

A close-up photograph of several golden-brown buns topped with sesame seeds, arranged in a cluster. The buns are resting on a textured, light brown surface, possibly a woven basket or burlap. The lighting is warm, highlighting the texture of the bread and the seeds.

Mastering Productivity Growth- Where
Canadian Food processing is lagging behind



Main takeaways

- Productivity in food processing is declining
 - Driven by a decrease in technical progress
- Main drivers differ by subindustry
 - Scale inefficiency
 - Decline in technical progress is the main driver in most industries
 - Full technical efficiency in some industries and substantial decline in dairy, animal food, and bakery and tortilla



Motivation

“Productivity isn't everything, but, in the long run, it is almost everything. A country's ability to improve its standard of living over time depends almost entirely on its ability to raise its output per worker.”
- Paul Krugman

- Productivity is one of main drivers of economic success
 - Living Standards
 - Aging population
- Productivity Is Literally a Matter of Survival for Businesses

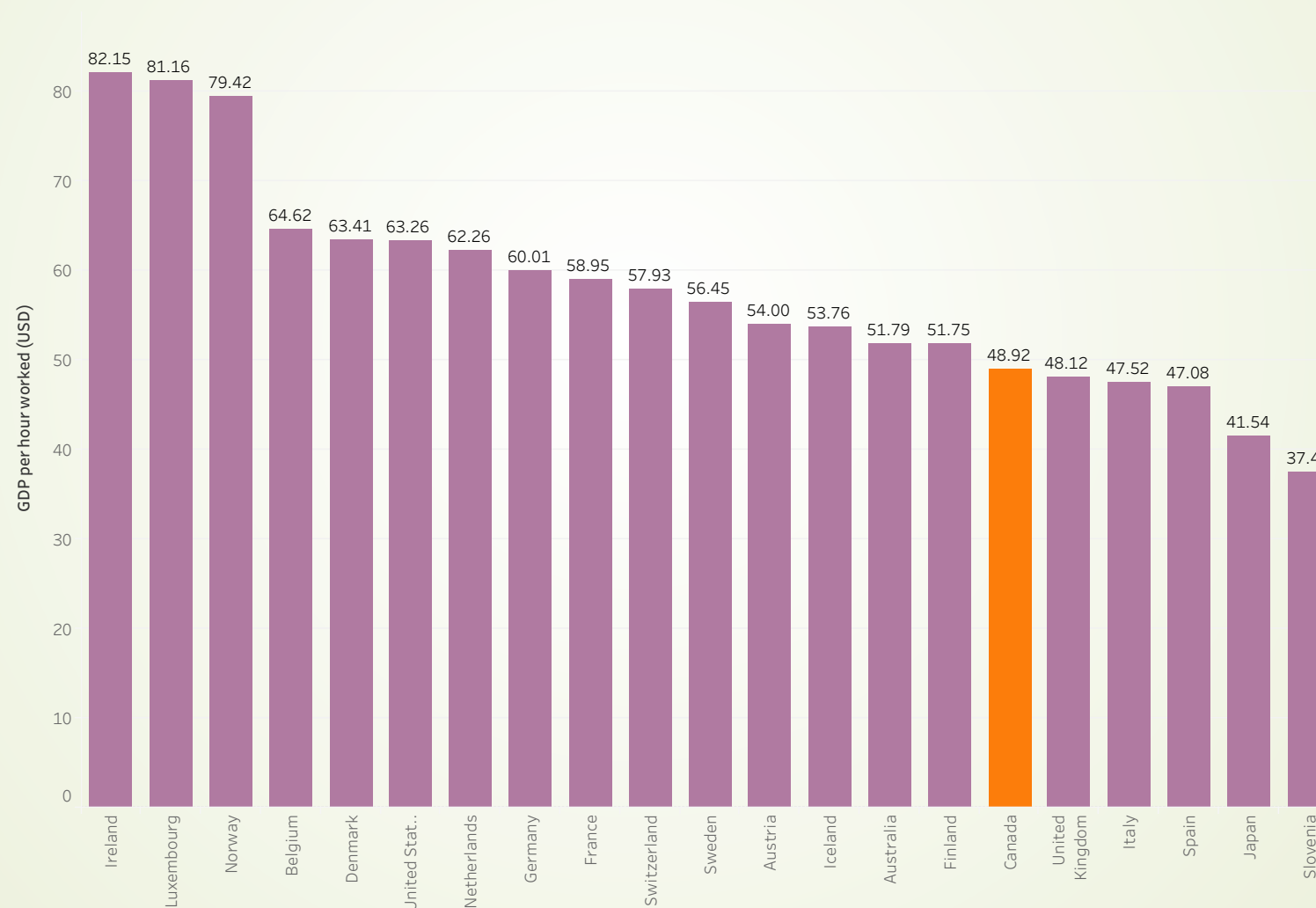


Motivation

- What is productivity?
 - Partial factor productivity
 - Multifactor productivity
- So What Determines Productivity?
 - Things that are within a businesses' control—"levers"
 - Aspects of the operating environment- Regulation, trade competition

Productivity among OECD Countries

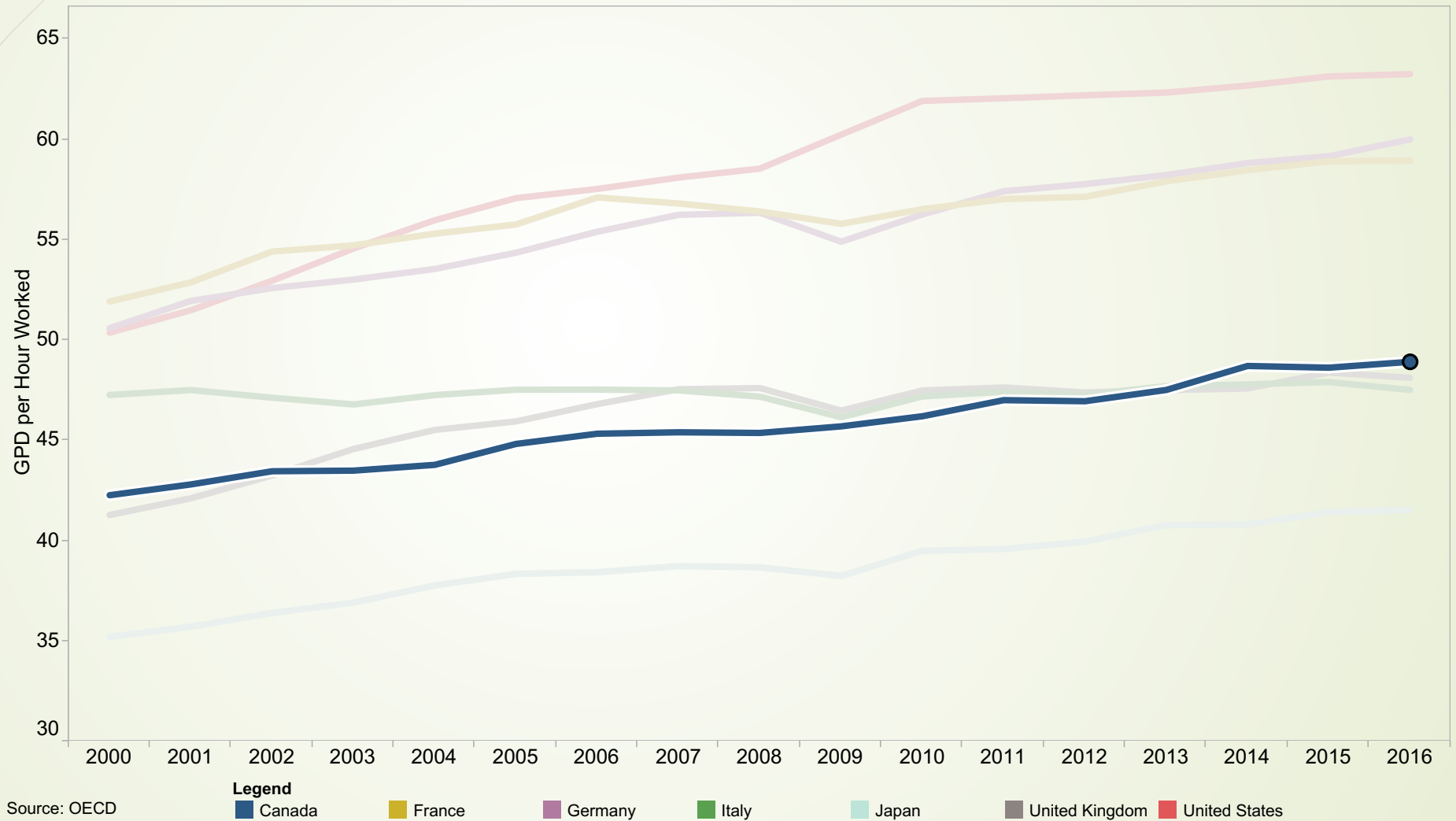
GDP per Hour Worked (USD) Among OECD Countries



Source: OECD Growth in GDP per capita, productivity and ULC

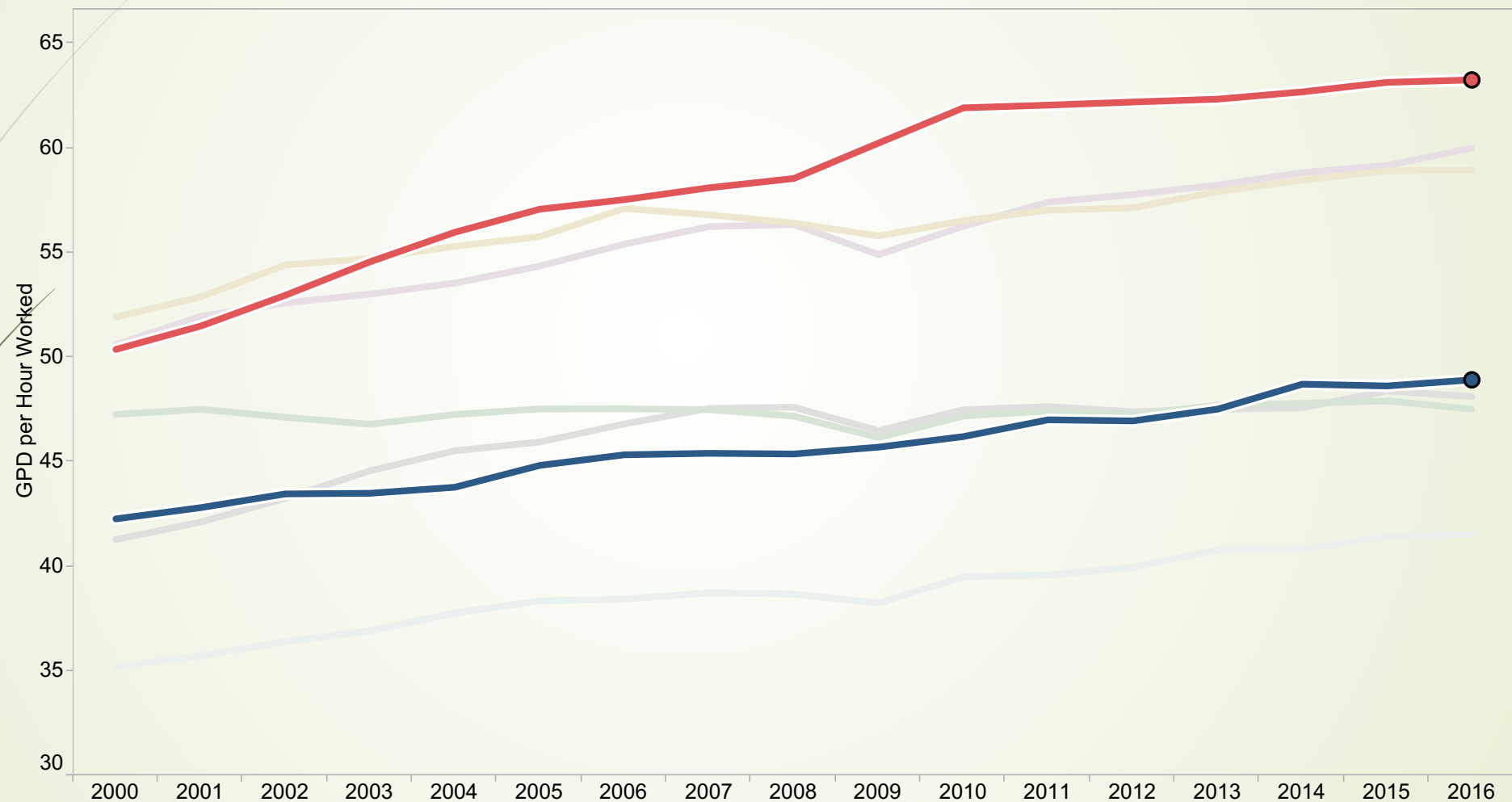
Productivity Growth G7 Countries

GDP per Hour Worked from 2000- 2016
G7 Countries



Productivity Growth G7 Countries

GDP per Hour Worked from 2000- 2016
G7 Countries



Source: OECD

Legend

Canada

France

Germany

Italy

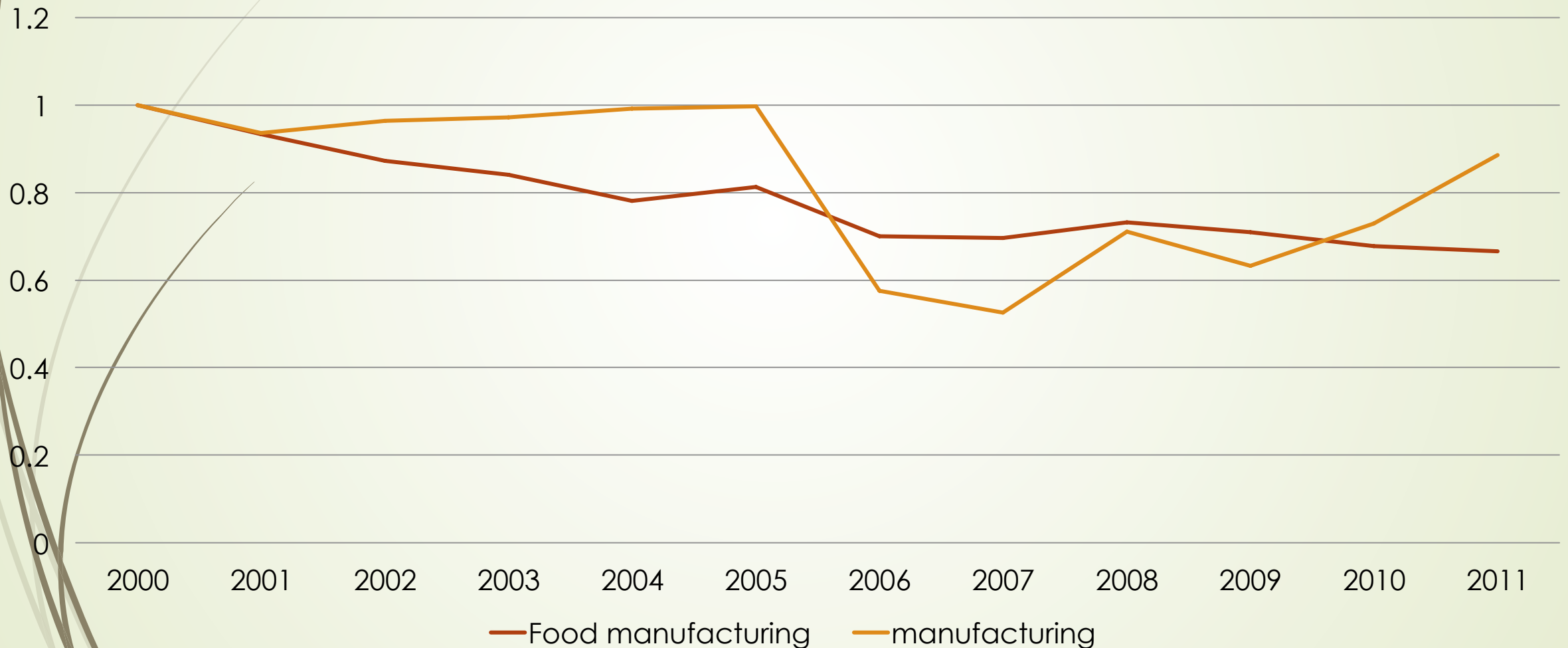
Japan

United Kingdom

United States

Multifactor productivity in Canadian Manufacturing and Food Manufacturing Plants

Multifactor productivity Canadian Manufacturing and Food Manufacturing





Productivity Dispersion is Everywhere

- Aggregate measures of Productivity don't tell the whole story
- Productivity dispersion is everywhere
 - There are very large productivity differences across producers, even within narrowly defined industries
 - U.S: 90th – 10th ratio: 2-1
 - India: 90th – 10th ratio: 5-1
- What this implies:
 - the 90th percentile producer obtains five times more output from the same amount of inputs as the 10th percentile producer
 - Lowest 20 percent of manufacturers 2.5X more likely to go out of business within five years than those in highest 20 percent



Dispersion in Food Manufacturing

Industry	90-10 Percentile Range
Manufacturing	3.341
Food manufacturing	3.361
Animal Food	3.573
Grain and Oilseeds Milling	2.758
Sugar and Confectionary	3.617
Fruits and Vegetables	3.198
Dairy	1.682
Meat and Poultry	3.298
Seafood	1.221
Bakery	3.377
Other Food Processing	3.344



Firm Level drivers of Multifactor Productivity

- Technical Change
 - Technical Efficiency
 - Scale efficiency
- 

Firm Level drivers of Multifactor Productivity

Technical Progress:

- Changes in productivity “stemming from innovation and the diffusion of new knowledge and technologies”
 - Can occur in 2 ways:
 1. research and development
 2. Adoption of innovations from other industries or countries
 - Serves as a measure of innovation
- *“Although big discoveries such as the transistor, antibiotics, and the electric motor attract most of the attention, it takes millions of little discoveries like the new design for the cup and lid to double a nation’s average income”.- Paul Romer*



Firm Level drivers of Multifactor Productivity

Technical Progress:

- For every dollar invested per worker in the United States, we invest 62 cents (George Morris Center, 2012, p. 2)
- By 2012, R&D spending as a percentage of GDP in food manufacturing was 0.6 percent compared to 4.8 per cent for overall manufacturing (Butler, Munro, and Stuckey, 2012, p. 31)
- We find lack of technical progress the main driver of the decline in food manufacturing's MFP.

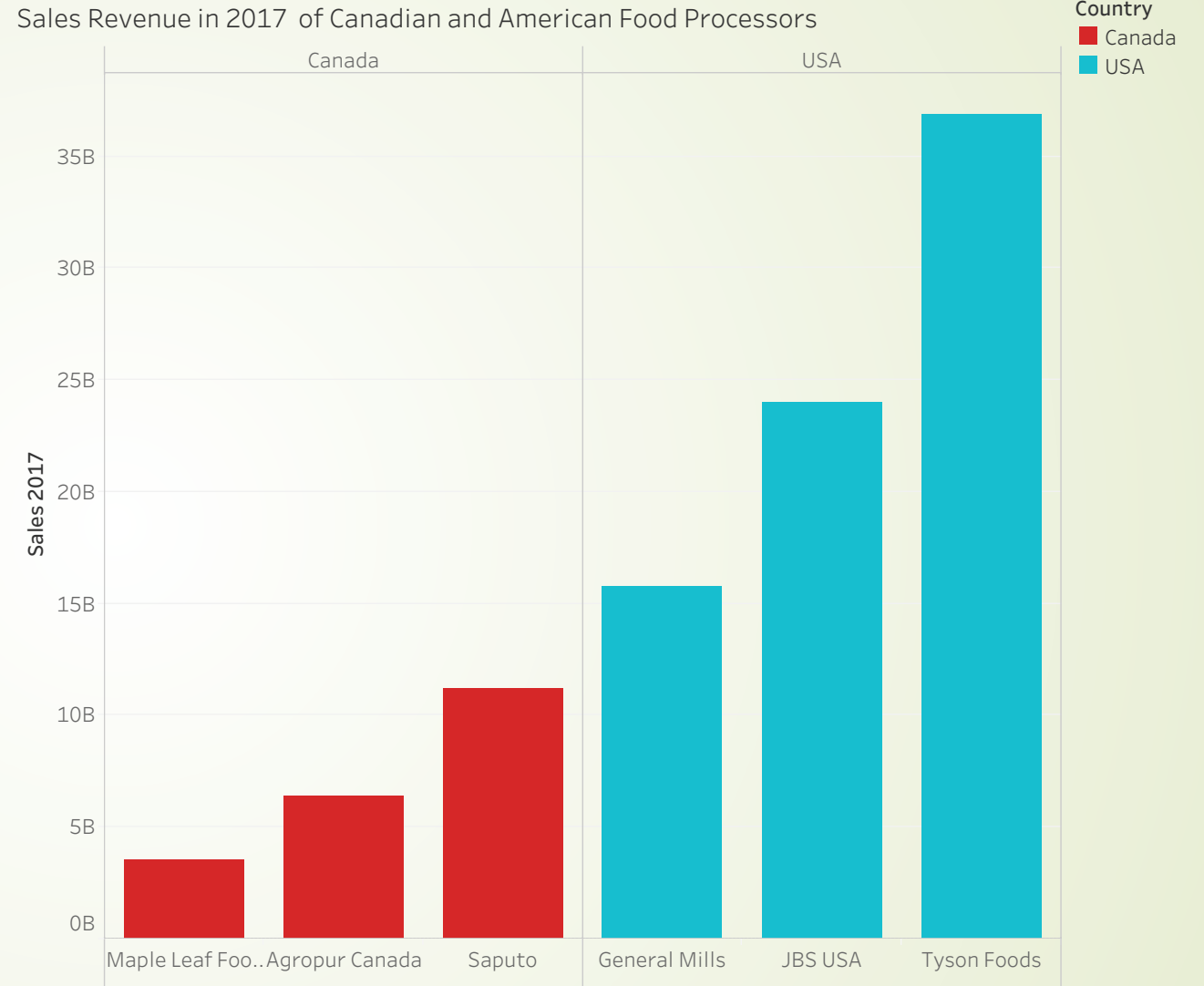


Firm Level drivers of Multifactor Productivity

Scale Efficiency:

- a plant is said to be scale efficient when any modification to the size of operations will render lower productivity for the plant
 - Canadian food processing facilities have half the number of employees and less than half the sales revenue of US facilities
- We find increasing returns to scale for food manufacturing and its sub-industries
 - This implies firms can lower their average costs by increasing production

Canadian v.s. U.S firms

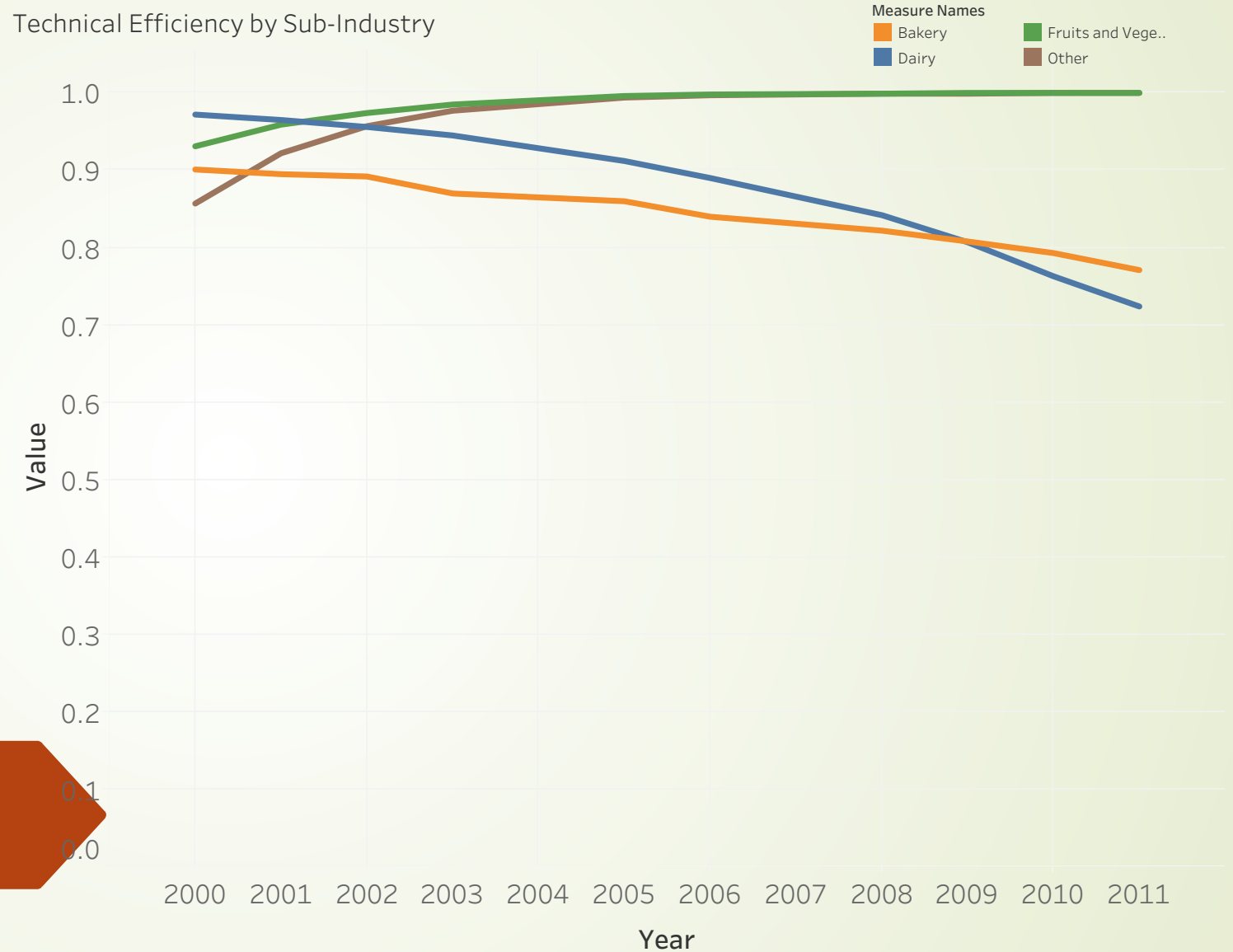




Firm Level drivers of Multifactor Productivity

- Technical Efficiency:
- Ability to reduce waste by producing as much output as possible from a given set of inputs
- Industry faces pressures to be as efficient as possible at the expense of innovation – e.g., Loblaws
- Lai (2015) finds the industry has reached full efficiency
- We also find that on average the industry has reached full efficiency, but not necessarily every sub-industry

Changes in Technical efficiency by Sub-Industry





Results



Industry	MFP Growth (%)	Technical Progress (%)	Technical Efficiency Change (%)	Scale Efficiency Change (%)
Manufacturing	- 1.007	0.166	-1.258	0.085
Food Manufacturing	- 0.911	-1.307	0.300	0.096

Results

Industry	MFP Growth (%)	Technical Progress (%)	Technical Efficiency Change (%)	Scale Efficiency Change (%)
Animal Food	-2.840	-0.874	-2.002	0.0379
Grain and Oilseeds	-0.244	-1.009	0.434	0.3309
Sugar and Confectionary	0.079	-0.908	0.604	0.3842
Fruits and Vegetables	-0.707	-2.156	1.446	0.00223
Dairy Product	-1.436	2.409	-3.945	0.1011
Meat and Poultry	-0.803	-0.117	-0.824	0.1377
Seafood	-2.179	-1.379	-0.444	-0.357
Bakery and Tortilla	0.041	1.499	-1.661	0.2026
Other Food processing	-0.447	-1.829	1.155	0.2267



Summary of Findings

- On average, productivity of the Canadian food processing Industry is declining
 - Main drivers are a decline in technical progress and economies of scale.
 - The industry has reached full technical efficiency.
- All sub-industries except two saw declines in MFP
 - Main driver of declines differs by industry



Policy

- How can we foster innovation and technological progress?

Firms

- When firms innovate and invest, they generate knowledge spillovers
 - Sizeable spillovers of R&D have been found in the literature
- Which firms should be helped by policy?
- innovations at the beginning are much more radical - new firms need to prove themselves (ackcigit and kerr, 2016)

Inventors:

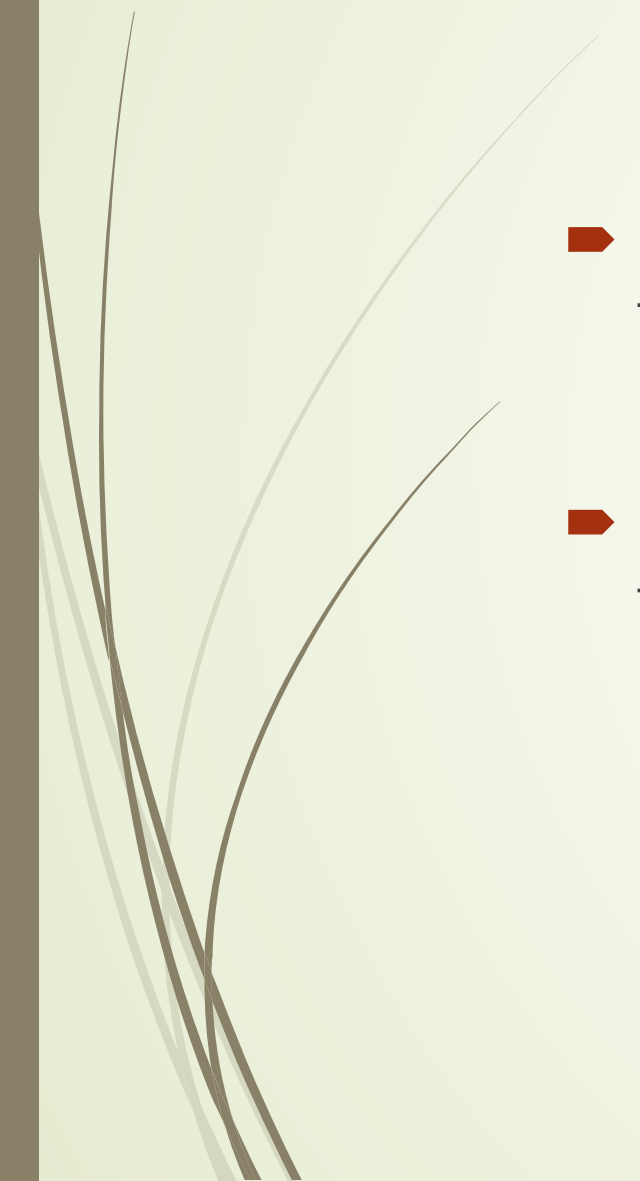
- Inventors - policies that ensure we retain our inventors

Innovations

- quality vs quantity



Policy

- Policies which encourage and support firms to expand to explore economies of scale
 - Encourage firms to minimize costs in industries with technical inefficiency
- 

Thank you

