

# Inefficient at any level

## *A comparative efficiency argument for eliminating narrow-based state taxes*

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# Agenda

## Main focus:

Can we do better than ranking taxes according to their economic cost per unit revenue (excess burden) at their current tax rate?

See:

Nassios, J., and J. A. Giesecke. *Inefficient at any level: A comparative efficiency argument for complete elimination of property transfer duties and insurance taxes*. CoPS Working paper G-337.

## Maybe a small mention:

CGE models carry rich detail when assessing tax reforms.

Is all this information reflected in excess burdens? Can we do more?

See:

Nassios, J., and J. A. Giesecke. *Studying the impact of property tax reform on housing prices and efficiency*. CoPS Working paper G-330.

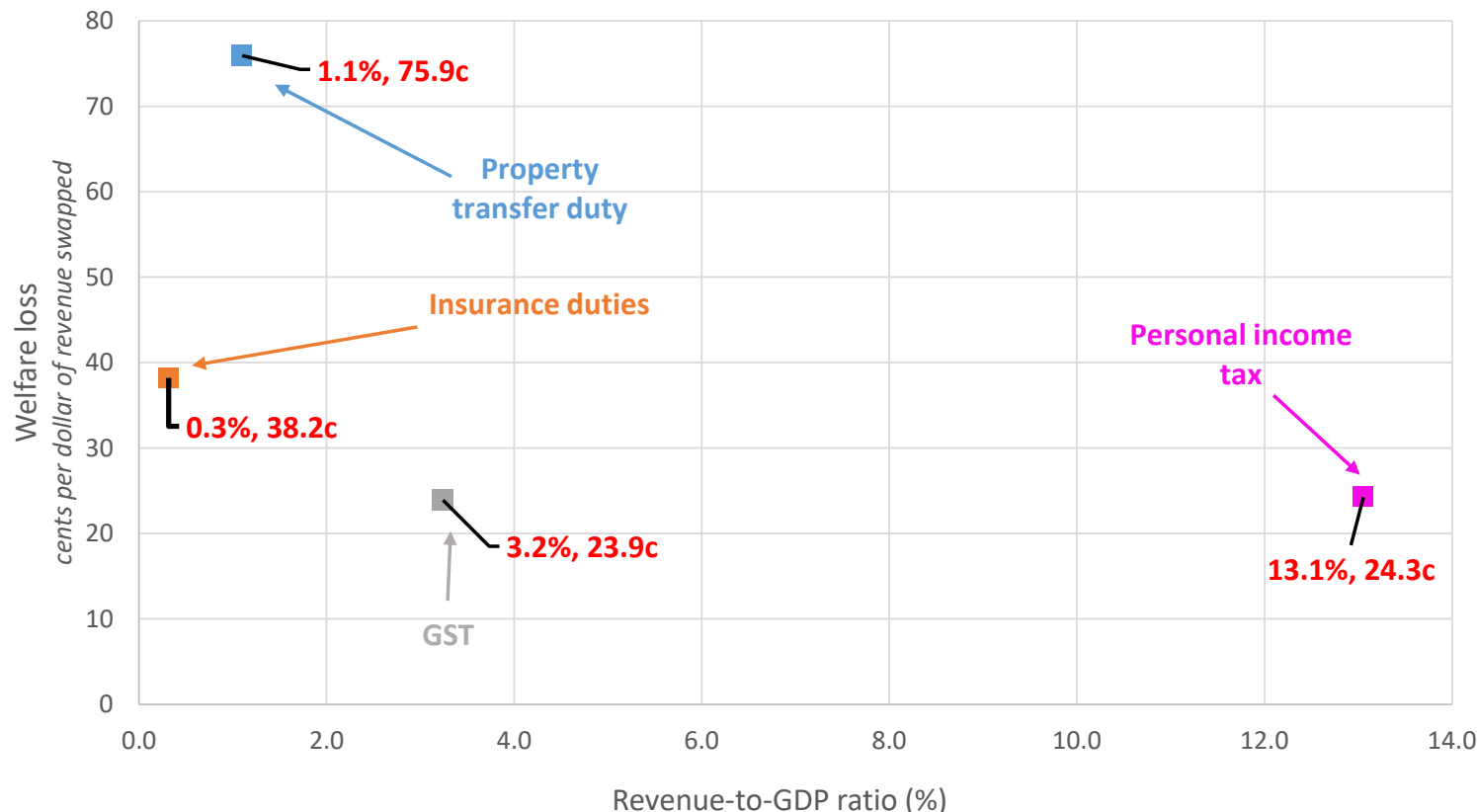


# What do we know?

## The state of play in the welfare impacts of taxation in Australia

- Studies of Australia's tax system using CGE often report rankings of economic costs per unit revenue for many taxes, i.e., the **marginal excess burden (MEB)**.

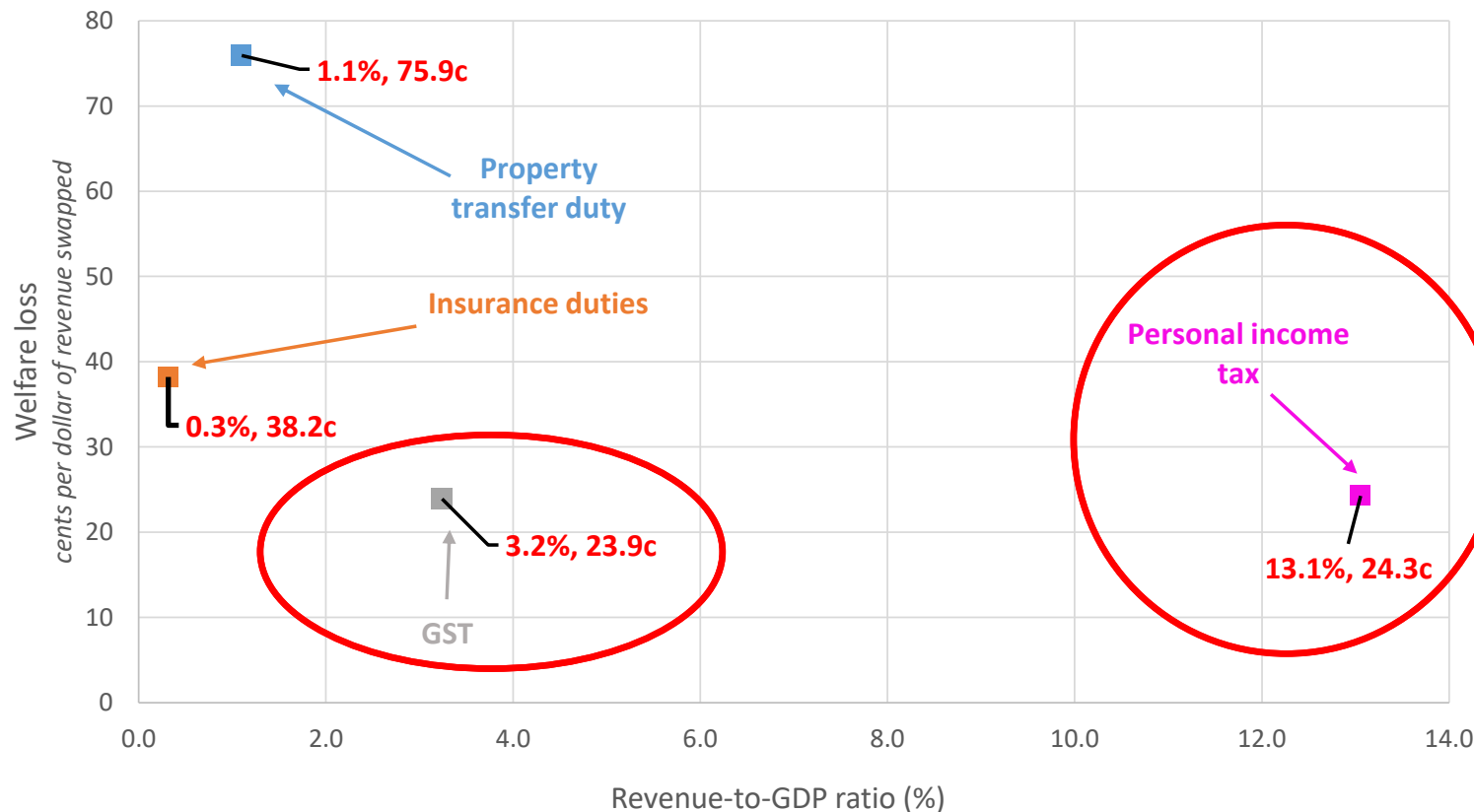
$$MEB(2040) = -100 \cdot \frac{d_{welfare}(2040)}{d_{revenue}(2040)}$$



# Q&A on the state of play

## Question 1

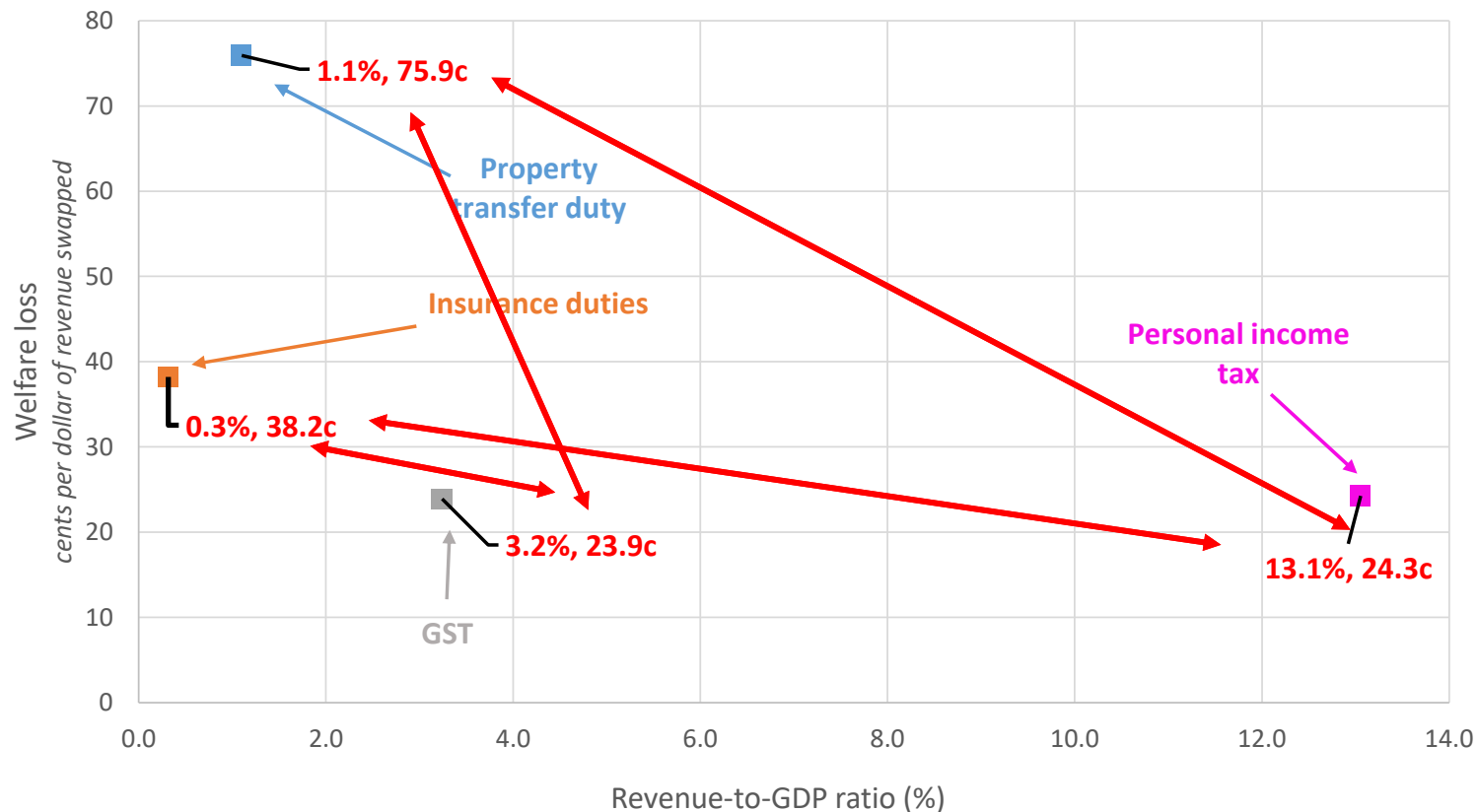
- **Q:** The OECD say Australia relies too much on personal income tax, and should move towards consumption taxes. Discuss.
  - **A:** MEBs are similar. The mix between GST and PIT looks about right.
  - **Policy analyst:** Oh, that is great. Can I try a few more?



# Q&A on the state of play

## Question 2

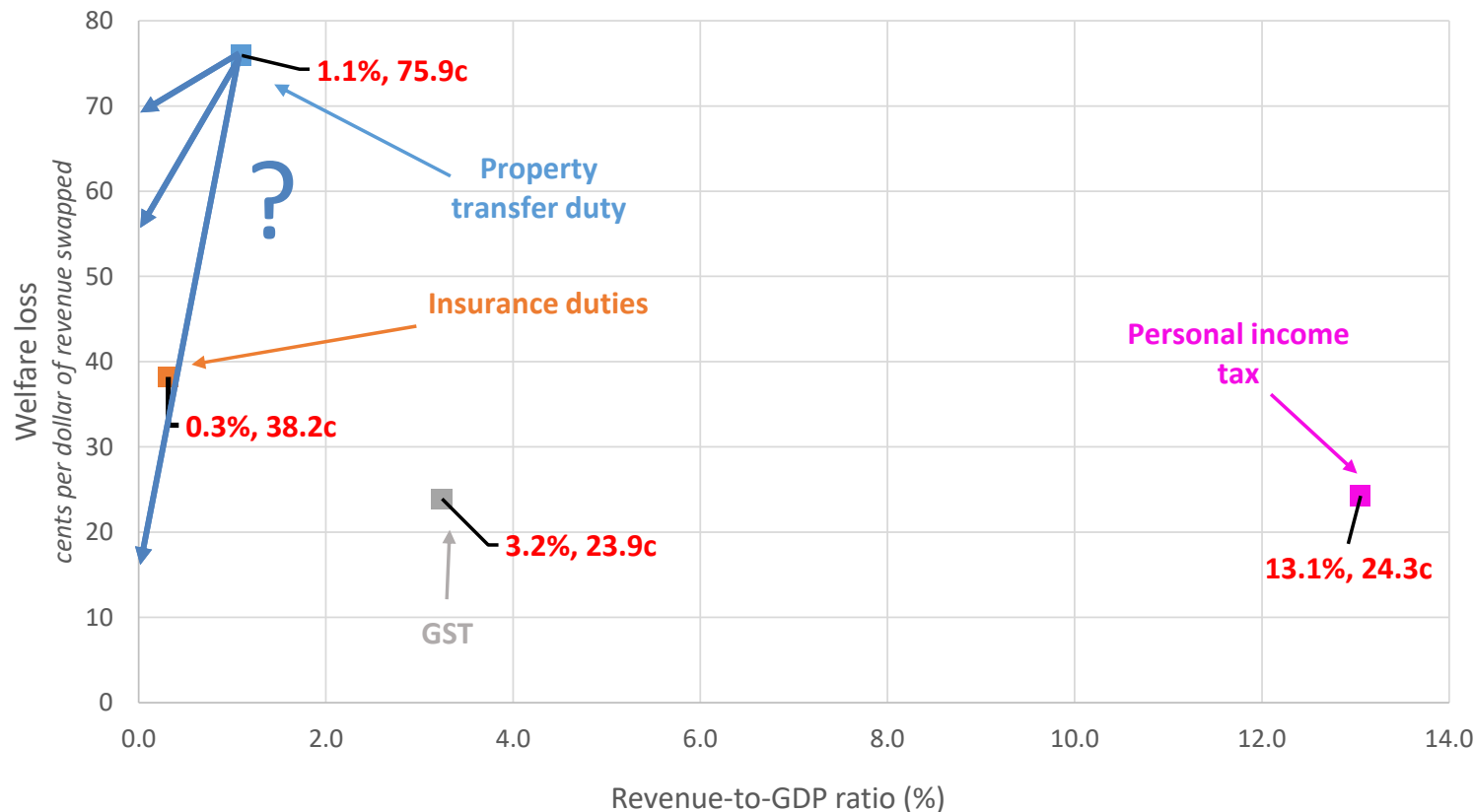
- **Q:** Should Property transfer duty be reduced, or removed? What about insurance duty?
  - **A Part 1:** Reduced certainly, excess burdens very high compared to broad-based federal taxes.



# Q&A on the state of play

## Question 2 cont.

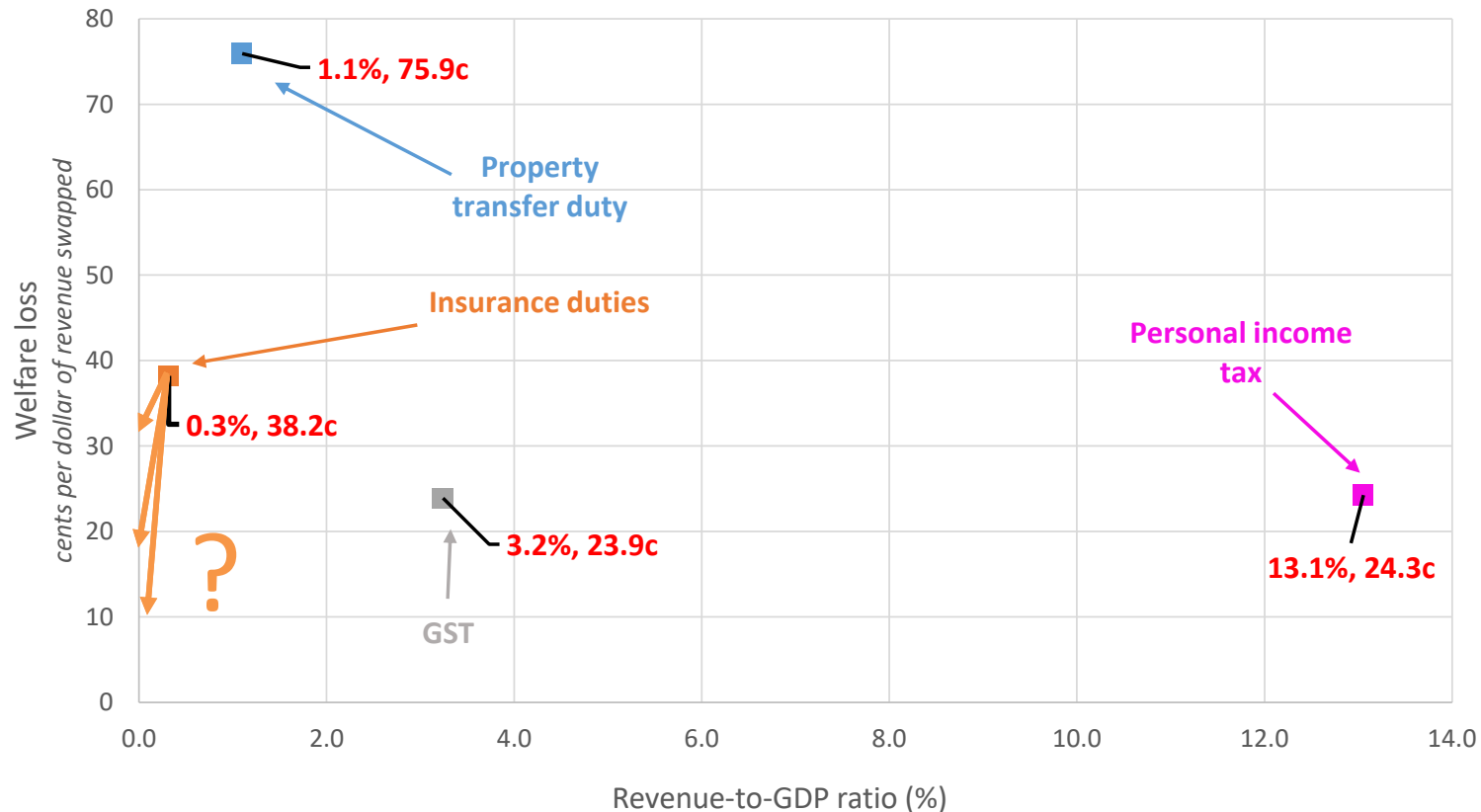
- **Q:** Should Property transfer duty be reduced, or removed? What about insurance duty?
- **A Part 2:** Removed? Not sure. How sensitive are MEBs (y-axis) to decreases in revenue-to-GDP (x-axis)?



# Q&A on the state of play

## Question 2 cont.

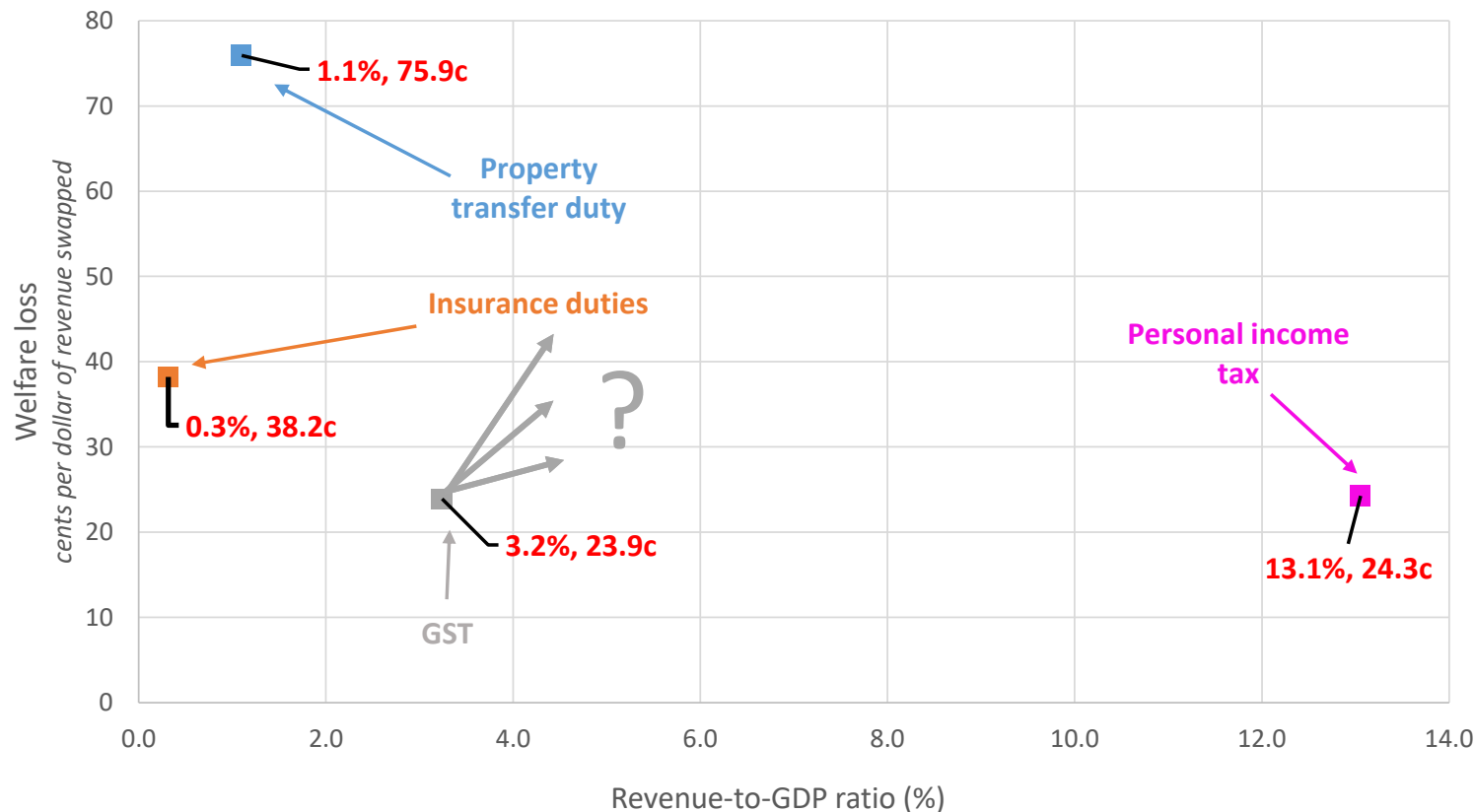
- **Q:** Should Property transfer duty be reduced, or removed? What about insurance duty?
  - **A Part 2:** Removed? Not sure. How sensitive are MEBs (y-axis) to decreases in revenue-to-GDP (x-axis)?
  - **Policy analyst:** Oh...I suppose you helped a little there.



# Q&A on the state of play

## Question 3

- **Q:** If we are talking about federally-assisted replacement of state taxes: should we raise the GST rate, or PIT rates?
  - **A:** Good question...not sure. Would need to know how sensitive MEBs (y-axis) are to increases in revenue-to-GDP (x-axis).

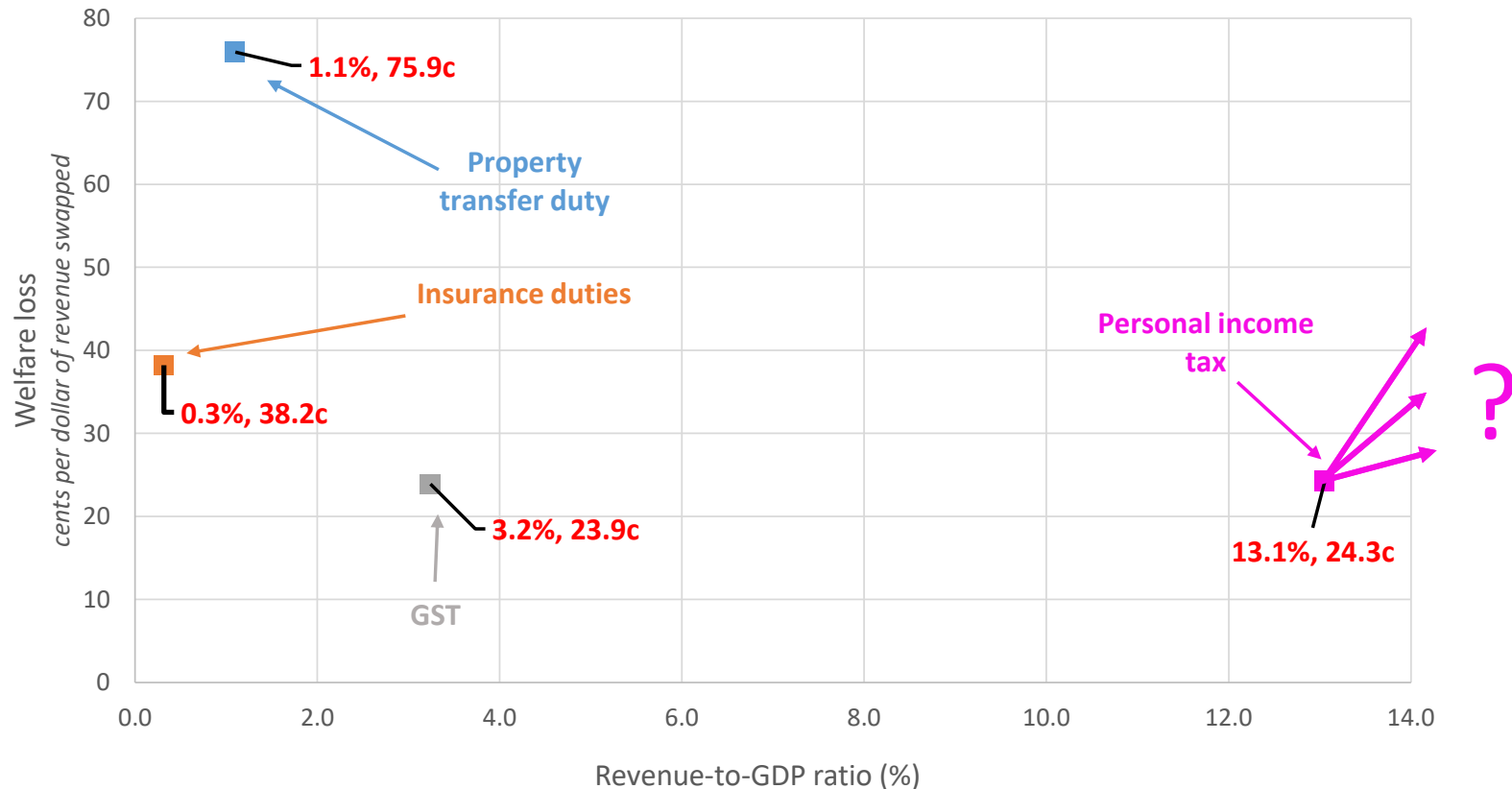




# Q&A on the state of play

## Question 3 cont.

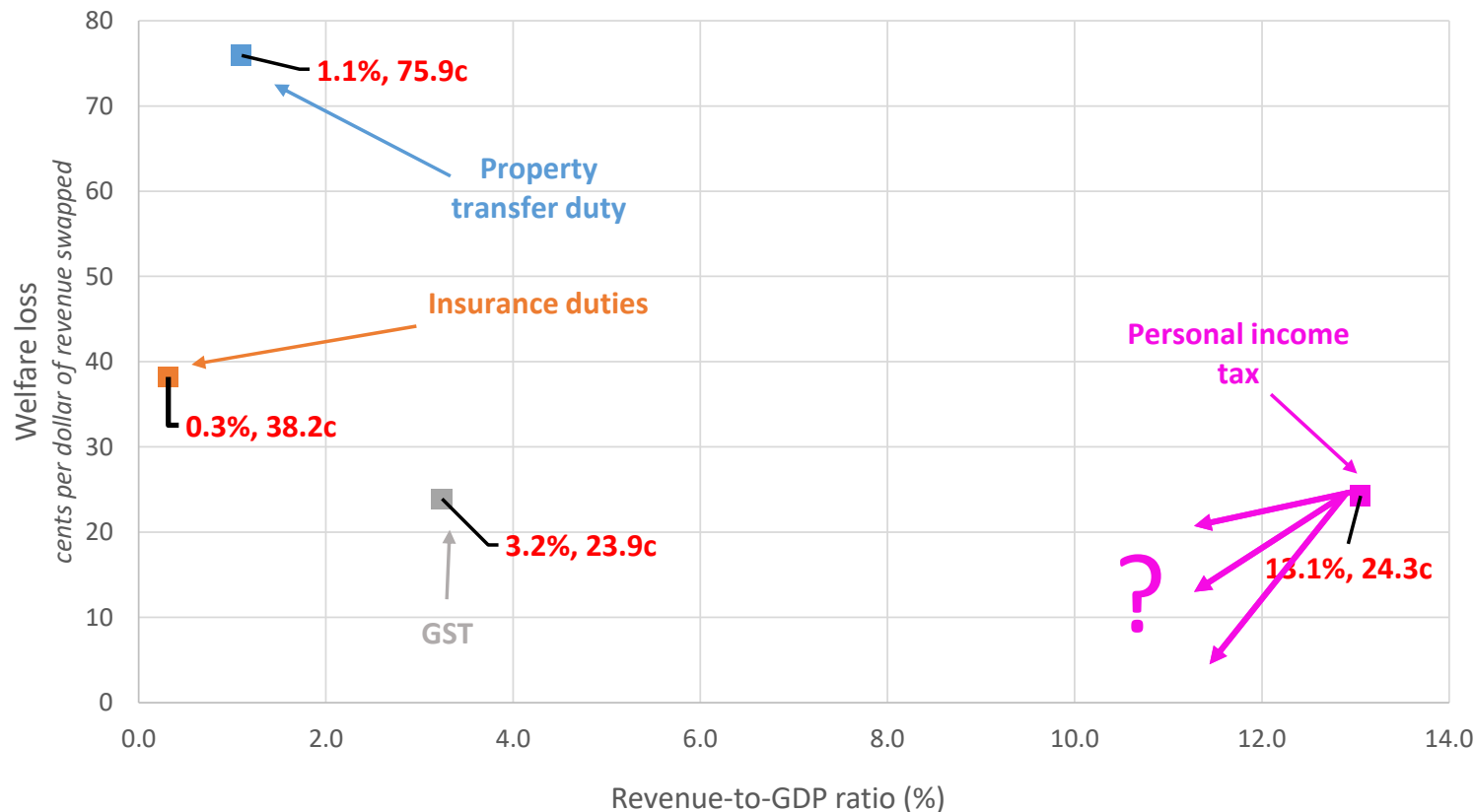
- **Q:** If we are talking about federally-assisted replacement of state taxes: should we raise the GST rate, or PIT rates?
  - **A:** Good question...not sure. Would need to know how sensitive MEBs (y-axis) are to increases in revenue-to-GDP (x-axis).
  - **Policy analyst:** Oh...again



# Q&A on the state of play

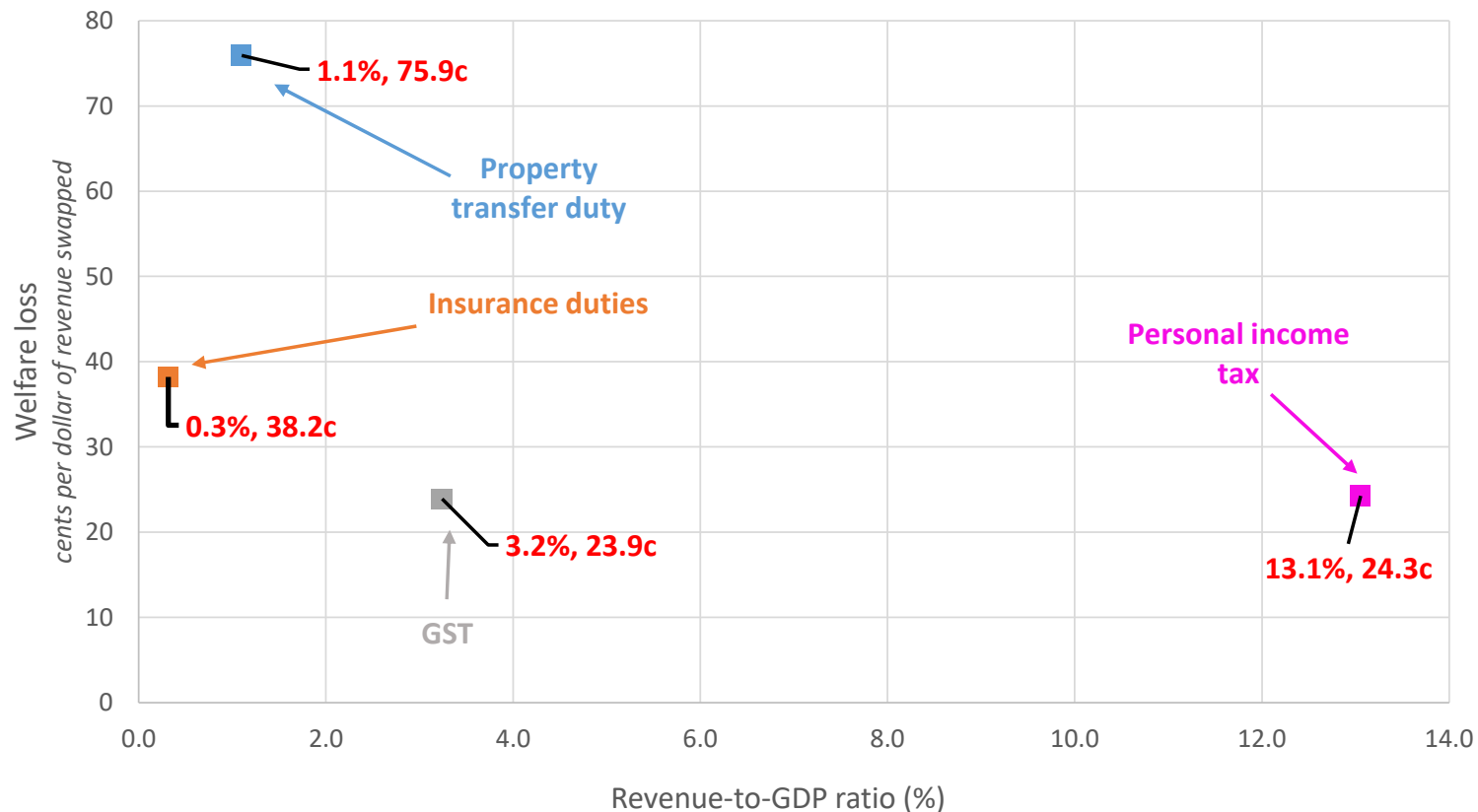
## Question 4

- **Q:** Are personal income tax cuts a priority?
  - **A:** Good question...doesn't look like it. Big gains may materialize if MEB is very sensitive to falls in tax rates, but this chart can't help there.
  - **Policy analyst:** Oh...maybe we try again after some more work.



# What we have vs what we need

- Work to date is useful, but incomplete.
- To inform debate, need to understand how MEBs change as tax rates change.
- This is the focus today.
- Look only at the four taxes introduced thus far.



# Sketch of the approach

## VURMTAX

- Our tool for building MEB distribution functions is VURMTAX.
  - **Recursive-dynamic:** What are the short- and long-run impacts?
  - **Bottom-up multi-regional:** Two layers of government.
  - **High-level tax and subsidy detail:** Approximately thirty tax lines tracked distinctly, along with subsidies like fuel tax credits.
  - **Multi-production:** 86 industries that produce 96 commodities.
    - Housing distinguished by density and tenure type;
    - Industry-specific capital. Endogenous foreign equity ownership. Foreign debt adjusts to finance the current account deficit.

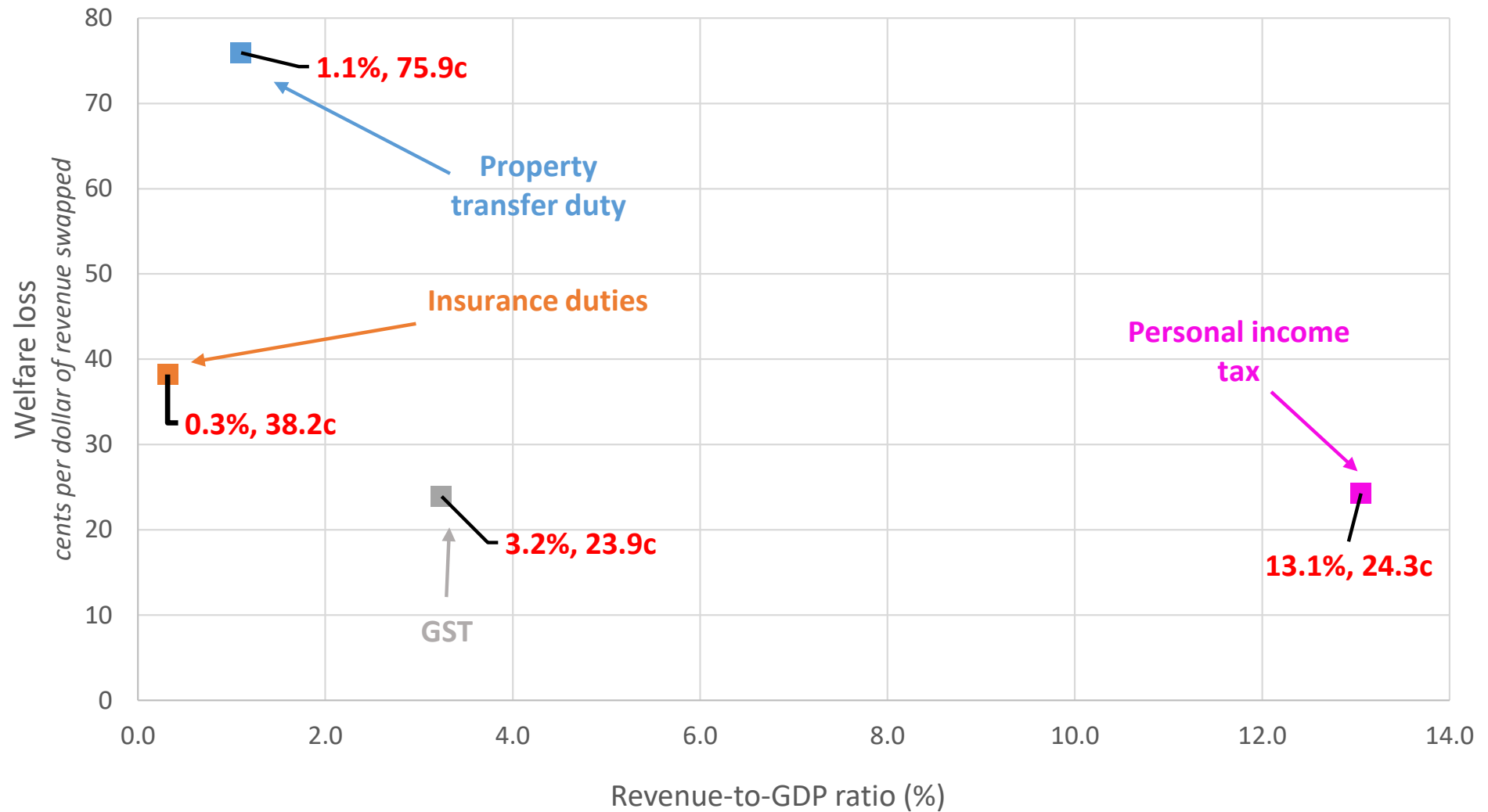
# Sketch of the approach

## Deriving discrete MEB distribution functions

- For each of the **GST**, Personal income tax (**PIT**), Property transfer duty (**TD**), and Insurance duty (**ID**):
  - Run a series of counterfactual simulations for  $k \in [\text{PIT}, \text{GST}, \text{TD}, \text{ID}]$ ;
  - For each  $k$ , incrementally adjustment the tax rate in the counterfactual  $T_k^{\text{Pol}} \in [0.01 T_k^{\text{Base}}, T_k^{\text{Base}}, 1.99 T_k^{\text{Base}}]$ ;
  - Measure changes welfare and aggregate revenue relative to baseline;
  - Compare these deviations across the counterfactuals. This yields the MEB at one point along the MEB distribution for tax  $k$ ;
  - Allows us to build up a set of discrete points along the MEB distribution for each  $k$ .

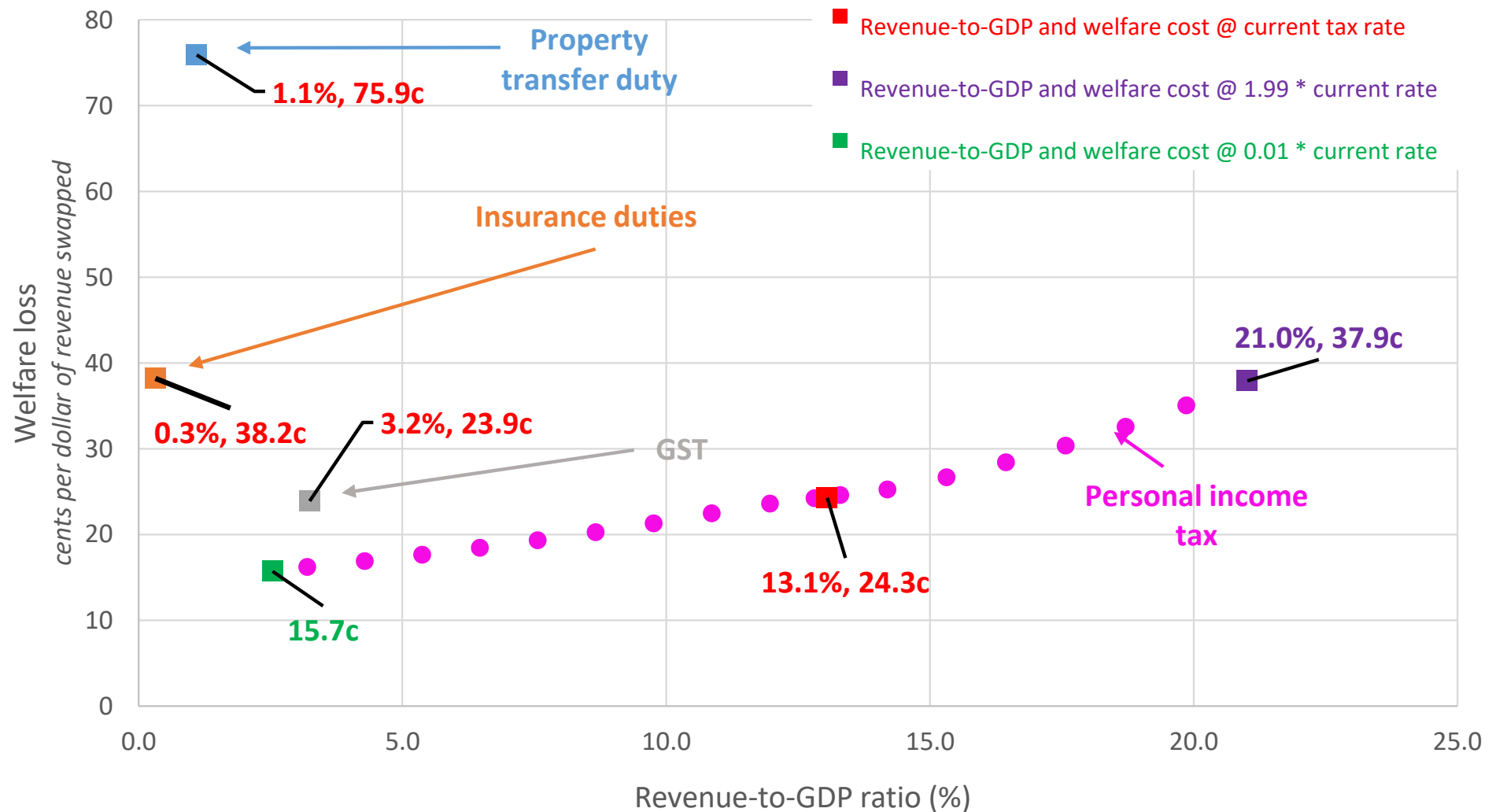
# Discrete MEB distribution functions

## Go from this...



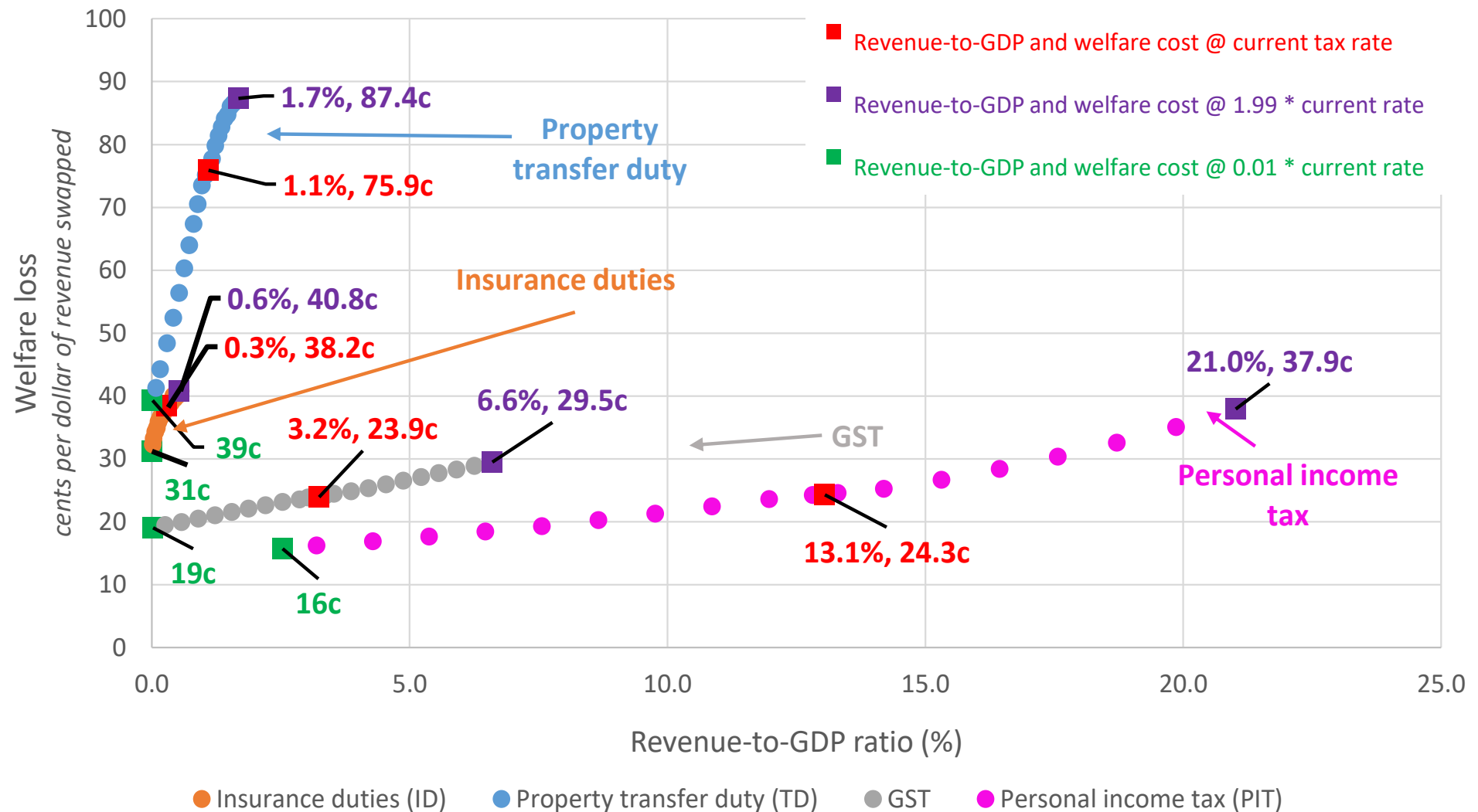
# Discrete MEB distribution functions

## ...to this...



# Discrete MEB distribution functions

## ...then this in 100 simulations!

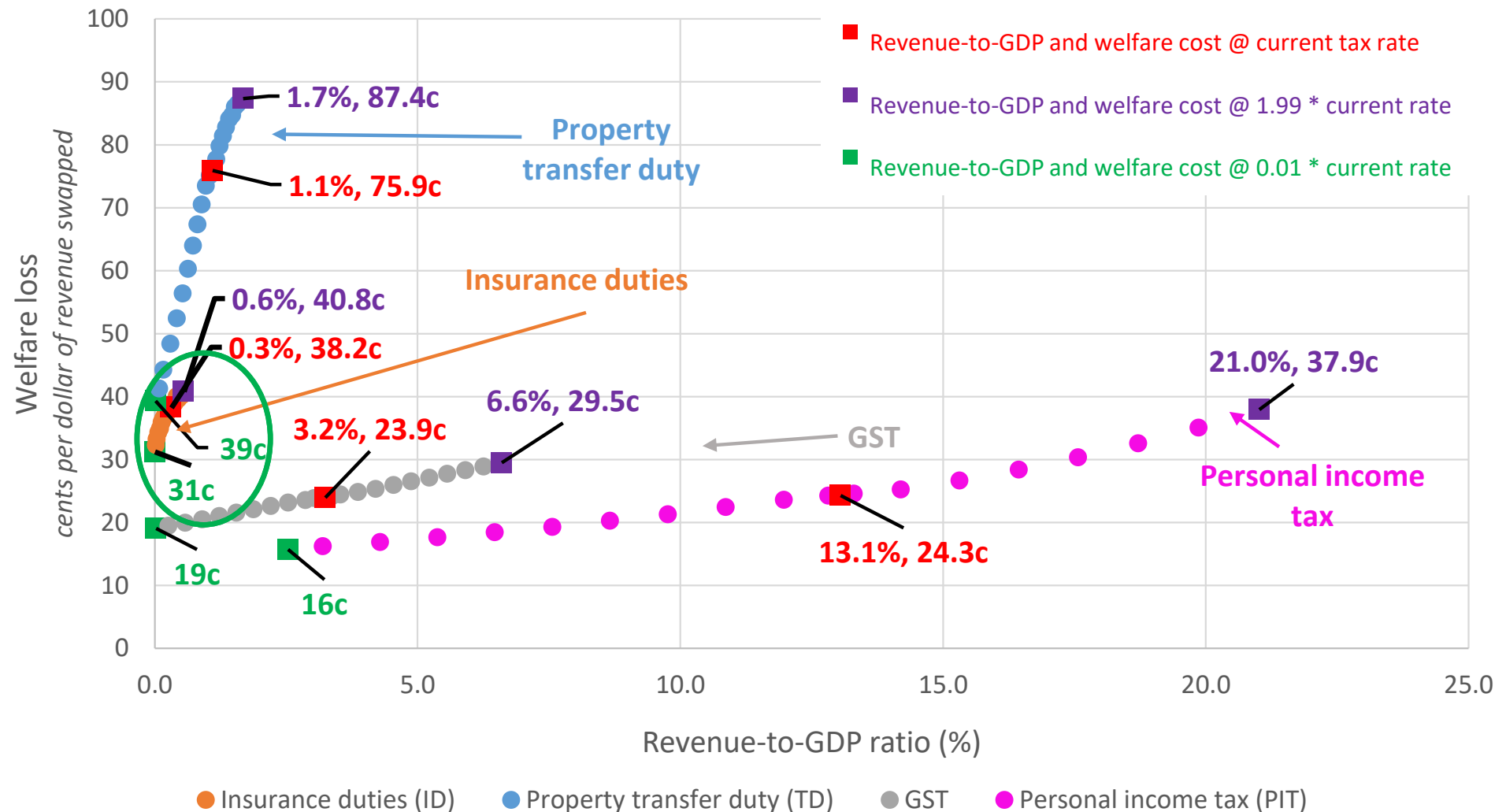




# Discrete MEB distribution functions

## Revisiting Question 2

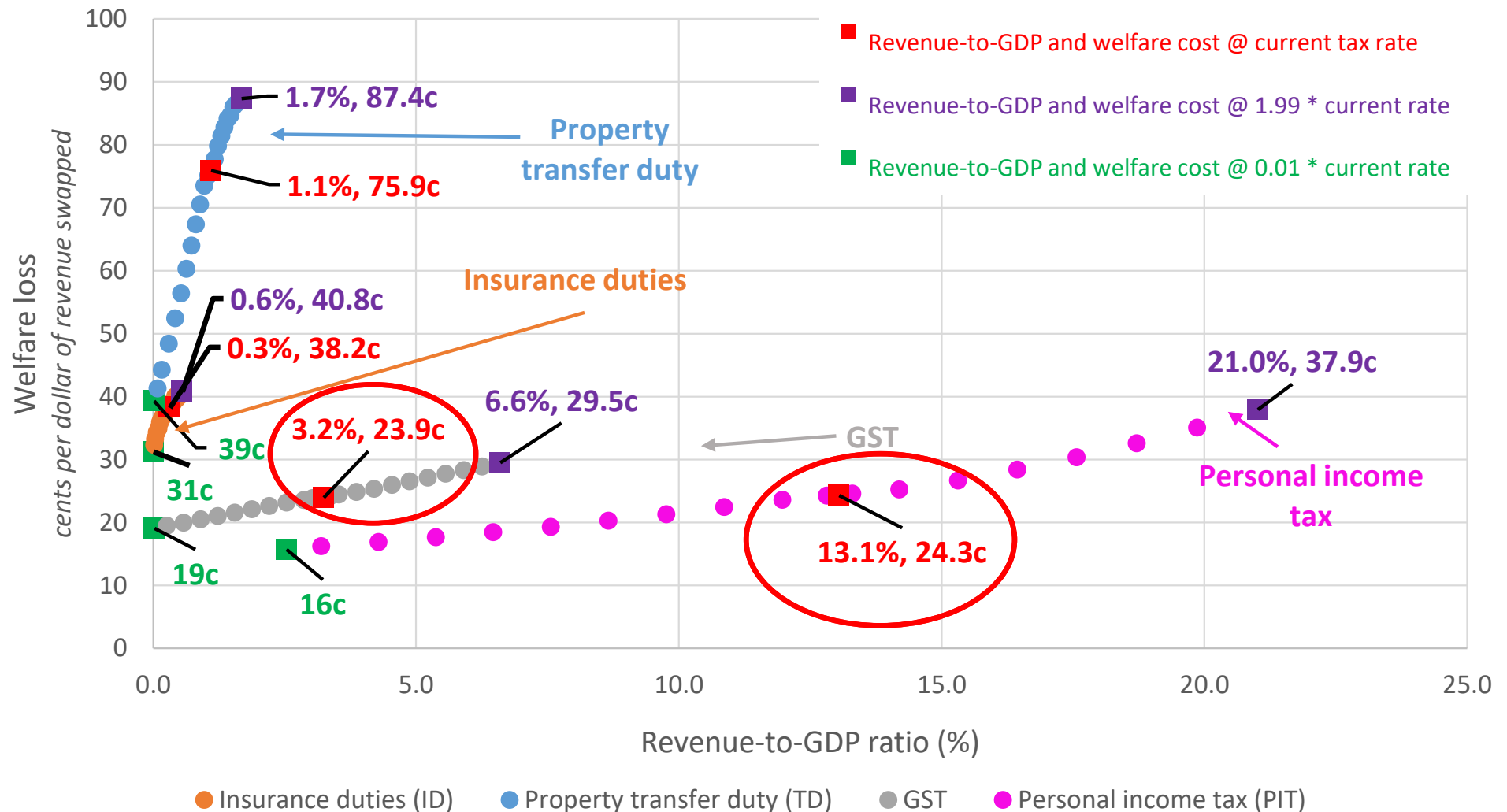
- Q: Should property and insurance duties be removed?
  - A: Removed, certainly. MEBs remain high (39c and 31c) even at low rates.



# Discrete MEB distribution functions

## Revisiting Question 3

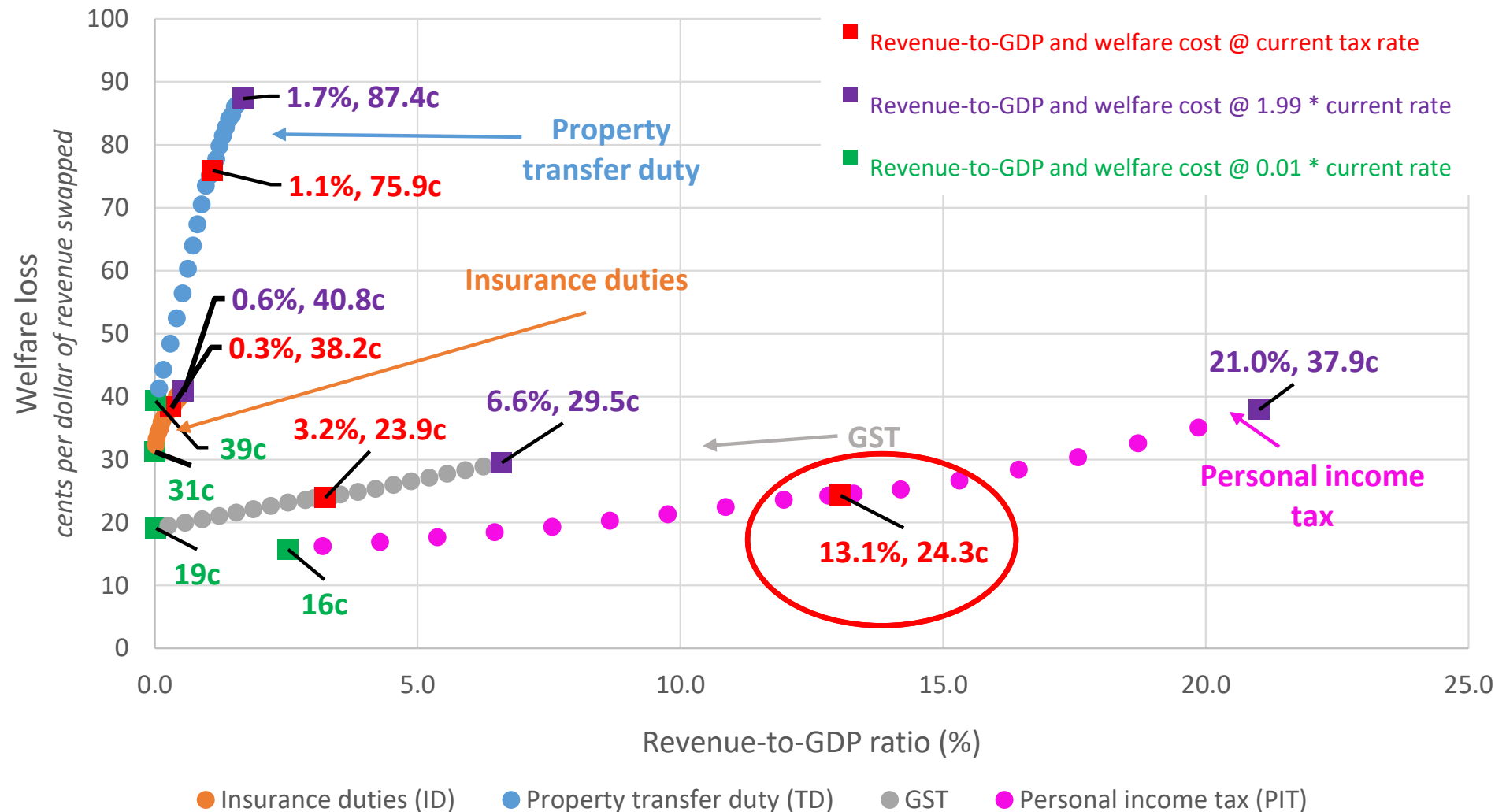
- Q: If federal assistance was forthcoming, do they fund it with GST or PIT rate rises?
  - A: A mix, certainly. Perhaps slight overweight to PIT.



# Discrete MEB distribution functions

## Revisiting Question 4

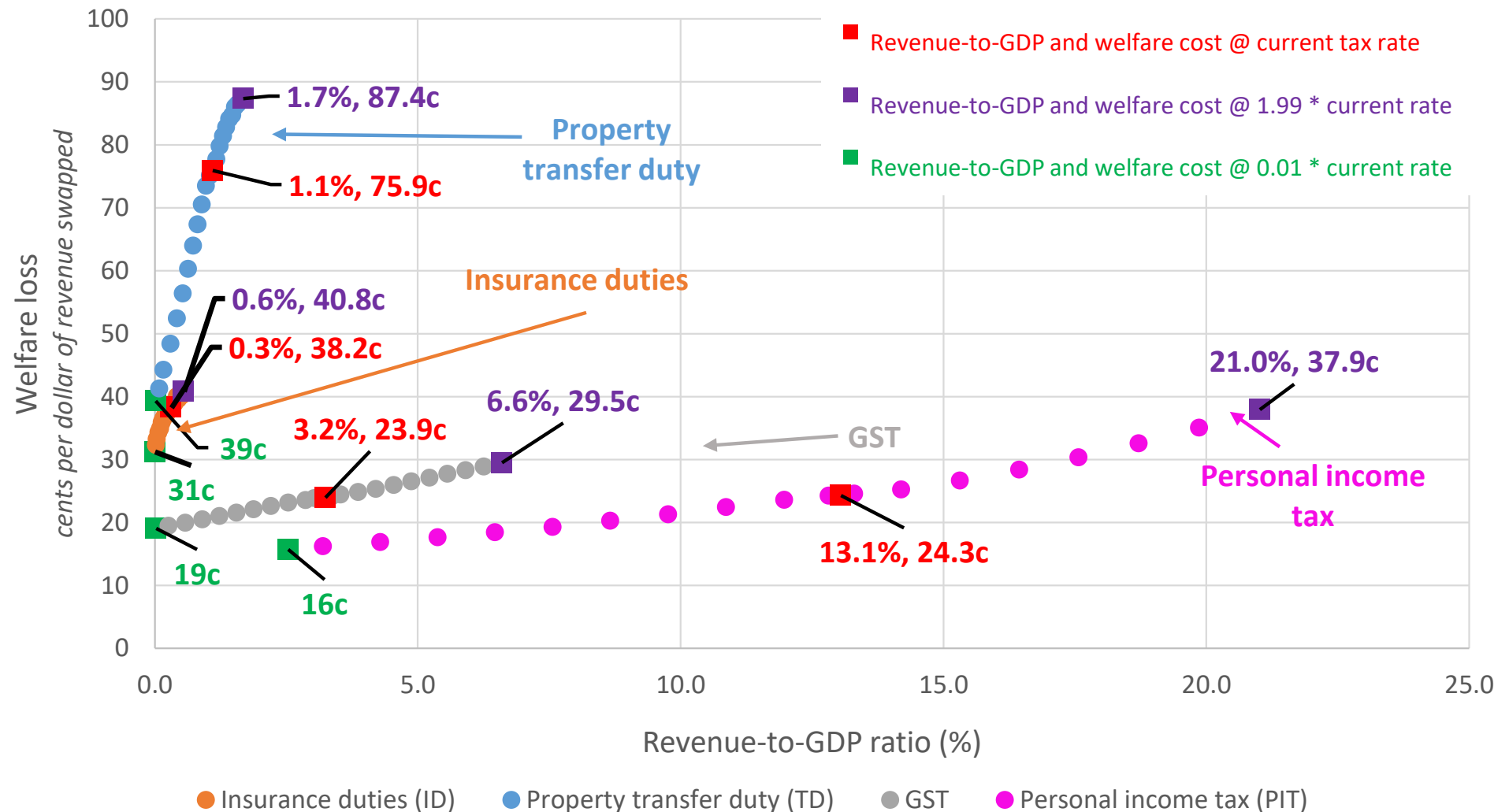
- Q: Are PIT cuts a priority?
  - A: No. MEB distribution looks relatively linear at the current revenue ratio.



# Discrete MEB distribution functions

## Go from this...

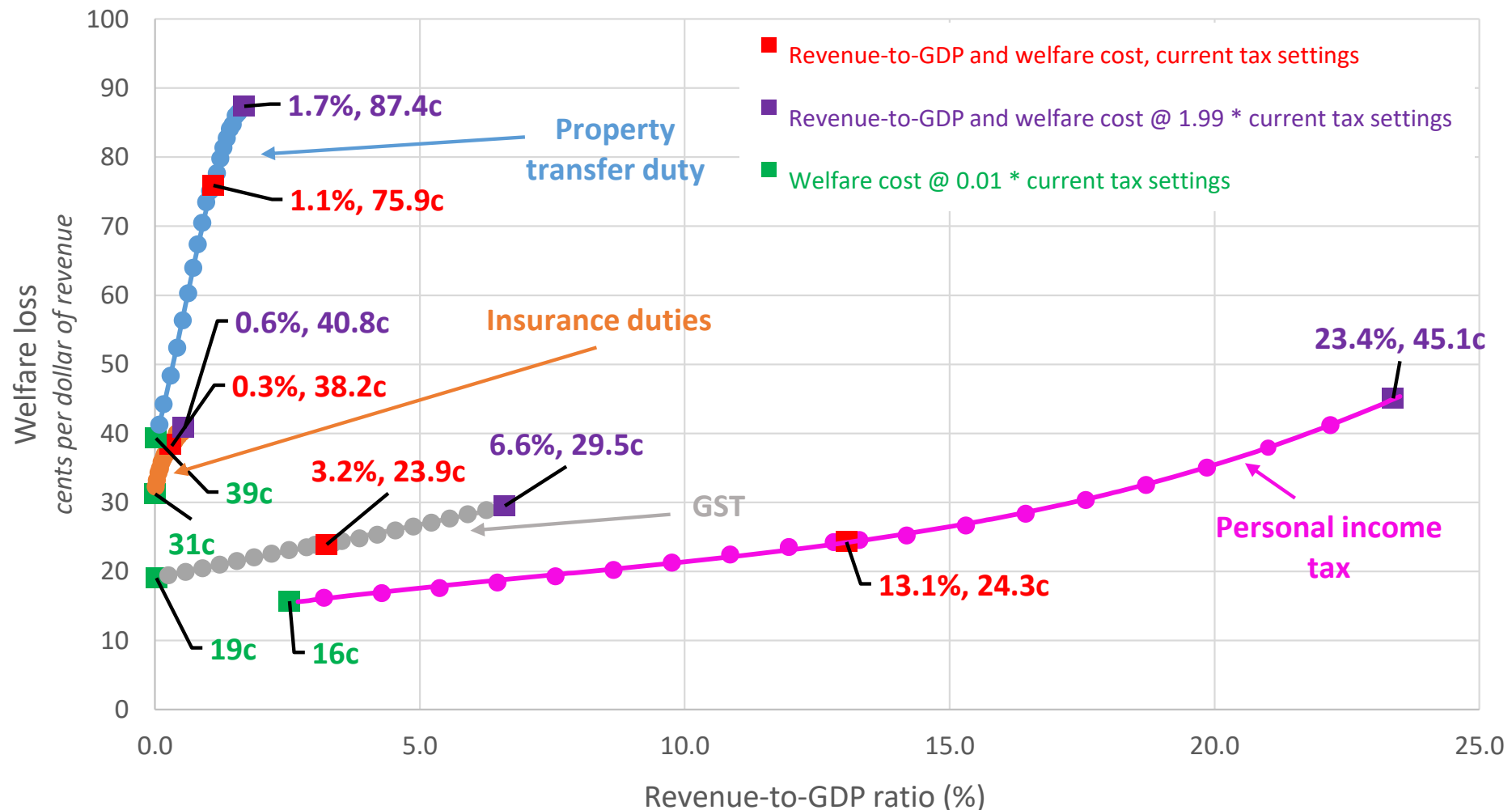
- Q: Discrete MEBs look nice on a graph, but are hard to use. Can we address this?
- A: Yes!



# Continuous MEB distribution functions

## ...to this!

- Using a curve-fitting algorithm, continuous functions can be derived!
- Solve these with a pen and paper to study tax mix changes, welfare gains etc.
- Agreement with data is excellent.



# Continuous MEB distribution functions

## Polynomials: easy to understand and solve

- Paper covers two functional forms. Only one today!
- Form differ w.r.t the independent variable choice.
  - If using revenue-to-GDP (R2GDP, equation 7 in paper) equations are:

Intercept is the MEB  
when tax rate is 1% its  
current level

$$MEB_{GST}^{2040}(R2GDP) = 19.1^{***} + 1.55^{***} R2GDP, \quad (1a)$$

$$MEB_{PIT}^{2040}(R2GDP) = 12.6^{***} + 1.30^{***} R2GDP - 0.076^{***} R2GDP^2 + 0.0034^{***} R2GDP^3, \quad (1b)$$

$$MEB_{ID}^{2040}(R2GDP) = 31.5^{***} + 43.6^{***} R2GDP - 91.7^{***} R2GDP^2 + 78.6^{***} R2GDP^3, \quad (1c)$$

$$MEB_{TD}^{2040}(R2GDP) = 38.7^{***} + 29.6^{***} R2GDP + 13.1^{***} R2GDP^2 - 8.05^{***} R2GDP^3. \quad (1d)$$

# Continuous MEB distribution functions

## Application: Revisit Q3 to derive optimal GST/PIT replacement mix

- Should federal assistance to remove TD and ID be funded by GST, PIT or both?
  - **A:** Almost 50/50, it turns out!
    - Need to replace 1.4% of R2GDP - equal to current TD and ID revenue;
    - GST and PIT are worth 3.2% and 13.1% R2GDP;
    - GST target revenue is  $A + 3.2$ ;
    - PIT target revenue is  $13.1 + 1.4 - A = 14.5 - A$ . Yields:

$$MEB_{GST}^{2040}(A) = 19.1 + 1.55 \cdot (3.2 + A), \quad (2a)$$

$$MEB_{PIT}^{2040}(A) = 12.6 + 1.30 \cdot (14.5 - A) - 0.076 \cdot (14.5 - A)^2 + 0.0034 \cdot (14.5 - A)^3. \quad (2b)$$

- 2 equations, 3 unknowns ( $A$ ,  $MEB_{PIT}$ ,  $MEB_{GST}$ );
- Seek a solution for  $A$  where the  $MEB_{PIT} = MEB_{GST}$ ;
- Find  $A = 0.65$ , or about 48% of total replacement revenue should come from the GST, remainder from the PIT.

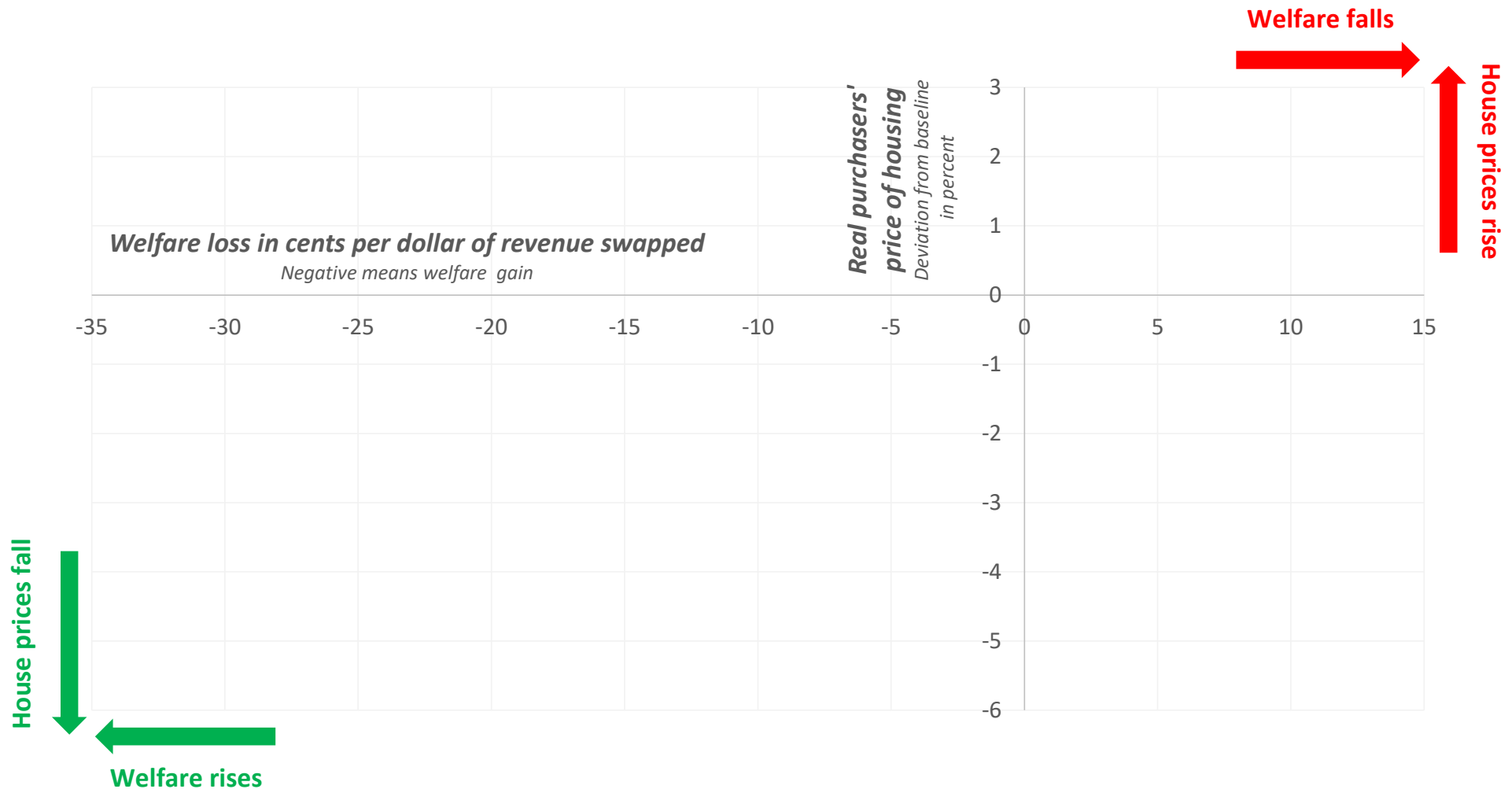
# Summary and future work

- The tax system is complicated! But...
- ...focusing on measures like the MEB at the current tax rate oversimplifies matters.
- **One metric does not rule them all!**
- **Are state taxes inefficient?**
  - Yes, at their current rates they are. But...
  - We need to understand how MEBs change as rates change to discuss Australia's future tax system;
  - Lots of work to do. More than 100 distinct taxes in Australia!
- **Is there more to the tax debate than MEBs though? Absolutely!**
  - What does property tax reform do to housing prices, for example?

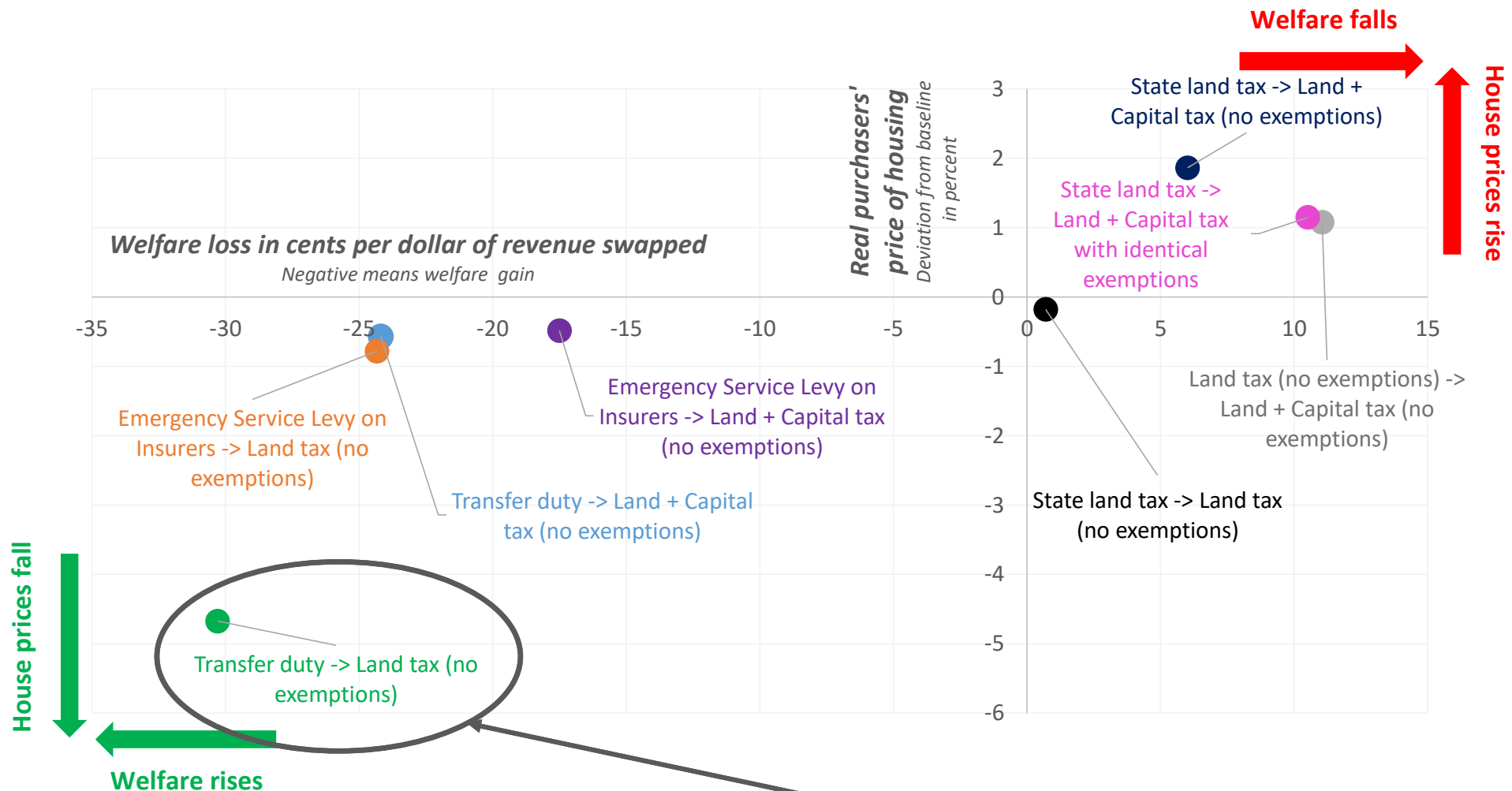




# Thinking multidimensionally...



# ...can enrich policy advice!



Prices fall on average, but compositional change is evident. In the paper we show why low-density prices fall, yet high-density prices rise.