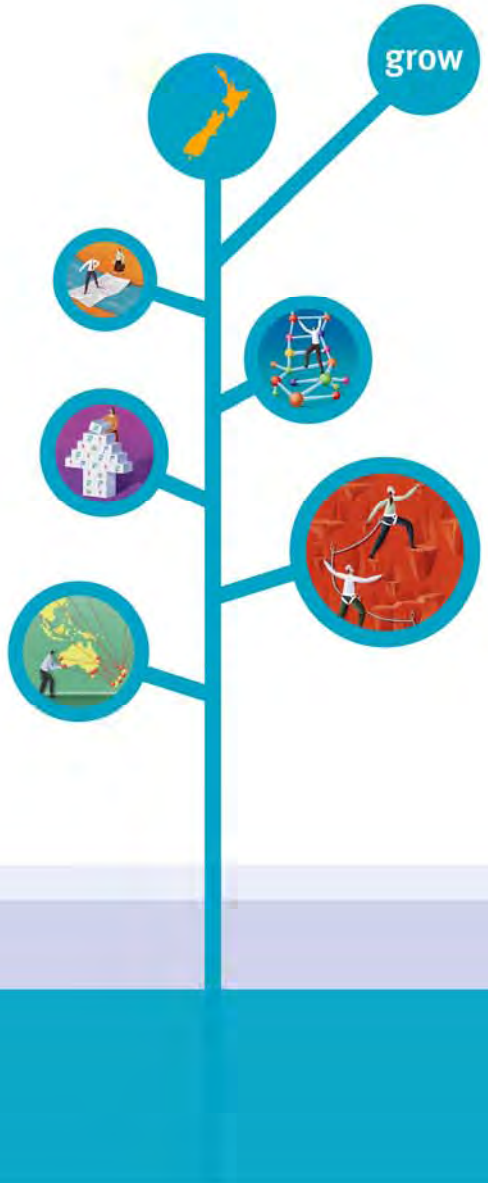

The use of economic analysis and quantitative techniques in evaluations

Presented by:
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Evaluation Team, Economic Strategy Branch

Ministry of Economic Development
Manatū Ōhanga

Evaluation Team Members:

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Cavan O'Conner-Close (now at Reserve Bank)

Evaluation Team Role

- Provide advice on evaluation across the Ministry
- Carry out evaluations
  - Evaluations of Crown Agency programs
    eg New Zealand Trade and Enterprise (NZTE) ,
    Venture Investment Fund
  - MED programme evaluation
  - Participate in multi-agency evaluations eg KiwiSaver

Recent Evaluations

Evaluations carried out in 2008&09:

-Evaluation of the NZTE Growth Services Range
-NZTE Standardised Training and Advisory Services
-Venture Investment Fund
-Kiwi Expat Association evaluation
-Buy Kiwi Made evaluation
-Enterprise Development Grants – Market Development Scheme
-Incubator Support Programme

Currently working on:

-NZTE Sector Programs
-KiwiSaver (Treasury, MED, Inland Revenue, Housing New Zealand)
-Cross-Vote Evaluation (MED, NZTE, Ministry of and Foundation for Research, Science and Technology)
-Innovation Meta-Evaluation
-Procurement

Reports on MED website:
http://www.med.govt.nz/templates/ContentTopicSummary____1191.aspx

Website links

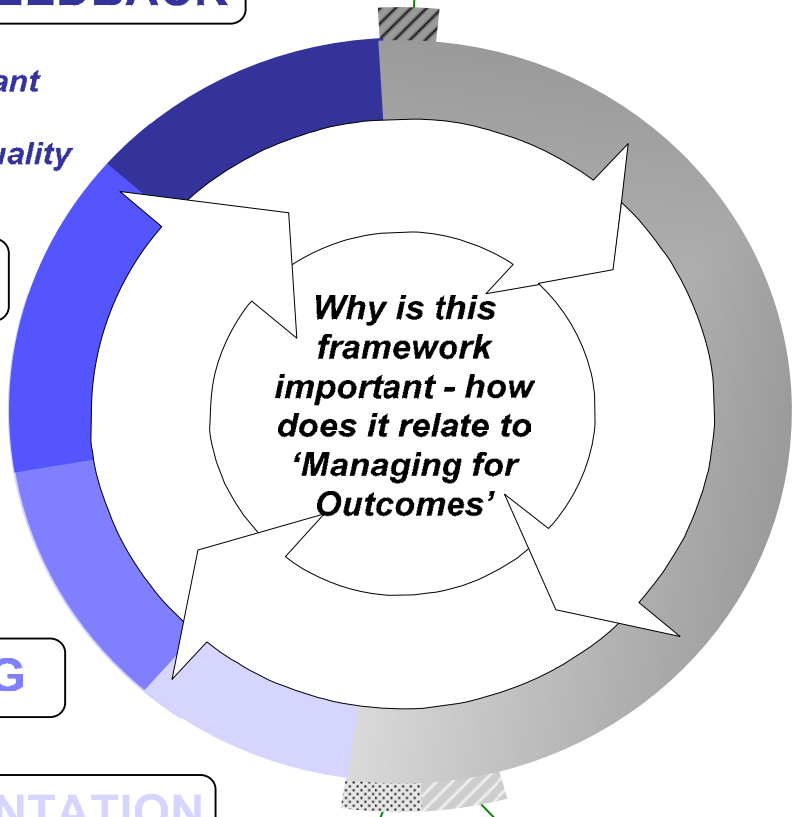
Website for MED evaluations:
http://www.med.govt.nz/templates/ContentTopicSummary____1191.aspx

Refer particularly to Growth Services Range evaluation
Qualitative GSR 2005:
http://www.med.govt.nz/templates/MultipageDocumentTOC____19756.aspx

Econometric GSR evaluation:
http://www.med.govt.nz/templates/MultipageDocumentTOC____40617.aspx

For description of the longitudinal business data base, with references to publications see:
http://www.stats.govt.nz/browse_for_stats/businesses/business_characteristics/longitudinal-business-database.aspx
(At bottom of page the downloadable publication 'Potential Outputs from the lbd' gives an introductory description of data available.)

Evaluation as part of the Policy Cycle



Project and Stakeholder engagement planning

FEEDBACK

Evaluation is reliant on clear policy objectives and quality monitoring data

EVALUATION

Is implementation proceeding as expected? Are the correct data being collected so success can be measured?

MONITORING

IMPLEMENTATION

POLICY DEVELOPMENT

Rationale

Objectives

Appraisal of options

Define performance measures and data collection process (monitoring and evaluation plans)

Quality Assurance Check list

Produce recommendations

Policy proposals should include:

- a clear statement of the policy objective
- intervention logic diagram
- performance measurement, monitoring and evaluation plans

Economic policy objectives

Examples:

‘More New Zealand businesses on paths to global success by increasing their access to international experts, networks and market knowledge.’

‘Increased firm productivity and growth performance’

‘Improvement in firm performance’

Intervention logic and 'Market Failure'

Problem	Intervention / activities	Intermediate outcomes	Ultimate Outcomes
Firms lack management expertise Some of the benefits of external business advice are external to the firm (externalities)	**Client Management:** assessments of firms' needs, mentoring, advice, and referrals to services. **Growth Services Fund:** provides grants/offers co-funding to purchase external advice and expertise.	Firms improve their: • market knowledge and/or market development capabilities. • business and management capability to plan for and pursue growth. • capability to innovate and manage the commercialisation process. • likelihood of accessing finance for growth.	• accelerated development of firms with high growth potential as measured by increased revenue, profits, and exports.

Six Steps to Heaven:

Six levels of evaluation
(Adopted by the OECD…)

Storey, DJ (2000) in Handbook of Entrepreneurship

1. Take up of schemes
2. Recipient's views on own performance
3. Recipient's views of the difference made by Assistance
4. Comparison of the performance of 'Assisted' firms with 'Typical' firms
5. Comparison with 'match' firms
6. Taking account of selection bias

Tools we use

Qualitative ⟷ **Quantitative**

- Relationships
- Literature review (incl. previous evaluations)
- Interviews, both in person and telephone
- Electronic surveys
- Meta-evaluation
- Performance measures
- Statistics
- other data
- Econometric analysis of firm performance data

Performance Measures

Example: NZTE Standardised Training and Advisory Services
- improving the environment for enterprise and growth
- business development providers support the capability development of firms to achieve growth and internationalisation

Enterprise Training Programme performance measures:
3000 capability assessments
7000-8000 clients

Problems
Measure program outputs rather than outcomes.
How well do performance measures address policy outcomes?

Benefits
Data more likely to exist.
Performance measures more familiar to stakeholders than policy outcomes.

Statistics:

- Economic Development Indicators

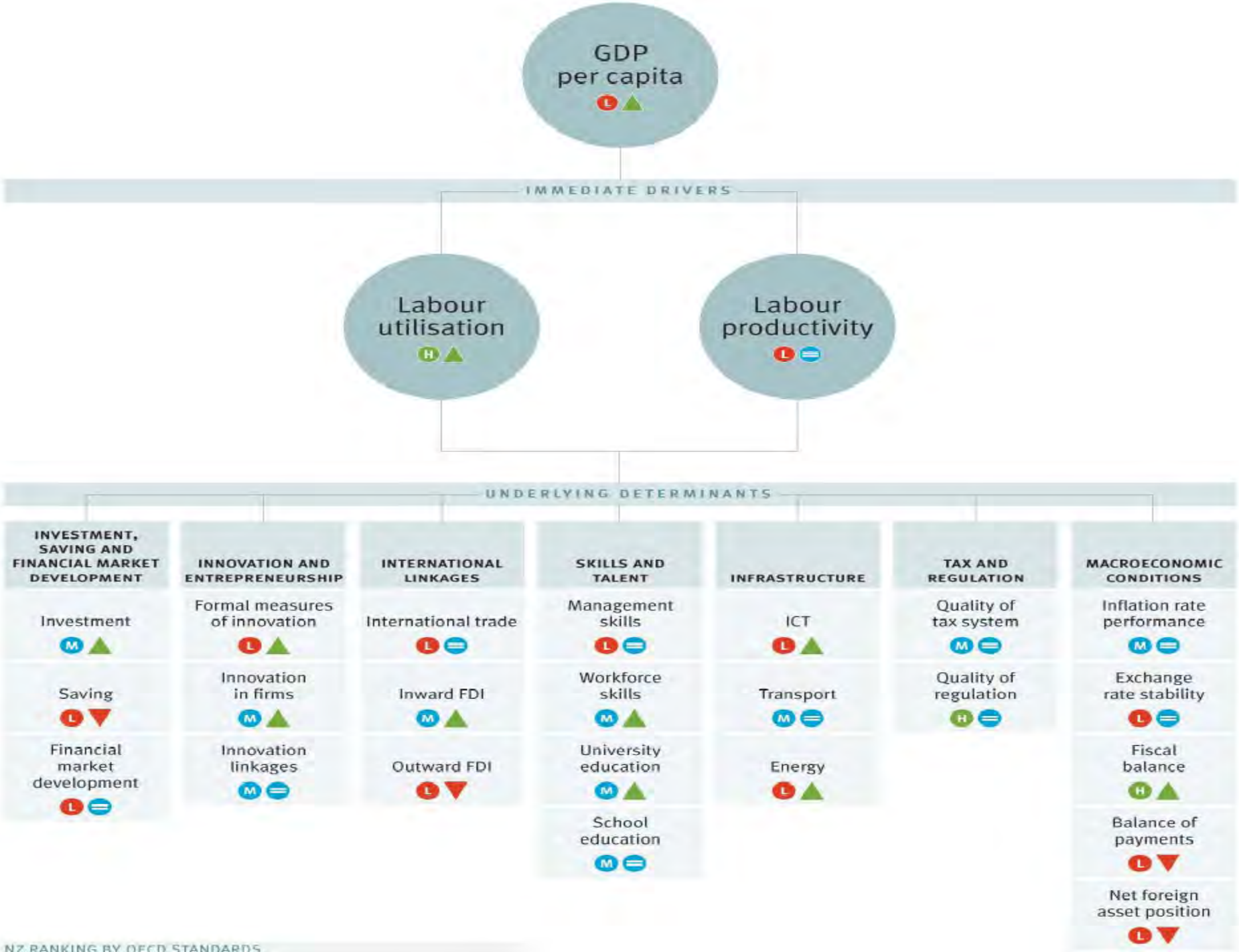
- SMEs in New Zealand: Structure and Dynamics 2008

- Statistics New Zealand, Surveys eg BOS, R&D

- OECD statistics, international comparisons

Problems
Program participants aren't identified
Information not specific enough
Single indicators can be misleading – a set is needed

Benefits
Can sometimes provide baselines or be used to infer baselines
Provides good background context


GDP per capita
L ▲
IMMEDIATE DRIVERS
Labour utilisation
H ▲
Labour productivity
L =
UNDERLYING DETERMINANTS
INVESTMENT, SAVING AND FINANCIAL MARKET DEVELOPMENT
Investment
M ▲
Saving
L ▼
Financial market development
L =
INNOVATION AND ENTREPRENEURSHIP
Formal measures of innovation
L ▲
Innovation in firms
M ▲
Innovation linkages
M =
INTERNATIONAL LINKAGES
International trade
L =
Inward FDI
M ▲
Outward FDI
L ▼
SKILLS AND TALENT
Management skills
L =
Workforce skills
M ▲
University education
M ▲
School education
M =
INFRASTRUCTURE
ICT
L ▲
Transport
M =
Energy
L ▲
TAX AND REGULATION
Quality of tax system
M =
Quality of regulation
H =
MACROECONOMIC CONDITIONS
Inflation rate performance
M =
Exchange rate stability
L =
Fiscal balance
H ▲
Balance of payments
L ▼
Net foreign asset position
L ▼
NZ RANKING BY OECD STANDARDS

Other Data

- Information about programme: financial, grant size, number of participants, etc

-Demographic information about programme participants

- Client satisfaction surveys

- Analysis of survey responses

- Other related research providing context

Econometric Analysis

-describes economic relationships mathematically;

-estimates the influence of the independent variables on the dependent variable; and

-tests the validity of such relationships.

Example:

Dependent variable = *f*(independent variables + assistance)

Sales = *f*(firm size, sector… + assistance)

The ‘Evaluation Problem’

- Consider an outcome, which we denote Y

e.g. profitability, amount of R&D, firm survival

- Imagine two worlds, one where a firm receives assistance and one where it does not

- The impact of the programme is the difference between the outcomes in these two worlds:

$$\Theta_i = Y_i^1 - Y_i^0$$

Of course we cannot observe both worlds

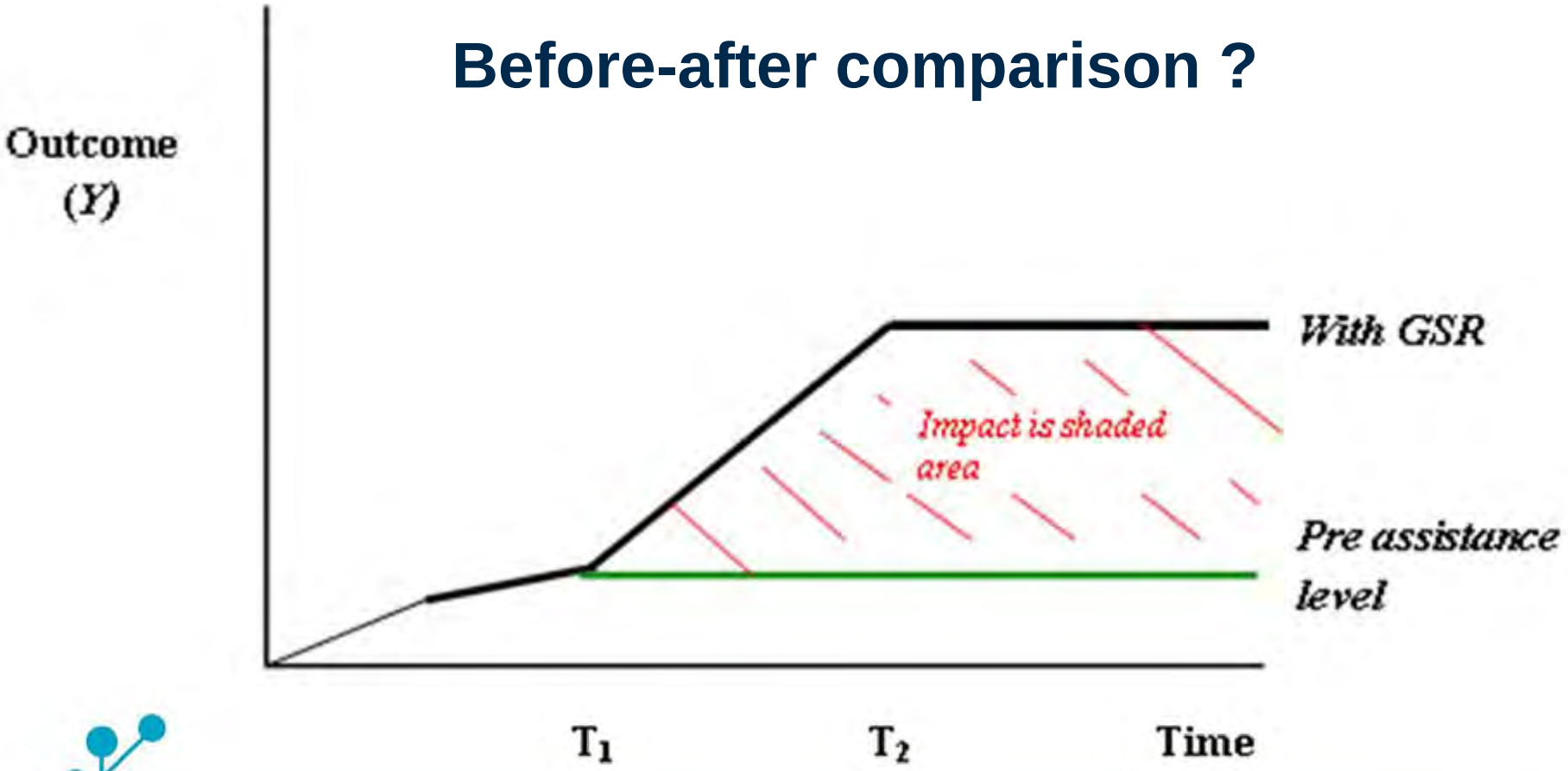
Approaches we apply to the evaluation problem

Measuring additionality

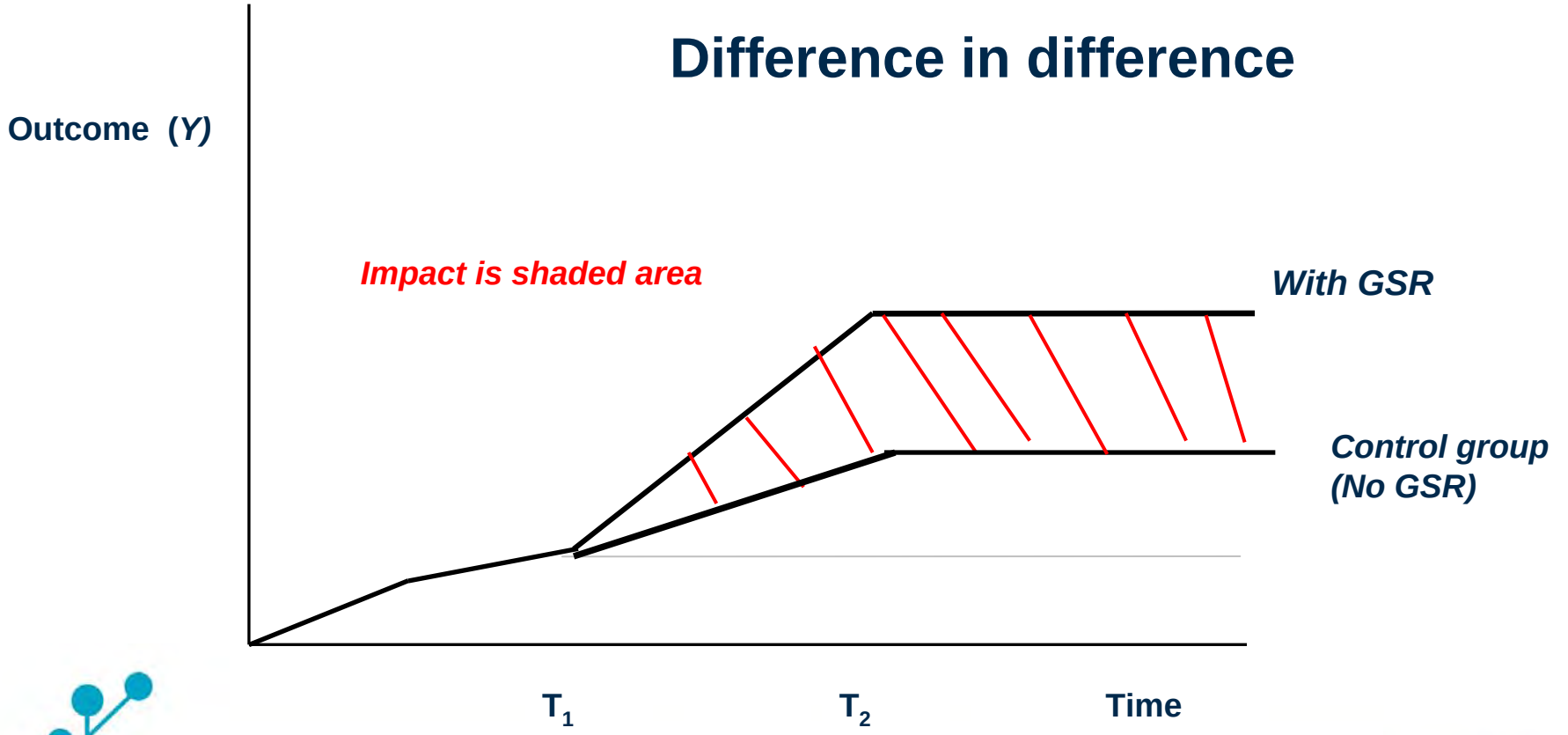
- Surveys comparing firm performance for different types of intervention
- Survey comparisons of participants with non-participants
- Baseline analysis e.g. through regulatory impact analysis
- Econometric techniques

Counterfactual problem

Before-after comparison ?



Creation of a counterfactual



Control group chosen on basis of similarity of firm characteristics- size, industry, export/sales etc

Econometric Techniques

Unconfoundedness, **Selection on Observables**	**Selection on Unobservables**	**Dynamic Models**
•Regression •Matching	•Before & after •Difference-in-differences •Instrumental variables •Selection models •Regression discontinuity	•Duration models •Sequential matching •Matching with time varying treatment indicators

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Evaluation using Econometrics

- **There is no golden bullet**
  - Suit the technique to the question
- **Thus it is imperative to understand:**
  - The intended outcome of the programme
  - The intended recipients of the programme
  - Potential selection issues
  - How the programme is expected to work

Firm level data: Statistics New Zealand prototype Longitudinal Business Database, LBD

- LBD covers all economically significant firms (~450,000 per year) but less-than-complete coverage of smaller firms

- spine of the LBD consists of the Longitudinal Business Frame,
  - + Goods and Services Tax (GST);
  - + financial returns (IR10);
  - + aggregated Pay-As-You-Earn (PAYE) returns (IRD);
  - + merchandise imports and exports (Customs);
  - + Government assistance programs for firms (NZTE and FRST etc)
  - + SNZ survey data

- use governed by Statistics Act 1975. Results must be protected to ensure confidentiality of individual or particular businesses.

LBD excels in three dimensions:

- Breadth – all economically significant firms

- Depth – wide range of linked data on each firm, can link performance measures with other variables – eg innovation, exports, foreign ownership, business assistance

- Length – currently 8 years of data in the core dataset, more for some variables

LBD Research

(see Statistics New Zealand web site)

- Evaluating government business assistance programmes (MED)
- OECD cross-country micro study on innovation and productivity (RBNZ, SNZ)
- The impact of immigration and local workforce characteristics on innovation and firm performance (DoL, MOTU, RBNZ)
- International engagement and firm performance (MED, RBNZ)
- Productivity and agglomeration in Auckland (MED, MOTU)
- Business Practices and Firm Performance (MED, RBNZ)
- Other agencies are starting to use it, MAF, Treasury …

Growth Services Range Econometric Evaluation

618 firms assisted 2001 to 2005

- average RME 32 (NZ av.=4), average revenue $6.9m p.a. (NZ av.=$0.8m)
- Rationale*: Investment by high-growth firms in expertise and information is critically constrained at key periods by limited experience and other resources*
- Provides managerial, technical, market information and advice
- In order to increase business skills and knowledge
  - And result in growth in firm sales, value-added and labour productivity

GSR Econometric Evaluation Conclusions

We measured additionality in firm performance due to GSR using econometric techniques.

GSR support had a significant positive impact on sales of firms.

Impact on value-added and productivity due to GSR support is less conclusive.

Discussion

Few econometric studies have reported significant impacts on positive outcomes

Choice of method a matter of judgment

Selection bias not fully accounted for

Econometrics as a tool for evaluation

Challenges

Econometric evaluation techniques still evolving so time consuming

Measurement bias: Drawing conclusions from the numbers only

May ignore policy objectives that are hard to quantify

Interpretation bias: Difficult comparison between qualitative and quantitative evaluations

Benefits

Quantitative measure of additionality

Measures impacts of total value of assistance

Can test for different effects

NZ firm level data is better than anyone else's so work is cutting edge

For example, programmes that build long term skill capabilities and that rely on qualitative evidence to support their business case may be discounted and their benefits foregone

GSR Econometric Evaluation complemented an earlier evaluation based on both qualitative and quantitative techniques

EXAMPLE: GSR evaluation

- GSR established July 2003, integration of programmes previously delivered by Industry New Zealand and Trade New Zealand
- $61m per year
- Evaluation reported Nov 2005

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GSR Evaluation Constraints

Lack of a control group

Lack of pre-intervention data

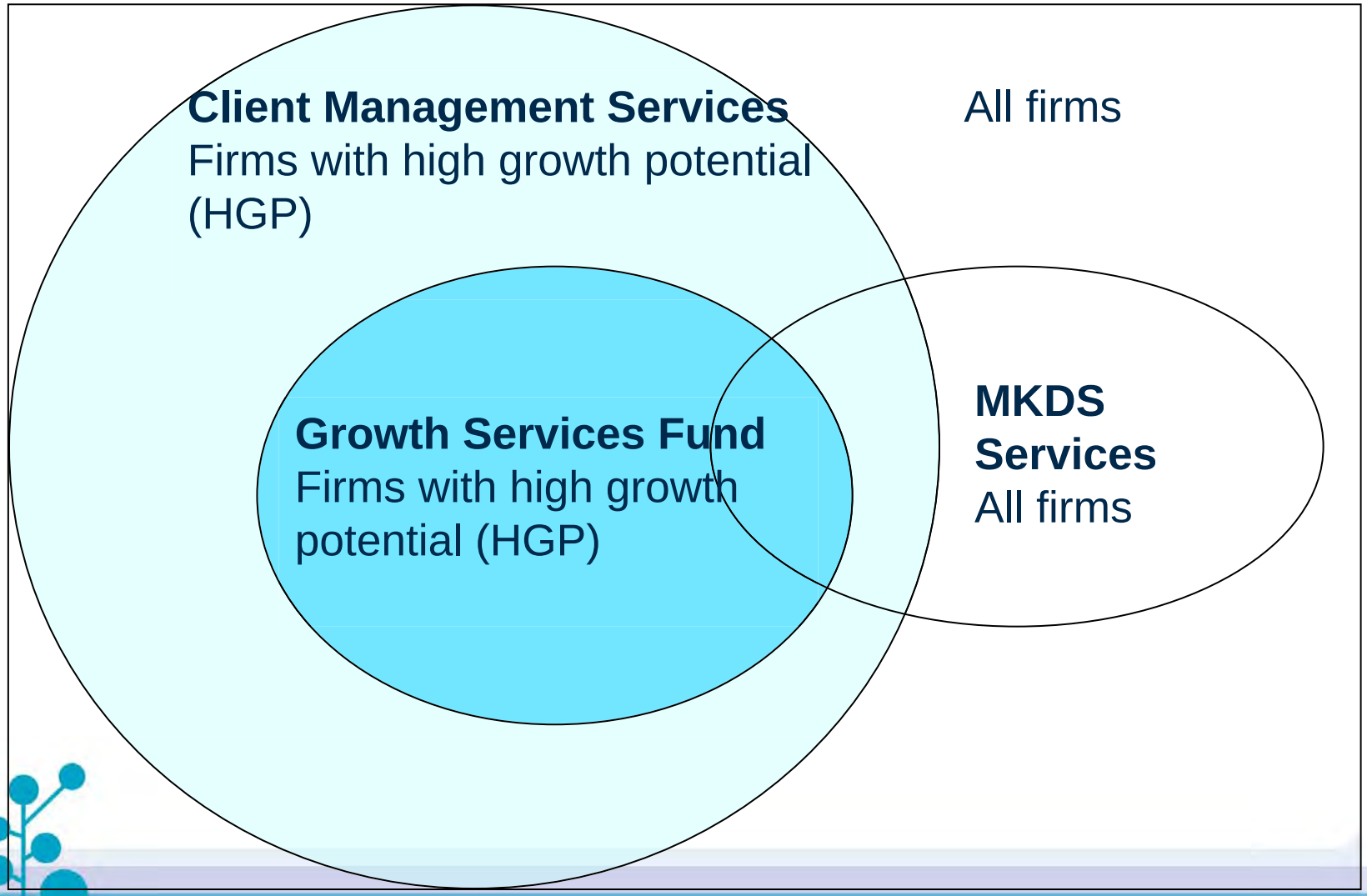
Lack of data for econometric analysis

Lack of objective data on outcomes

Lack of data for two KPIs

- *90% of GSR firms are classified as high growth potential and meet the eligibility requirement of the GSF at the time of application*

-After receiving GSR intervention, GSR firms are growing faster than NZ firms in the same sector


Client Management Services
Firms with high growth potential (HGP)
All firms
Growth Services Fund
Firms with high growth potential (HGP)
MKDS Services
All firms

GSR methodology

-35 case studies (file reviews, sector/client managers interviews, company interviews)

-Online survey

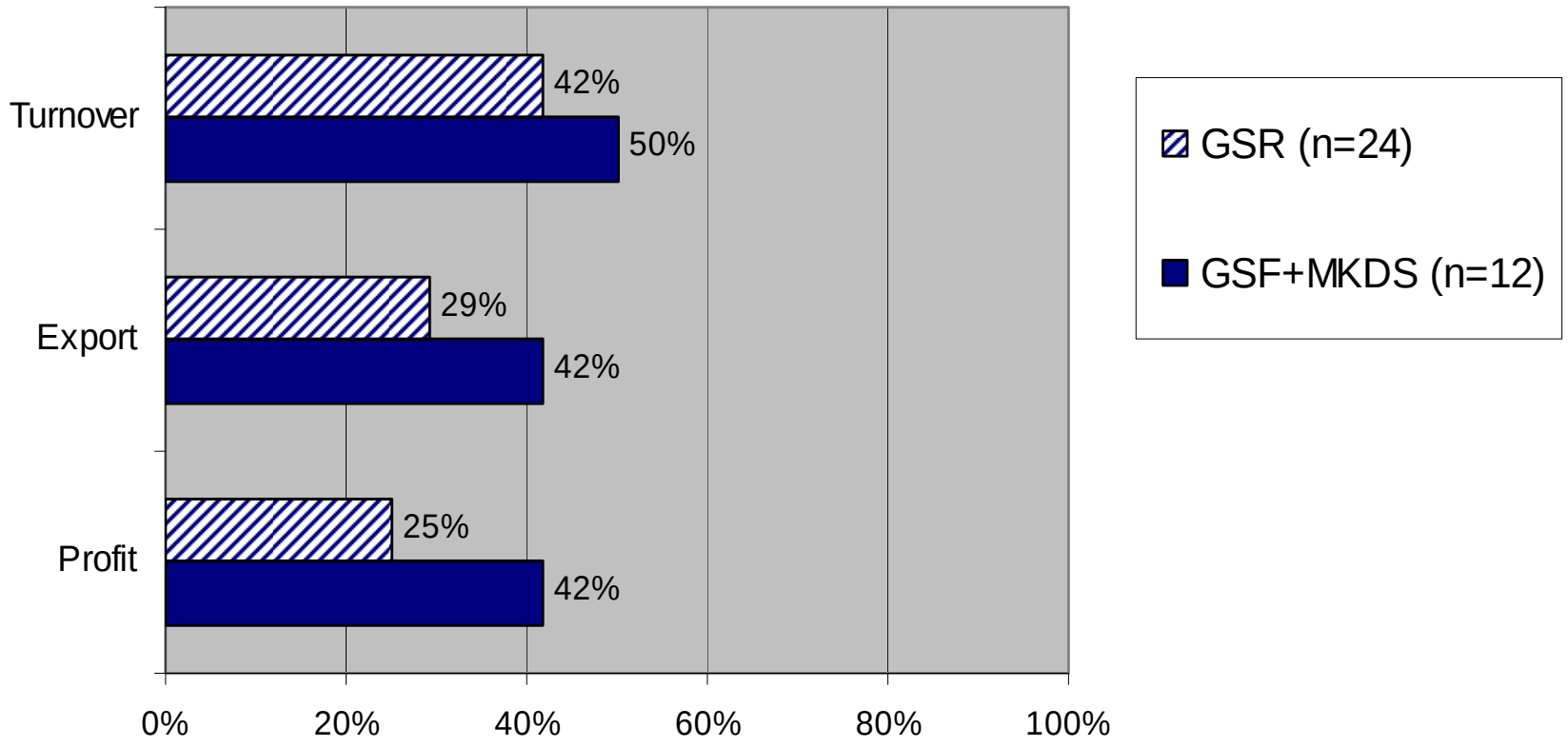
- GSF, 229 respondents 55%
- CM (no GSF), 34 respondents 57%
- MKDS (no GSR) , 155 respondents 33%

-NZTE data base

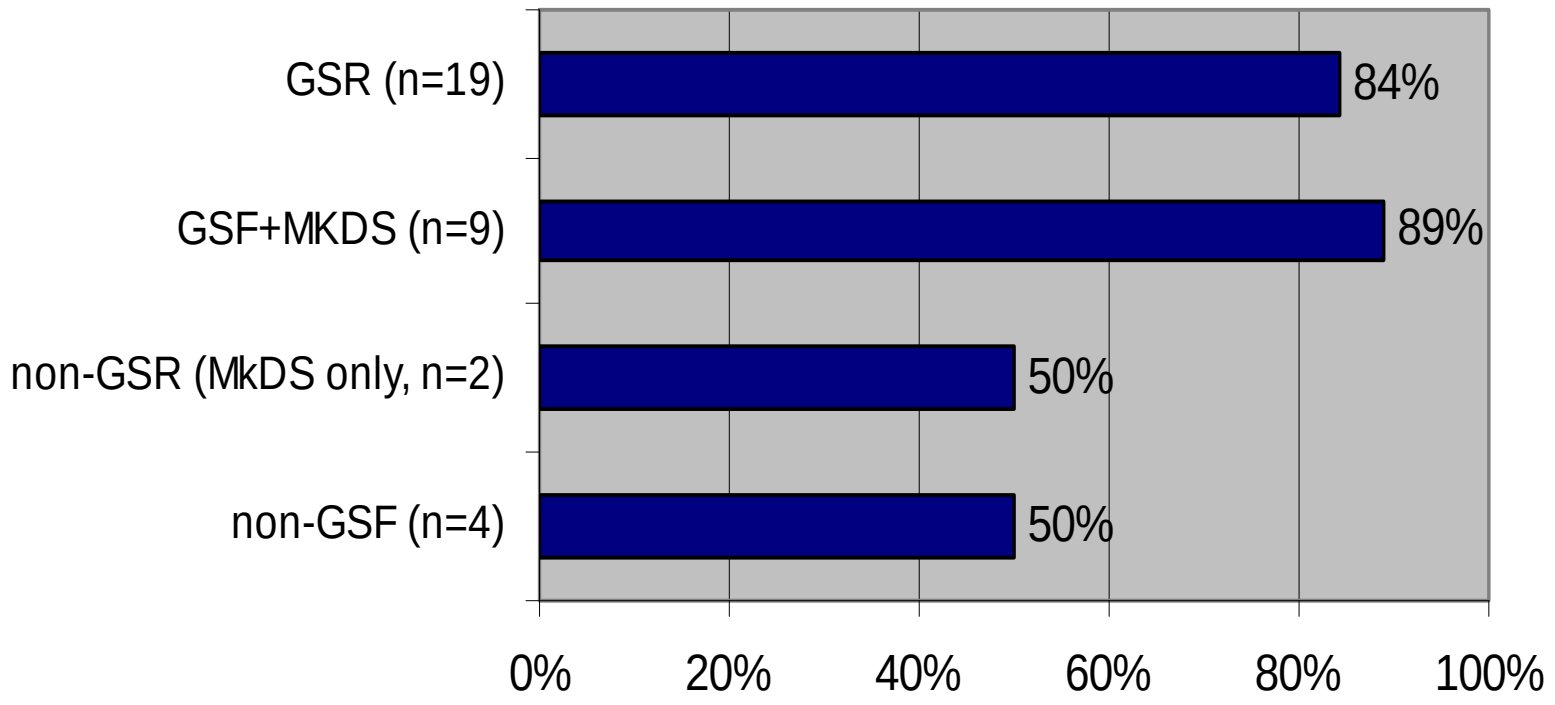
-Other interviews

- NZTE assessment panel
- NZTE offshore staff
- Economic Development agencies and business groups

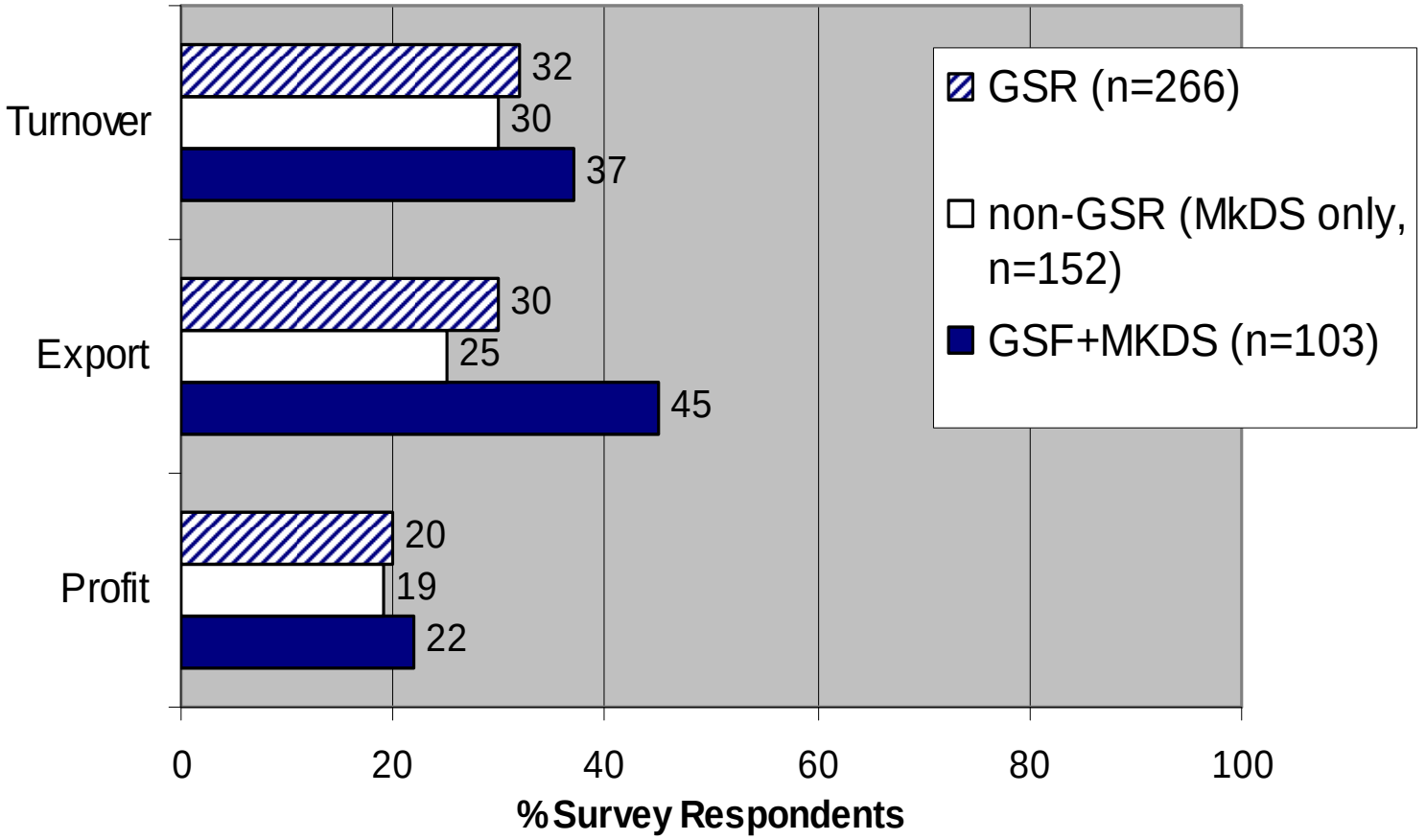
2000/01 GSR cohort: Firms which experienced over 20% average annual growth over the last 5 years



2000/01 GSR cohort: Firms which indicated that their profit growth was 'at least partly due to the GSR'



Firms who experienced over 20% average annual growth over the last 5 years



GSR Recommendations

GSR seems effective in improving firm capability in areas that are important contributors to firm growth. … continuation of the GSR provided:

NZTE, with support from MED, develop a Performance Management System to improve assessment and management of the programme's performance.

MED, in consultation with NZTE, should review the April 2003 GSR policy objectives, principles and design, to ensure it provides sufficiently clear and updated framework to guide the development of a GSR Performance Management System.

Other, more specific, programme recommendations…