



FARE

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What's Inside?

This issue of *FARE Share* features a topic that author Karl Meilke calls “two sides of the same coin” – technology and trade.

Inside, we further examine the impact of technology in Canadian agriculture with a study that estimates and measures the effects of technological change in crop yields.

On the back page, we remember an exceptional colleague and examine a topic of interest to those inside and outside of academia – farmland values, rent and interest rates.

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The FARE Share Newsletter features research and analysis from faculty and students in the Institute for the Advanced Study of Food and Agricultural Policy in the Department of Food, Agricultural and Resource Economics (FARE).



Trade and Tech: Two Sides of the Same Coin

By: *Karl Meilke, OAC Professor Emeritus, FARE*

Recently, my grandson asked me what video games I played when I was his age. I replied that I didn't have video games, a computer, cell phone or TV until I was eight when my parents purchased our first black and white set with three fuzzy channels. Our family lived in a tiny rural town that supplied nearly all of our needs from small local businesses.

My father was a farmer and the machinery he used in the 1950s would be recognizable to today's farmers but as out of date as our communication devices. The transformation of our personal and work environments by technical change has been phenomenal and there is good reason to believe that it will continue into the future, and probably at a more rapid pace than in the past.

A less obvious change has taken place in the last 70 years as international trade shrunk the world. While my mother was limited to buying oranges, apples and bananas, today's supermarket stocks exotic produce sourced from around the world. Trade has improved our lives in many of the same ways as technical change. In fact, technical change and trade have many of the same effects

on our economy – but the public's perception of the two phenomena is quite different. Technical change is generally accepted as a good thing, but trade is often viewed skeptically. I offer a few observations why this might be the case.

“Technical change is generally accepted as a good thing, but trade is often viewed skeptically.”

Technical change involves the development of new products and new ways of making old products. Air conditioning, a global positioning system, a cell phone and a massive combine currently make harvesting crops easier and faster than my father could ever imagine. Innovations in public and private laboratories increase crop and animal yields, keeping farm prices low and the world better fed than ever before. Still, these innovations have negative effects on some people. Less farm labour is required as well as fewer farmers. Small town businesses close as the rural population shrinks. Still, most people



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see this as “progress” as backbreaking labour-intensive tasks are replaced by “technology.”

When it comes to trade, we are all familiar with simple trading relationships. You might trade a bag of carrots for an apple pie with your neighbour. In this case, you are both better off – you made a trade, and no one lost. Next week you might go to the farmers’ market and purchase a box of local peaches. Again, both you and the seller feel good – you have peaches and the seller has money to spend in the local community. Perhaps a week later you go to your local supermarket and buy New Zealand lamb chops – you have made a trade and won, but the other winner is now seemingly in New Zealand. Don’t forget that while you dine on New Zealand lamb, a Christchurch restaurant might be serving Ontario pork. Still, you might feel a pang of guilt for not buying “local.” As supply chains become longer, the products more complex and the trades less personal it is easy to forget that there are still benefits from trade in terms of lower prices, better quality and a greater variety of goods for sale. The marketplace for food is no longer your local farmers’ market but the world.

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During the Great Depression, most developed countries raised their tariffs on imported goods to protect local production, but this *beggars-thy-neighbour* policy backfired by shrinking the world marketplace and prolonging the depression. Following World War II, several rounds of multilateral trade negotiations were conducted and the tariffs on manufactured goods were slowly

lowered until import barriers for most manufactured goods, in developed countries, are now very low. Agriculture has been a latecomer to trade liberalization, but some progress has been made. This expansion of the world’s marketplace, plus technical change has improved our lives and increased the incomes of people, rich and poor alike.

Currently, more open trading relationships are under attack from many quarters – especially from the United States who traditionally favoured lowering trade barriers. Granted, it is difficult to support trade when a factory closes, and people lose their jobs. Sometimes the link between job losses and trade is fairly obvious but most of the time it is a combination of technical change and trade. The benefits of both trade and technology are often diffuse coming in the form of new goods; lower prices for domestic manufacturers and consumers; and jobs in different industries. However, destroying trading relationships, as between North America and China, also causes job losses and higher prices for all.

The 24-hour news cycle makes it difficult to ignore current events and to plan further into the future. However, looking forward into the next decade I urge: 1) Canada to work with the United States and their traditional allies to mend and maintain the World Trade Organization as the primary institution for setting trade rules; 2) Canada to consider and plan for an alternative world where the rules of trade are increasingly dominated by China and its allies; and 3) Canada to fear and consequently fight against a world where trade rules are determined unilaterally by the economic goliaths.



FARE Talk



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Enlightening discussions about contemporary topics relevant to food, agricultural and resource economics

Duty to Consult

In this podcast, Dr. Brady Deaton, FARE Professor and McCain Family Chair in Food Security, is joined by some of his natural resource economics students to speak with Dwight Newman, a Professor of Law and Canada Research Chair in Indigenous Rights in Constitutional and International Law at the University of Saskatchewan.

Their conversation is centred on one of the more important legal issues of our time: the Canadian Government’s “Duty to Consult” Indigenous People. The meaning and history of duty to consult

is discussed in detail. As listeners will hear, the podcast begins with an assessment of the following quote: “To be blunt, anyone who perpetuates misunderstandings about the duty to consult is standing in the way of Canada’s future.”

To listen to the complete conversation and other podcasts, visit the FARE website: <https://www.uoguelph.ca/fare/institute/podcasts#dutytoconsult>



Understanding Technological Change

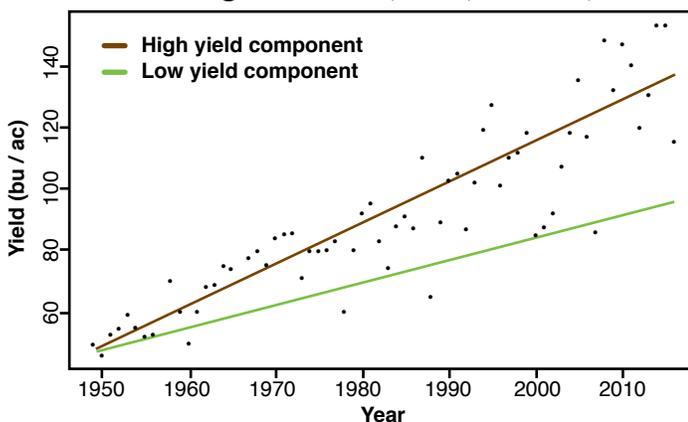
By: Horlick Ng, Former Graduate Student, and Alan P. Ker, Professor, FARE

The study of technological change is critical for meeting future food demand, enhancing yield resiliency, mitigating any negative externalities from a changing climate and remaining internationally competitive. Understanding technological change in Canadian agriculture is critically important given our dependence on export markets and the need to remain economically competitive. Canola seed, canola oil, wheat and soybean currently represent the top four agri-food exports. In 2017, 50% of canola production, 49% of wheat production and 48% of soybean production were exported (Canadian Grain Commission, 2019). Conversely, the majority of barley, corn and oats are domestically consumed in the production of beef and pork products. In 2017, beef and pork exports totalled \$6.4 billion (Agriculture and Agri-Food Canada, 2019). Technological change is and will continue to be paramount to the competitiveness of Canadian agriculture.

In Ontario, we have corn, soybean and winter wheat yield data. Ontario accounted for 62%, 49% and 77% of national crop production in 2017, respectively (Statistics Canada, 2018). We have 32 counties for corn, six for soybean and 26 for winter wheat. Our counties represent 97%, 40% and 95% of Ontario crop production, respectively. In Saskatchewan, we have yield data for barley, canola, oats and spring wheat. Saskatchewan accounted for 40%, 52%, 53% and 39% of national crop production in 2017, respectively (Statistics Canada, 2018). We have 204 counties for barley, 144 for canola, 131 for oats and 267 for spring wheat. For all four crops, our counties represent over 95% of Saskatchewan production. In total, we have seven crops and 810 county-crop combinations.

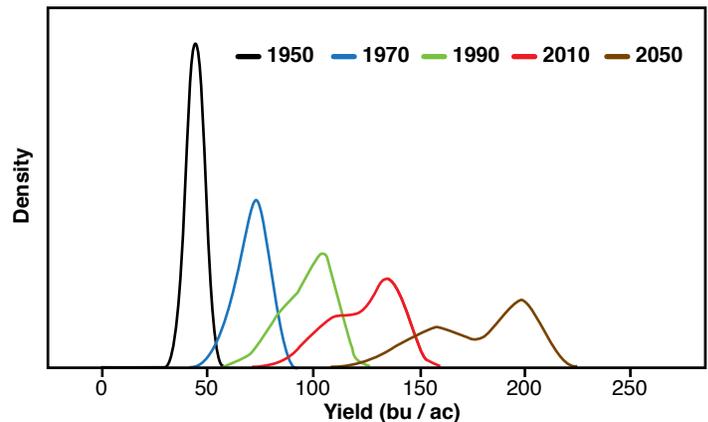
We use mixture modelling methods, which allow varying responses to technology. That is, the methodology recognizes that technologies may affect yields in good weather years differently than in bad weather years. We illustrate our estimated models and resulting yield distributions in the accompanying figures.

Technological Trends, Peel, Ontario, Corn



These figures are illustrative of our empirical results. First, rates of technological change exceed the rate of population growth.

Estimated Yield Distribution, Peel, Ontario, Corn



The results are consistent with similar research looking at yields in other developed countries. While many others have raised significant alarm bells regarding feeding nine billion people by 2050, they naively do not account for changing technology or economic structures. This is tantamount to suggesting that agricultural supply and technology in 1970 is not sufficient to meet demand in 2020. This logic is simply nonsensical.

Second, we find technological change is increasing yields much greater in good and optimum growing conditions versus poor weather conditions. As a result, yield resiliency relative to the high yields is decreasing for most crops. This is not found with genetically modified crops containing the drought-resistant trait. Despite this, we find that premium rates for crop insurance will continue to increase in dollar value but remain flat relative to the percent of total liability.

Third, most of our results showed very notable spatial bifurcations within the provinces. We find different results in southwestern Ontario versus more northern and eastern regions. Similarly, we find different results in the northwest region of Saskatchewan versus the more southern and eastern regions.

We also consider the effect of historical climate change on our estimates of technological change. Interestingly, we found weak statistical evidence of any climate effects, but those that we did find to be significant were concentrated in our location rather than volatility measures. While our results are not as strong as others have suggested, we do properly account for spatial correlation in our statistical tests.

We also forecasted the effects of technological change on AgriInsurance premium rates. We found that, despite widespread volatility increases in the estimated yield distributions, premium rates while increasing in total dollar value, will not increase as a function of total liability. That is because guarantees should increase at a higher rate than losses.

Remembering Bill Braithwaite

Our former colleague, Bill Braithwaite, passed away on August 9, 2019 at Hospice Wellington at age 87. Bill is survived by his wife of 63 years, Elizabeth, and his three children, Michael, Ken and Ann.

Bill was a graduate of University of Western Ontario (BA in Honours Business Administration 1954), a Chartered Accountant (1957) and a graduate of McMaster University (Masters of Business Administration 1967). His remarkable career as a professor at the University of Guelph and Ontario Agriculture College spanned 50 years from 1959 to 2009. He was celebrated as an exceptional teacher. Honours from students included the OAC Alumni Distinguished Teaching Award and an endowment of the Braithwaite Business Scholarships. In 2009, the Braithwaite Accounting Endowment Fund was established by the University to mark 50 years of outstanding vision, dedication and commitment to excellence.

Not only was Bill an outstanding teacher, he was a valued colleague to many in Agricultural Economics and Business as it was formerly called. He mentored many young faculty as they began their career and was always available to provide advice and encouragement.

Away from the University, Bill enjoyed sports of all kinds. He was a skilled skier and a superb golfer. For several years he was President of the prestigious Windemere Golf Club.

Those of us who remember Bill, recall a kind and gentle person with a great sense of humour. He made our lives better and will be truly missed.

Tom Funk,
Professor Emeritus

Farmland Values, Rent & Interest Rates

Research by: *B. James Deaton, Professor, FARE;*
Martin S. Beaulieu, Senior Analyst, Agricultural Division, Statistics Canada; Liam Kelly (pictured) and A. Edwige Tia, Ph.D. Candidates, FARE



One topic that generates widespread interest is farmland values and farmland rental rates. Both are essential to determining the wealth and income of a farm operation. They also influence long-term decisions to invest in agriculture; whether to expand farm activities and how to pass land to the next generation. Farmland values depend on a range of factors such as soil quality, topography, drainage, interest rates, potential use for non-farming activities, etc. This short paper describes the relationships between farmland values, rental rates, and the interest rate.

Farmland is a primary input in agricultural production and a measure of wealth. The per-acre rental rate (r) is a measure of cost from the tenant's perspective; and, a measure of financial return to owning farmland from the owner's perspective. Where farmland is expected to remain in agricultural use, the per-acre price of farmland (p) is expected to depend on the discounted stream of future net-revenues associated with farming. Rental rates are often used as a proxy for these net-revenues. Hence, rental rates and land values generally move in a similar direction.

Rental rates and farmland values can also be used to approximate the return to investing in farmland. This is determined by dividing the per-acre rental rate by the per-acre price of farmland: i.e., r/p . The rent-price ratio remained below 2% for most of the twenty-first century (since 1999). One reason for the relatively low rent-price in Ontario is upward pressure on farmland values due to its proximity to large urban areas. This urban pressure to develop farmland for non-agricultural uses, increases the per-acre price in

the denominator but not for reasons related to its agricultural value.

Another way of thinking about the relationship between land value and rental rates is to measure the capitalized value of farmland and compare it to the actual value of farmland. Capitalized values are measured by r/i where (i) is a measure of the capitalization rate, which can be measured in a number of ways. For our purposes, we simply use a measure of the interest rate. Falling interest rates are expected to increase capitalized values and be associated with increases in real farmland prices.

We focus on the trend between capitalized values and farmland values over time rather than using capitalized value to predict an exact farmland value. From this standpoint, the upswing in capitalized values that seems distinct after 2012 is consistent with declining interest rates and the relatively high grain and oilseed prices during 2012 and 2013. This suggests that the trend (not necessarily the magnitude) in the recent appreciation of farmland prices was consistent with fundamentals.

In summary, when exploring the general relationship between farmland values, rental rates and interest rates, we emphasized their theoretical and empirical relationships over the last 25 years. There are many other factors that are important, such as exchange rates, urban pressure, input costs, etc. There are also non-monetary factors that influence willingness to pay for farmland. That said, looking forward, the important relationships we identify are likely to continue to play an important role.

For the complete report, visit: www.ldkelly.com/ontario-farmland-report



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