Faculty of Sciences, Technology and Communication

Work place relocation and mobility changes in a transnational metropolitan area: The case of the University of Luxembourg

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Scope of the presentation

- Objectives of the paper
- Context
  - Commuting mobility in Luxembourg
  - The University of Luxembourg
- Literature review
  - Impacts of workplace relocation
  - Transport Demand Management measures
- Data & methodology
  - Travel survey & data processing
  - Discrete Choice Modelling
- Analysis
  - Distance variation due to workplace relocation
  - Scenario development and results
- Conclusion

Objectives

Objectives of the paper:

- Will the University relocation have a strong impact on the staff members commuting mode choice ?
- In the new suburban area, what would be the impact of Transport Demand Management measures ?

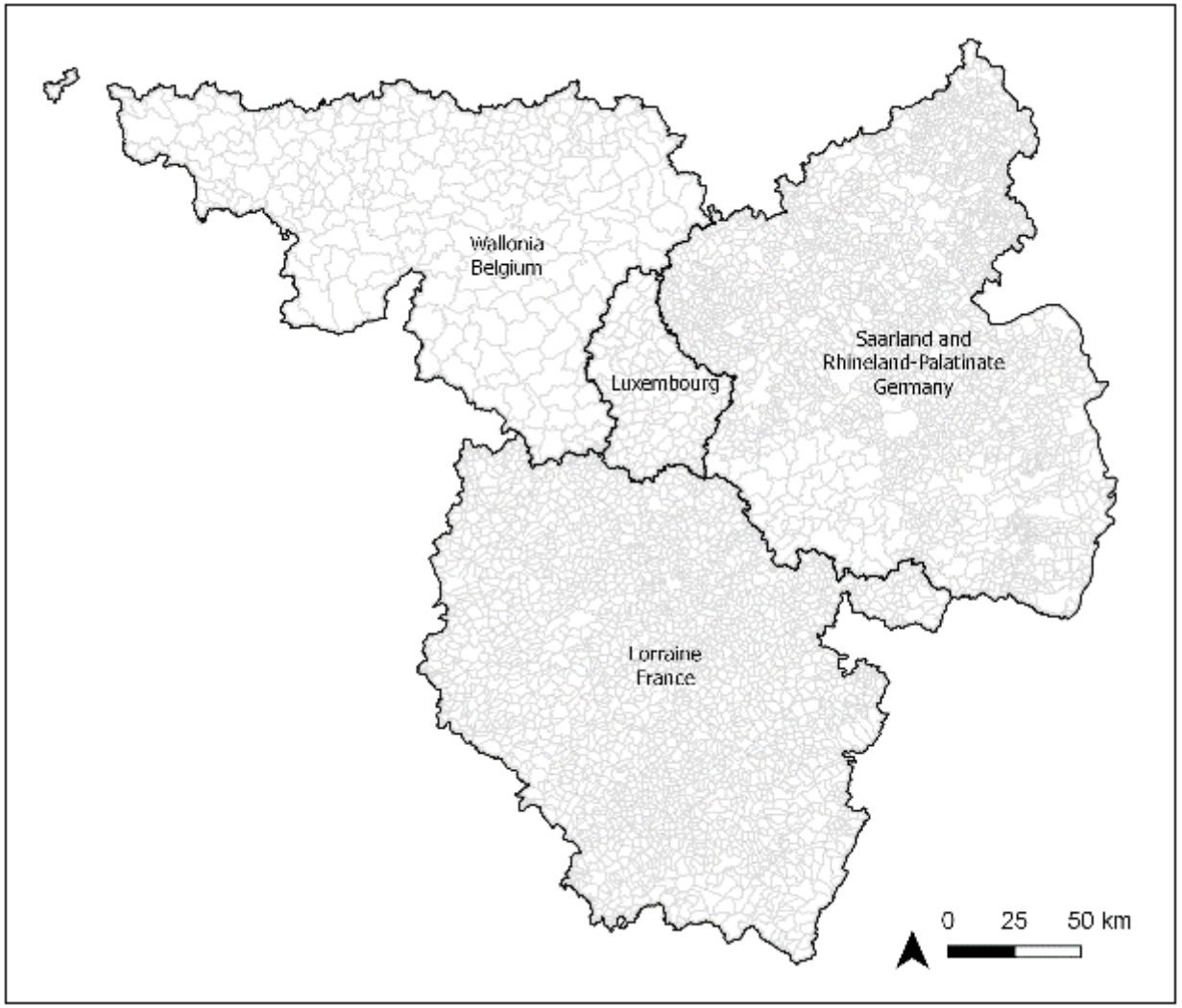
Objectives of my PhD project:

- How short/long term decisions affect travel behavior ?
- How do activity-chain influence our travel mode choice ?
- Could new mobility solutions (live carpooling, e-bike sharing) induce a modal shift toward more sustainable transport modes ?

Context: Luxembourg

- 549 700 inhabitants (212 inhabitant/km²)
- 380 226 jobs available in the country
- BUT 162 000 cross border workers (42%) (STATEC, March 2014)
  - 25% from Belgium
  - 25% from Germany
  - 50% from France
- High coverage and high quality of Public Transport services in the country (situation ≠ for cross-borders commuters)

Context: The University and its relocation



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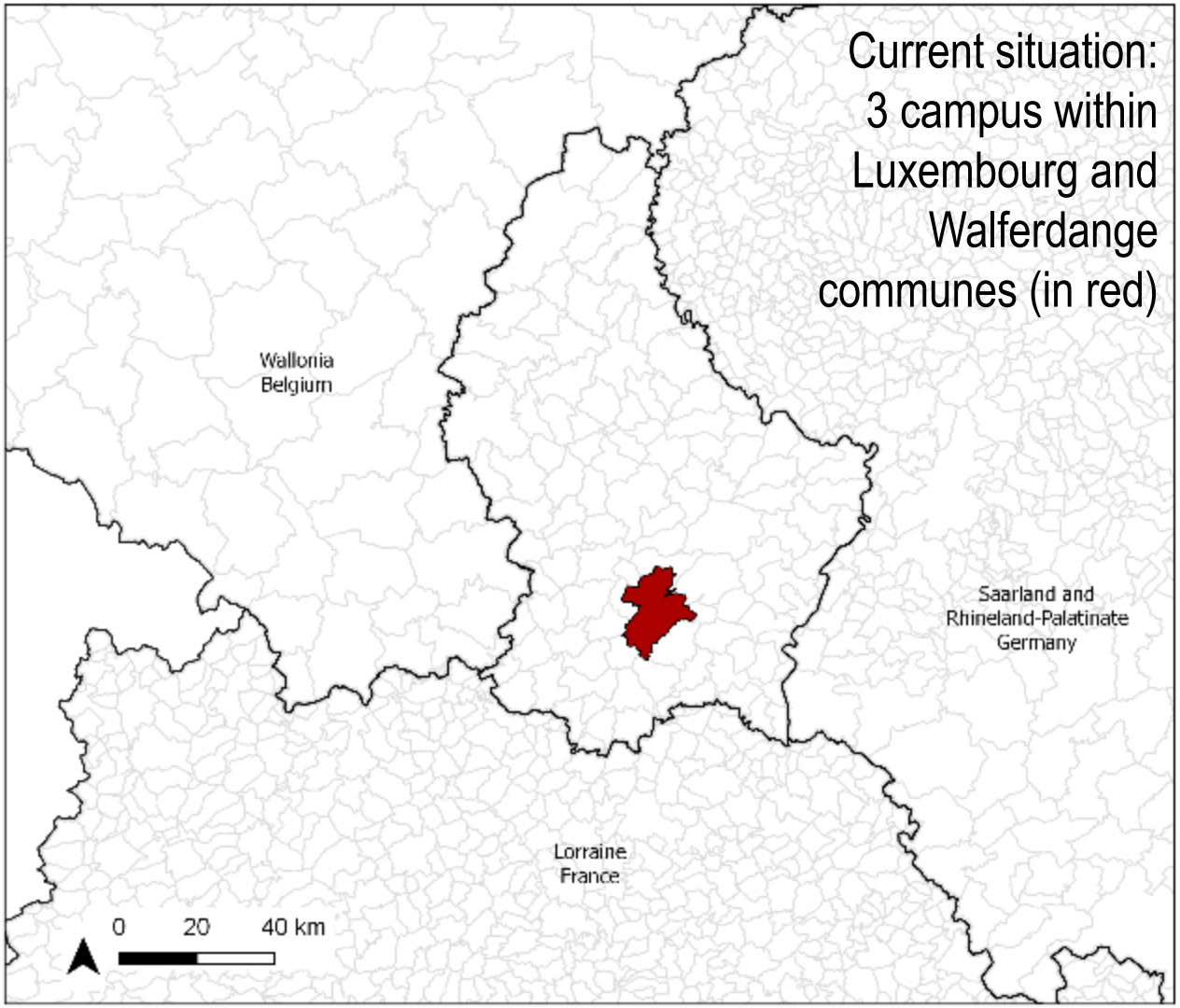

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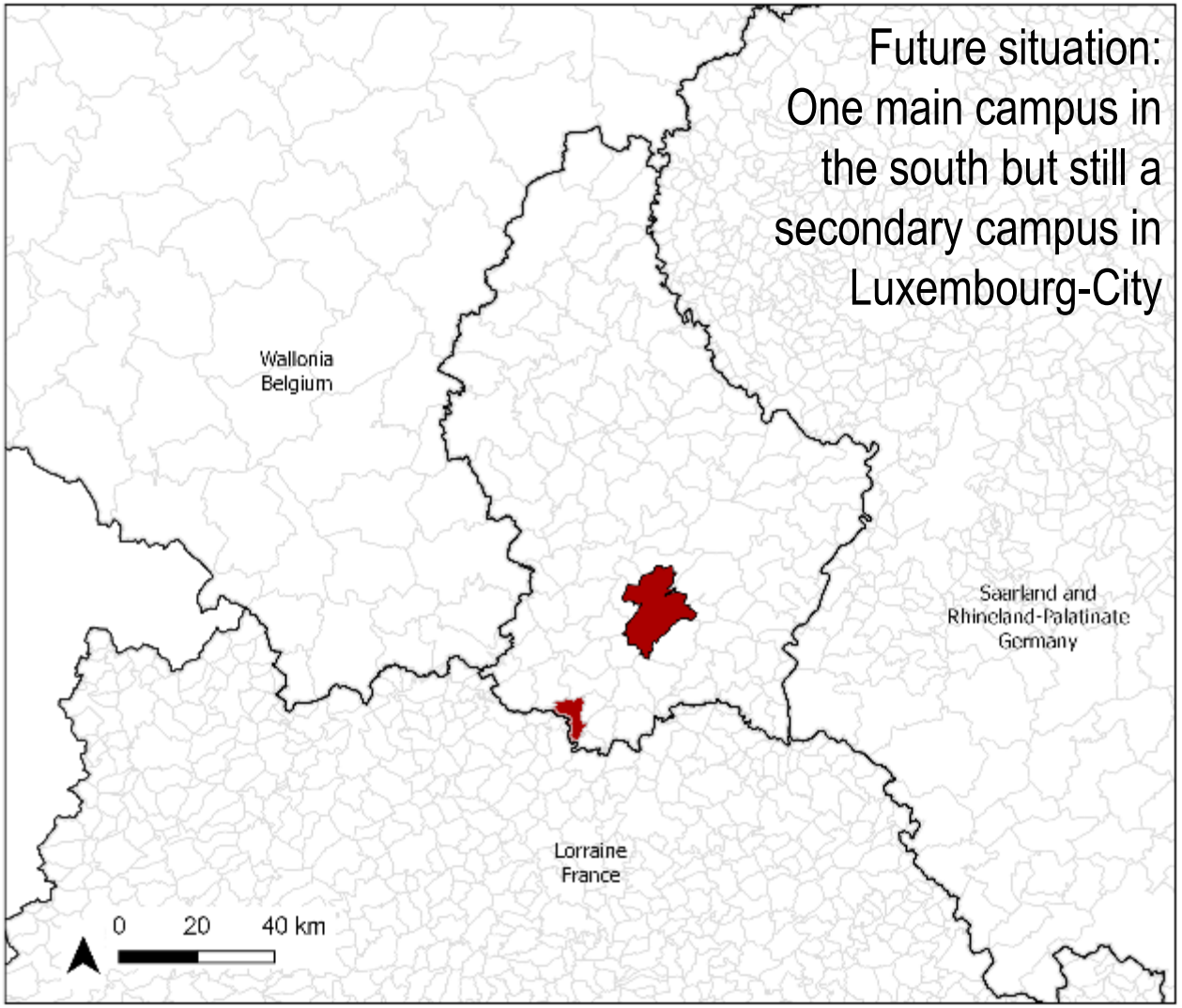


Context: The University and its relocation

The New-Town of Belval (Master Plan, source: AGORA)

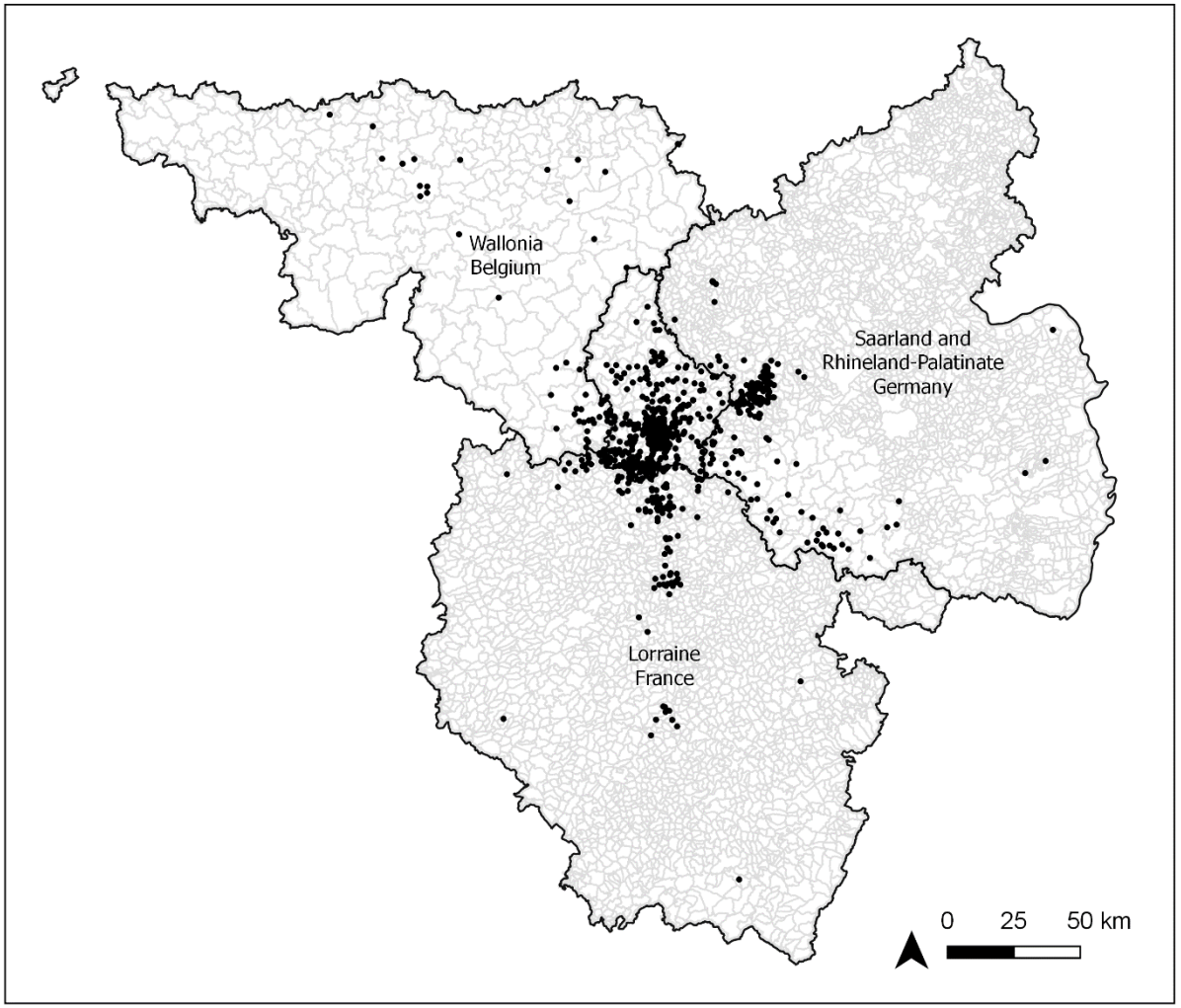
Headquarter of the RBC bank (source: Wikipedia)

Belval: a mix of modernity and historical heritage (source: Les Fonds Belval)

The train station (source: Wikipedia)

Context: The University and its relocation

The staff members location (2012 data)



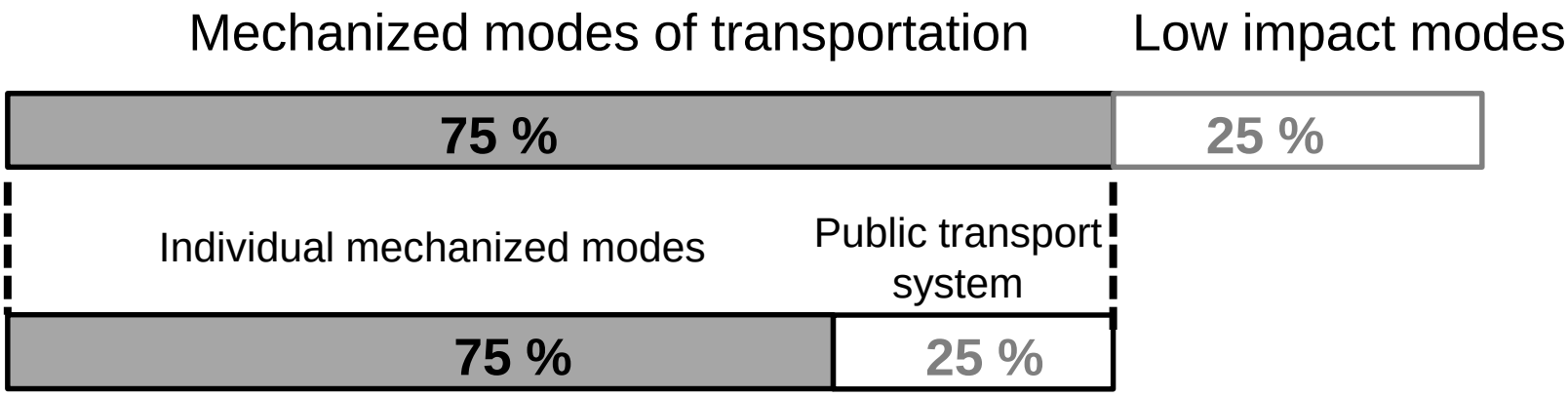
Context: Cross border workers

Country	Year		Car		PT		Soft modes	
	Uni	Country	Uni	Country	Uni	Country	Uni	Country
Luxembourg	2012	2007	49%	74%	38%	15%	13%	11%
Belgium		2010	63%	88%	38%	12%	0%	0%
Germany		2010	63%	90%	37%	10%	0%	0%
France		2010	30%	83%	70%	17%	0%	0%

Adapted from Carpentier & Gerber, 2009. University modal split based on the 2012 survey

Contexte: MoDu, Sustainable Mobility

- Transport policy in Luxembourg (2020 objective)



25% low impact modes, 56 % of the car, 19 % for the public transport system

These targets are probably unattainable but still constitute the national objective

Literature review: workplace relocation

- Suburban relocation, even with good PT access, often lead to more car commuting (Vale, 2013)
- Authors even observed increased car ownership (Bell, 1991)
- Strong transport mode inertia (Vale, 2013)
- Distance does not always increase (Cervero & Landis, 1991)

Literature review: TDM measures

Mode	Measures	Mode	Measures
General measure	Travel coordinator/Mobility Manager	Carsharing	Promote and use existing carpooling initiatives
	Information campaign		Develop a new carpooling platform
	Mobility working group creation		Reserved car park for carpoolers
Cycling / Walking measures	Washing and changing facilities		Guarantee for the return journey
	Develop a bike fleet system		Reserve car
	Subsidize bike sharing system registration	Public transport	Real time information (intranet, TV corridor…)
	Provision of rain clothes		Subsidized season ticket
	Interest free loans to bike a bike		Develop a shuttle service
	Agreement on discount with a local bike reseller		Secure and protected bike sheds
	Provide a Personalised-Cycling-Commuting map		Lobbying from local authority for service development or improvements.
	Bad weather condition lift	Miscellaneous	(electric) car fleet for professional use
	Bike repair station		Flexible working time
	Cycle mileage rate		Parking scheme

Adapted from Rye, 2002

Data and methodology: the model

- 397 respondents among staff members (36,4%)
- 330 usable data (few people didn't gave home location, some gave "impossible" home).

Additional data needed:

- Car, PT and soft modes times & distances both for the current and the future home-to work trip
- Estimated travel costs for now and in the future

Possible issue with travel time estimation (due to post code size ?)

Data and methodology: the model

- Define the “modes availabities” (before & after)
- 3 modes
- 2 variables (generic across modes, time is not “≠”)
- Simple but easily understandable, nice for forecasting

$$V_{n,CAR} = betatime \cdot [time\ car]_n + betaprice \cdot [price\ car]_n$$

$$V_{n,PT} = betaPT + betatime \cdot [time\ PT]_n + betaprice \cdot [price\ PT]_n$$

$$V_{n,SOFT} = betaSOFT + betatime \cdot [time\ PT]_n + betaprice \cdot [price\ PT]_n$$

Data and methodology: the model

Name	Value	Std err	t-test	p-value		Robust Std err	Robust t-test	p-value	
ASC_CAR	0	fixed							
ASC_PT	-0.0893	0.241	-0.37	0.71	*	0.251	-0.36	0.72	*
ASC_SOFT	-0.0331	0.356	-0.09	0.93	*	0.361	-0.09	0.93	*
B_COST	-0.113	0.0457	-2.47	0.01		0.0551	-2.05	0.04	
B_TIME	-0.0534	0.00938	-5.69	0		0.0101	-5.26	0	

Rho-square 0,199

Adjusted rho-square: 0,183

69% matching rate

		Predicted Choice		
		CAR	PT	SOFT
Choice	CAR	150	17	1
	PT	62	71	2
	SOFT	13	8	6

Data analysis: Distance variation

		Before relocation					
		> 3 km	3 to 10	11 to 20	21 to 50	< 50km	Total
After relocation	> 3 km				6		6
	3 to 10			3	18		21
	11 to 20	7	41	12	5		65
	21 to 50	27	58	16	54	2	157
	< 50km				47	34	81
	Total	34	99	31	130	36	

- Low population density in Belval, few people having short commuting distances
- People from Luxembourg & Germany having huge distance increase

Data analysis: the scenario

Scenario 1, the relocation

		FUTURE (Modelled Choice)		
		CAR	PT	SOFT
BEFORE (Revealed Choice)	CAR	161	7	
	PT	71	62	1
	SOFT	13	14	

- Difference between revealed choice and modelled choices
- A 24% car increased in modelled (-16% for PT, - 8% for soft modes)

Data analysis: the scenario

Scenario 2, fixed parking cost

- 110€/month, 5 €/day, 2.5 € per commuting trip

		Scenario 2, fixed parking cost		
		CAR	PT	SOFT
Scenario 1, simple relocation	CAR	237	8	
	PT		83	
	SOFT			1

- 8 people would change to PT (2,4%...)
- Due to the long distance travelled, a 5 € might be a (too) small deterrent
- (with a double parking fee, 15 additional people would shift towards PT and active modes)

Data analysis: the scenario

Scenario 3:Soft modes incentives + PT increased subsidy

- 0,2 € / km done by soft modes
- PT free in Luxembourg (! Cross borders !)

		Scenario 3, Soft and public modes incentives		
		CAR	PT	SOFT
Scenario 1, simple relocation	CAR	239	6	
	PT		83	
	SOFT			1

- 6 people would change to PT (1,8%...) and NOBODY to soft modes (!)
- PT improved subsidy; high cost for relatively low results

Conclusions

- In accordance with literature review;
  - Car use will increase after the relocation among staff pop.
  - Distance and travel time will, in average, increase

- Transport Demand Management measures;
  - Have to be selected carefully (investment Vs results)
  - Are not THE solutions but are part of the solutions