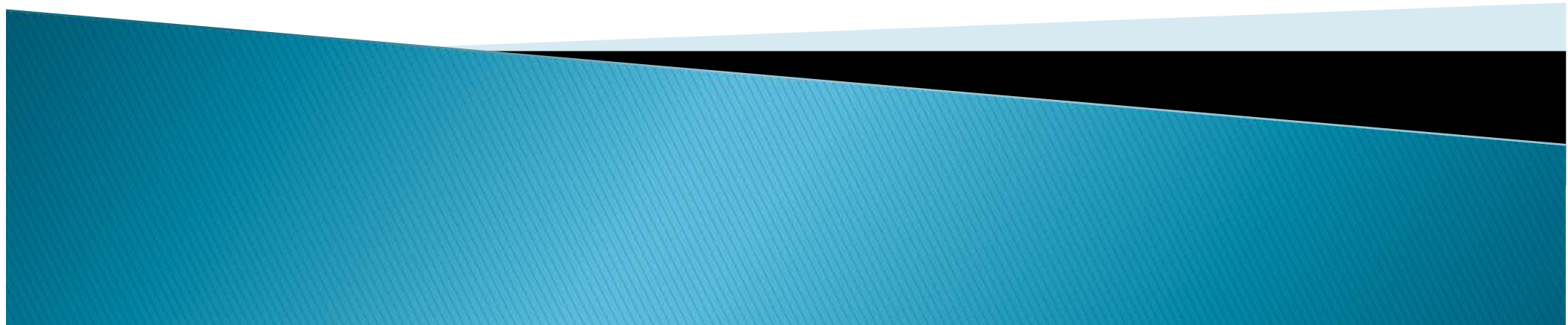


Measuring Tax Pyramiding:

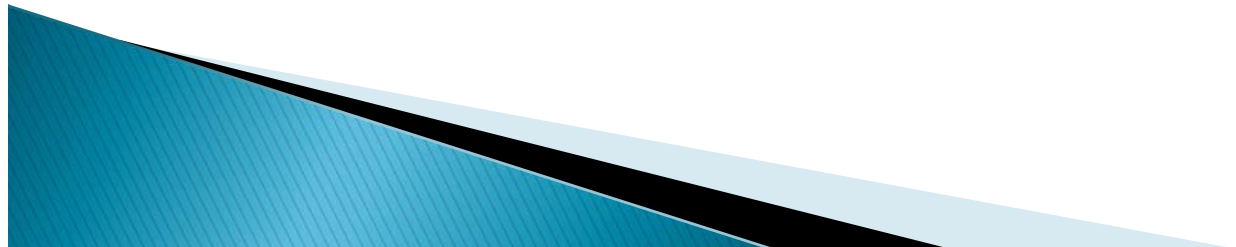
Modeling the cascading effects of Hawaii's general excise tax

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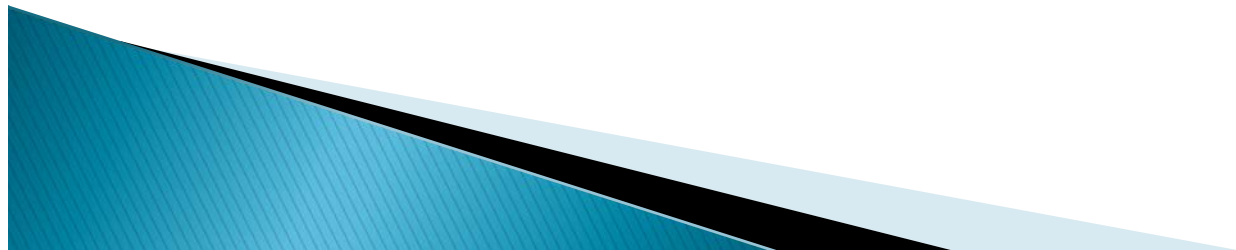


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Tax Pyramiding



Tax pyramiding is bad

- ▶ What is the problem with tax pyramiding?
 - A layering of taxes– a tax on a tax
 - The effective tax rate becomes higher than the statutory rate
 - Sectors are taxed unequally– disfavors sectors highly reliant on inputs
 - Loss of transparency– taxes are hidden

Tax Pyramiding of Aloha Shirts				
Gross Receipts Tax				
	Price	Value Added	Tax Rate	Tax
Fabrics	\$100	\$100	2.0%	\$2
Wholesale	\$200	\$100	2.0%	\$4
Retail	\$400	\$200	2.0%	\$8
Subtotal		\$400		\$14
Nominal Rate			2.0%	
Effective Rate		\$14/\$400	3.5%	
Pyramiding			150%	

The ratio of inputs is an important driver of tax pyramiding

Consider price structure for good P_r :

$$P_r = V_r + C_r$$

Tax on good can be expressed as:

$$T = t \cdot P_r + t \cdot P_i$$

$$T = t \cdot (V_r + C_r) + t \cdot P_i$$

Substitute $(V_r + C_r)$ for P_i

$$T = t \cdot (V_r + P_i + t \cdot P_i) + t \cdot P_i$$

$$T = t \cdot V_r + 2t \cdot P_i + t^2 \cdot P_i$$

Where,

P_r : price of the retail good

V_r : value added of the retail good

C_r : cost of inputs of retail good

P_i : price of the intermediate good

t : tax rate, where $0 \leq t \leq 1$

T : total tax on the good

The size of P_i has a larger impact on the final tax at the value-added

The ratio of inputs and the tax rate affect the level of pyramiding

Implications

- ▶ The magnitude of inputs has the greatest effect on pyramiding
- ▶ The tax rate has a nonlinear relationship on pyramiding

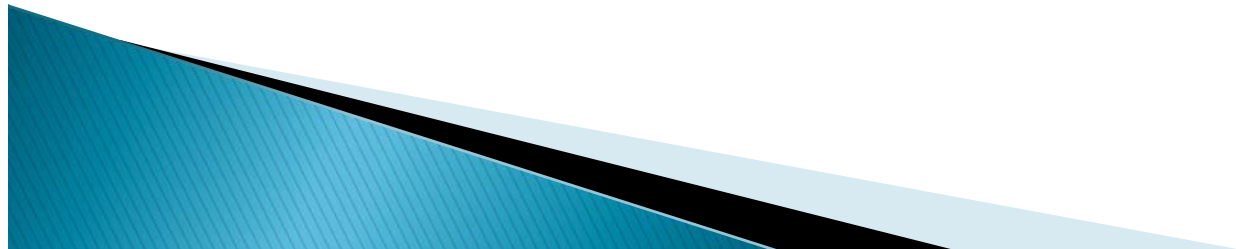
Takeaways

- ▶ High value added industries (and economies) less prone to pyramiding
- ▶ Lower rates minimize pyramiding

		Effective Tax Rates				
		Nominal Tax Rates				
		0%	2%	4%	6%	8%
Inputs Price/ Total Price	0%		2.00%	4.00%	6.00%	8.00%
	25%	2.51%	5.04%	7.59%	10.16%	
	50%	3.02%	6.08%	9.18%	12.32%	
	75%	3.53%	7.12%	10.77%	14.48%	

		Tax Pyramiding				
		Nominal Tax Rates				
		0%	2%	4%	6%	8%
Inputs Price/ Total Price	0%	0.0%	0.0%	0.0%	0.0%	0.0%
	25%	25.5%	26.0%	26.5%	27.0%	
	50%	51.0%	52.0%	53.0%	54.0%	
	75%	76.5%	78.0%	79.5%	81.0%	

What is the General Excise and Use Tax?



Hawaii's GET is broad consumption tax that limits tax pyramiding

- ▶ Business share of consumption tax in Hawaii is lower than the national average
 - COST (2005) found business share of taxes in Hawaii is 32.2% vs. 42.8% for national average
 - Tax Pyramiding from GET is 19.4% (Hawaii DOTAX)
 - Statutory Rate: 4.00%
 - Effective Rate: 4.78%
- ▶ Why is their lower levels of pyramiding in Hawaii?
 - The structure of GET law
 - The structure of the Hawaii economy (isolated with low participation in supply chains)

General Excise and Use Tax: What is it?

- ▶ Provides slightly less than half of Hawaii's general fund revenue
- ▶ The GET is levied on the "gross income" or "gross proceeds of sale" derived from the sale of tangible personal property or services
 - Very broad coverage. Economic activities that are not taxed must be explicitly cited in the law
- ▶ Two-tiered Rate System:

Wholesaling, manufacturing, producing, wholesale services	0.5%
Retail and all others	4.0%

- ▶ Few exemptions
 - (e.g. exports, financial transactions, core activities of non-profits)
- ▶ Tax is levied on the business
 - Can visibly be passed onto customer
- ▶ Use tax applies to purchases from out-of-state vendors that are not required to collect tax on their sales to Hawaii
 - Applied to the wholesale and retail rate

Comparison of consumption taxes

	GET	Sales	VAT
Taxpayer (statutory)	Business	Consumer	Business
Coverage	Broad	Narrow	Broad
Activity taxed	Gross sales	Cost of taxable goods	Value-added
Inputs taxed	Yes	No (ideally)	No
Admin Burden:			
Business	Low	Medium	High
Tax Authority	Low	Medium	Low

GET raises significant revenue through a low rate and a broad base

Amongst the lowest sales tax rates in the country

State	State Tax		Avg. Local		Rank
	Rate	Rank	Tax Rate	Combined	
La.	5.00%	33	4.98%	9.98%	1
Tenn.	7.00%	2	2.46%	9.46%	2
Ark.	6.50%	9	2.80%	9.30%	3
Ala.	4.00%	40	5.01%	9.01%	4
Wash.	6.50%	9	2.42%	8.92%	5
Okla.	4.50%	37	4.36%	8.86%	6
Ill.	6.25%	13	2.39%	8.64%	7
Kans.	6.50%	9	2.12%	8.62%	8
N.Y.	4.00%	40	4.49%	8.49%	9
Calif.	7.25%	1	1.00%	8.25%	10
Hawaii	4.00%	40	0.35%	4.35%	45

Highest per capita collections of any state

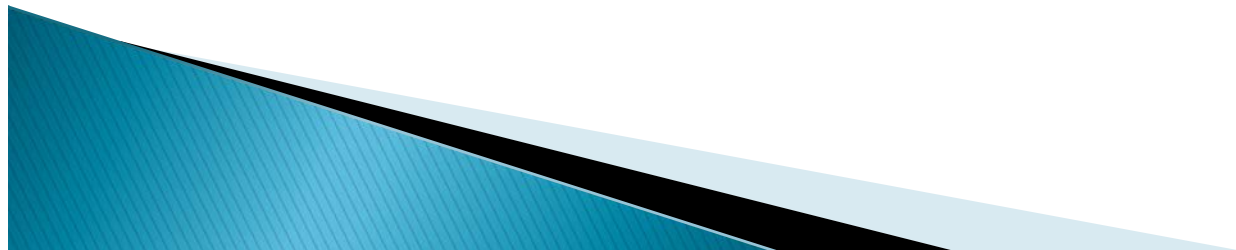
State	Collections	
	per Capita	Rank
Hawaii	\$ 2,090	1
N.D.	\$ 1,835	2
Wash.	\$ 1,746	3
Nev.	\$ 1,412	4
Wyo.	\$ 1,384	5
Tex.	\$ 1,226	6
Miss.	\$ 1,144	7
Conn.	\$ 1,137	8
S.D. (b)	\$ 1,131	9
Ind.	\$ 1,100	10
N.M. (b)	\$ 1,082	11
Fla.	\$ 1,075	12
Ark.	\$ 1,069	13
Kans.	\$ 1,049	14
Ohio	\$ 1,025	15

Broadest scope of sales tax of any state

State	Sales Tax	
	Breadth	Rank
Hawaii (a)	104%	1
N.D.	73%	2
S.D. (a)	65%	3
Wyo.	62%	4
N.M. (a)	59%	5
Nev.	49%	6
Miss.	47%	7
Ark.	43%	8
Tex.	42%	9
Maine	41%	10
Ariz.	41%	11
Fla.	40%	12
Ind.	40%	13
Idaho	38%	14
Wash.	38%	15

Source: Tax Foundation

Modeling Tax Pyramiding?



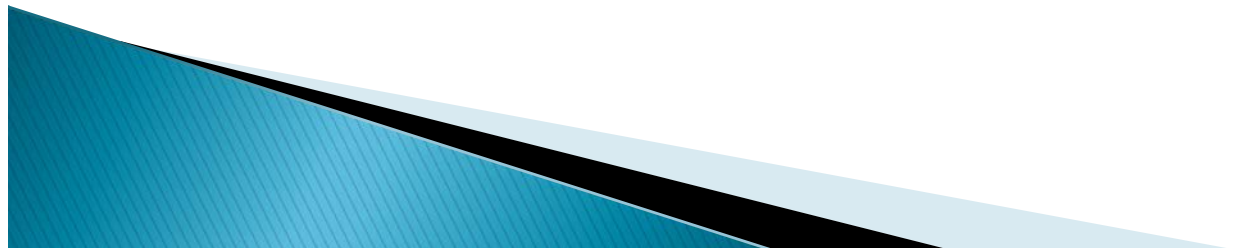
There are different approaches to measuring industry impact of tax pyramiding

All approaches depend on Input-Output tables to measure business purchases

Approach	Advantage	Disadvantage	Examples
Percentage of consumption tax burden levied on business	Easy to compare across states	Uses EY proprietary state tax model. Intricacy of model not clear	(COST 2005)
Measure tax generated by incremental value added by industry (I-O multiplier coefficients)	Easy to generate findings with state I-O table	Does not let you adjust for changes to tax code	(Washington State Tax Structure Study 2001)
Build model that simulates tax code and calculate effective tax rate	Allows you to change tax code and look at effects, including applying different rates to intra industry purchases	Time consuming to build model. Permits human discretion	(New Mexico Tax Institute 2005), (Hawaii 2017)

Creating the Hawaii Tax Pyramiding Model

- 1) Begin with the 2012 Hawaii Input Output Table
- 2) Create tax model that allows user to turn on/off exemptions and change rates for inter-industry and intra-industry purchases and household consumption
- 3) Measure GET tax paid due by industry by their demand
- 4) Adjust model to fit tax collection data
 - Match gross receipts, taxable base, ratio of wholesale to retail rate, tax revenue



Pyramiding rates for select group of aggregated industries (Preliminary Results)

	Pyramiding Rates							
	Tax Liability \$millions	GET Pyramid \$millions	Business Share	Consumer Share	% Pyramiding (Effective rate/ Nominal Rate)	Generic GET/ Final Taxable Consumption	Output GET/(Final Consumption + Exports)	Demand GET/(Final Consumption - intermediate exports)
State Level*	2,777	451	15%	85%	18.0%	4.72%	4.38%	4.67%
Industry								
Agriculture	20.65	6.38	31%	69%	44.7%	5.79%	3.50%	5.08%
Mining and Construction	282.31	26.99	10%	90%	10.6%	4.42%	4.37%	4.42%
Food Processing	27.44	9.97	36%	64%	57.1%	6.28%	3.02%	5.10%
Other Manufacturing	175.23	61.51	35%	65%	54.1%	6.16%	4.37%	5.53%
Information	60.14	9.51	16%	84%	18.8%	4.75%	4.03%	4.64%
Wholesale Trade	147.68	27.04	18%	82%	22.4%	4.90%	4.69%	4.86%
Retail trade	283.96	21.11	7%	93%	8.0%	4.32%	4.30%	4.32%
Professional services	87.92	17.11	19%	81%	24.2%	4.97%	4.01%	4.78%
Business services	50.62	13.47	27%	73%	38.3%	5.45%	4.93%	5.31%
Arts and Entertainment	41.22	3.03	7%	93%	7.9%	4.32%	4.18%	4.31%
Accommodation	257.99	20.33	8%	92%	8.6%	4.34%	4.34%	4.34%
Eating and Drinking	156.96	16.18	10%	90%	11.5%	4.46%	4.45%	4.46%

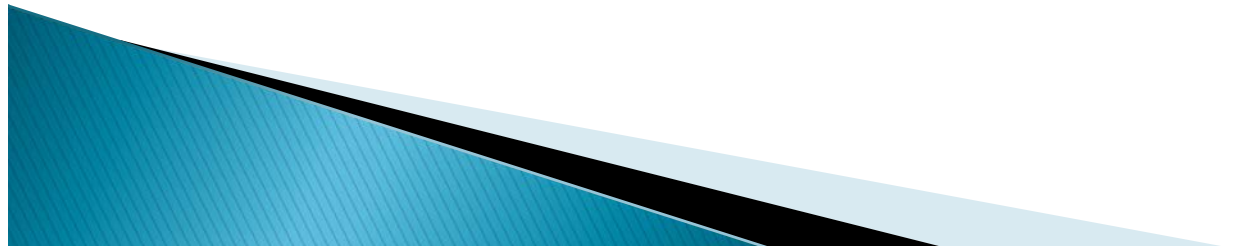
- Industries with lower-value added experience higher levels of pyramiding
- Business and professional services experience higher tax pyramiding since many inputs are not at wholesale rate

*Includes the \$29.6M Capital Goods Income Tax Credit
 Orange rows represent low value added industries (value added less than 50% of final price)

The wholesale rate is the most important source of anti-pyramiding

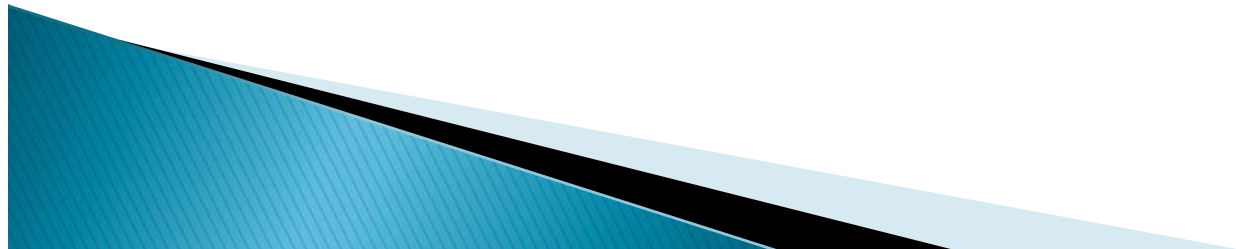
	Gross Income (\$ millions)	Subject to Tax (\$ millions)	Tax Liability (\$ millions)	GET Pyramid (\$ millions)	Pyramiding	GET/ Taxable Consumption
Actual GET*	115,163	93,328	2,777	451	19.5%	4.78%
No Exemptions (GET)	115,163	102,369	2,951	458	17.5%	4.70%
No Wholesale Rate (GET)	115,163	93,238	3,689	1,363	58.5%	6.34%

* Does not includes the \$29.5M Capital Goods Income Tax Credit



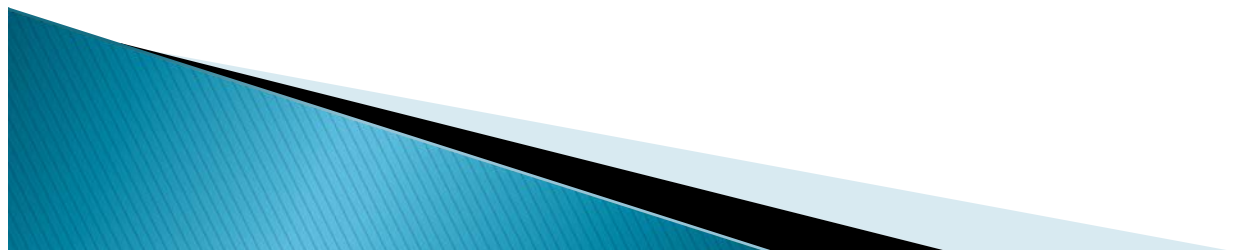
Applications of Tax Pyramiding Model

- ▶ Measure tax pyramiding rates of 68 industries
- ▶ Measure effects of anti-pyramiding legislation
- ▶ Measure impact of moving to a different consumption tax system
- ▶ Measure relative impact of rate changes
- ▶ Measure the amount of tax exported

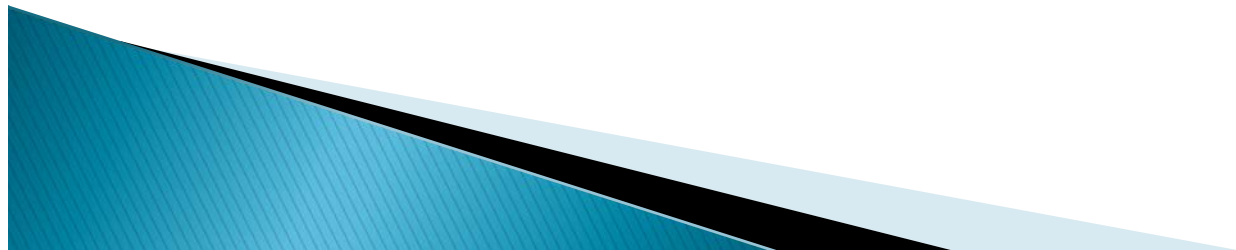


This model provides information about the relative impacts of tax pyramiding

- ▶ **I-O have limitations in their use for estimations**
 - The Hawaii I-O table is adopted from the national I-O Table, which means that composition of intra-industry purchases may not accurately match those found in the state
 - The I-O model does not allow for adjustments at industry sector level that is below 68 industry sectors
- ▶ **The model is better at providing information regarding the relative impacts of tax law changes rather than absolute impacts**
 - Do not use for revenue forecasting



Thank You



A tiered rate system, exemptions, and tax credits reduce pyramiding

- ▶ Wholesale is taxed at a lower rate (0.5%)
- ▶ Exemption of exports
- ▶ Exempts public utility companies (But these items are subject to alternative taxes.)
- ▶ Exempts cost of subcontractors and other industries
- ▶ Refundable income tax credit for GET paid on the purchase of capital goods by businesses
- ▶ Broad Tax Base
 - Problems of cascading are less of a problem for small states with broad tax base (Hawkins 2002)

Exemptions erode tax liability by 11.1% (\$388 million)

Major Tax Expenditures	Cost \$millions (2017)	Rationale
Non-profit sales (health, education)	215	Social
Drugs and prosthetic devices	63	Social
Affordable housing	46	Social
Sub-contractors	18	Reduce pyramiding

The GET pyramids slightly more than a traditional sales tax

	Gross Income (\$ millions)	Subject to Tax (\$ millions)	Tax Liability (\$ millions)	GET Pyramid (\$ millions)	Pyramiding (%)	GET/ Taxable Consumption	Revenue Neutral Rate
Actual GET*	115,163	93,328	2,777	451	19.5%	4.78%	
Sales (No wholesale tax)	115,163	66,155	2,646	320	13.8%	4.55%	4.20%
VAT	115,163	58,145	2,326	0	0.0%	4.00%	4.78%

The higher levels of pyramiding of GET versus a sales tax is due to the wholesale rate of 0.5%

Introducing a VAT tax would require Hawaii to raise the GET rate by 0.78% to generate the same amount of revenue

