

Financial Incentives and Municipal Solid Waste Expenditures

Michal Struk

Masaryk University

Potential of financial incentives in MSW management

- Performance of MSWM depends both on the designed system, available infrastructure and the behavior of the people
- Nudge theory (Thaler, Sunstein, 2008) suggests that, if provided with the appropriate incentives, people can be nudged to act in a desired way, while still having option not to choose so
 - Little to no additional costs from the municipality are necessary, if the choices are correctly designed
 - On contrary, the whole system can actually become cheaper while having a better performance

Objective of the study

- What types of financial incentives are used in MSW management (in the Czech Republic)?
- How do municipalities with different types of financial incentives perform in MSWM from the economic perspective?
 - Positive environmental impacts already proved in previous studies

Types of financial incentives in MSWM

- PAYT (Pay-as-you-throw)
 - Most common type of financial incentive in MSWM
 - People pay for additional generated waste
 - Usually based on volume or weight
 - A negative type of incentive using punishments
 - Positives include motivation to reduce waste generation
 - Negatives include unwanted behavior such as illegal dumping, waste burning, etc.
- Suitable for regular housing structure with door-to-door collection – direct link between waste and the producer (municipal citizens)

Types of financial incentives in MSWM

- Reversed PAYT or tax rebate (other alternatives available)
 - Most common type in the Czech Republic
 - People pay flat annual fee and depending of the waste separation performance get discount
 - Regular kerbside collection of selected recyclable waste fractions from individual households using unique stickers or barcodes
 - Bag collection of paper, plastics, tetrapak...
 - Rewards for household up to 70% depending on the conditions
 - A positive type of incentive using rewards
 - Positives include much higher waste separation rate and no motivation for unwanted waste-related behavior
 - Negatives include less pressure towards reducing overall waste generation compared to the regular PAYT

Descriptive statistics of the sample

| | | 2010 | 2011 | 2012 | 2013 | 2014 |
|-------------------------|--------------------------|--------|--------|--------|--------|--------|
| Population | Min | 34 | 33 | 33 | 36 | 35 |
| | 2 nd quartile | 270 | 270 | 272 | 274 | 274 |
| | Median | 549 | 556 | 560 | 568 | 576 |
| | 4 th quartile | 1 025 | 1 032 | 1 043 | 1 056 | 1 065 |
| | Max | 34 078 | 34 073 | 33 964 | 33 805 | 33 761 |
| MSWE p.c. (CZK/year) | Min | 112 | 116 | 178 | 170 | 267 |
| | 2 nd quartile | 500 | 507 | 539 | 540 | 553 |
| | Median | 603 | 613 | 627 | 631 | 649 |
| | 4 th quartile | 714 | 724 | 751 | 753 | 782 |
| | Max | 3 791 | 3 679 | 3 823 | 3 546 | 3 417 |

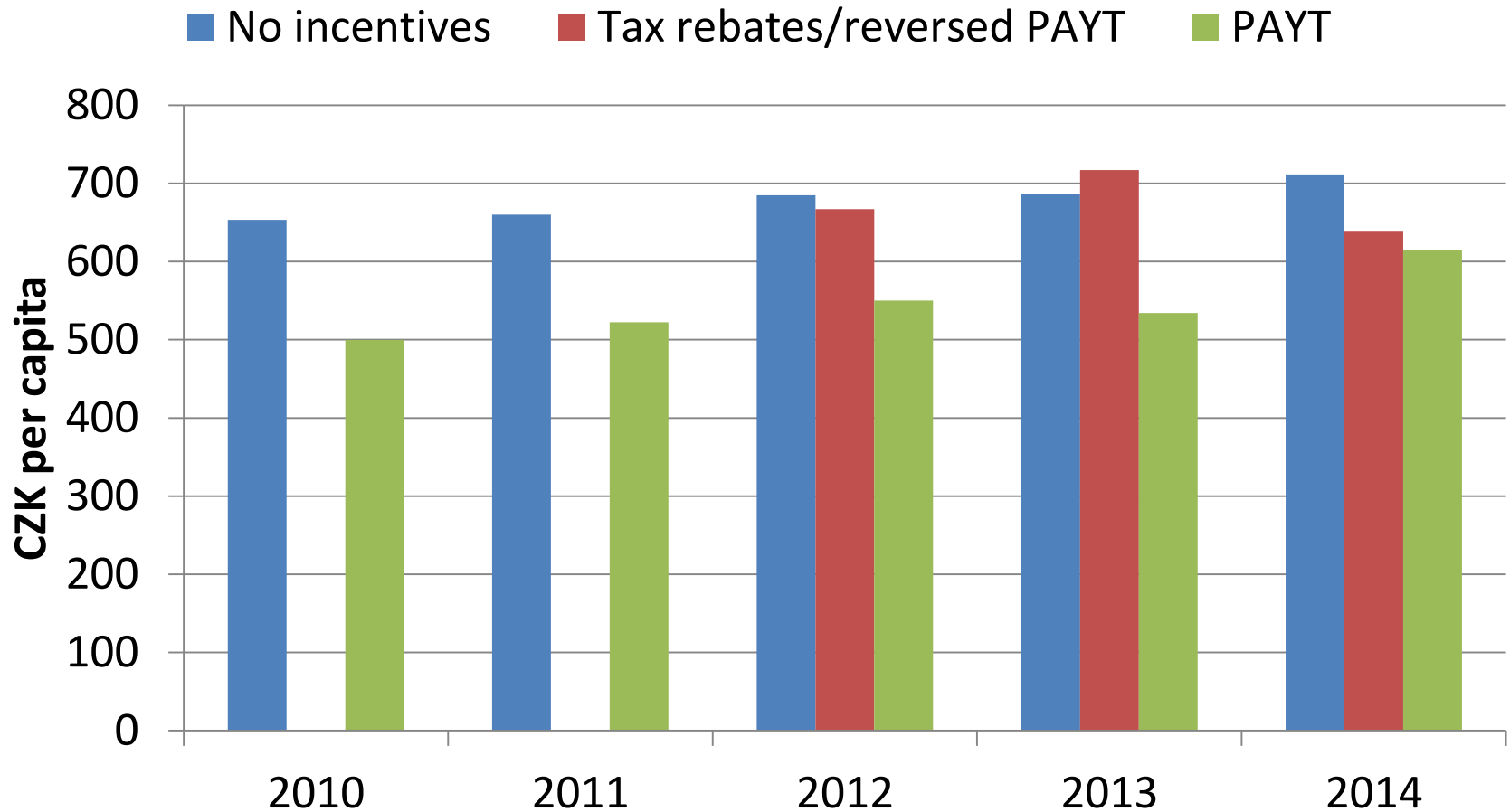
- Sample of 534 municipalities in the Czech Republic
 - Very high fragmentation (over 6000 municipalities in CZE)
 - Only current MSW expenditures (day-to-day activities) used

Financial incentives utilization in MSW management

| | 2010 | 2011 | 2012 | 2013 | 2014 |
|---------------------------|------|------|------|------|------|
| No incentives | 529 | 529 | 526 | 522 | 519 |
| PAYT | 4 | 4 | 4 | 4 | 4 |
| Tax rebates/reversed PAYT | 1 | 1 | 4 | 8 | 11 |

- Financial incentives in MSWM are so far not very popular in the Czech Republic
 - But situation is improving, currently several dozens of municipalities use incentives
 - Possibility to learn from early adopters including results

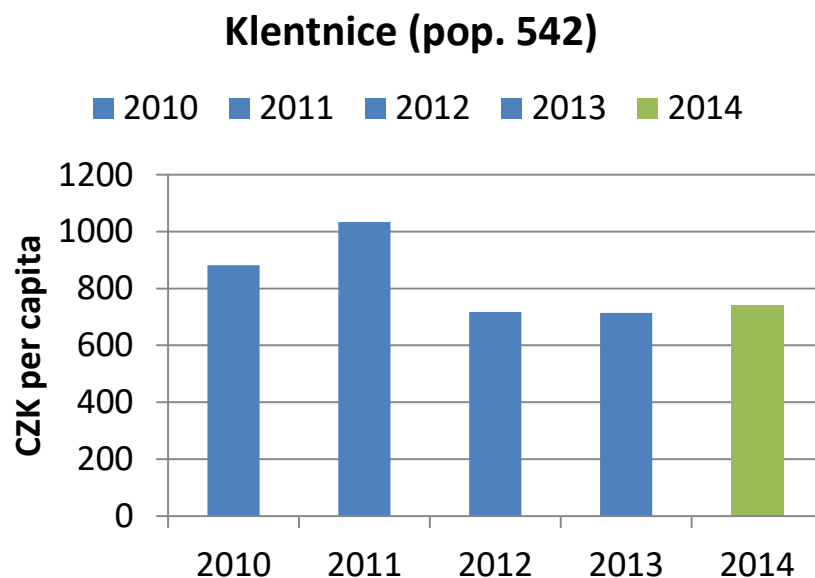
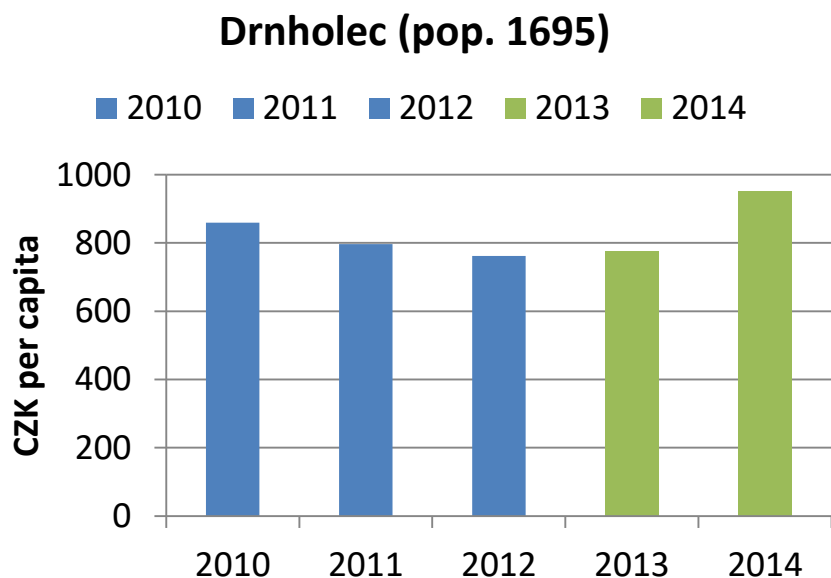
MSWE and financial incentives



MSWE and financial incentives

- MSW expenditures of municipalities without incentives continuously rise
 - Increase by almost 9% in 5-year period
- Municipalities using PAYT have approximately 20% lower MSW expenditures
 - But there are certain PAYT-related issues
- Municipalities using reversed PAYT tend to have lower MSWE after initial “adaptation” period

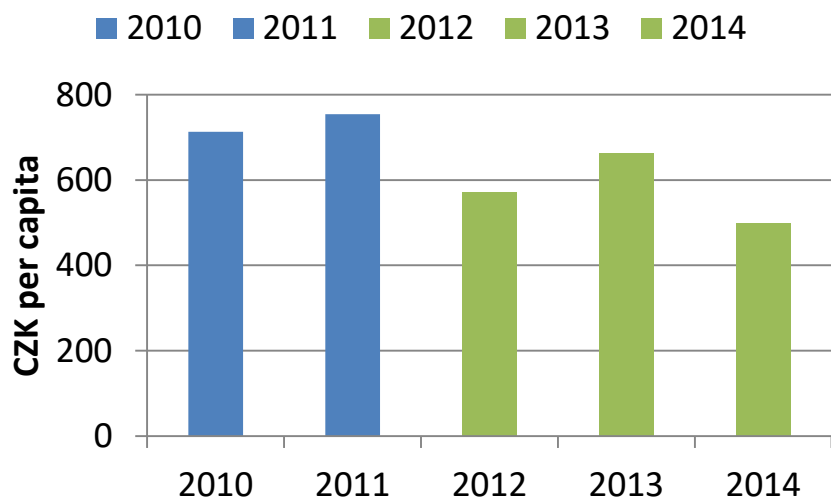
Reversed PAYT adopters (group 1)



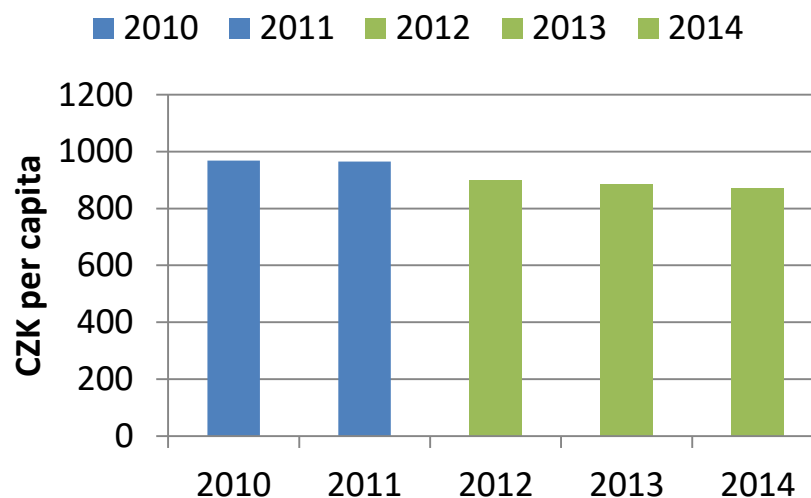
- Little to no impact on the MSW expenditure
 - 2014 spike likely due to the biowaste collection
- Strong positive environmental impact as well

Reversed PAYT adopters (group 2)

Březí (pop. 1547)

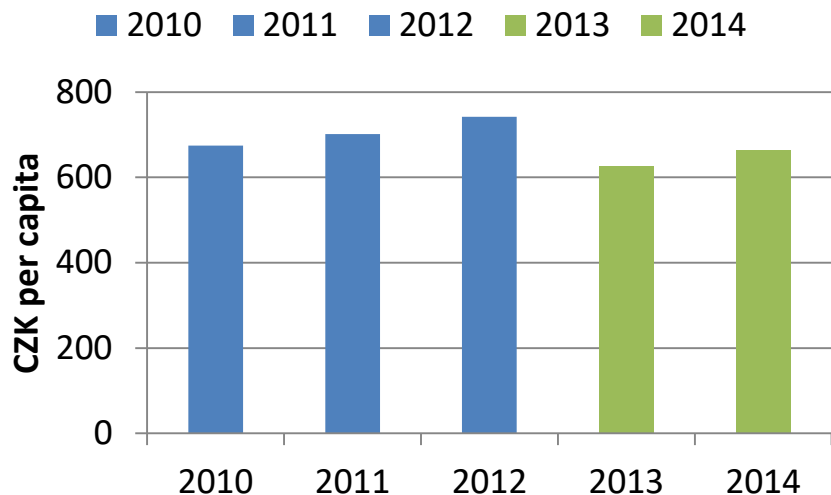


Mikulov (pop. 7410)

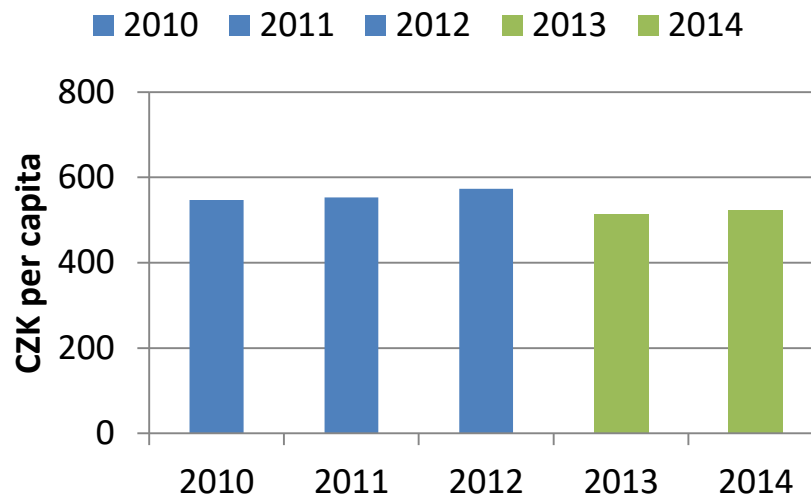


- Positive impact of financial incentives on MSWE from the initial period

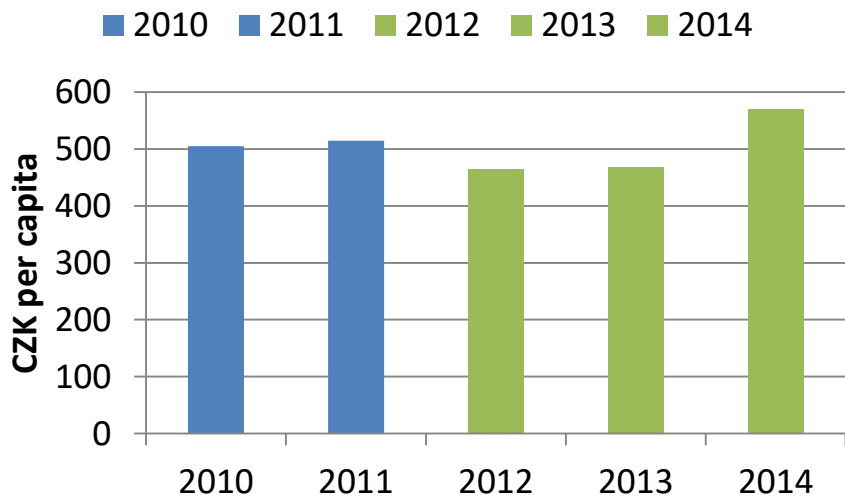
Dobšice (pop. 2521)



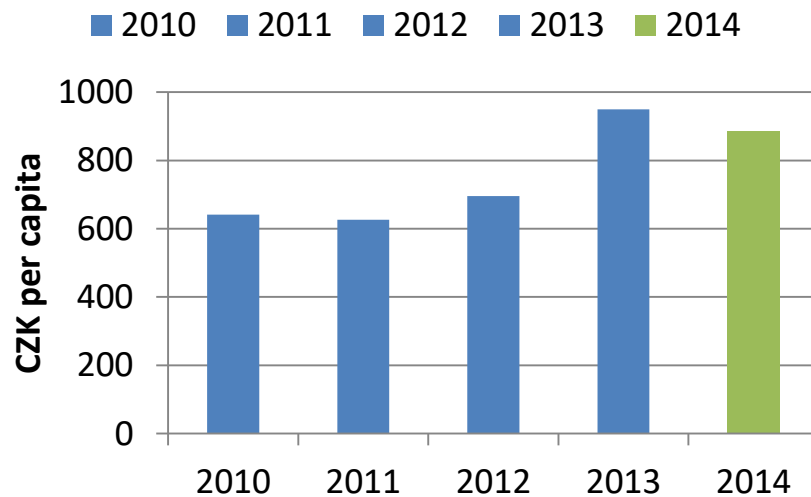
Jevišovka (pop. 617)



Křepice (pop. 1322)

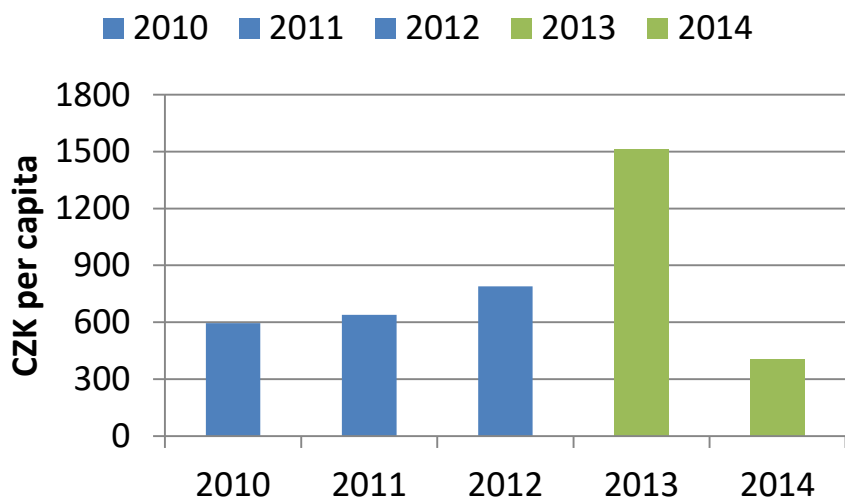


Ostopovice (pop. 1564)

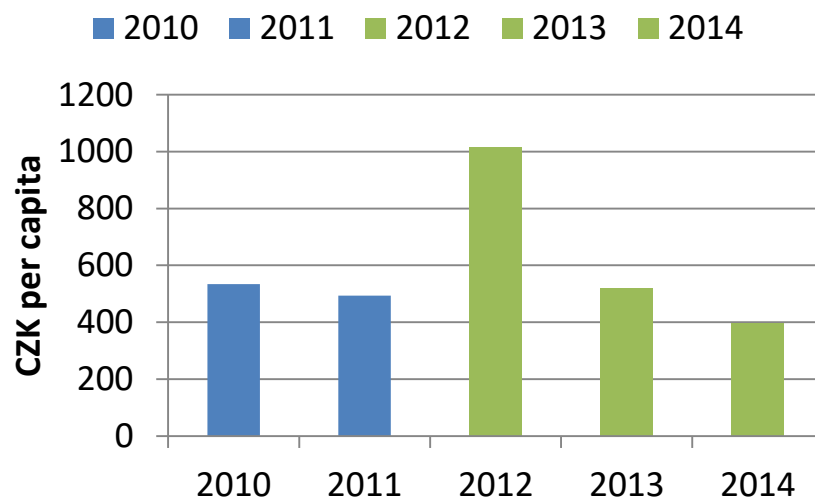


Reversed PAYT adopters (group 3)

Kobylí (pop. 2102)



Šitbořice (pop. 1929)



- Substantial increase of MSWE in the initial period
- Followed by a steep drop in the next period
 - Caused by costs related to introducing new system

Concluding observations

- Well designed incentive system and appropriately introduced to the people can have both environmental and economic benefits
 - Savings can often outweighing the related costs
 - Very high potential of incentives and nudging in MSW management
- PAYT and reversed PAYT are most common financial incentive systems in MSWM in the Czech Republic
 - Both have pros and cons, there is no one-size-fits-all solution
- Depending on the introduction process, results in form of savings and improved MSWM performance might take some time to occur
- Initial investments to introducing new waste management system are sometimes required
 - But **informing and educating citizens is crucial** and can significantly affect the outcomes of new system (people can actually do significant amount of work)
 - Common suggestion is to influence local opinion leaders

- Thank you for your attention

- Michal Struk
- struk@mail.muni.cz
- www.researchgate.net/profile/Michal_Struk