Optimal R&D Investments in Plant Breeding with IPRs and Flexibility between Hybrid and Herbicide Tolerance Trait Development

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Optimal R&D Investments in Plant Breeding with IPRs and Flexibility between Hybrid and Herbicide Tolerance Trait Development

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Introduction:

The self-reproducing nature of some crops makes crop research output non-excludable. Thus optimal R&D investments in plant breeding for self pollinating seeds are different from other sectors. The problem in capturing the benefits of breeding contributes to an underinvestment in breeding. Most countries have some form of public investment in seed breeding or regulation to help create incentives in the private sector. Currently, intellectual property rights (IPRs) in Canada have two forms, patents and plant breeders rights (PBRs). Both regimes provide the owner with exclusive commercial rights for a limited period of time. However under PBRs, farmers can save the seed for subsequent reproduction (Galushko, 2008). Canada's Plant Breeder's Act lags behind the US, Australia, and most of the EU. Some argue that PBRs are too weak and Canada must adjust its plant IPRs laws to catch up with others. Some on the other hand, argue that PBRs are even a stronger tool in terms of allowing open access to foreign technologies.

Is Canada falling behind?

Figure 1, is constructed based on the area harvested under oilseeds and the yield of oilseeds of IPR pioneer countries relative to the yields and area of Canola in Canada for the period 1990 to 2010. The numbers on the left y axis are calculated by dividing the harvested area of each country or group of countries by that of Canada. (For Australia the result is multiplied by 10 for the sake of scale) The figure suggests no clear increasing pattern in the ratio of harvested area under oilseed crops after the implementation of 1991 act. The numbers on the right y axis are calculated by dividing the yield of each country or group of countries by that of Canada and yet show rather a slight decreasing trend.

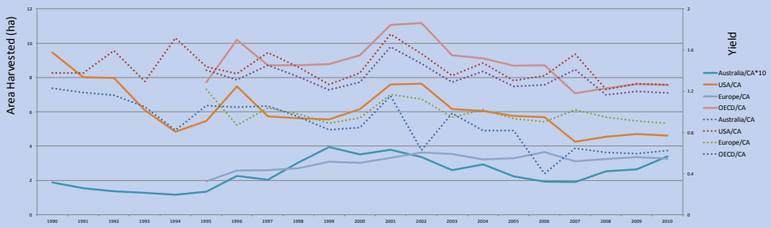

Figure 1. Ratios of area harvested and yield of oilseeds for selected countries to those of Canada.
Source: constructed from OECD-FAO Agricultural Outlook 2012-2021 data set.

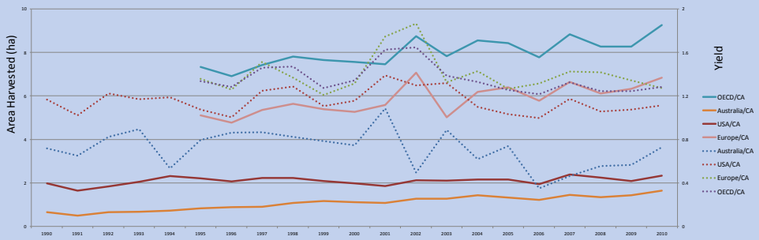

Figure 2. Ratios of area harvested and yield of wheat for selected countries to those of Canada.
Source: constructed from OECD-FAO Agricultural Outlook 2012-2021 data set.

Figure 2 is constructed with the same groups of countries but using wheat harvested area and yield. Although the data on wheat shows an increase of about 26 percent in the ratio of harvested area of OECD countries by that of Canada, the data on wheat yield has had a stable trend. Adding to this information is the fact that R&D in Wheat is still largely funded by the public sector in Canada whereas oilseed R&D comes mostly from the private sector. This casts doubts on the claim that IPR's in other countries are necessarily more productive than those in Canada.

Exercise Aim's:

Before making any adjustments in the regimes of IP protection, it seems crucial to examine the effects of each IPR regimes on R&D investments in plant breeding. This exercise therefore tries to develop a model for BPR's regime proposing a dynamic version of a model first introduced in a static framework by Galushko (2008) to incorporate the effect of stock of knowledge on the rise in yield as well as accounting for the complementary relationship between process and product innovations.

Methodology:

Propositions:

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