

Rising Chinese Imports and its Impact on the Canadian Economy

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CSLS Seminar Series May 27th 2019

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Outline

- I. Trade shock?
- II. Rising Chinese exports to advanced economies
- III. Some Key developments in Canadian manufacturing
- IV. Non-technical Summary of CSLS research on China
 - Manufacturing employment
 - Consumer goods prices
 - Innovation and productivity in manufacturing
- V. Conclusion

I. Trade shock?

• Multi-dimensional impact

Table 1: A Categorization of Trade Shocks

Direction

		Increased competition in domestic market	Increased access to foreign market
t market	Output market	Import competition	Export opportunities
Target	Input market	Foreign input competition	Access to imported intermediates

Source: Shu and Steinwender (2018)

• CSLS research mainly focuses on **import competition in the output market** but when possible, also on the input markets (increasing competition and access to imported intermediates).

II. Rising Chinese exports to advanced economies

Chart 1: Share of imports from China in total imports by country, 1991-2017



Note: Other advanced economies include Australia, Denmark, Finland, Germany, Japan, New Zealand, Spain and Switzerland. Source: Kim (2019a)

Episode of rising Chinese exports

- It's like a "natural experiment"
 - Changes in trade policy in one country is often affected, if not dictated, by the behaviour of its trading partners (*e.g.* NAFTA)
 - Growth in Chinese exports was driven by rising competitiveness of Chinese manufacturing and lower trade costs due to factors internal to China

*e.g.) rapid urbanization, accession to WTO, opening to foreign investment through reforms such as Special Economic Zones (SEZs)

- A sudden and unexpected rise since the early 2000s
- Trade with low-wage countries like China: the distributional effect of trade tends to be more pronounced

Two low-wage countries among the top ten exporters to Canada: China and Mexico

Chart 2: Import penetration ratio in Canadian manufacturing, Low-wage countries: China and Mexico, 1992-2015, manufacturing



Source: Kim (2019b)

Note: Import penetration ratio is defined as the ratio of imports to domestic absorption (total industry shipment less export plus import).

III. Key observations in Canadian manufacturing since the early 2000s

- 1. Manufacturing **employment** fell (both in levels/as a share of total)
- 2. **Consumer prices** for some manufactured goods (electronics, furniture, clothing, and textile) either fell or did not increase as much
- 3. Real **R&D expenditure** fell (in levels/as a share of output)
- 4. Total factor **productivity** growth stagnated
- Studies linking these observations in Canada to rising Chinese import competition are rare

IV. CSLS Research on China

- 1. Impact on manufacturing employment (census data)
 - Aggregate (Murray, 2017)
 - By occupation group skill level/type (Kim, 2018a)
 - By gender (Kim, 2018b)
- 2. Impact on consumer goods prices (Kim, 2019a)
 - CPI data mapped to commodity-level trade data
 - Product level exposure to Chinese imports
- 3. Impact on innovation and productivity in manufacturing (Kim, 2019b)
 - Firm-level data at CDER, Statistics Canada
 - R&D expenditure
 - Total factor productivity

1. Non-technical Summary: Manufacturing Employment



1. Non-technical Summary: Manufacturing Employment

- We estimate the impact on employment in two dimensions:
 - > **Direct effect** on manufacturing employment in Canada
 - Effect within local labour markets: the net effect of labour reallocation and demand spillovers operating within localities
- Analysis in manufacturing at the aggregate level
- Any differential effect **by occupation group** or **by gender**? e.g. Isn't the aggregate effect simply driven by low-skilled/production workers?

Exposure to rising Chinese import penetration

Table 1: Annual percentage-point change in Chinese import penetration ratio,Selected 4-digit NACIS in manufacturing, 2001-2011

Five largest:	% p
NAICS 3341 - Computer and Peripheral Equipment Manufacturing	7.0
NAICS 3169 - Other Leather and Allied Product Manufacturing	6.6
NAICS 3343 - Audio and Video Equipment Manufacturing	5.4
NAICS 3151 - Clothing Knitting Mills	5.2
NAICS 3342 - Communications Equipment Manufacturing	4.9
Five smallest:	
NAICS 3274 - Lime and Gypsum Product Manufacturing	0.0
NAICS 3311 - Iron and Steel Mills and Ferro-Alloy Manufacturing	0.0
NAICS 3131 - Fibre, Yarn and Thread Mills	-0.2
NAICS 3333 - Commercial and Service Industry Machinery	-0.2
Manufacturing	
NAICS 3132 - Fabric Mills	-0.2

Chart 4: Employment Growth and the Change in Chinese Import Exposure 4-Digit NAICS Manufacturing Industries, 2001-2011



Source: Murray (2017)

Local labour markets (CMA/CAs)

Table 2: Annual percentage-point change in Chinese import penetration ratio, 2001-2011:		
Ten largest:		
CMA/CA 450 - Granby, Quebec	0.32	
CMA/CA 440 - Victoriaville, Quebec	0.32	
CMA/CA 454 - Sorel-Tracy, Quebec	0.29	
CMA/CA 428 - Saint-Georges, Quebec	0.28	
CMA/CA 541 - Kitchener - Cambridge - Waterloo, Ontario	0.27	
CMA/CA 553 - Stratford, Ontario	0.27	
CMA/CA 512 - Brockville, Ontario	0.26	
CMA/CA 550 - Guelph, Ontario	0.25	
CMA/CA 465 - Salaberry-de-Valleyfield, Quebec	0.25	
CMA/CA 452 - Saint-Hyacinthe, Quebec	0.24	
Ten smallest:		
CMA/CA 320 - Fredericton, New Brunswick	0.02	
CMA/CA010 - Grand Falls-Windsor, Newfoundland and Labrador	0.02	
CMA/CA 850 - Grande Prairie, Alberta	0.02	
CMA/CA 598 - Kenora, Ontario	0.02	
CMA/CA 977 - Fort St. John, British Columbia	0.02	
CMA/CA 745 - Prince Albert, Saskatchewan	0.02	
CMA/CA 411 - Dolbeau-Mistassini, Quebec	0.02	
CMA/CA 965 - Terrace, British Columbia	0.01	
CMA/CA 845 - Cold Lake, Alberta	0.01	
CMA/CA 860 - Wood Buffalo, Alberta	0.01	

Occupations

Δ.

Table 3: Annualized percentage point change in Occupation-Specific Chinese Import PenetrationRatio for Selected 3-digit NOC-S 2006, Manufacturing, 2001-2011

Five largest	
C07 Computer and Information Systems Professionals	2.25
J16 Machine operators and related workers in fabric, fur and leather products manufacturing	2.20
H51 Upholsterers, tailors, shoe repairers, jewellers and related occupations	2.12
G98 Other elemental service occupations	2.09
C18 Technical occupations in computer and information systems	1.96
Five smallest	
I12 Supervisors, Mining, Oil and Gas	0.17
I14 Mine Service Workers and Operators in Oil and Gas Drilling	0.13
I11 Supervisors, Logging and Forestry	0.12
G73 Other Occupations in Travel, Accommodation, Amusement and Recreation	0.12
I15 Logging Machinery Operators	0.10

Source: Kim (2018a)

Implied employment effect in manufacturing

Table 4: Implied employment changes induced by rising Chinese import competition, in thousand, Canadian manufacturing, 2001-2011

	Actual Change in	Implied Employment
Occupation Group	Employment	Effect
(1) Aggregate	-505.9	-113.5*
(2) By Skill Level		
High-skilled	-36.5	-6.6
Mid-skilled	-135.8	-2.7
Low-skilled*	-333.6	-89.8*
(3) By Skill Type		
Management	-30.4	15.2
Professional	0.1	3.4
Technical/Paraprofessional*	-20.2	-12.1*
Other services*	-66.3	-57.6*
Trades/Construction/Transportation	-82.1	-12.0
Production*	-307.0	-51.8*

Labour reallocation and demand spillovers

• The total decline in the employment in import-competing sectors is partially offset by the increase in unaffected sectors

➤The labour reallocation effect more than offsets the negative demand spillovers effect

- Weak evidence of labour reallocation for **production** occupations
- Labour reallocation across localities could be at work (e.g. BC-AB), which is not captured here

thousand, Canadian manufacturing, 2001-2011				
	Male	Female		
Counterfactual change	-280.7	-133.2		
Actual change	-337.5	-169.3		
Change due to China	-56.8	-36.1		
% explained by China	16.8%	21.3%		

Table 5: Implied employment effect of rising Chinese import competition, in thousand, Canadian manufacturing, 2001-2011

Actual decline in the manufacturing employment for females was smallerfemales had a proportionally larger loss (21.3% vs. 16.8% for males)

Relatively high female employment shares in sectors with large increases in import penetration

Results by Gender

Table 6: 2001 Employment level (thousand), share in three-digit NAICS manufacturing sectors, annual % pt change in import penetration at three-digit NAICS industry level over 2001-2011, male and female, Canada

	Male share	Female share	Annual∆in import
	(%)	(%)	penetration (% pt)
Total manufacturing	71	29	1.1
311: Food Manufacturing	60	40	0.1
312: Beverage and Tobacco Product Manufacturing	75	25	0.0
313: Textile Mills	62	39	0.0
314: Textile Product Mills	50	50	1.8
315: Clothing Manufacturing	25	75	2.6
316: Leather and Allied Product Manufacturing	43	57	3.0
321: Wood Product Manufacturing Wood Product Manufacturing	86	14	0.4
322: Paper Manufacturing	83	17 :	0.2
323: Printing and Related Support Activities	63	37	0.2
324: Petroleum and Coal Product Manufacturing Petroleum and Coal Product Manufacturing	80	20	0.0
325: Chemical Manufacturing Chemical Manufacturing	64	36	0.2
326: Plastics and Rubber Products Manufacturing Plastics and Rubber Products Manufacturing	68	32	0.9
327: Non-Metallic Mineral Product Manufacturing	80	20	0.6
331: Primary Metal Manufacturing	89	11 :	0.7
332: Fabricated Metal Product Manufacturing	82	18	0.9
333: Machinery Manufacturing Machinery Manufacturing	83	17	0.9
334: Computer and Electronic Product Manufacturing	64	36 :	3.8
335: Electrical Equipment, Appliance and Component Manufacturing Electrical Equipment, Appliance and			
Component Manufacturing	67	33	1.9
336: Transportation Equipment Manufacturing	79	21	0.3
337: Furniture and Related Product Manufacturing Furniture and Related Product Manufacturing	75	25	2.1
339: Miscellaneous Manufacturing	59	41	2.1

Source: Kim (2018b)

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2. Non-technical Summary: Consumer Prices

Table 7: Domestically-produced and imported consumer goods, Canada, 2001-2017

	Panel A: Domestically-produced and imported consumer goods, in million of 2002 CAD				
	(1) Household expenditure on				
	domestically-produced consumer		(3) Imported consumer goods from		
	goods	(2) Total imported consumer goods	China		
2001	296,228	58,983	7,437		
2006	344,956	69,331	14,078		
2011	380,554	76,696	16,579		
2017	445,843	93,191	17,588		
		Panel B: Shares, %			
	Share of imports in total consumer	Share of imports from China in total	Share of imports from China in total		
	goods: $(2) / (1) + (2)$	imported consumer goods: $(3) / (2)$	consumer goods: $(3) / (1) + (2)$		
2001	16.6	12.6	2.1		
2006	16.7	20.3	3.4		
2011	16.8	21.6	3.6		
2017	17.3	18.9	3.3		

Source: Kim (2019a)

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2. Non-technical Summary: Consumer Prices



Chart 5: Chinese share in total imports by product category in CPI, Canada, %, 1991-2017

• The remaining CPI product categories are: alcoholic beverages and tobacco products, food, health and personal care, transportation, and shelter (mostly services)

Chinese shares remained below 5%, if not 0%, over the 1991-2017 period

2. Non-technical Summary: Consumer Prices

Chart 6: Share of imports from China in total imports by detailed product category in CPI, Canada, %, 1991-2017



Source: Kim (2019a)

Product-level Exposure to China and their Price Changes: Some examples

nese share (% pt) 3.87 3.32 3.18 2.88	ΔPrice (%) -14.98 -0.55 0.82
3.87 3.32 3.18 2.88	-14.98 -0.55
3.32 3.18 2.88	-0.55
3.18 2.88	0.92
2.88	-0.83
0.74	-8.62
2.74	-1.80
2.69	2.37
2.54	-1.71
2.37	-4.83
2.11	0.53
2.08	-0.77
nese share (% pt)	ΔPrice (%)
-0.29	3.24
-0.27	7.47
-0.18	1.30
-0.16	2.51
-0.05	5.68
-0.01	7.21
-0.01	1.09
-0.004	0.31
0.004	1.51
-0.004	0.51
	-0.004 -0.004 -0.002

Source: Kim (2019a)



- Consumer prices on electronics, furniture, clothing, and textile fell or did not increase as much
 - Technological progress (especially for electronics)
 - Expansion of "superstores" (e.g. Wal-Mart)
 - High-volume and low-margin sales

Imported manufactured goods from China

- Comparative advantage in manufacturing these goods
- Cheaper Chinese goods replace domestically-produced goods
- Domestic producers reduce mark-ups / improve productivity

Implied price effect by CPI product: some examples

	Trade-		Counter	Expenditure
Top ten product categories in Table 8	induced	Actual	factual	share
Digital computing equipment and devices	-4.82	-14.98	-10.16	1.90
Bedding and other household textiles	-4.13	-0.55	3.58	0.50
Upholstered furniture	-3.95	-0.83	3.12	1.20
Video equipment	-3.58	-8.62	-5.04	1.09
Non-electric kitchen utensils, tableware and cookware	-3.40	-1.80	1.60	0.36
Window coverings	-3.34	2.37	5.72	0.29
Clothing	-3.16	-1.71	1.46	9.09
Audio equipment	-2.95	-4.83	-1.89	0.52
Other personal care supplies and equipment	-2.62	0.53	3.15	0.57
Footwear	-2.58	-0.77	1.81	2.13

Table 9: Trade-induced annual price changes, %, Selected CPI products, 2001-2011, Canada

Implied gains for Canadians (holding other factors constant)

Tuble 10, Implied effects of efficies imports, cumulative over 2001 2011			
Panel A: Cumulative inflation on all consumer goods in CPI			
Actual cumulative inflation	17.60%		
Counterfactual cumulative inflation	20.01%		
Counterfactual - Actual	2.41% pt.		
Panel B: Implied gain from trade with China, in 2002 CAD			
Total gain	\$8.74 billion CAD		
# of manufacturing job loss due to China	113,500		
Gain per job loss	\$76,996		

Table 10: Implied effects of Chinese imports, Cumulative over 2001-2011

- The **average annual earning** for workers in manufacturing was **\$42,868 CAD** (in 2002 dollars) for 2001-2011
- The expected complete duration of unemployment in manufacturing was about 12.0 weeks for 2001-2011

3. Non-technical Summary: Innovation and Productivity



BERD in manufacturing

Chart 7: Manufacturing share in total BERD, Canada 1994-2013



Chart 8: R&D intensity, Canadian manufacturing, 1994-2013

Total factor productivity in manufacturing





Source: Kim (2019b)

R&D and Total Factor Productivity at the firm level

- We estimate the effect of rising Chinese import competition on R&D expenditure and TFP of manufacturing firms
 - R&D is a key input to innovation
 - Not all R&D becomes successful (*e.g.* patented). R&D is a good indicator for innovative effort of firms
 - TFP is a broad measure of productivity
 - Firm-level TFP is estimated using available data on output and input employed by firms

A Good Data Source

- Most studies focus on large firms (*e.g.* listed firms) or firms with patents (*i.e.* successful innovation)
- We use administrative firm-level data (T2 corporate tax income; T661 SR&ED expenditure claims; Statistics Canada LEAP database): T2-LEAP-SRED
 - All incorporated firms in manufacturing
 - > All incorporated firms that filed R&D expenditure with CRA
 - > A broad measure of R&D expenditure
 - But do not include R&D outsourced to non-residents

Results

- 1. Rising Chinese import competition led to declines in R&D expenditure and TFP growth *within* manufacturing firms
 - Declines were pronounced within firms that were initially smaller, less profitable, and less productive
 - Also experienced declines in profit margins while larger and betterperforming firms did not
 - shrinking room to finance R&D and other innovations
 - the Schumpeterian effect dominates for these firms
 - Rents after R&D lower than rents before R&D
- 2. But reallocated resources towards more productive surviving firms and induced less productive firms to exit.

Productivity Decomposition: Changes driven by China

Table 12: Change in TFP due to China, manufacturing, 2005-2010

	Contribution to the change in TFP level between 2005 and 2010
Within	Negative but small
Between	Positive & magnitude larger than Within
Exit	Positive but small
Total	Positive

- Reallocation of resources is important
- The within-effect is negative but potentially small as the effect was pronounced mostly in smaller firms which tend to be less productive in the initial period

V. Conclusion

- Trade with China has a multi-dimensional implication for the Canadian economy
 - > A broad assessment of the distributional effect of trade is key
 - Loss in one part may be compensated through gains in others (at least in theory)
- Be aware of other factors (*e.g.* technological progress)

Technological progress coincides with rising Chinese imports



Source: Fort, Pierce and Schott (2018)

A recent Wall Street Journal article (reported in Michaels (2017)):

"When Drew Greenblatt bought Marlin Steel Wire Products LLC, a small Baltimore maker of wire baskets for bagel shops, he knew nothing about robotics. That was 1998, and workers made products manually using 1950s equipment. ... Pushed near insolvency by Chinese competition in 2001, he started investing in automation. Since then, Marlin has spent \$5.5 million on modern equipment. Its revenue, staff and wages have surged and it now exports to China and Mexico."

Fort, Pierce and Schott (2018):

"Are changes in Marlin's employment and output driven by the availability of robots or increased Chinese competition? What about employment and output at other producers of steel wire products, who face increased competition from both China and from Marlin? These questions are even more difficult to answer if robots' availability itself is influenced by trade liberalization, for example, by robot manufacturers' ability to source intermediate inputs from China."

(1) Skill Type (2) Stats Can/HRSDC re-classification (3) 2-digit NOC (4) Skill Level 00 Senior management occupations Skill level A Management Management 01-05 Specialized middle management occupations Skill level A 06 Middle management occupations in retail and wholesale trade and customer services Skill level A 07-09 Middle management occupations in trades, transportation, production and utilities Skill level A 11 Professional occupations in business and finance Skill level A Professional Professional 21 Professional occupations in natural and applied sciences Skill level A 30 Professional occupations in nursing Skill level A 31 Professional occupations in health (except nursing) Skill level A 40 Professional occupations in education services Skill level A 41 Professional occupations in law and social, community and government services Skill level A 51 Professional occupations in art and culture Skill level A 22 Technical occupations related to natural and applied sciences Skill level B Technical and Technical and paraprofessional 32 Technical occupations in health Skill level B paraprofessional 42 Paraprofessional occupations in legal, social, community and education services Skill level B 43 Occupations in front-line public protection services Skill level B Skill level B 52 Technical occupations in art, culture, recreation and sport 12 Administrative and financial supervisors and administrative occupations Skill level B Other services Administration and administrative support 13 Finance, insurance and related business administrative occupations Skill level B Skill level C 14 Office support occupations 15 Distribution, tracking and scheduling co-ordination occupations 62 Retail sales supervisors and specialized sales occupations Skill level B Sales 64 Sales representatives and salespersons - wholesale and retail trade Skill level C Skill level D 66 Sales support occupations 63 Service supervisors and specialized service occupations Skill level B Personal and customer information services 65 Service representatives and other customer and personal services occupations Skill level C 67 Service support and other service occupations, n.e.c. Skill level D 34 Assisting occupations in support of health services Skill level C 44 Care providers and educational, legal and public protection support occupations Skill level C 72 Industrial, electrical and construction trades Skill level B Trades, construction, and Industrial, construction and equipment operation trades 73 Maintenance and equipment operation trades Skill level B transportation 74 Other installers, repairers and servicers and material handlers Skill level C Workers and labourers in transport and construction 75 Transport and heavy equipment operation and related maintenance occupations Skill level C 76 Trades helpers, construction labourers and related occupations Skill level D 82 Supervisors and technical occupations in natural resources, agricultural and related production Skill level B Production Natural resources, agriculture and related production 84 Workers in natural resources, agriculture and related production Skill level C occupations 86 Harvesting, landscaping and natural resources labourers Skill level D 92 Processing, manufacturing and utilities supervisors and central control operators Skill level B Occupations in manufacturing and utilities 94 Processing and manufacturing machine operators and related production workers Skill level C 95 Assemblers in manufacturing Skill level C 96 Labourers in processing, manufacturing and utilities Skill level D

Appendix Table: Occupation group classification, skill level and skill type