

**Better Regulation Framework Manual**

Guidance on:

- Part 2 is the Impact Assessment Toolkit, providing more detailed guidance for those undertaking impact assessments.



[https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/211981/bis-13-1038-better-regulation-framework-manual-guidance-for-officials.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/211981/bis-13-1038-better-regulation-framework-manual-guidance-for-officials.pdf)

## The CEAL study – key findings

Benefit	Low-income economies	Advanced economies
Equipment sales	<p>MAC equipment stock increases by \$604bn over 5 – 7 years:</p> <ul style="list-style-type: none"> <li>• \$541bn (+77%) in 'emerging and developing economies';</li> <li>• \$62bn (+38%) in 'advanced economies in need of reform'.</li> </ul>	<p>Exports increase by \$60-85bn per annum over 7-10 years</p>
Output	<p>Increase in MAC sector output: \$1.2 trillion to \$1.8 trillion</p> <p>Increase in GDP: \$1 trillion to \$2 trillion</p>	<p>Increase in GDP: \$120-170bn pa \$1 trillion over 7 – 10 years</p>

## The CEAL study – critique (1)

Variable	CEAL study	Discussion
Set-up costs	Not included	<ul style="list-style-type: none"> <li>• Resource costs may be significant.</li> <li>• Could slow rate of adoption.</li> </ul>
Rate of adoption of the protocol	Unclear - assumption appears to be all 'low-income countries in need of reform' ratify, adopt and effectively enforce protocol	<ul style="list-style-type: none"> <li>• Unlikely all member states will adopt and enforce with immediate effect.</li> <li>• Transitional and familiarisation costs.</li> <li>• No counterfactual: some countries may have reformed rules anyway.</li> </ul>
Baseline data	Global and regional estimates of the MAC equipment stock in 2011 calculated as 2.83% of GDP, equal to US	<ul style="list-style-type: none"> <li>• Likely to overstate stock in low-income countries.</li> <li>• Takes no account of relative size, capital efficiency or equipment needs of MAC sectors in different economies.</li> </ul>

## The CEAL study – critique (2)

Variable	CEAL study	Discussion
Credit market reaction (supply-side)	Credit for MAC equipment expands by 77%  Cost of credit falls by 350bps	<ul style="list-style-type: none"> <li>• From single hypothetical example of a car loan.</li> <li>• Changes in supply and cost of credit unlikely to be uniform.</li> <li>• Country or region specific regulations and risks will constrain credit and limit repossession and cross-border movement of equipment.</li> <li>• Possible crowding out of credit for other sectors.</li> </ul>
Credit market reaction (demand-side)	Demand for credit constrained only by its supply	<ul style="list-style-type: none"> <li>• Cost and quality of capital will affect demand.</li> <li>• Substitution between secured and unsecured credit and credit secured on other assets.</li> </ul>



## The CEAL study – critique (3)

Variable	CEAL study	Discussion
Equipment market response	MAC equipment exports to 'developing and low income OECD countries' increase by US\$60-85bn per annum over 7-10 years	<ul style="list-style-type: none"> <li>• Equivalent to an increase of 42 – 60% in value of annual exports (2010 baseline)</li> <li>• Assumes no supply-side constraints.</li> <li>• Retirement of old equipment may increase and expand second-hand market.</li> <li>• No segmentation of equipment market.</li> </ul>
Assessment period	5 – 7 years (equipment stock) 7 – 10 years (exports and GDP)	<ul style="list-style-type: none"> <li>• Significant lags between adoption of the protocol and realisation of benefits.</li> <li>• Speed of adjustment to new stock may be the result of many interdependent factors.</li> </ul>
Implied GDP multipliers	Low income countries, based on global average capital to output ratio 'between 2 and 3'	<ul style="list-style-type: none"> <li>• Incremental and MAC sector ratios will differ.</li> <li>• Advanced economies, implied multiplier is 2. No justification and likely overstated.</li> </ul>
Discount rate	GDP impacts are 7 - 10 year present values	<ul style="list-style-type: none"> <li>• Time profiles and discount rate not provided.</li> </ul>

## Our approach

- Clarify what the MAC protocol can and can't do
- Construct analytical framework to map out channels of impact
- Factor in that markets don't work perfectly - adjustment takes time and is incomplete. Understand the specifics of the markets
- Identify exogenous factors
- Produce some indicative early findings – refine analysis as information allows

## Preliminary report structure

<b>1</b>	<b>Introduction: context and objectives</b>
<b>2</b>	<b>The MAC protocol: legal changes, objectives and costs</b>
<b>3</b>	<b>Product market characteristics (MAC equipment)</b>
<b>4</b>	<b>Credit market characteristics</b>
<b>5</b>	<b>An initial assessment of the potential global impact of the MAC protocol</b>
<b>6</b>	<b>Developing the analytical framework</b>
<b>7</b>	<b>Next steps</b>

## 2 MAC protocol: legal changes, objectives and costs - summary

- **Creates legal certainty creditors can recover the asset**
- **Creates legal certainty the asset can be exported for sale**
- **Bankruptcy - several options with potentially different effects  
(Alternative A gives greatest certainty to creditors)**
- **Costs are likely to be quite low in absolute terms and relative to the cost of MAC equipment, making compliance a modest burden.**
- **The value derived from the scheme should greatly exceed costs**

### 3 Product market characteristics - summary

- **Huge global market : \$200 billion production; \$100 billion trade worldwide/year**
- **Enormous range of products and buyers - far more heterogeneous than aircraft sector**
- **Big difference between specialist, low volume, high cost innovation/performance machinery made by a few firms and high volume "commodity" products**
- **Great diversity of buyers and use to which they put equipment, care they take of it, etc.**
- **Very different from aircraft sector, so less certainty over recovery value**

## 4 Characteristics of the credit market - summary

- **Cost of borrowing and availability of secured credit for MAC equipment currently varies massively between countries**
- **MAC protocol reduces some important barriers to credit provision for some borrowers in some markets, not all.**
- **Credit quality still matters. Broader credit market development and reforms are likely to increase the benefits derived from the MAC protocol, e.g. improved credit information**
- **Credit decisions are not a binary decision to lend or not, but a range of choices of loan-to-value, price and duration**
- **Big advantage of secured lending is it reduces the amount of capital tied up**

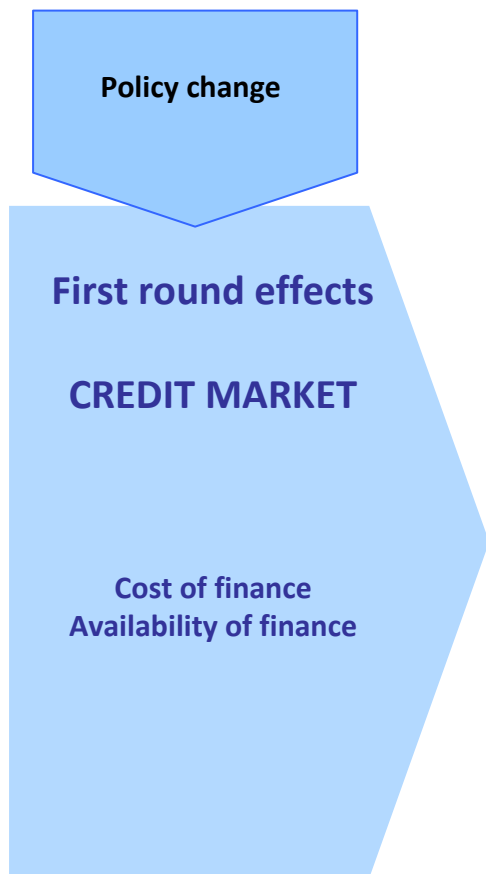
## Developing the analytical framework

First step towards development of a robust analytical framework requires a meaningful logic model or 'theory of change'

A well-specified theory of change:

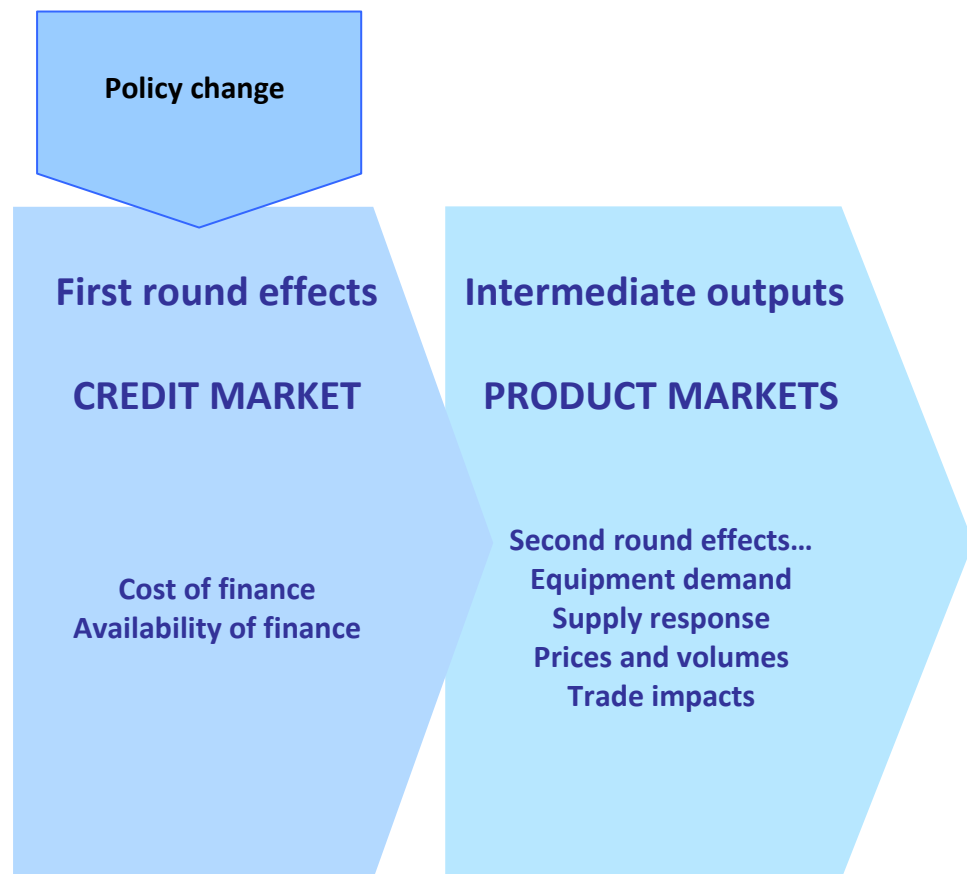
- sets out how implementation of the MAC protocol (the 'policy change') will affect different economic variables
- identifies long-term economic goals, outcomes and impacts and their necessary preconditions
- maps key economic relationships and channels of impact
- identifies evidence requirements for *a priori* assessment and *ex post* evaluation.

## Theory of change: channels of impact

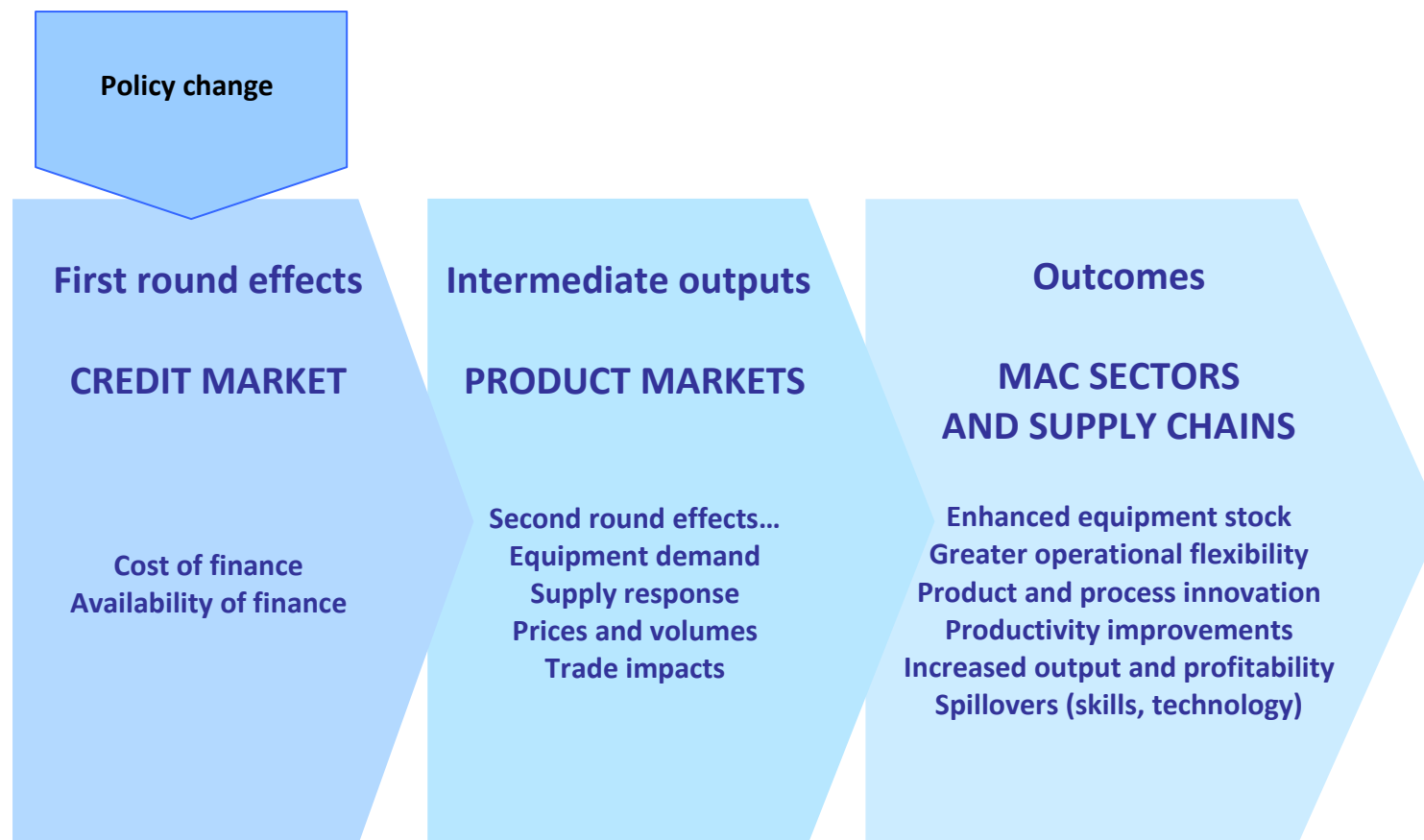




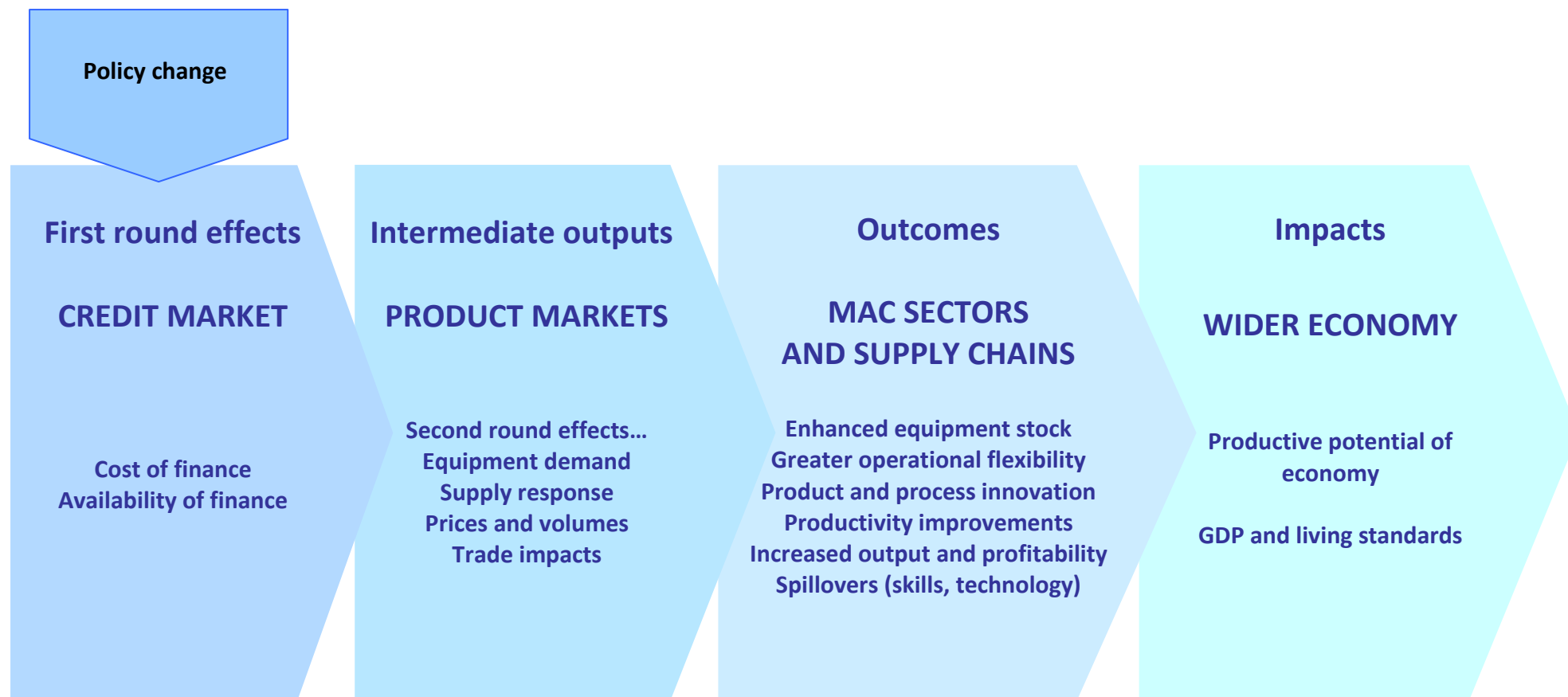
## Theory of change: channels of impact



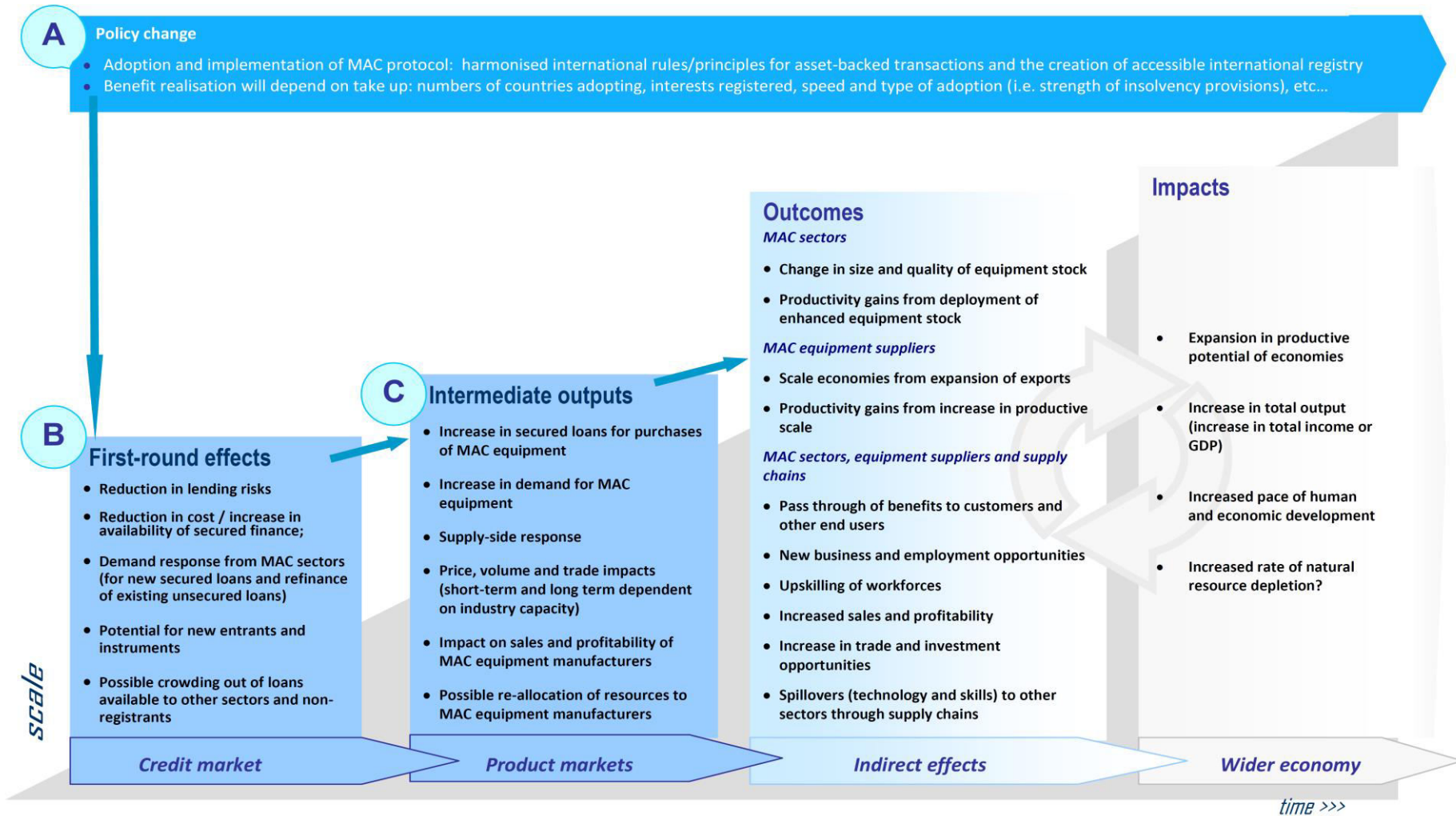
## Theory of change: channels of impact



## Theory of change: channels of impact



# Theory of change



## Challenges to estimation

- **No direct equivalents, no convenient proxies, few common characteristics** e.g. with aircraft. MAC is not one market, but dozens of different products with different characteristics.
- **Better data leads to better estimates.** Data availability is problematic. Production data is opaque and difficult to access. Trade data is more useful for assessing cross border transactions.
- **Economic theory can provide a guide** to potential interactions but don't assume that's how markets work, engage with sector experts.

## Key uncertainties

- **Critical mass. How many countries will ratify and how quickly will precedents emerge?**
- **How much will the protocol reduce due diligence and enforcement costs?  
Partially, not wholly**
- **Credit market response to decrease in risk. In how many cases will the MAC protocol enable a move to secured lending? Many other factors are relevant**
- **Capacity of domestic banks and appetite of international lenders to respond. Results will vary for endogenous and exogenous reasons**
- **Demand response in goods market to partial relaxation of credit constraint. Which market segments will demonstrate biggest responses?**
- **Supply response in goods market - quantity and impact on prices?**

## Importance of disaggregation

- **MAC protocol markets are much more heterogeneous than aircraft sector.**
- **Headlines hide a vast amount of variation in impact: between countries, between products, between borrowers and lenders and over time.**
- **Aggregated data hides trends and specifics in some markets.**
- **Trade data at 6-digit good for definition, bad for identifying market segment**
- **Case studies can provide relevance and insight**

## Simple sensitivity tests based on CEAL model

Assessment variable	CEAL study	Revised assumption(s)	Cumulative impact on CEAL estimates (all 'low-income economies')	
			Increase in debt availability (%)	Increase in equipment stock (\$ billions)
CEAL estimates			77% / 38%	604
Baseline equipment stock	(2011) \$869bn	(2015) \$687bn	77% / 38%	435 (-169)
Interest rate spread	350bps	100bps	62% / 31%	350 (-254)
Secured loan maturity	7 years	6 years	44% / 22%	245 (-359)
Adoption of protocol	100%	50%	44% / 22%	125 (-479)



## 'Low-income economies'

Study	Increase in equipment stock by years 5 – 7	Average capital to output ratio	Implied annual increase in MAC sector output	GDP impact (MAC sectors)
CEAL	\$604bn	2 – 3	\$200-300bn	\$1,200-1,800bn <i>(over 10 years discounted at an estimated 4.8%)</i>
Current Phase 2	\$125bn	2 – 3	\$42-63bn	\$32-48bn <i>(annual GDP impact averaged over 10 year adjustment period)</i>

## 'Advanced economies'

Study	Annual increase in MAC equipment exports (years 1 – 10)	Implied exports to GDP multiplier	Annual increase in GDP	GDP impact
CEAL	\$60-85bn	2	\$120-170bn	\$1,000bn <i>(over 10 years discounted at an estimated 4.8%)</i>
Current Phase 2	\$18-25bn	2	\$36-50bn	\$36-50bn <i>(annual GDP impact averaged over 10 year adjustment period)</i>

## Key messages

- **We are still at an early stage of our work. We are applying economic good practice to help understand product and credit markets. The quality of what we can do is dependent on information we can get.**
- **The CEAL estimates of global benefits were too large. They combine estimates of key parameter and assumptions about market responses that were too optimistic.**
- **Our analysis is not yet complete. We expect to come to much lower estimates of global benefits, but still \$billions.**
- **The costs of implementing the MAC protocol are very modest. Even if benefits are modest, they will greatly exceed costs.**

## Next steps: phase 3 and beyond

Subject to confirmation of funding, the third and final part of the current project will be delivered by the end of 2017.

Key additional elements will be:

- Assessment of bankruptcy laws, impact of protocol on developed markets
- Further Interviews
- Case studies
- Applying the analytical framework
- Refinement of estimate of global impact
- Final report

Potential further work may include: detailed assessment of costs; analytical toolkits; deeper analysis of trade data; deeper assessment of loan data.