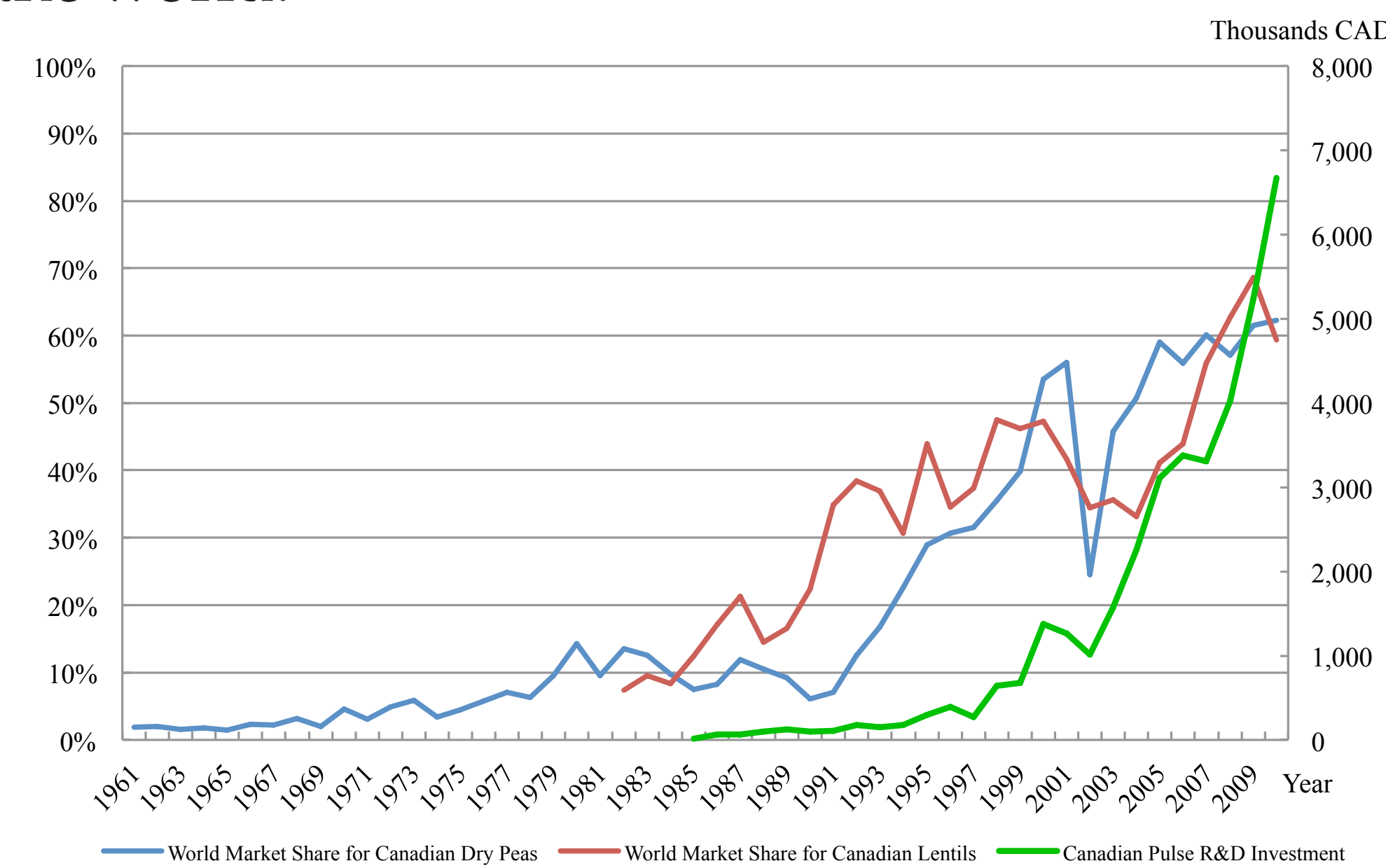


## INTRODUCTION

Producer check-offs are a major source of funding for agricultural research and development (R&D) in a number of countries and for a number of crops. A good example of this is Canadian pulse crop R&D, which is financed largely by Canadian pulse growers.

As a major world pulse exporter, Canada accounts for roughly 60% of the world trade in peas and lentils. Thus, Canadian pulse R&D activity can be expected to have a significant impact on not just Canadian farmers and consumers due to lower costs, but also producers and consumers around the world.



Globally, Canadian pulse crop R&D results in importing countries relying more on Canadian pulse production, thus raising domestic food security issues in developing countries.

## OBJECTIVES

The goals of this study are to:

1. Examine the distribution of Canadian pulse R&D benefits and costs between domestic consumers and producers.
2. Examine the economic impact of Canadian pulse R&D investment on overseas producers and consumers in the major import markets for Canadian pulses.
3. Examine how the distribution of benefits and costs of producer-funded R&D determines farmers' incentives to undertake R&D.

## METHODOLOGY

The analysis starts by constructing a multi-region, multi-product partial equilibrium model (PEM) that captures market connections between different crops and different regions with an emphasis on the welfare impacts of Canadian pulse research to groups in connected markets.

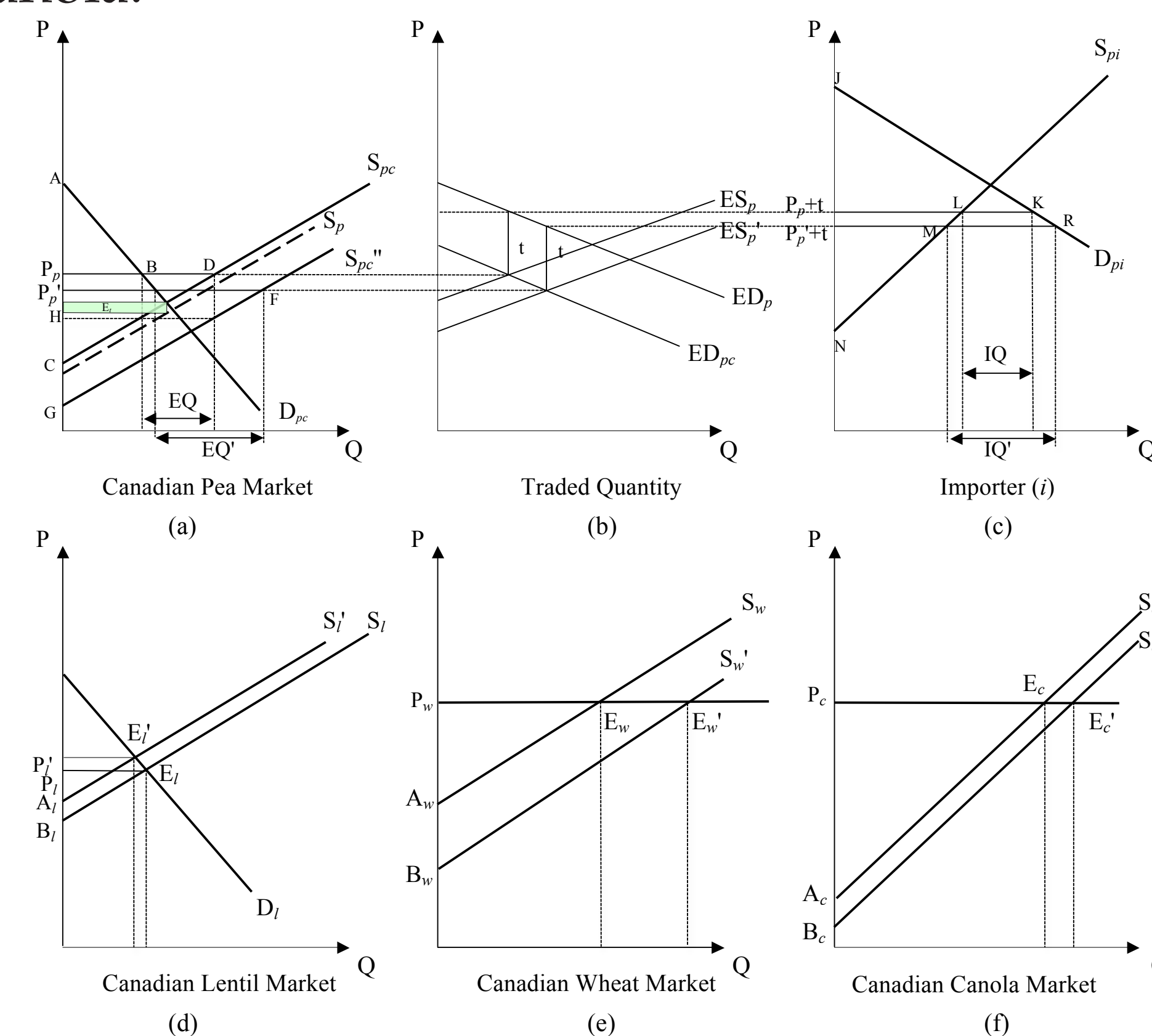
Using data on prices and quantities from FAO-STAT, and elasticities from the existing literature, the supply and demand curves are calibrated.

Once the initial PEM model is solved, the worldwide impact of an increase in pea R&D investment in Canada is examined by shocking the PEM model with a linear technology shift. Transportation costs and trade policy distortions are captured by spatial price differentials between Canada and the other importers.

In addition to determining the equilibrium prices and quantities in different regions and for different crops, the model calculates the welfare effects in each region by using the normalized quadratic indirect profit function and the normalized quasilinear utility function.

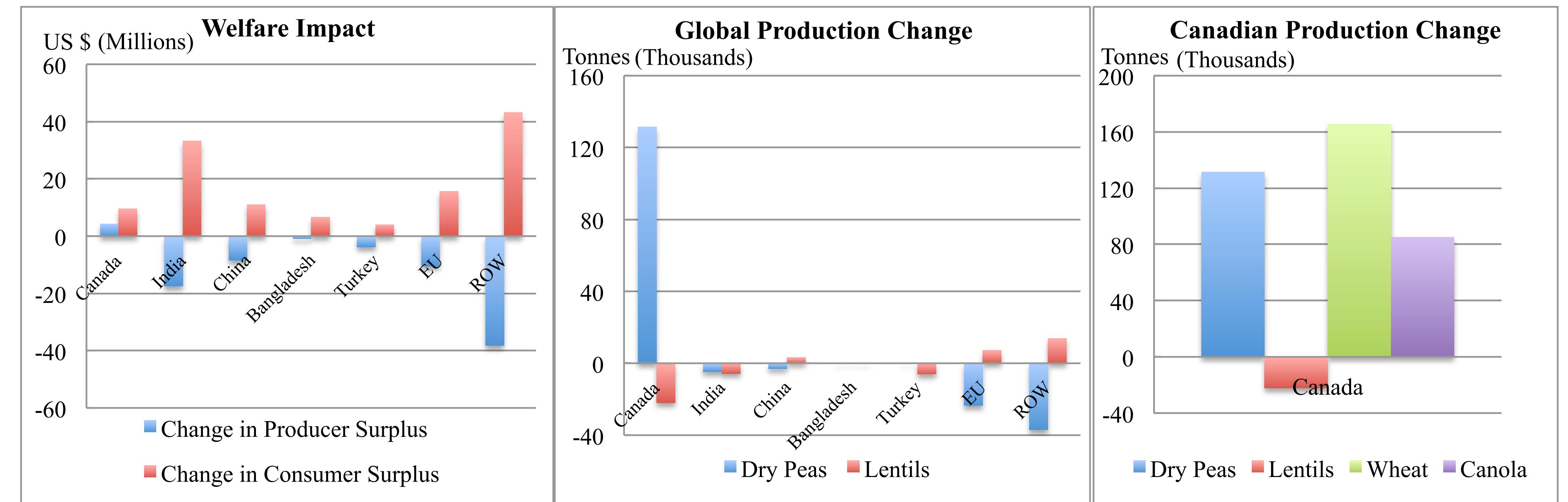
## THEORETICAL FRAMEWORK

The model is divided into seven regions (Canada, India, China, Bangladesh, Turkey, EU and ROW) and captures the interaction and the welfare effects of four major markets of Canadian agricultural products: peas, lentils, wheat, and canola.



## RESULTS

The following diagrams demonstrate welfare effects and the production change associated with a 10% increase in the existing knowledge stock (i.e., 1.9 million US\$) in the Canadian pea sector.



Impact of Canadian Pea R&D Investment

	Canada	India	China	Bangladesh	Turkey	EU	ROW
$\Delta$ Total Surplus (US\$)	13,840,757	15,782,009	2,553,707	5,833,016	218,770	5,175,118	4,924,291
$\Delta$ PS (US\$)	4,296,384	-17,496,895	-8,497,336	-853,336	-3,829,079	-10,517,742	-38,285,066
$\Delta$ CS (US\$)	9,544,373	33,278,904	11,051,043	6,686,352	4,047,850	15,692,861	43,209,356
$\Delta$ Production (tonne)							
Peas	131,485	-4,721	-2,994	-110	5	-23,594	-37,041
Lentils	-22,056	-5,696	3,194	-365	-6,079	7,191	13,766
Wheat	165,446						
Canola	85,098						

Source: Calculated by the author based on FAOSTAT data.

## CONCLUSIONS

1. Consumers in all regions are better off from increased Canadian pulse R&D investment.
2. Overseas producers are worse off from increased Canadian pulse R&D investment.
3. Canadian producers are better off from the increase of pulse R&D investment.
4. Although overseas pea production declines, world pea production increases due to the increase in Canadian pea production.
5. Production of Canadian peas, wheat, and canola rises, while lentil production falls.
6. Research benefits captured by Canadian producers are not as high as evaluated by previous research (the marginal B/C=3.3:1 in this study, compared to 15.8:1 in previous studies).

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