State vs Consumer Regulation
The case of Road Safety in Kenya

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Traffic fatalities and injuries

- ## Global figures
  - – Annual road fatalities: 1.3 million
  - – Annual road injuries: 20 – 50 million

- ## By level of development

	Low income	Middle income	High income
Deaths per 100,000 population	21.5	19.5	10.3
Deaths per vehicle (relative rates)	9		1

Leading causes of death

2004		Rank	2030	
Cause	%		Cause	%
Ischaemic hearth disease	12.2	1	Ischaemic hearth disease	12.2
Cerebrovascular disease	9.7	2	Cerebrovascular disease	9.7
Lower respiratory infections	7.0	3	Chronic obstructive pulmonary disease	7.0
Chronic obstructive pulmonary disease	5.1	4	Lower respiratory infections	5.1
Diarrhoeal diseasees	3.6	5	Road traffic injuries	3.6
HIV/AIDS	3.5	6	Trachea, bronchus, lung cancers	3.5
Tuberculosis	2.5	7	Diabetes mellitus	2.5
Trachea, bronchus, lung cancers	2.3	8	Hypertension	2.3
Road traffic injuries	2.2	9	Stomach cancer	2.2
Prematurity and low birth weight	2.0	10	HIV/AIDS	2.0
Neonatal infections and other	1.9	11	Nephritis and nephrosis	1.9
Diabetes mellitus	1.9	12	Self-inflicted injuries	1.9
Malaria	1.7	13	Liver cancer	1.7

4

Leading causes of death, by age

| Rank	0-4 years	5-14 years	15-29 years	30-44 years
1	Perinatal causes	Lower respiratory infections	Road traffic injuries	HIV/AIDS
2	Lower respiratory infections	Road traffic injuries	HIV/AIDS	Tuberculosis
3	Diarrhoeal diseases	Malaria	Tuberculosis	Road traffic injuries

Source: WHO Global Status Report on Road Safety, 2009

Causes and Responses

	Cause	Response
Conditions	• Weather conditions	• Hope?
	• Road conditions	• Road construction and maintenance
	• Vehicle conditions	• Vehicle Inspection laws
	• Driver quality	• Driver training and licensing laws
Behavior	• Driver risk taking behavior	
	• Speed	• Speed limits
	• DUI	• Blood alcohol limits (other drugs?)
	• Driver/passenger precautions	
	• Seat belt use	Mandatory use laws
	• Child restraint use	Mandatory use laws
	• Helmet use	Mandatory use laws

Economic motivation

Inter-vehicle externality
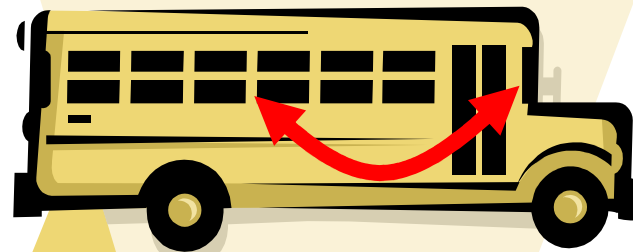
Intra-vehicle externality

This project

- We focus on one type of vehicle
  - 14 seater minibuses, or *matatus*, in Kenya

- Assess the impacts of <u>two interventions</u>
  - The Michuki Rules
    - a tightening of regulations governing *matatus*, and a strengthening of enforcement
  - Consumer empowerment
    - a simple message campaign aimed at passengers

- Caveat: this is not a full RCT

Outline

I. The Michuki Rules: State Regulation
   - Description of the reform
   - Data
   - Empirical Strategy
   - Results

II. RCT of an intervention to Motivate Consumer Regulation
   - Results of Phase I
   - Proposed Phase II: scale-up plus modifications

I. Michuki Rules

- Initiated by the Minister of Transport, John Njoroge Michuki, in February 2004

- Wide-ranging reforms
  - Mandatory speed governors
  - Driver certification
  - Seat belts, to enforce limits on occupancy
  - Vehicle and driver/tout appearance

Before

After

I'm serious!

11

Outcome

- Widespread shortages of public transport immediately after the reform

- Anecdotal evidence of large positive effects on *matatu* safety, followed by a perceived deterioration of safety conditions

- Michuki became Minister for Internal Security in December 2006

Data

- Claims data from four insurance companies
  - In 2008, these covered 90-95% of *matatus*

| | Michuki appointed MoT | Michuki rules implemented | | | Michuki appointed MoIS | |

	2003				2004				2005				2006				2007			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4

Standard Assurance

Blue Shield Insurance

Amaco

Direct Line Assurance

13
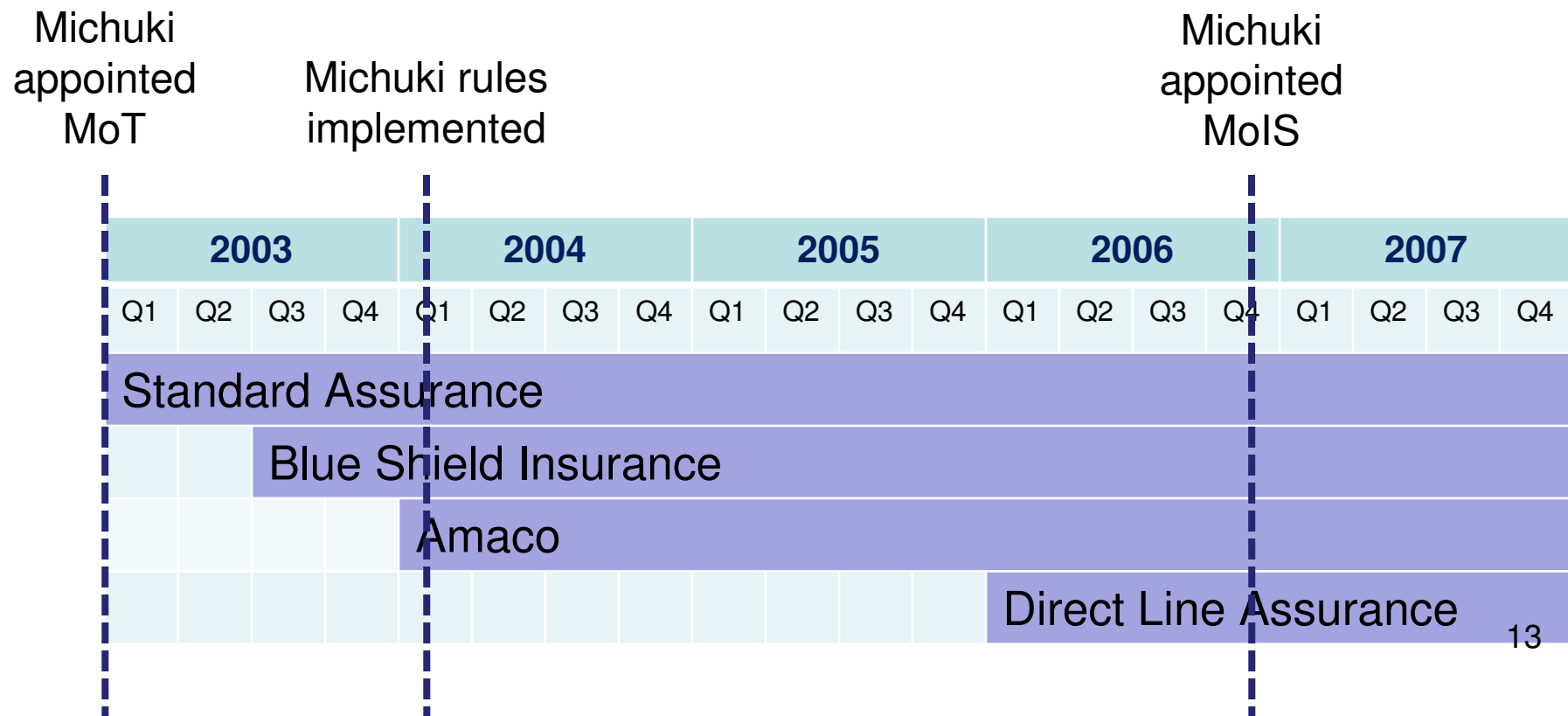
Insurance data

	Standard	Blue Shield	Amaco	Direct Line
Policy data	✓	x	X	✓
Claims data				
Date	✓	✓	✓	✓
Vehicle Class*	✓	✓	✓	✓
Deaths	✓	✓	✓	✓
Injuries	✓	✓	✓	✓
Claim amount	✓	✓	✓	✓

* Private vehicles, commercial vehicles (trucks, etc.), buses, *matatus*, motorcycles.

- Standard data is most suitable for studying Michuki rules

Empirical Strategy

- We examine changes in claims rates of *matatus* before and after the reforms

- ……..and compare these with claims rates for other private vehicles not directly affected by the reforms

- Specifically:

$$prob(y_{ijt} = 1) = \theta_0 + \omega_i + \sum_{\tau} \delta_{\tau} I_{t=\tau} + \sum_{\tau} \beta_{\tau} C_j I_{t=\tau} + \varepsilon_{ijt}$$

  where y_{ijt} = 1 if vehicle i of class j filed a claim in period t ; $t = 0$ is date of reform; $C_j = 1$ if class is *matatu*.

- β_{τ} captures the deviations from trend compared with private vehicles.
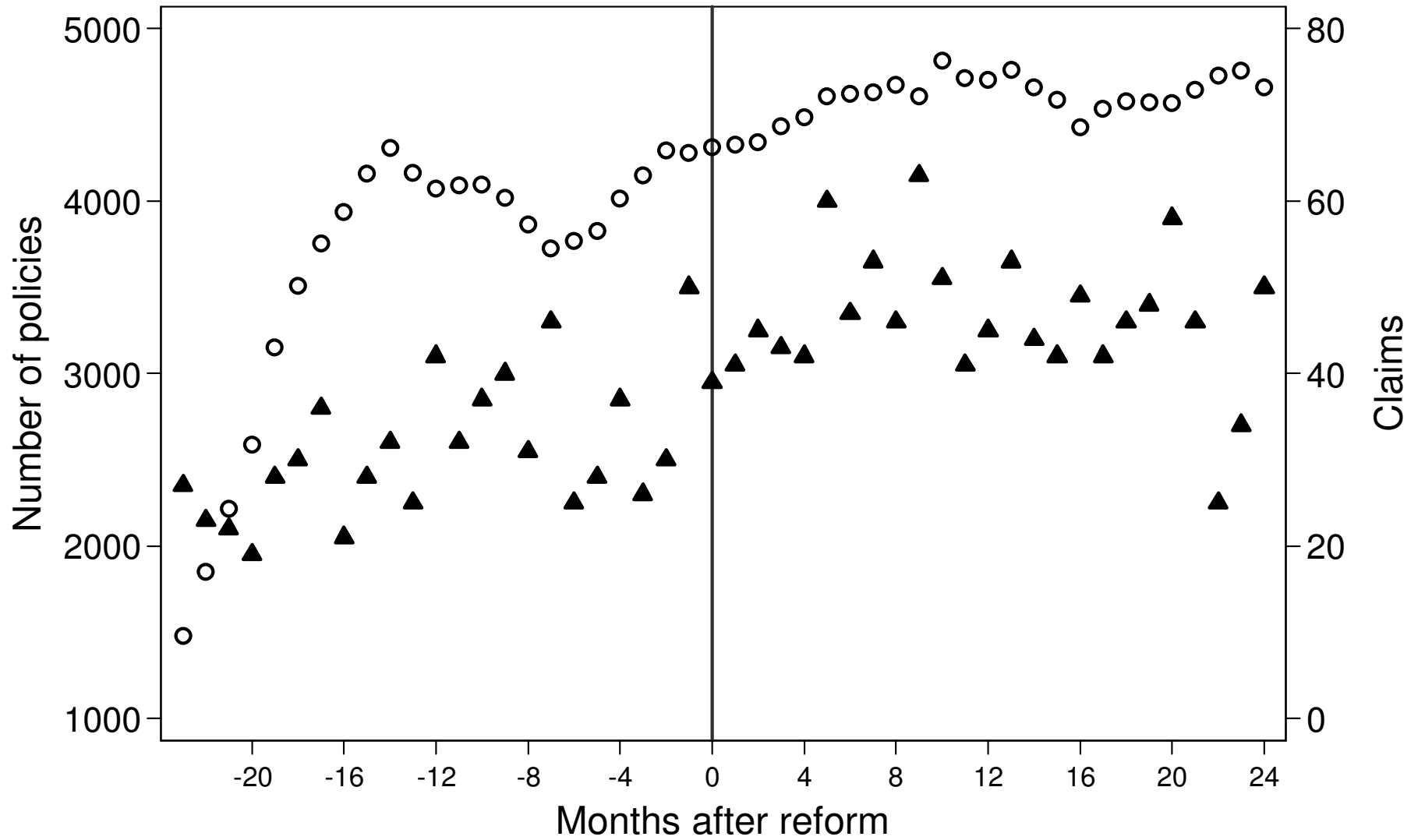
Time Profile for Policies/Accidents for Private Vehicles
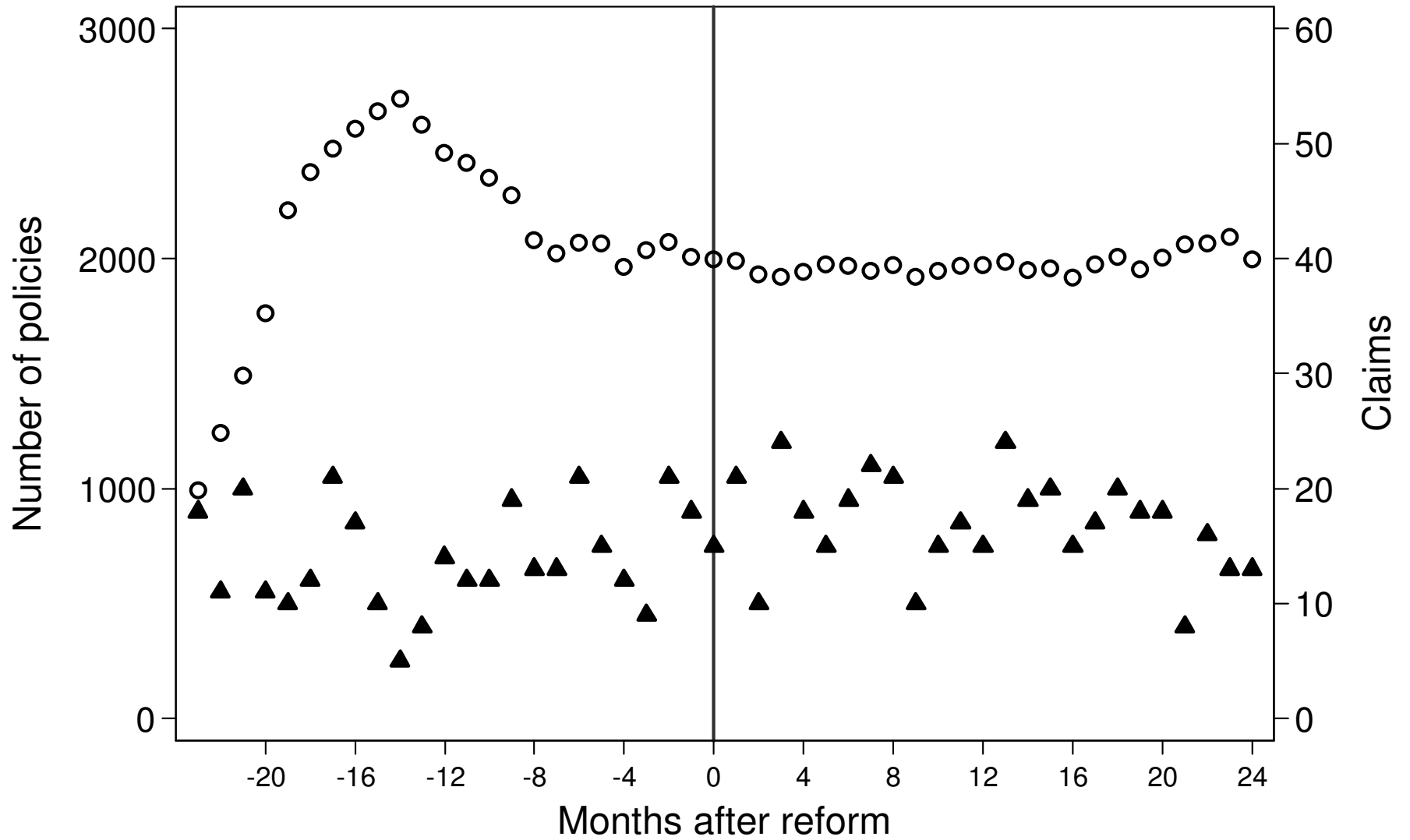
Time Profile for Policies/Accidents for Matatus
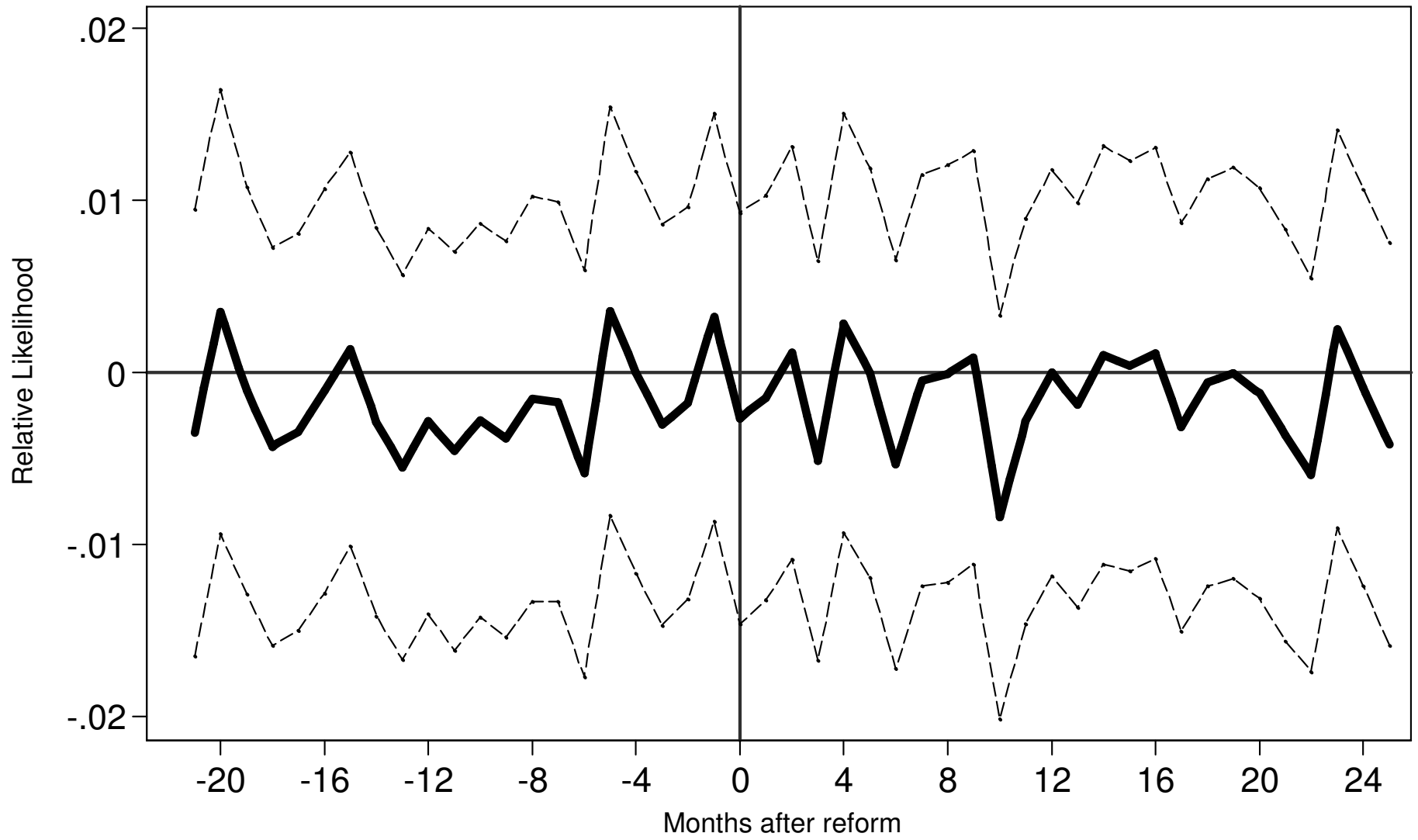
17

Differential Likelihood of Matatu Claim

18
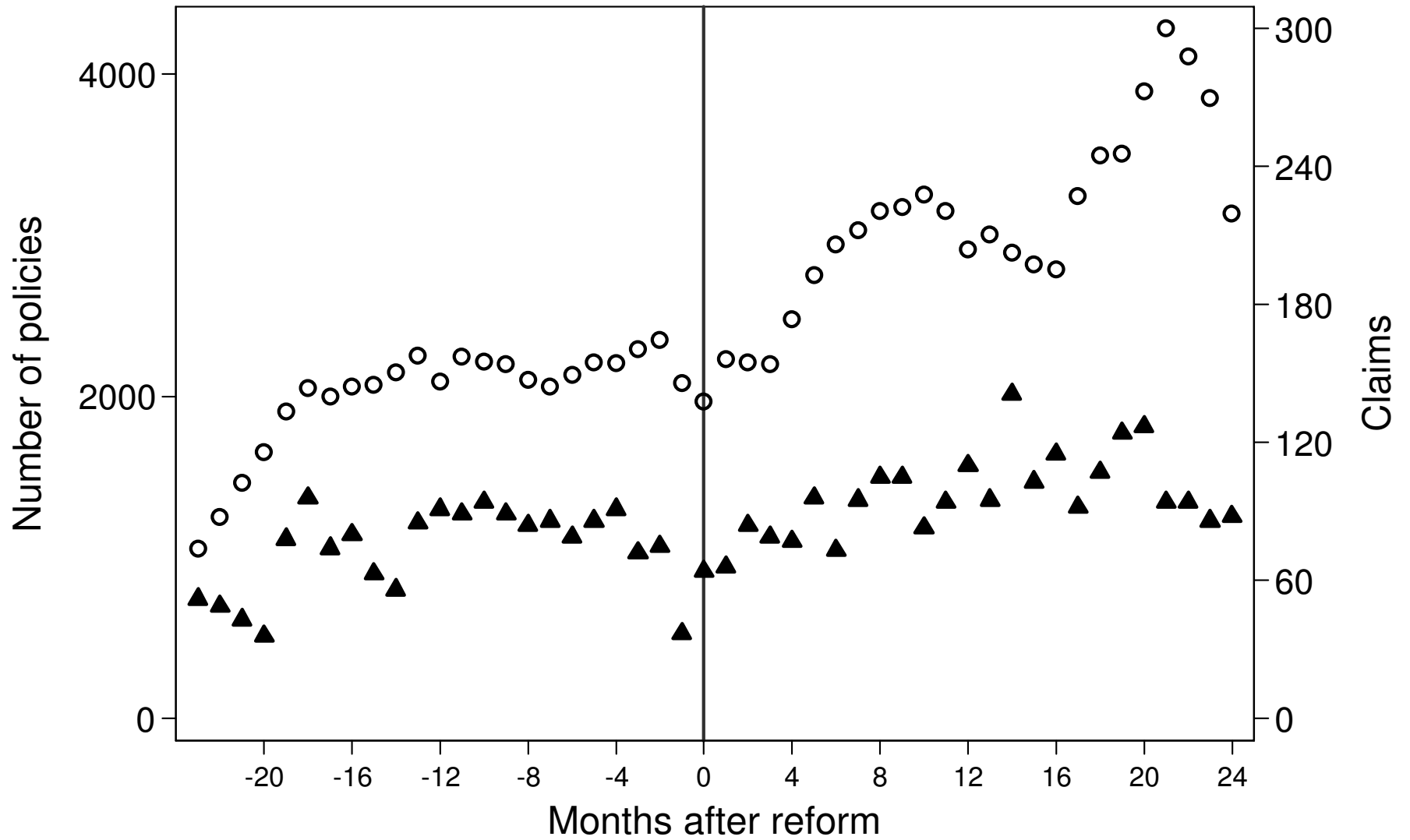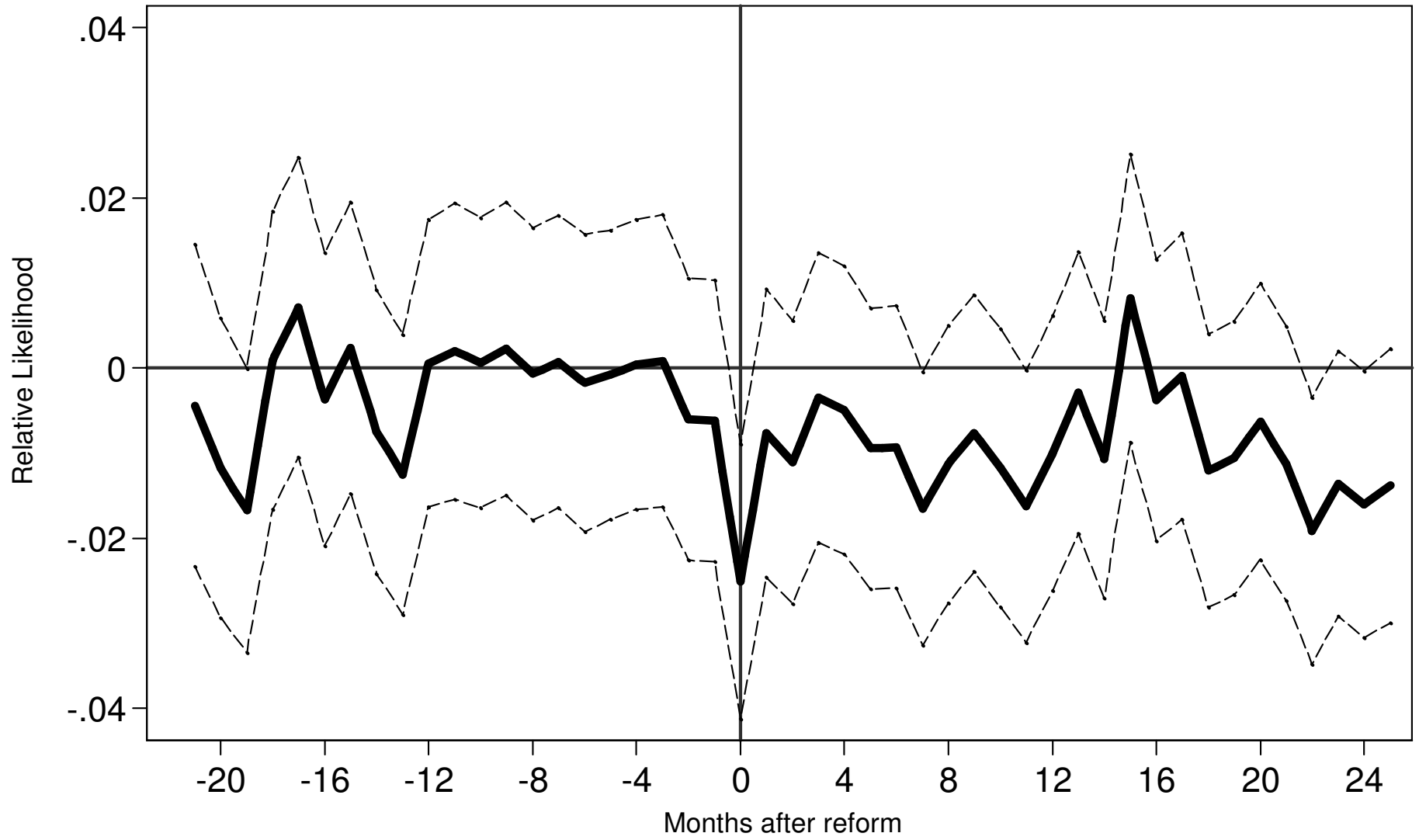
Time Profile for Policies/Accidents for Buses

Differential Likelihood of Bus Claim

II. Consumer regulation

- We empower/encourage passengers to demand better driving behavior, to:

<p align="center">**Heckle and Chide!**</p>

- Phase I, we inserted motivational stickers in the passenger cabins of randomly selected *matatus*

- Drivers enrolled in a lottery to encourage retention of stickers (cost about $5 per vehicle per year)

Don't just **sit** there as he drives dangerously! STAND UP. SPEAK UP. NOW!

This message has been given in the interest of passenger safety with support from: Safaricom | OMD | ASIRT Kenya | Colourprint

Je, utaweza kuongea akizusha **ajali?**
KAA MACHO. KAA CHONJO. TETA!

Huu ujumbe umeletwa kwa manufaa ya usalama wa msafiri na usaidizi kutoka: Safaricom | OMD | Colourprint

Hey, if he's driving recklessly, will you arrive?
BE AWAKE. BE STEADY. SPEAK UP!

Je, ukiendeshwa **vibaya,** utafika?
KAA MACHO. KAA CHONJO. TETA!

Huu ujumbe umeletwa kwa manufaa ya usalama wa msafiri na usaidizi kutoka: Safaricom | OMD | Colourprint

Hey, will you complain after he causes an accident?
BE AWAKE. BE STEADY. SPEAK UP!

22

23

Matatu routes

Design

- Sample size: 2,300

- Assigned to treatment/control based on last digit of license plate

- All treated *matatus* offered same five stickers

- Control *matatus* got nothing, ineligible for lottery

Recruitment site, Nairobi

Sticker insertion

Results

$$y_{ijt} = \alpha_o + \beta_1 Post_{it} + \beta_2 T_{it} + \beta_3 (Post * T)_{it} + \mu_j + \epsilon_{ijt}$$

	OLS		ITT	
	I	II	III	IV
Post	0.024	0.025	0.029	0.030
	(0.012)*	(0.012)*	(0.013)*	(0.012)*
T	0.007	0.009	0.010	0.009
	(0.010)	(0.011)	(0.010)	(0.011)
Post x T	**-0.042**	**-0.043**	**-0.050**	**-0.051**
	(0.016)**	**(0.015)****	**(0.016)****	**(0.016)****
Constant	0.062	0.042	0.061	0.042
	(0.008)**	(0.013)**	(0.008)**	(0.013)**
SACCO controls	No	Yes	No	Yes
Observations	4322	4318	4322	4318
Rate reduction	-45%	-57%	-50%	-63%

p-values in parentheses.

Sustainability?

Differential likelihood of claim (*matatus* vs private) by quarter
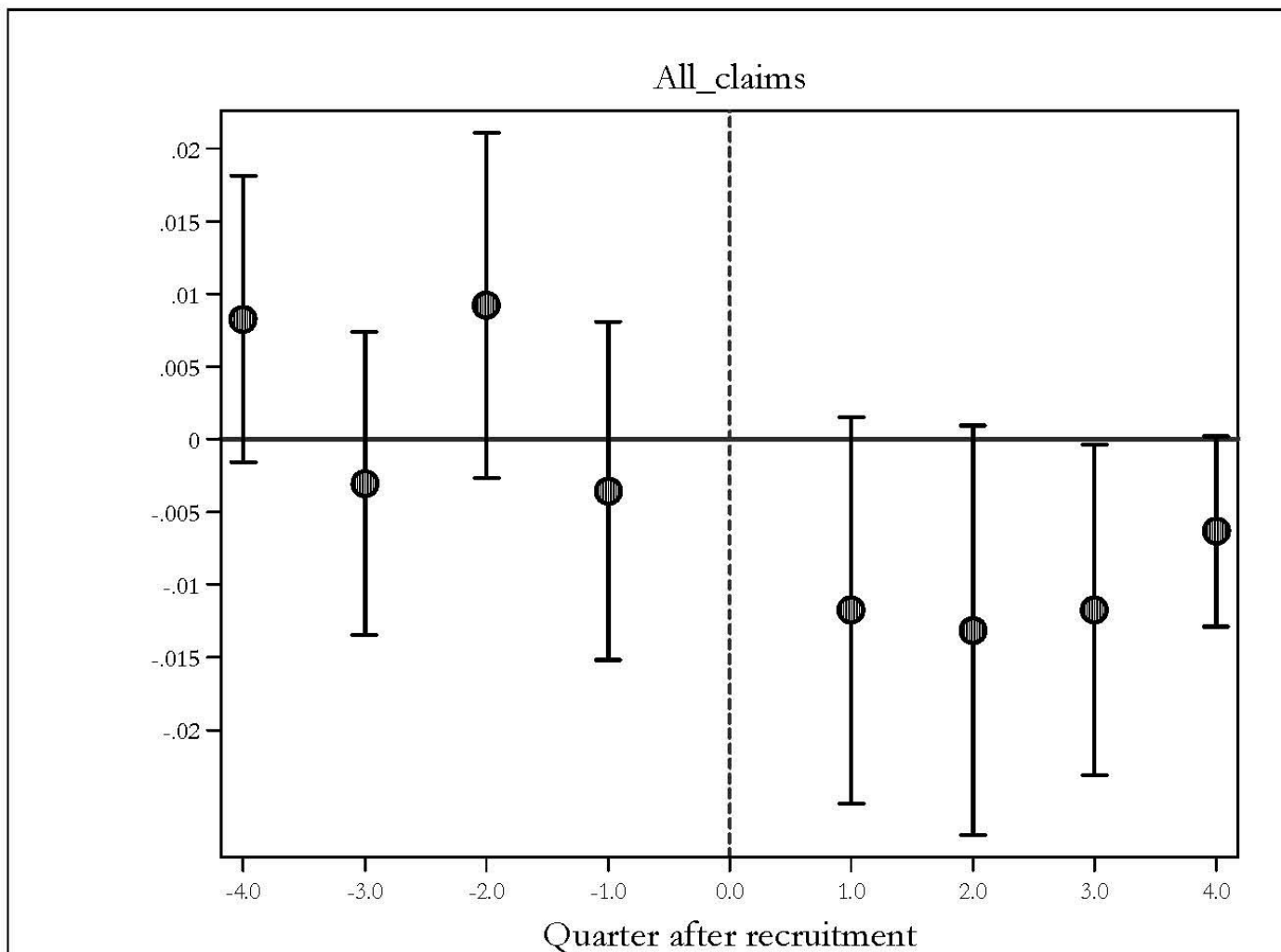
Phase II: Stickers

- Collaborating with Direct Line Assurance to implement a second phase
  - Sample size: up to10,000

- We examine additional issues of:
  - Mechanisms (direct observations)
  - Fear vs Reason (different stickers)
  - Group vs individual action (different stickers)
  - Lottery vs stickers (use pure control + placebo)
 - Sustainability (local ownership, etc.)

Phase II: Media campaign

- We are also partnering with Royal Media Services

  - Operates 12 radio stations across the country
  - Some in local tribal languages
  - Willing to geographically roll out campaign/randomize

- So we hope to examine relative effects of
  - real-time motivation (stickers) vs
 - general awareness campaigns (radio)

Conclusions

- There is limited evidence that explicit regulation had, if anything, only a short term impact on road accidents

- There appears to have been no long term effect

- Encouraging evidence from information campaign

Time Profile for Policies/Accidents for Private Vehicles
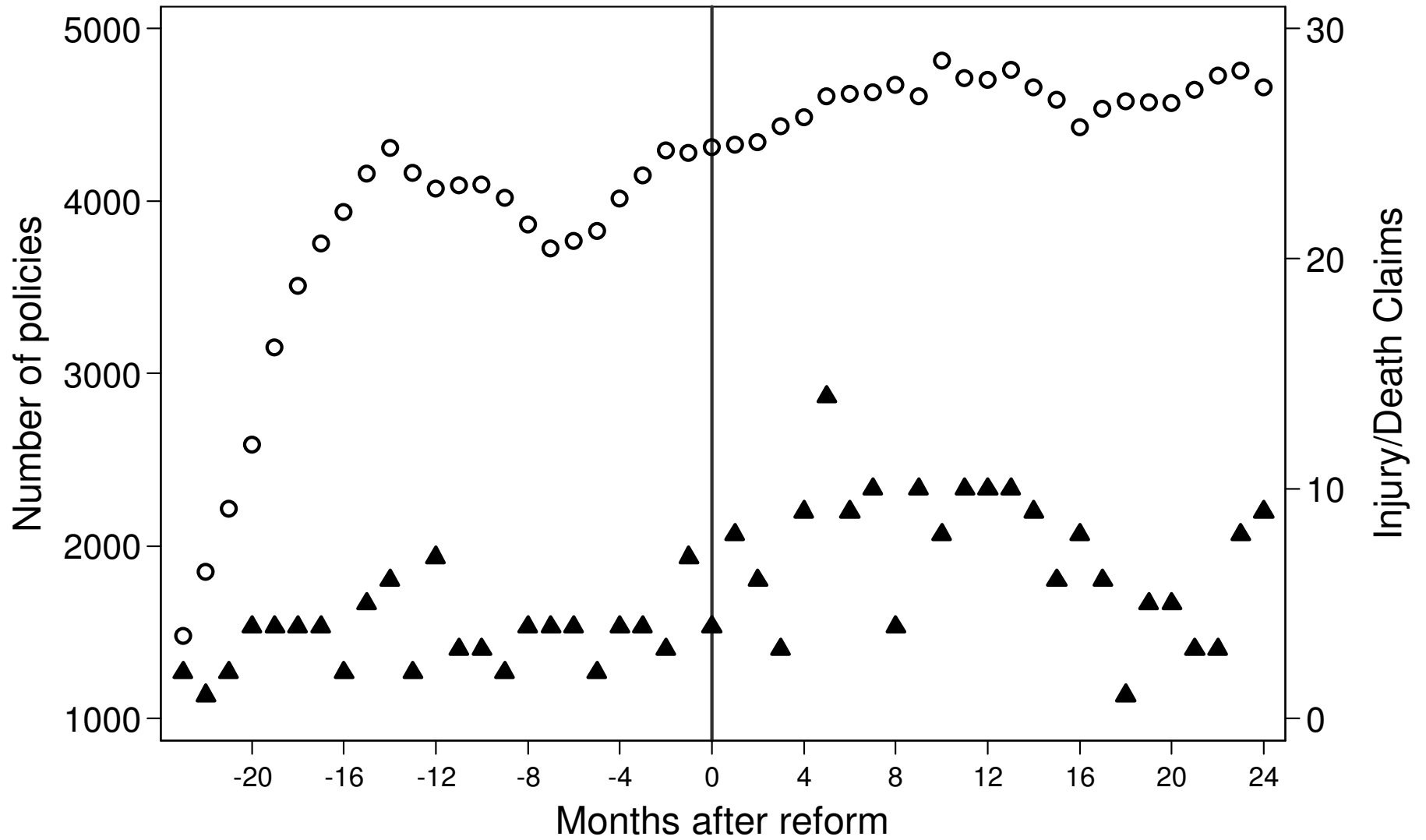
○ Policies
▲ Claims

33

Time Profile for Policies/Accidents for Matatus

34
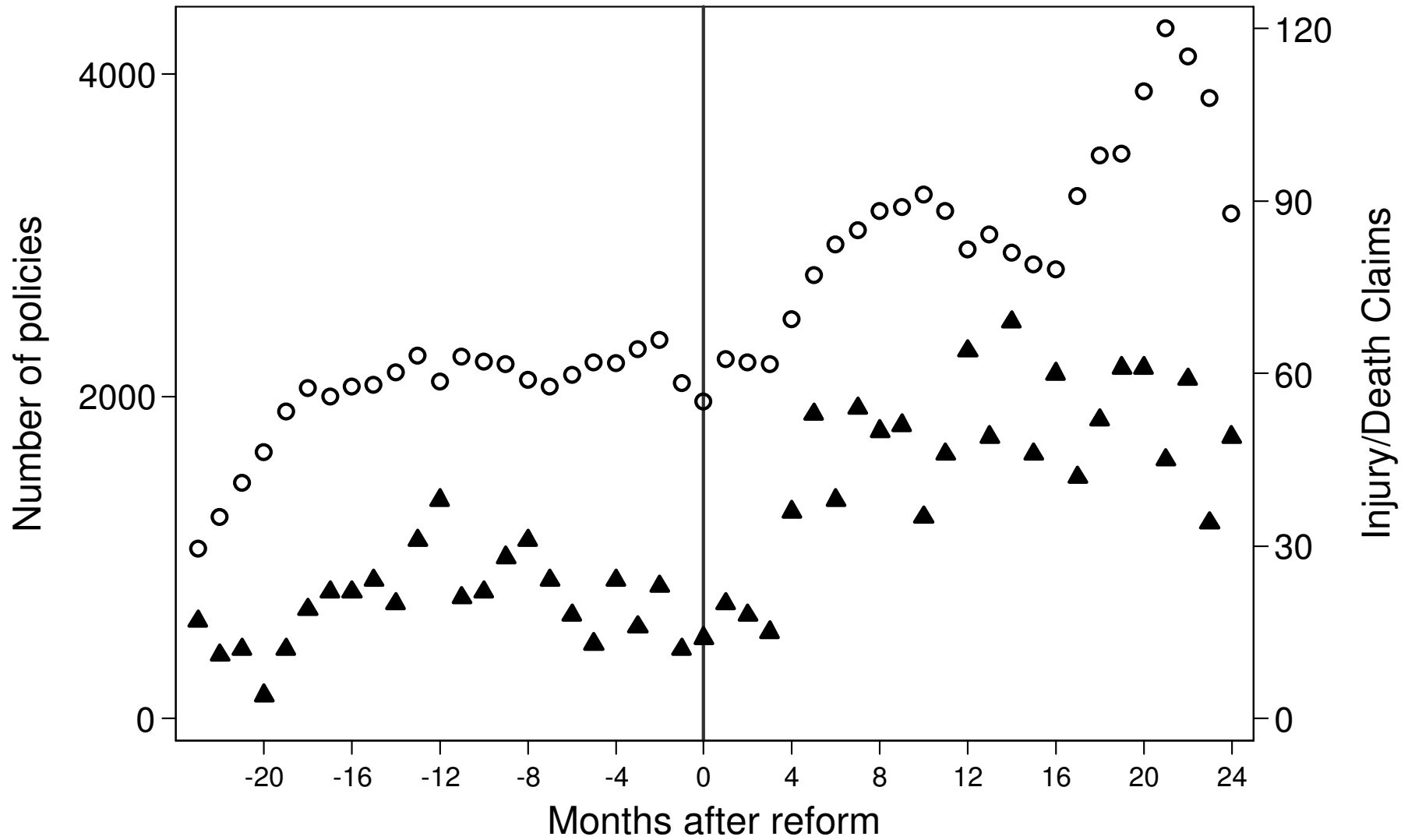
Differential Likelihood of Matatu Claim:Injury or Death