



# Package 2

## D. Cost-benefit analysis (CBA)

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# “Ex-post” cost benefit analysis



**This is done so that we can determine if the tax incentives given to recipients benefit our economy more than it costs.**

Note: Evaluation of the past performance does not necessarily indicate future priority or preference over some industries.

# Tax incentives usually violate the principles of:



**Efficiency**



**Equity**



**Simplicity**

However, incentives may be justified if they provide net benefit to society as a whole.

# Cost benefit analysis methods:

1. Estimating implicit labor subsidy	What is the cost for each job created? (Similar analysis can also be done for investments)
2. Performing a counterfactual analysis	Do firms with registered activities for incentives perform better in terms of compensation, employment, exports, capital investments, and R&D investments when compared to non-registered firms?
3. Net government revenue approach	Do we generate more government revenues from the taxes we forgo?
4. Accounting of direct and indirect cost and benefit	Do total benefits from incentives, both private and social, outweigh total costs?

# Key issues on methods 2 and 3

1. Time period: only one year of data available.
  - A. TIMTA data available only for 2015. 2016 data are being prepared.
  - B. Two years lag based on TIMTA law and regulation.
  - C. Better if more years available to calculate NPV of cost and benefit but this is not possible today.
2. Benefits data are weak.
  - A. TIMTA law mandates disaggregated cost data but only mandates aggregated benefits data.
  - B. Also weak submission compliance by IPAs.
  - C. Tax team has to work with what is available, like ASPBI.
  - D. Additional data request sent to industries but response is very slow.

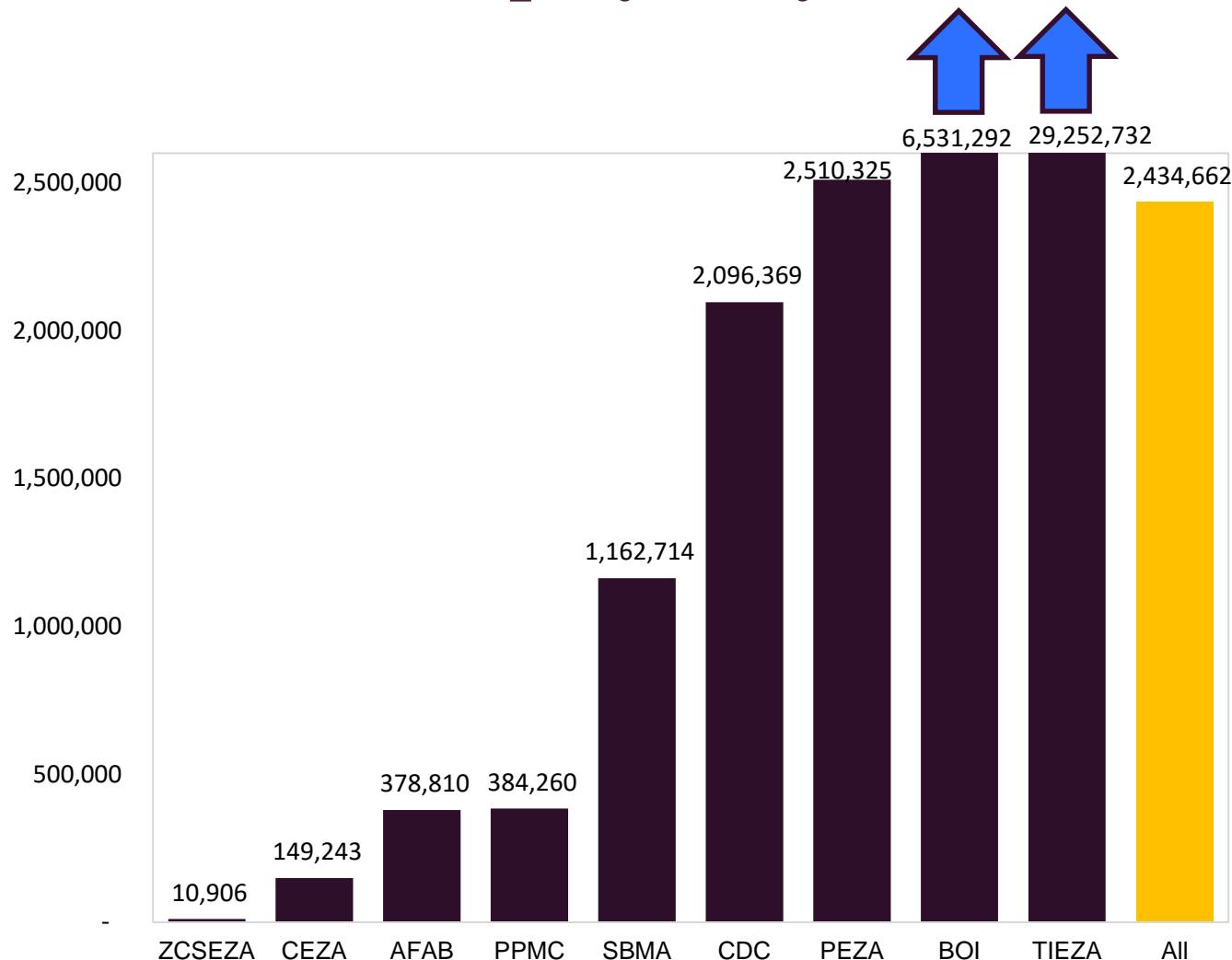
# Key issues on methods 2 and 3

3. Assumptions are used.
  - A. Lack of data means we use assumptions, like how much investment will go away if incentives are removed, but this is open for debate.
  - B. So tax team also looks at literature, other country experience, and a preponderance of data from several sources to find useful patterns.
  - C. Sensitivity analysis and cases are used to show different possible outcomes.



# 1. Implicit labor subsidy

# 2015 Implicit subsidy per employee by IPA (in PHP)



In 2015, **123,725** additional jobs were created. (note: we only use incremental jobs, not total jobs as the industry would do).

A total tax expenditure of **P301 billion** on ITH, GIE, and customs duties. If this figure is adjusted for VAT refund, the implicit labor subsidy would be P1.4 million

Source: IPA, TIMTA, submissions, and from DOF staff estimates





## 2. Counterfactual analysis

# Counterfactual analysis

- We want to find out whether tax incentives delivered on its promises (e.g., more jobs and exports, and higher productivity).
- Ideally, we want to compare a firm receiving incentives to the same firm not receiving incentives.
- However, at any point in time, only one of these two states is observable.
- Thus, we use statistical tools to construct a **counterfactual** to compare between what actually happens with incentives and what would have happened in the absence of incentives.



Company A  
WITH incentives

VS



Company A  
WITHOUT incentives

# The golden standard — randomized assignment

- Ideally, randomly assign eligible firms to receive and not receive tax incentives to remove bias.
  - Outcomes are then measured before and after receiving tax incentives.
- However, tax incentives are not randomly assigned. They are purposely given.
- What we have:
  - Tax incentives (2015 TIMTA).
  - Nationwide survey on firm characteristics and outcomes of interest (2014 ASPBI).

# The golden standard— randomized assignment

Design	When to use	Advantages	Disadvantages
<b>Randomization</b>	<ul style="list-style-type: none"> <li>•Whenever feasible</li> </ul>	<ul style="list-style-type: none"> <li>•Gold standard</li> <li>•Most powerful</li> </ul>	<ul style="list-style-type: none"> <li>•Not always feasible</li> <li>•Not always ethical</li> </ul>
<b>Regression discontinuity</b>	<ul style="list-style-type: none"> <li>•If an intervention has a clear, sharp assignment rule</li> </ul>	<ul style="list-style-type: none"> <li>• Project beneficiaries often must qualify through established criteria</li> </ul>	<ul style="list-style-type: none"> <li>•Only look at sub-group of sample</li> <li>•Assignment rule in practice often not implemented strictly</li> </ul>
<b>Difference-in-differences</b>	<ul style="list-style-type: none"> <li>•If two groups are growing at similar rates</li> <li>• Baseline and follow-up data are available</li> </ul>	<ul style="list-style-type: none"> <li>•Eliminates fixed differences not related to treatment</li> </ul>	<ul style="list-style-type: none"> <li>•Can be biased if trends change</li> <li>•Ideally have 2 pre-intervention periods of data</li> </ul>
<b>Matching</b>	<ul style="list-style-type: none"> <li>• When other methods are not possible</li> </ul>	<ul style="list-style-type: none"> <li>•Overcomes observed differences between treatment and comparison</li> </ul>	<ul style="list-style-type: none"> <li>•Assumes no unobserved differences (often implausible)</li> </ul>

# What we use: propensity score matching (PSM) model

- Firms in 2015 TIMTA are matched with 2014 Annual Survey of Philippine Business and Industry (ASPBI).
- Firms that are both in TIMTA and ASPBI are the **treatment group** (i.e., IPA-registered or those that claimed tax incentives in 2015).
- Firms that are not in TIMTA but in ASPBI *potentially* comprise the **control group**.
- To determine a good control group, select firms in ASPBI that are most similar in characteristics to the ones that are IPA-registered or are recipients of tax incentives (finding the “twin”).
- Compare the performance of **treatment** vs. **control** group with respect to target outcomes (e.g., jobs, exports, productivity).

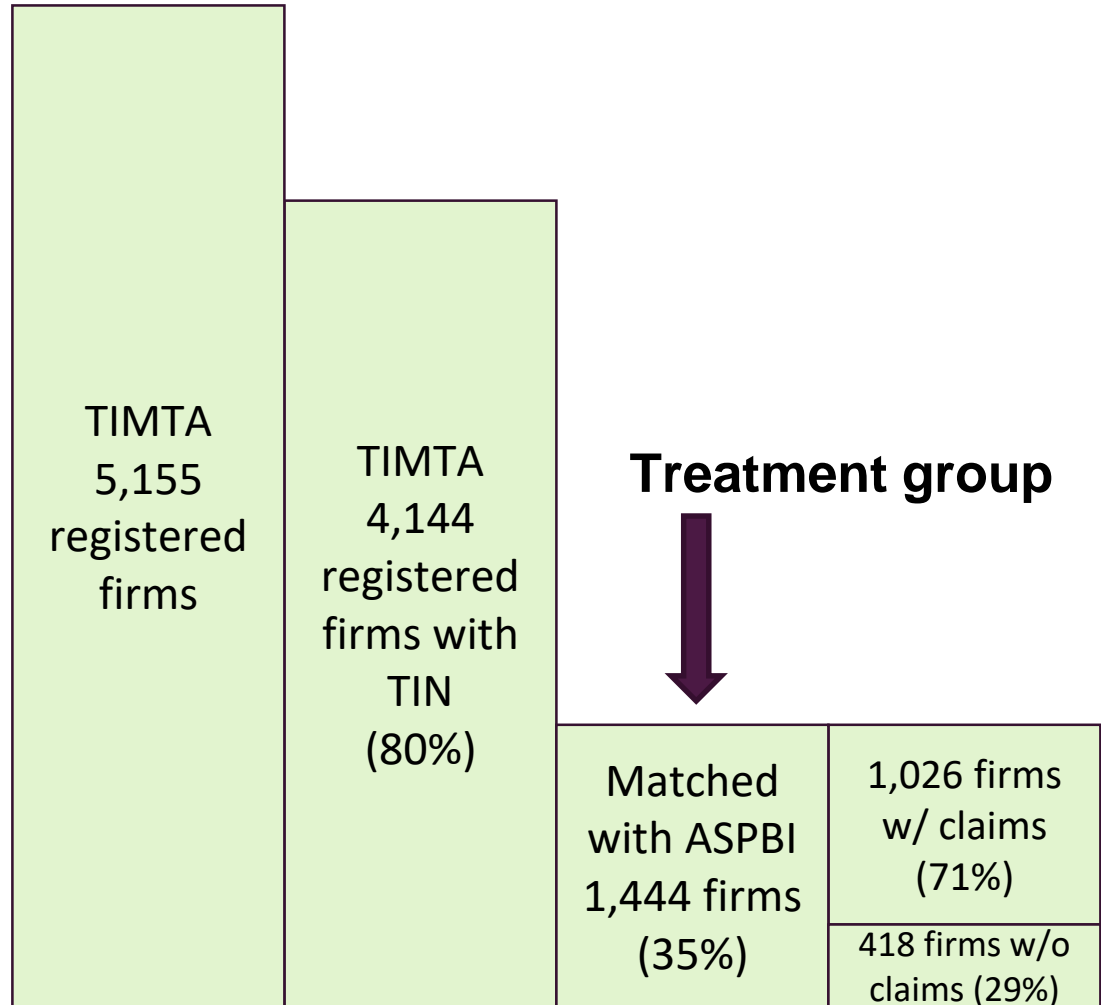
# Data

## TIMTA 2015

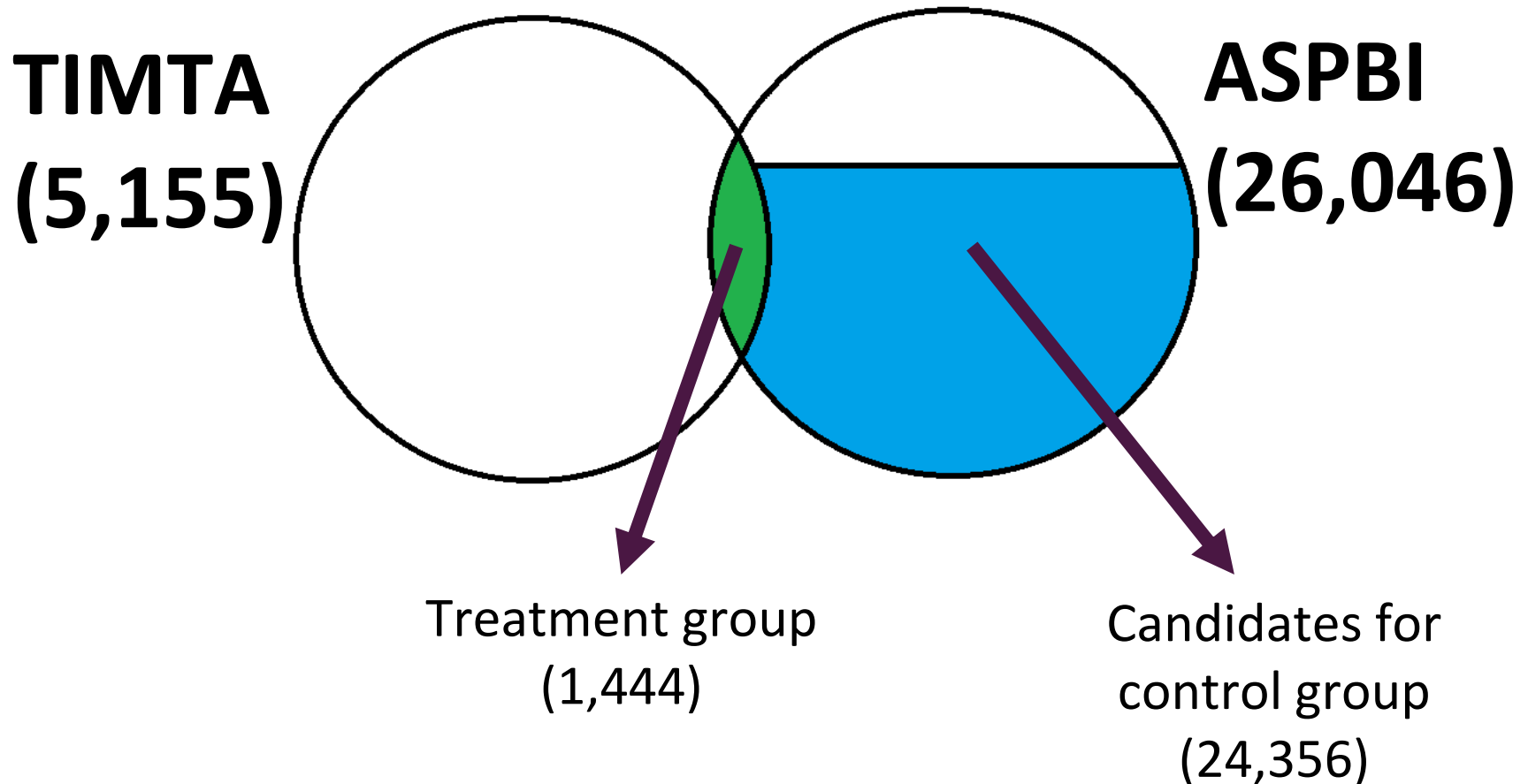
- IPA-registered

## ASPBI 2014

- Contains:
  - Firm characteristics for matching
  - Outcome variables



# Treatment and control groups



## Observable characteristics used for matching to select control group (the “twin”).

- Industry
- Ownership
- Employment size (i.e., micro, small, medium, large)
- Asset size (i.e., small, medium, large)
- Organization (i.e., stock corporation, single establishment)
- Exporter
- Age
- Region



## **Main question:**

Do IPA-registered firms perform better in terms of employment, exports, investments, and productivity vis-a-vis non-registered firms?

**If yes, then incentives are useful.  
If not, then incentives are wasteful.**

# Summary table (all firms)

Outcome	Indicators, ratios	Results
<b>Employment and compensation</b>	Total employment / total assets	No difference
	Total employment / total sales	
	R&D employment / total employment	
	Total compensation	Positive difference
	Total compensation / total expenses	(+)
	Average compensation to workers	
	Total salaries / paid workers	
<b>RD</b>	=1 if establishment has R&D spending	
	R&D expenses / total expenses	
<b>Capital investments</b>	Total investments / total assets	(+)
	Total fixed assets / total assets	(+)
	Building assets / total assets	(+)
	Machineries / total assets	(+)
<b>Exports</b>	Direct exports / sales	
<b>Productivity</b>	Average hours worked	
	Sales / total employment	
	Sales / paid workers	

(+) Higher for registered firms; (-) Higher for non-registered firms

# Summary table (subsets)

Outcome	Indicators	All	Claimed	Manuf	IC	ASSA
<b>Employment and compensation</b>	Total employment / total assets					(-)
	Total employment / total sales					
	R&D employment / total employment					
	Total compensation	(+)	(+)	(+)	(+)	
	Total compensation / total expenses	(+)				
	Average compensation to workers					
	Total salaries / paid workers					(+)
<b>R&amp;D</b>	=1 if establishment has R&D spending					
	R&D expenses / total expenses					
	Total investments / total assets	(+)				
<b>Capital investments</b>	Land assets / total assets	(+)	(+)	(+)	(-)	(-)
	Total fixed assets / total assets	(+)				
	Building assets / total assets	(+)				
	Machineries / total assets	(+)	(+)	(+)		
<b>Exports</b>	Direct exports / sales					
<b>Productivity</b>	Average hours worked			(+)	(+)	
	Sales / total employment					
	Sales / paid workers					

Note: Manuf comprises of electronics; Information and communication (IC) comprises of non-voice BPOs; Administrative and support service activities (ASSA )comprises of voice BPOs  
+ Higher for registered firms; - Higher for non-registered firms

# To summarize: registered firms when compared to non-registered firms...

- Have the same employment relative to size
- Have similar average wages
  - But give higher compensation for top management
- Spend more on fixed assets (this is expected)
- But do not spend higher on R&D
- Have the same level of exports relative to sales
- And no difference in productivity

## **Main question:**

Do IPA-registered firms perform better in terms of employment, exports, investments, and productivity vis-a-vis non-registered firms?

## **Answer:**

**Generally not much difference**, so in general, incentives are unnecessary or wasteful, but there are some notable exceptions.



# 3. Net Government Revenue Approach

Do we generate revenue from the tax we forego?

# Cases on necessity

1. None of the investment in the “Unnecessary” column will occur without the incentives (i.e., purely necessary incentives).
2. 100% of the investment in the “Unnecessary” column will occur without tax incentives (i.e., purely unnecessary incentives).

# CBA indicators used

Type	Benefits	Costs
<b>Direct</b>	<ul style="list-style-type: none"> <li>• Taxes paid by firms (CIT)</li> <li>• Taxes on dividends</li> <li>• Taxes paid by employees (PIT)</li> </ul>	<ul style="list-style-type: none"> <li>• Tax expenditure on income</li> <li>• Tax expenditure on duties</li> <li>• Tax expenditure on VAT (net)</li> <li>• Tax expenditure local taxes</li> </ul>
<b>Indirect</b>	<ul style="list-style-type: none"> <li>• Employment multiplier</li> <li>• Taxes paid on domestic input</li> </ul>	



# Economy wide results (all TIMTA firms): Cost and benefits in millions of peso (2015) Purely necessary incentives

	Total	Unnecessary	Necessary
<b>Number of firms</b>	<b>2,844</b>	<b>1,617 (56.9%)</b>	<b>1,227 (43.1%)</b>
<b>Net benefit (cost)</b>	<b>-8,495</b>	<b>-29,699</b>	<b>21,204</b>
<b>Benefit-cost ratio</b>	<b>0.95</b>	<b>0.79</b>	<b>1.53</b>
<b>I. Benefit</b>	<b>170,139</b>	<b>108,930</b>	<b>61,209</b>
<b>A. Direct</b>	<b>69,843</b>	<b>43,903</b>	<b>25,940</b>
Taxes paid by firm (CIT)	41,870	26,223	15,647
Taxes on dividends	14,183	8,543	5,640
Taxes paid by employees (PIT)	13,789	9,137	4,652
<b>B. Indirect</b>	<b>100,296</b>	<b>65,027</b>	<b>35,269</b>
Employment multiplier	23,231	15,374	7,857
Taxes paid on domestic inputs	77,065	49,653	27,412
<b>II. Cost</b>	<b>178,634</b>	<b>138,629</b>	<b>40,005</b>
<b>A. Direct</b>	<b>178,634</b>	<b>138,629</b>	<b>40,005</b>
Tax expenditure on income	86,259	67,706	18,553
Tax expenditure on duties	5,707	4,364	1,343
Tax expenditure on VAT (net)	85,024	65,293	19,731
Tax expenditure on local taxes	1,644	1,266	379

# Economy wide results (all TIMTA firms): Cost and benefits in millions of peso (2015)

## Purely unnecessary (excluded from benefits calculation)

	Total	Unnecessary	Necessary
<b>Number of firms</b>	<b>2,844</b>	<b>1,617 (56.9%)</b>	<b>1,227 (43.1%)</b>
<b>Net benefit (cost)</b>	<b>-117,425</b>	<b>-138,629</b>	<b>21,204</b>
<b>Benefit-cost ratio</b>	<b>0.34</b>	<b>0.00</b>	<b>1.53</b>
<b>I. Benefit</b>	<b>61,209</b>	<b>0.00</b>	<b>61,209</b>
<b>A. Direct</b>	<b>25,940</b>	<b>0.00</b>	<b>25,940</b>
Taxes paid by firm (CIT)	15,647	0.00	15,647
Taxes on dividends	5,640	0.00	5,640
Taxes paid by employees (PIT)	4,652	0.00	4,652
<b>B. Indirect</b>	<b>35,269</b>	<b>0.00</b>	<b>35,269</b>
Employment multiplier	7,857	0.00	7,857
Taxes paid on domestic inputs	27,412	0.00	27,412
<b>II. Cost</b>	<b>178,634</b>	<b>138,629</b>	<b>40,005</b>
<b>A. Direct</b>	<b>178,634</b>	<b>138,629</b>	<b>40,005</b>
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# 4. Accounting of direct and indirect costs and benefits

# Why do cost benefit analysis (CBA)?

- Tax incentives generally violate the principles of
  - *Efficiency* (distorts economic production)
  - *Equity* (tax rates are not based on ability to pay, but on someone's idea of economic significance)
  - *Simplicity* (adds to the cost of compliance and therefore opens the system to abuse)
- However, incentives may be justified if they provide a net benefit to society as a whole.

# Basis for cost benefit analysis

- **Economic value – can be quantified. This is what we analyze.**
- Social value – usually cannot be quantified; based on public perception of what is socially important.
- Political value – usually cannot be quantified; usually based on a political decision.

# Defining unnecessary and necessary incentives

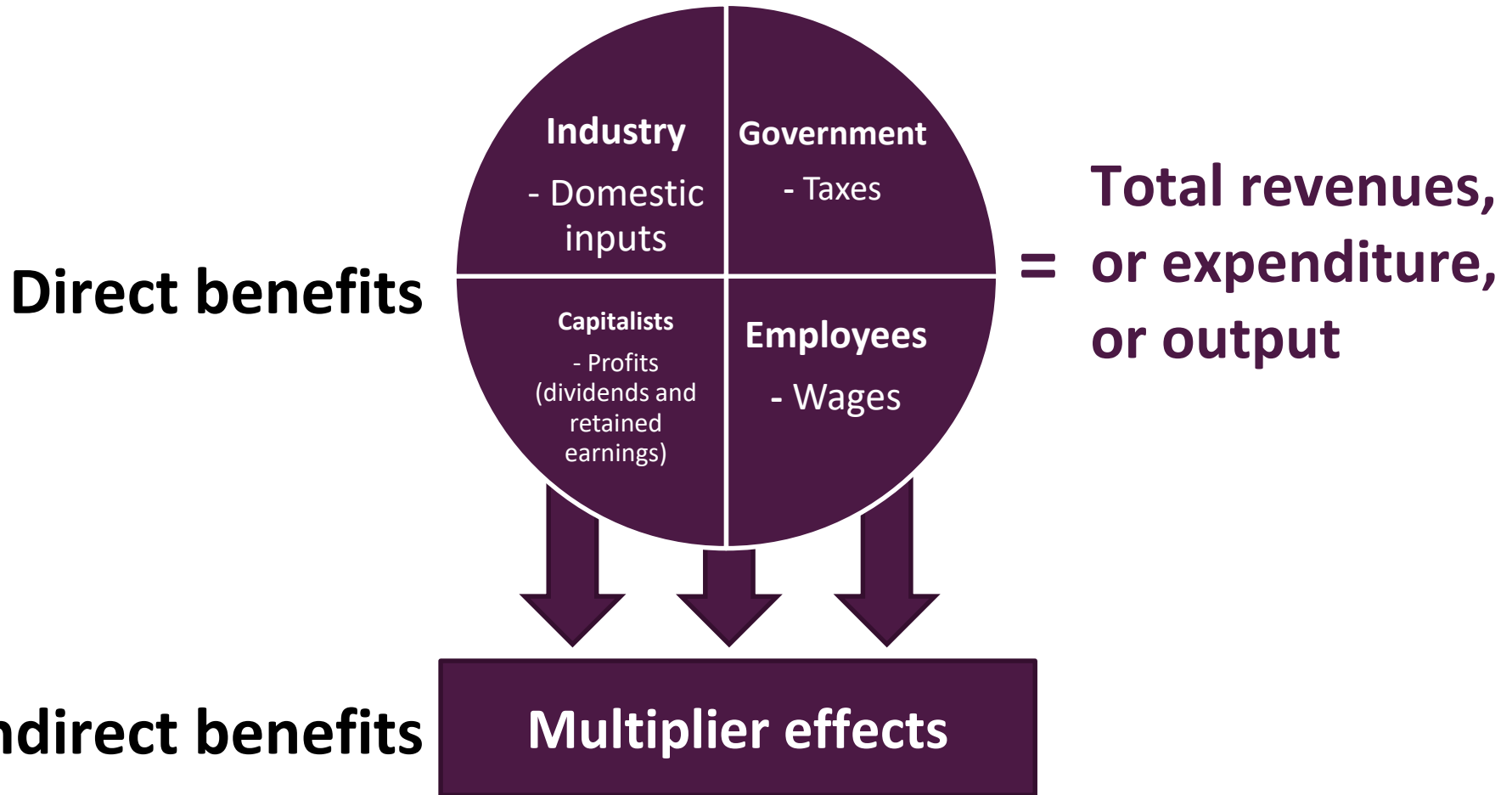
Criteria	Unnecessary incentives	Necessary incentives
Primary motivation	<ul style="list-style-type: none"> <li>• <b>Domestic market seeking</b> (the domestic market is enough incentive to invest)</li> <li>• <b>Resource seeking</b> (the land, minerals, or talent are enough incentive to invest)</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Export seeking</b> (they are mostly footloose and have to compete globally)</li> <li>• <b>Efficiency seeking</b> (they come to take advantage of scale and agglomeration).</li> </ul>
Sunk cost	<ul style="list-style-type: none"> <li>• Firms that have been in the country for a long time (10, 15, 20, 30 years)</li> </ul>	
High profitability	<ul style="list-style-type: none"> <li>• Firms that are very profitable, typically firms with profit ratios <b>3X</b> and <b>5X</b> the industry median and pay out large dividends</li> </ul>	

**Note very well: What is being labeled as “unnecessary” is the incentives, NOT the firm or industry.**

# Other ways to help firms

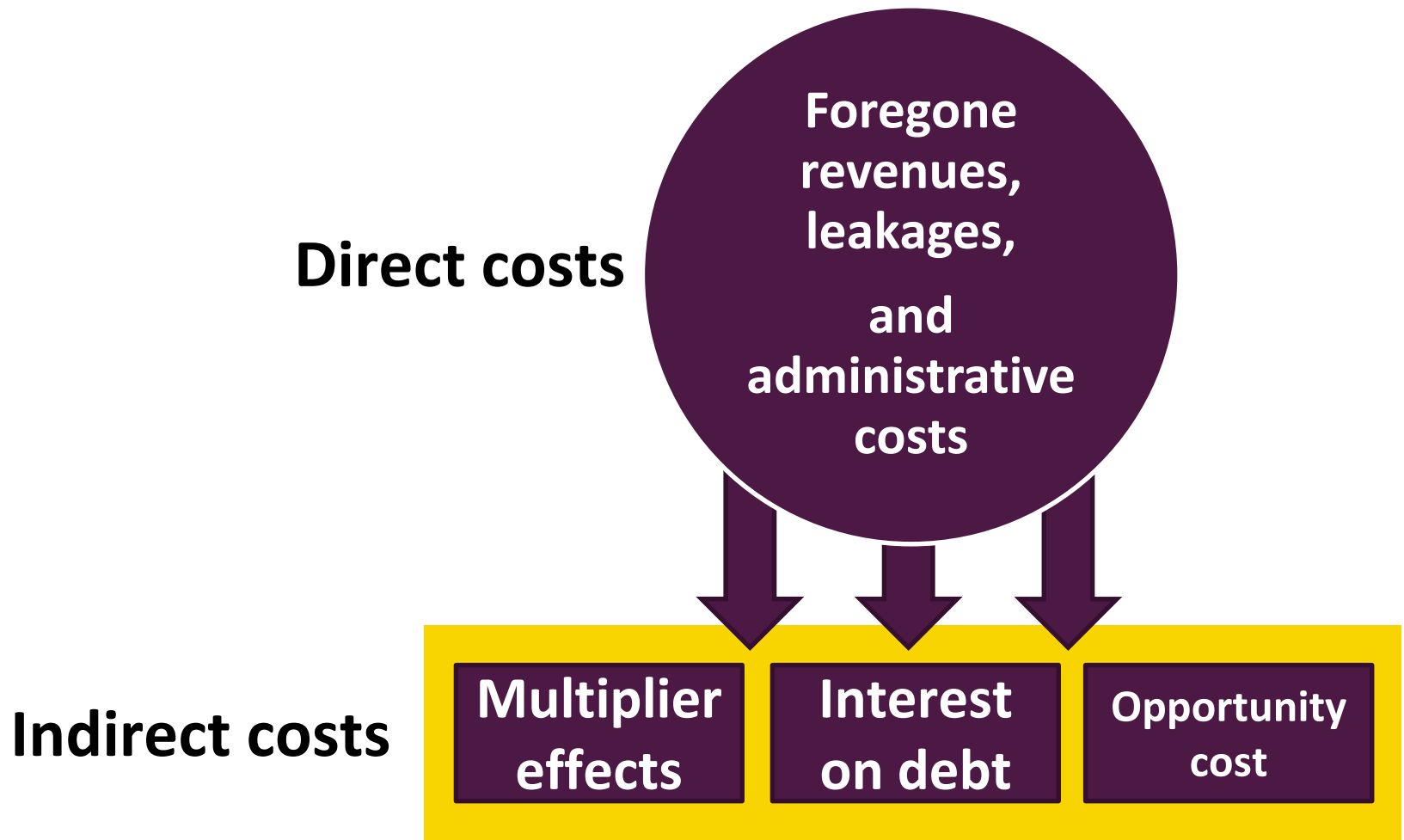
- Tax incentives are not the only way to directly help firms.
- The government can use more efficient and targeted subsidies. Some examples:
  - Lifeline subsidies for low income renewable energy consumers
  - Power subsidy for manufacturing
  - Housing vouchers for the poor
  - Skills training for workers
- But the real solution in the medium-term is to address
  - Infrastructure gaps, corruption, inefficiency in government, and complex business regulations.

# Accounting for the benefits





# Accounting for the costs



# CBA indicators used

Type	Benefits	Costs
<b>Direct</b>	<ul style="list-style-type: none"> <li>• Net compensation and benefits of employees</li> <li>• Domestic capital input</li> <li>• Other domestic inputs</li> <li>• Dividends paid out</li> <li>• Retained earnings</li> <li>• Taxes paid by firms</li> <li>• Taxes on dividends</li> <li>• Taxes paid by employees</li> </ul>	<ul style="list-style-type: none"> <li>• Tax expenditure (income, duties, VAT, local taxes)</li> <li>• Leakage due to transfer pricing abuse</li> <li>• Administrative cost</li> </ul>
<b>Indirect</b>	<ul style="list-style-type: none"> <li>• Industry multiplier (includes indirect jobs) (weighted average is 3.05)</li> <li>• Fiscal multiplier (3.94)</li> </ul>	<ul style="list-style-type: none"> <li>• Negative fiscal multiplier (-3.94)</li> <li>• Excessive rents to capitalists</li> <li>• Opportunity cost (i.e., traffic, low skills)</li> <li>• Interest paid on additional debt</li> <li>• Contribution to increased borrowing cost</li> </ul>

# CBA framework

	Unnecessary		Necessary	
Type	Cost	Benefit	Cost	Benefit
Direct	✓		✓	✓
Indirect	✓		✓	✓

- When incentives are unnecessary, benefits are not accounted for because the investments will likely occur even without the incentives.
- Necessary incentives, on the other hand, incur costs which may or may not be offset by benefits arising from incentives.
- Key summary indicator: benefit-to-cost ratio
  - If higher than 1, more benefit than cost.
  - If lower than 1, less benefit than cost.

# Cases on necessity

- Attempting to capture true necessity is difficult.
- This is because the threshold at which firms make decisions on whether or not to invest is the result of an interplay of several factors:
  - Individual preferences of owners/managers, specific circumstances faced at any given time, including the availability of tax incentives, among others.
- To reflect this, the CBA considers two cases mirroring possible investment decision outcomes based on degree of necessity.

# Cases on necessity

1. 100% of the investment in the “Unnecessary” column will occur without tax incentives (i.e., purely unnecessary incentives).
2. 70% of the investments will occur without tax incentives (thus, 30% of the investment is induced by the incentives).

# Economy wide results (all TIMTA firms): Benefits in millions of peso (2015)

	Total	Unnecessary	Necessary
Number of firms	2,844	1,617 (56.9%)	1,227 (43.1%)
Net benefit (cost)	-814,552	-1,655,178	840,626
<b>Benefit-cost ratio</b>	<b>0.63</b>	<b>0.0</b>	<b>2.54</b>
<b>I. Benefit</b>	<b>1,385,902</b>	<b>0.00</b>	<b>1,385,902</b>
<b>A. Direct</b>	<b>452,382</b>	<b>0.00</b>	<b>452,382</b>
Net compensation and benefits of employees	31,050	0.00	31,050
Domestic capital input	50,766	0.00	50,766
Other domestic inputs	228,436	0.00	228,436
Dividends	50,764	0.00	50,764
Retained earnings	65,427	0.00	65,427
Taxes paid by firm	15,647	0.00	15,647
Taxes on dividends	5,640	0.00	5,640
Taxes paid by employees	4,652	0.00	4,652
<b>B. Indirect</b>	<b>933,520</b>	<b>0.00</b>	<b>933,520</b>
Industry multiplier (including indirect jobs)	857,257	0.00	857,257
Fiscal multiplier	76,263	0.00	76,263

# Economy wide results (all TIMTA firms): Cost in millions of peso (2015)

	Total	Unnecessary	Necessary
<b>Number of firms</b>	<b>2,844</b>	<b>1,617 (56.9%)</b>	<b>1,227 (43.1%)</b>
<b>Net benefit (cost)</b>	<b>-814,552</b>	<b>-1,655,178</b>	<b>840,626</b>
<b>Benefit-cost ratio</b>	<b>0.63</b>	<b>0.0</b>	<b>2.54</b>
<b>II. Cost</b>	<b>2,200,454</b>	<b>1,655,178</b>	<b>545,276</b>
<b>A. Direct</b>	<b>243,723</b>	<b>188,037</b>	<b>55,686</b>
Tax expenditure on income	86,259	67,706	18,553
Tax expenditure on duties	5,707	4,364	1,343
Tax expenditure on VAT (net of refund)	85,024	65,293	19,731
Tax expenditure on local taxes	1,644	1,266	379
Leakage due to transfer pricing abuse	56,900	43,508	13,392
Administrative cost	8,189	5,900	2,289
<b>B. Indirect</b>	<b>1,956,731</b>	<b>1,467,141</b>	<b>489,590</b>
Fiscal multiplier	692,471	535,483	156,987
Excessive rents to capitalist	51,635	51,635	0.00
Interest paid on additional debt	7,360	5,692	1,669
Opportunity cost (traffic and low skills)	1,030,184	738,942	291,242
Contribution to increased borrowing	175,080	135,388	39,692

# Summary of benefit-cost ratio

All firms	Category	100%	70%
	<b>All firms</b>	<b>0.63</b>	<b>1.21</b>
Major Sector	Agriculture	0.50	0.84
	Manufacturing	1.02	1.64
	Non-Mfg Industry	0.00	0.74
	Services	0.33	0.77
Priority industry	Non-voice based BPO	1.31	1.39
	Voice based BPO	0.00	0.51
	Electronics	0.62	1.23
	Renewable energy	0.00	0.95
	Housing	0.00	0.56
Investment promotion agency (IPA)	AFAB	0.70	1.19
	SBMA	0.31	0.48
	BOI	0.95	1.68
	CDC	0.66	1.35
	CEZA	0.86	1.07
	PPMC	0.00	0.48
	ZCSEZA	0.79	0.82
	PEZA	0.53	1.08
	TIEZA	0.00	0.03



# Summary of benefit-cost ratio

All firms	Category	100%	70%
	<b>All firms</b>	<b>0.63</b>	<b>1.21</b>
Secondary industry	Manufacturing (chemicals)	1.56	1.80
	Manufacturing (food, food processing)	4.53	4.60
	Manufacturing (garments, textiles, wearables including jewelry, leather products - including bags)	2.14	2.67
	Manufacturing (metals, steel)	0.95	1.68
	Manufacturing (personal care and healthcare products, medical products)	0.73	1.05
	Manufacturing (vehicles, vehicle accessories, transport equipment)	1.50	2.12
	Manufacturing (Wood, Glass, Paper, Plastic, Ceramic, Rubber Products)	0.31	0.92
	Energy (coal, diesel)	0.00	0.35
	Energy (Refining, Storage, Marketing and Distribution of Petroleum Products)	0.00	1.95
	Mining and quarrying	0.00	0.36

# Conclusion

1. Future grant of incentives must be anchored on a cost benefit analysis.
2. At the **industry level**, CBAs must be performed before any industry is included in the SIPP.
3. At the **firm level**, incentives can only be granted if the firm satisfies the principles of performance-based, timebound, targeted, and transparent.

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