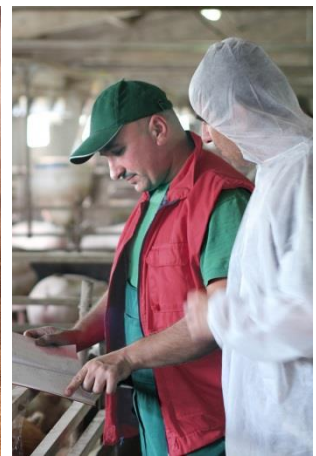




Leibniz Institute of Agricultural Development  
in Transition Economies



# Incentive provision to corporate farm workers in post-socialist settings

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# Conventional views on supervision problems

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## Two pillars of the “family farm theory”:

- No scale economies beyond labour capacity of a family
- Growth of labour force beyond family size inhibited by supervision costs

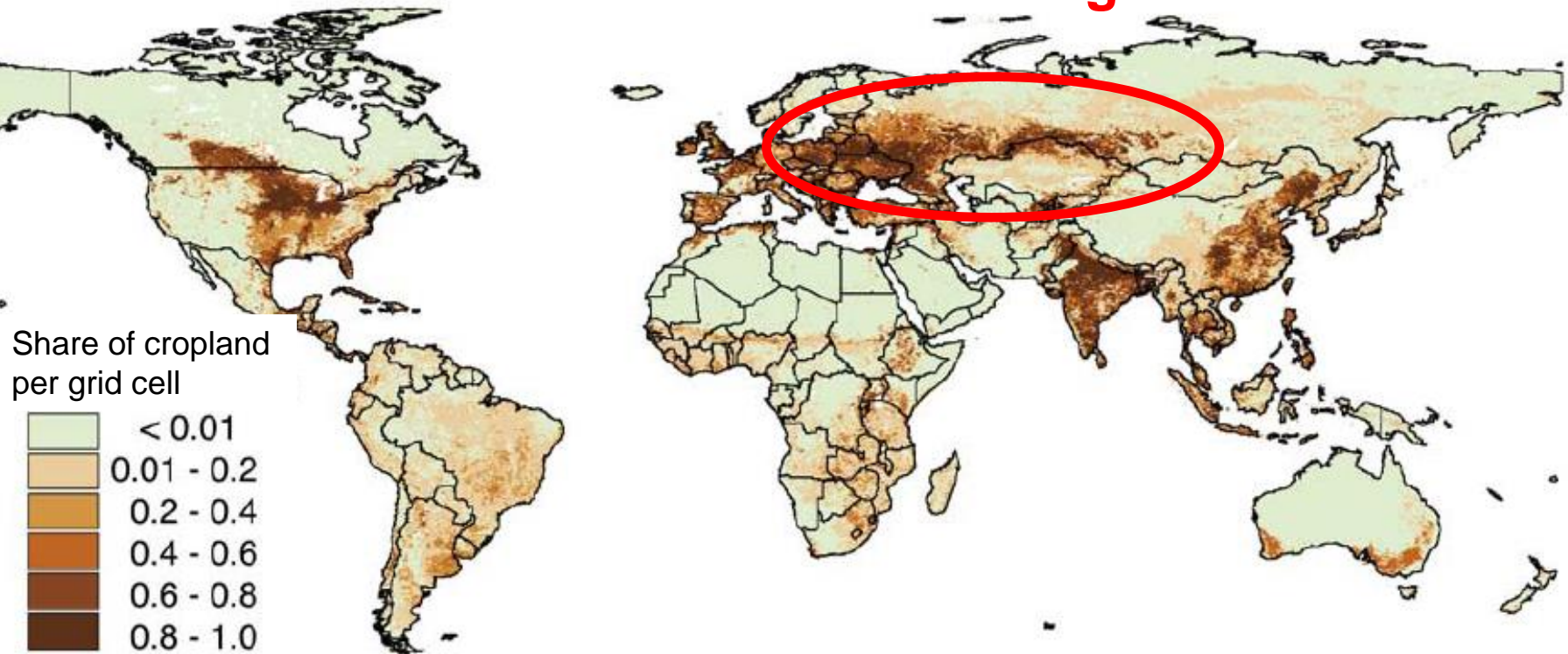
Brewster 1950; Chayanov 1966; Schmitt 1991; Hayami/Otsuka 1993; Lipton 2009

Long-standing model for agricultural policy making in most Western economies

Blueprint for agricultural reforms in developing countries endorsed by IMF, World Bank etc.

# But corporate farms are here to stay or even grow

## Post-socialist agriculture



Map: Leff et al. 2004.



Kazakhstan, Virgin Lands 2011

Russia, Belgorod 2013



# Focus of the presentation:

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**How do corporate farms in former socialist countries provide monetary & non-monetary incentives to their workers?**

**Which are the productivity & cost effects of pay systems?**

- A bit of theory on labour incentives in corporate firms
- Labour supervision during the Soviet era
- Survey evidence on HRM practice in East Germany & North Kazakhstan
- Regression analysis of productivity effects in Kazakhstan
- Conclusions

# Incentive provision if effort is non-contractible

A linear payment schedule

$$w = r + \alpha y$$

with  $w$  wage,  $r$  fixed rate,  $y$  farm output,  $\alpha$  output share defines different **contractual solutions**:

	$r$	$\alpha$
Fixed wage	$> 0$	0
Piece rate	0	$0 < \alpha < 1$
Mixed / sharing	$> 0$	$0 < \alpha < 1$
Fixed rent tenancy	$< 0$	1

Solution of the standard principal-agent model with a risk-averse worker characterised by a **risk-incentive trade-off** (Holmstrom Milgrom 1987).

# The high time of piece rates in the Soviet era

<b>1920s</b>	Vladimir Lenin endorses Frederick Taylor's "Scientific Management" as a model for Soviet industrialisation
<b>1930s</b>	Industrialisation of the countryside begins (forced collectivisation) Adoption of first set of agricultural work norms Stakhanovite ("heroes of labour") movement
<b>After 1948</b>	Ongoing experimentation with agricultural payment systems Permanent revision of work norms
<b>1970s</b>	Soviet practice becoming a caricature of initial intentions (Van Atta 1986): <ul style="list-style-type: none"><li>▪ Goal of plan fulfilment leads to labour hoarding</li><li>▪ Informal dilution of piece rates &amp; wage "equalisation" by managers</li><li>▪ Low real wages provide little incentives</li><li>▪ No threat of unemployment</li><li>▪ Systemic inefficiencies due to widespread coordination failures</li></ul>
<b>1991</b>	Collapse of the Soviet Union

# Agricultural reform paths in the 1990s (simplified)

Collective & state farms generally using piece rate systems



## Pathway 1:

### Land reform & individualisation

Fixed rent contract or ownership

Examples:

Albania, Kyrgyzstan, Transcaucasus



## Pathway 2:

### Restructured corporate farms

Reform of pay system?

Examples:

East Germany, Czech Rep., Slovakia, Hungary



## Pathway 3:

### Lingering collectives



### Agro-holdings

Reform of pay system?

Examples:

Russia, Ukraine, Kazakhstan

Lerman et al. 2004; Rylko et al. 2008; Wolz et al. 2009.



# Data sources for studying pay systems

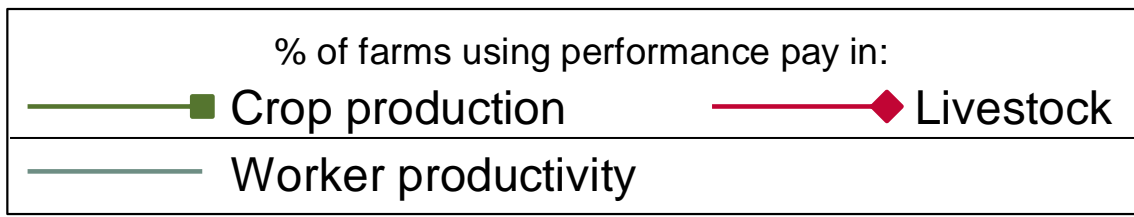
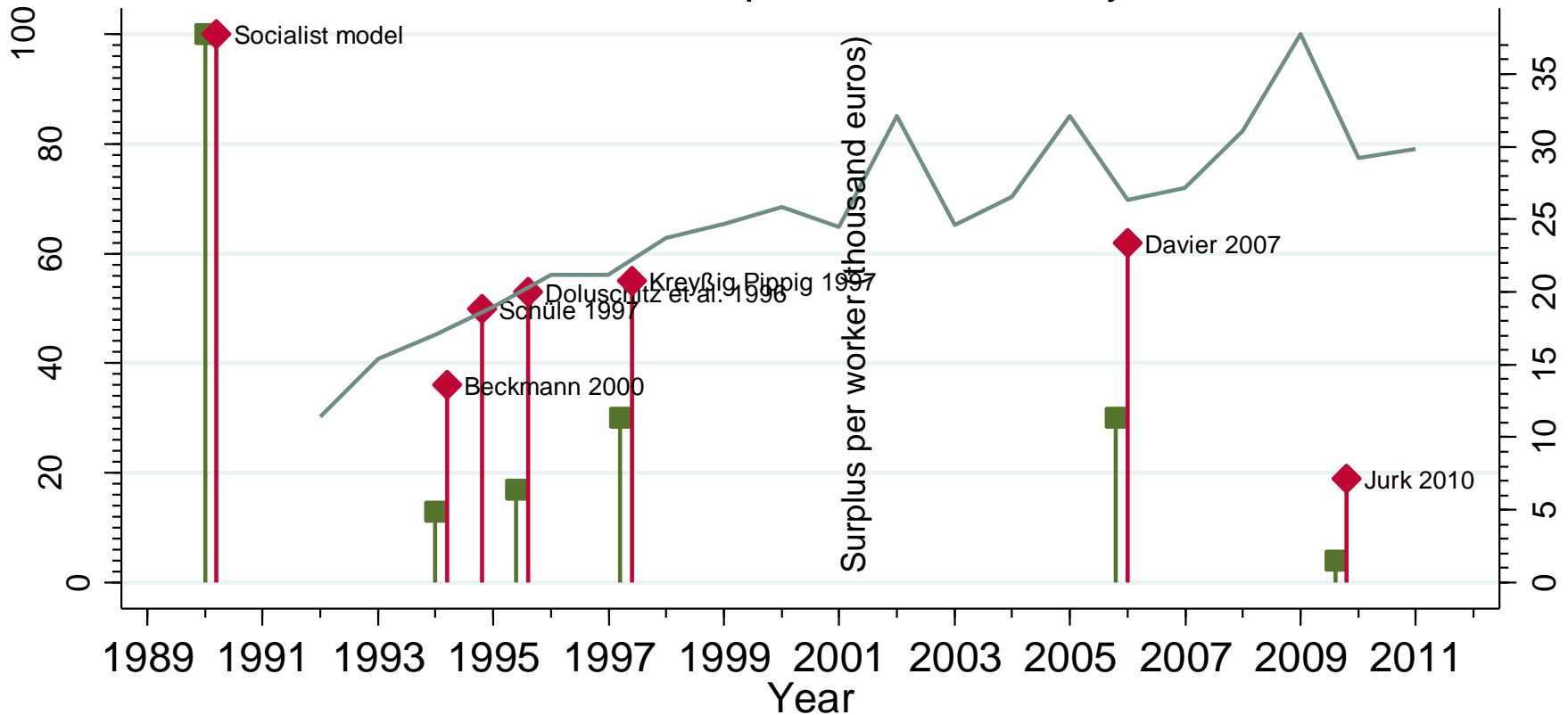
- Existing studies based on farm surveys (Germany)
- Primary data collection carried out by IAMO (Kazakhstan 2012)



Photos: Petrick; RGtimeline - Fotolia.com

# East Germany: the long decline of performance pay?

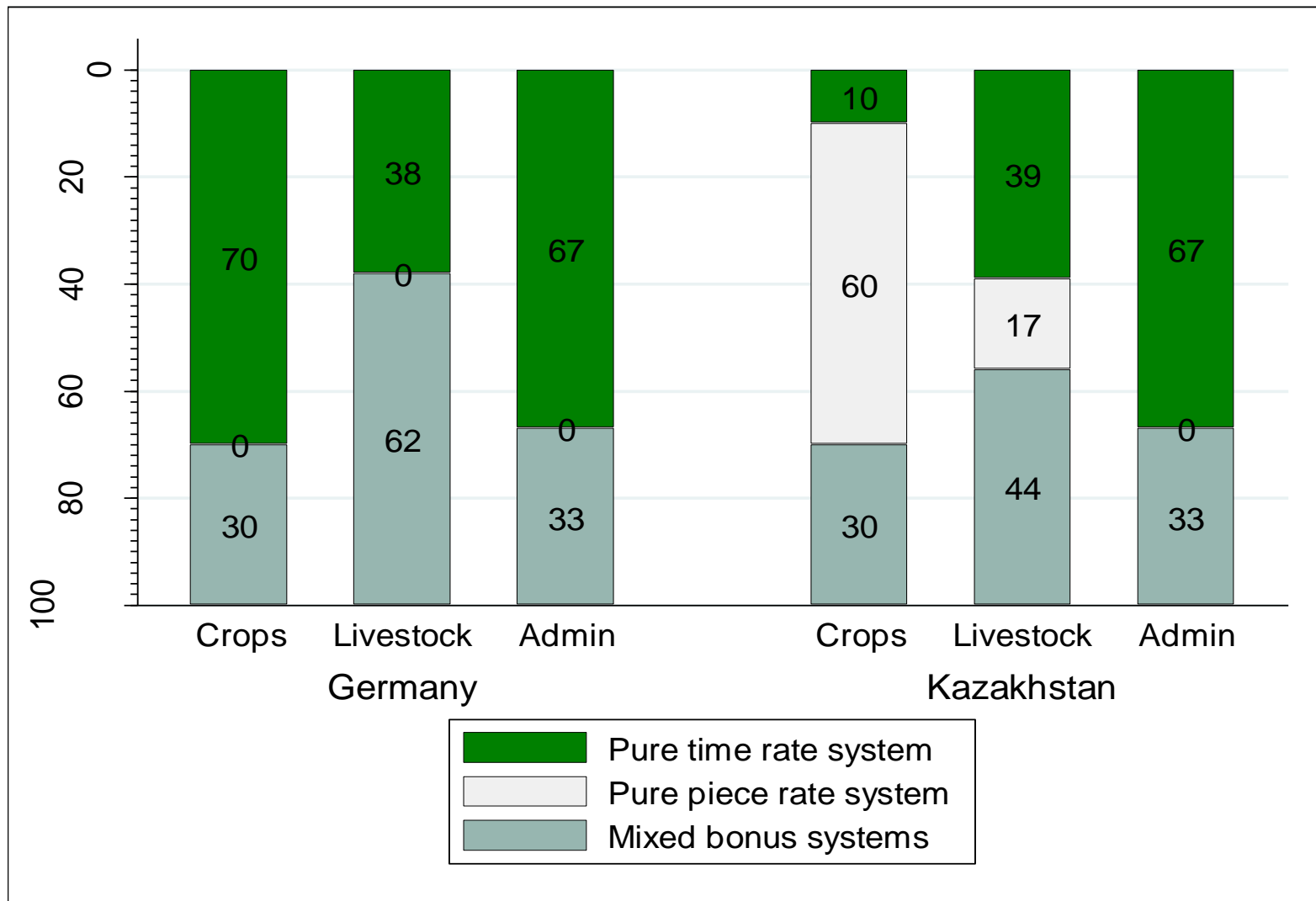
## Results of corporate farm surveys



Surplus per corporate farm worker in 2010 prices, based on FADN data.

# Post-socialist pay systems compared

Corporate farms in East Germany (N=92) & North Kazakhstan (N=50)



Sources: Author based on Davier 2007; IAMO Kazakhstan farm survey 2012.

# Productivity effects of mixed bonus systems

Regression analysis based on an endogenous dummy variable model

$$y_j = \mathbf{x}_j\beta + \delta t_j + \epsilon_j$$

$$t_j = \begin{cases} 1, & \text{if } \mathbf{w}_j\gamma + u_j > 0 \\ 0, & \text{otherwise} \end{cases}$$

$y$  log farm output

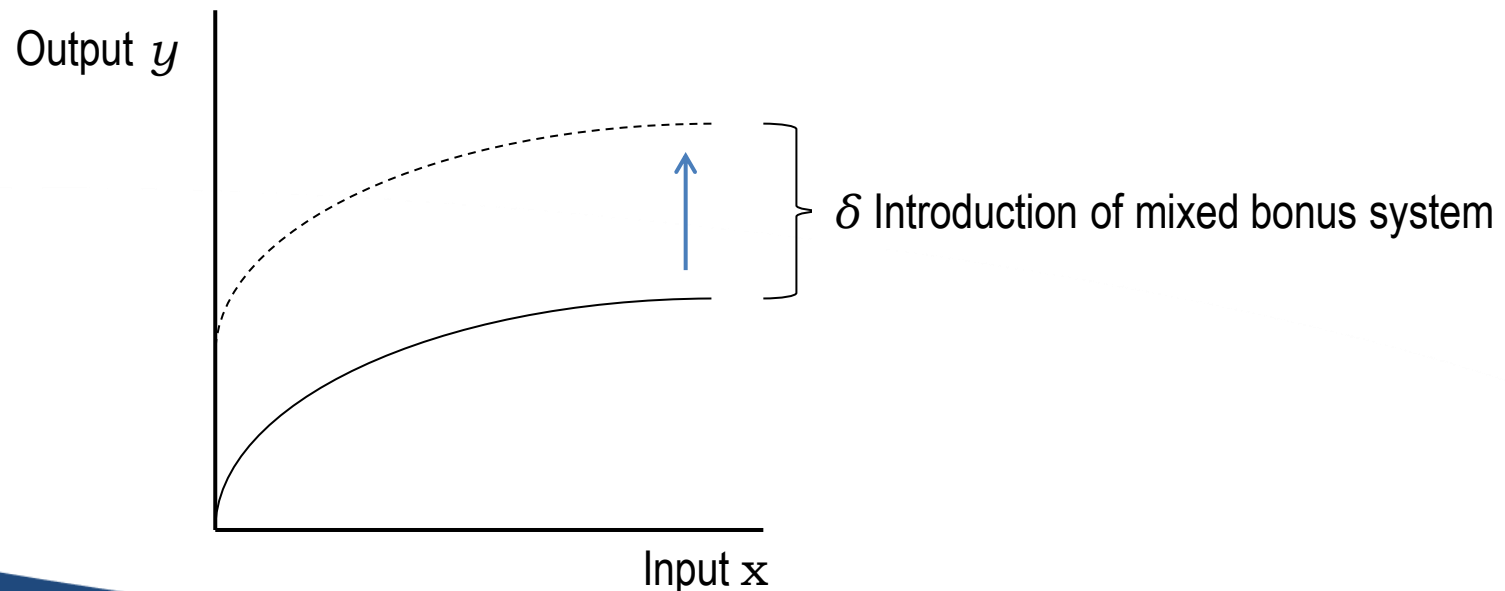
$\mathbf{x}$  log production factors land, labour, materials, capital

$t$  farm runs mixed bonus system (0/1)

$\mathbf{w}$  determinants of mixed bonus system introduction

$\delta$  productivity effect of mixed bonus system

Assumption: error terms are bivariate normal with correlation  $\rho$  (Maddala 1983).



# Productivity effects of mixed bonus systems

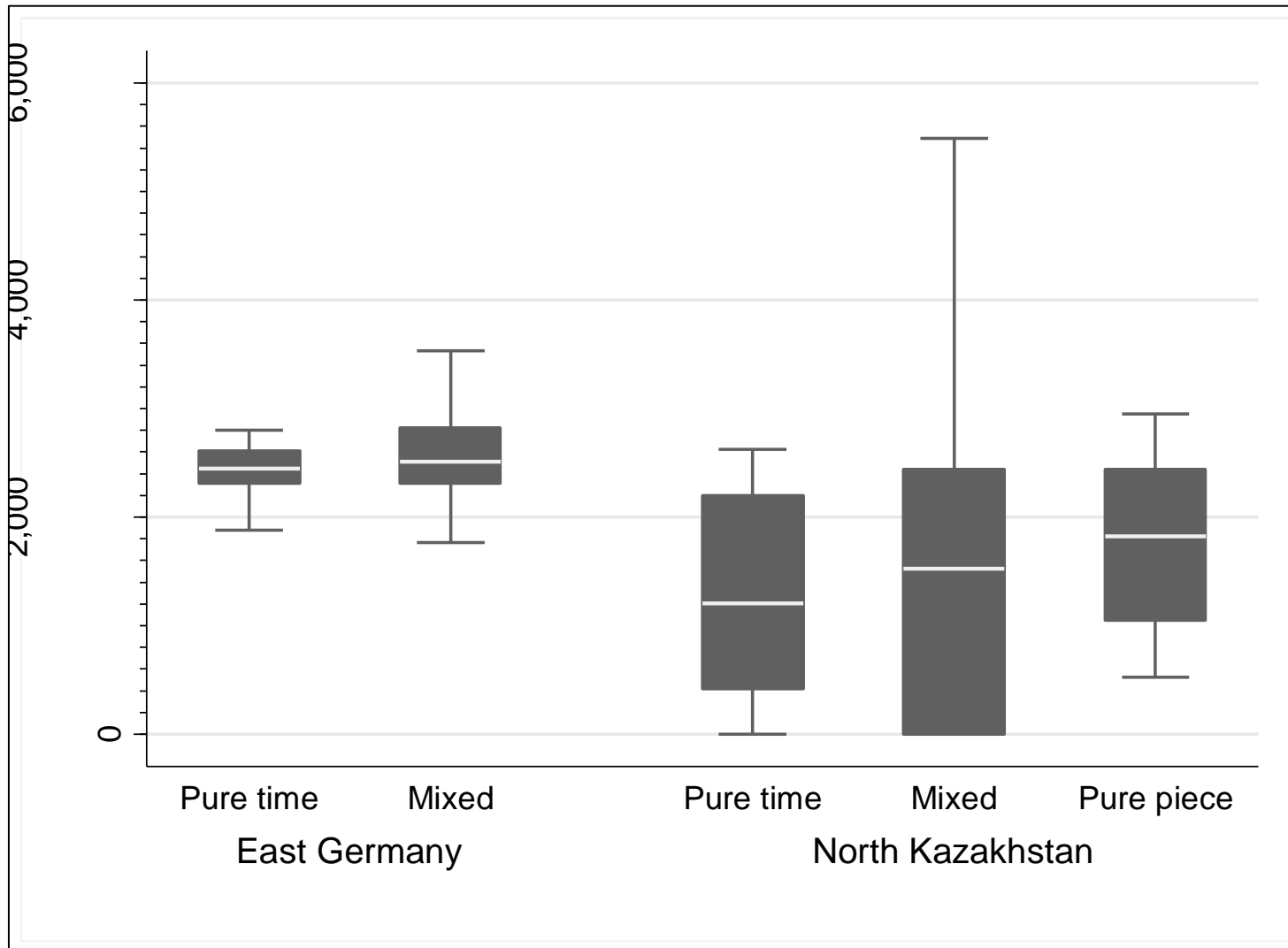
Maximum Likelihood estimation for North Kazakhstan farm survey data (N=125)

Output (log) equation	Coeff	Sig	Sample mean
Land input (ha) (log)	0.150	**	6,628
Labour input (workers) (log)	0.732	***	21.9
Materials input (USD) (log)	0.206	***	84,100
Capital input (USD) (log)	0.035	**	383,400
Mixed bonus system (0/1)	1.898	***	0.82
Pure piece rate system (0/1)	0.358		0.11
Mixed bonus system equation			
Land input (ha)	-0.005		6,628
Farm is keeping livestock (0/1)	-1.847	***	0.55
Farm was taken over by agroholding (0/1)	3.797	*	0.05
Years since last restructuring of farm	-0.029		11.4
Age of manager (years)	0.010		47.7
Education of manager (1..8)	-0.265	***	6.7
$\rho$ (Wald test $\rho=0$ )	-0.915	***	

\*, \*\*, \*\*\* significantly different from zero at 10, 5, 1% level.

# Cost effects of incentive pay

Boxplots of annual labour cost per worker under different pay systems



Sources: Author based on Davier 2007; IAMO Kazakhstan farm survey 2012.



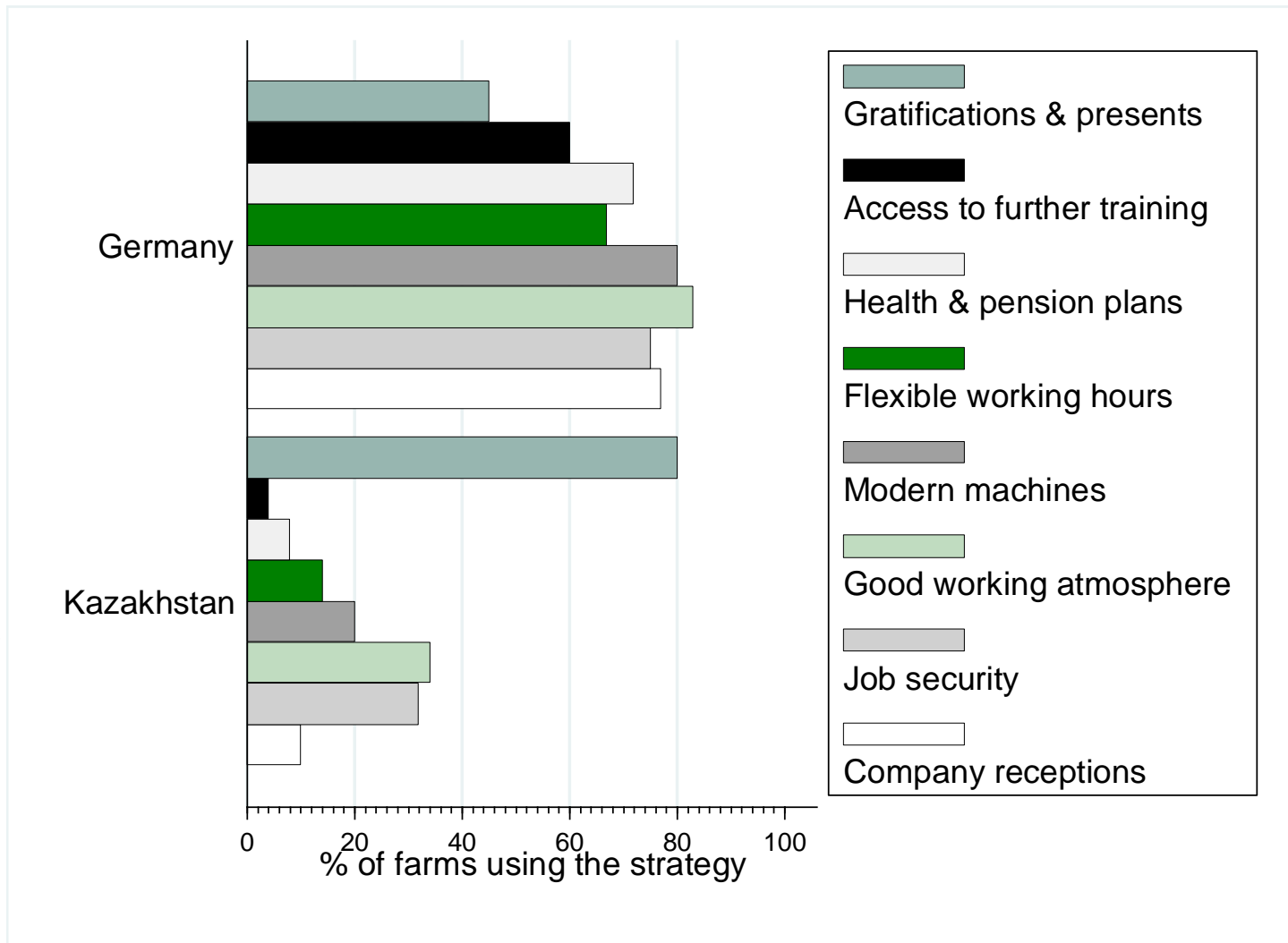
# Non-wage incentives

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- Threat of termination, resulting in involuntary unemployment (Bowles 1985)
- Employer promotes access to further training
- Company-sponsored health & pension plans
- Flexible work time regulations
- Workers identify with their employer (Akerlof & Kranton 2011)
- ...

# Non-wage incentives

Strategies used by corporate farms in East Germany (N=92) & North Kazakhstan (N=50)



Sources: Author based on Davier 2007; IAMO Kazakhstan farm survey 2012.

# Conclusions

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- Legacy of highly inefficient piece rate system introduced during forced Soviet industrialisation
- Much more persistent in Kazakhstan than in East Germany
- German farms use non-wage incentives much more actively: team building, social benefits, further training, job security
- Linking pay to output increases productivity but also cost
- Combining time rates with simple bonus schemes a promising option (mixed bonus system)
- Tend to be adopted in crop farms, agroholdings, & with overall liberalisation of economy

# Open questions

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HR management on corporate farms a vastly understudied subject:

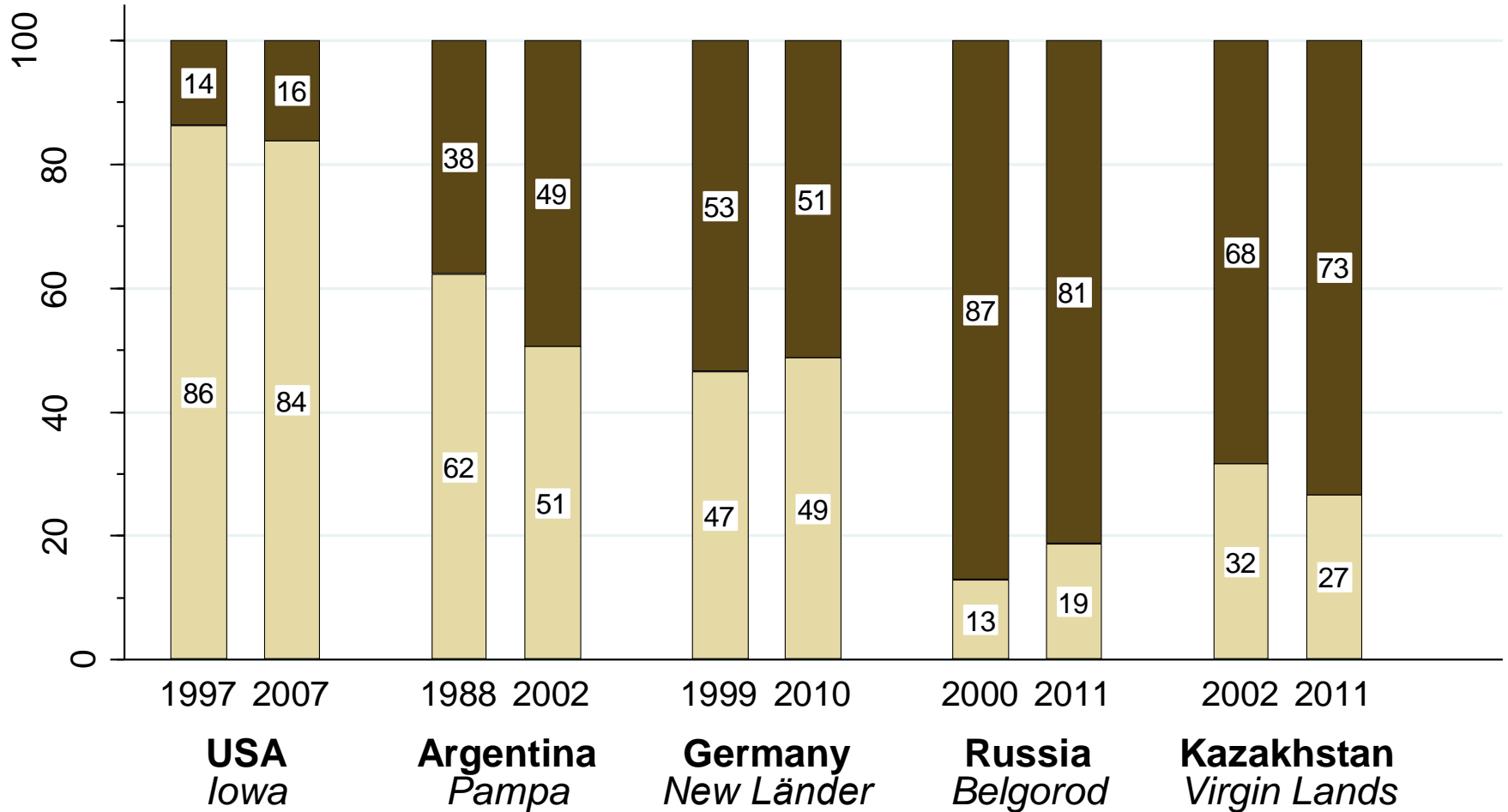
- Why was the reform of ag pay systems so much more successful in Germany (...Central Europe)?
- What can be done to improve worker incentives in a post-Soviet context?
- How to improve vocational training, attract young talents?
- Role of non-farm labour market, migration?

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# Land use by corporate farms

% in selected world regions



Source: national ag censuses.



# Main HRM challenges in Russia & Ukraine

Based on qualitative interviews with HR managers of agroholdings in 2011-2013

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- Finding effective ways to determine remuneration of managers & staff: current practice ranging from fully subjective up to “measuring everything”
- Lack of motivated & skilled personnel: hard to replace low performers; high potentials among own ranks are unknown to HQ; over-specialisation of existing staff
- Workers’ morale has changed little since Soviet era: norm achievement is central, no problem solving mentality, no understanding that timing is crucial in agriculture
- Loyalty to the company is low; prevalence of theft
- IT-based HRM (precision farming) has not delivered yet, still a lot of handwriting & paperwork

# Main HRM challenges

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“Our experiences show that it is **not sufficient** to run big farms with big plots, to invest in modern equipment and to use modern seeds, fertilizer and CPA. It is all necessary but not enough.

Also modern IT systems and incentive based payment schemes are not solving the problem alone.

[The] major topic is to **motivate the local people**. To make teambuilding and guide them.

The bad experiences with fraud and missing ideas of local managers lead to a tendency of centralization with strict control and external input of idea[s]. The reality shows that this is not working. **We must rely on local managers**. If they are not capable they have to be educated or replaced.”

CEO of a Russian agroholding specialising in sugar production, September 2012  
Emphasis added